REGIONAL TOOLKIT

FOR HEATWAVE MANAGEMENT IN ASIAN CITIES:

A VISUAL GUIDE

PURPOSE OF THE DOCUMENT

Every city differs in definition of a heatwave due to local contexts and the population's ability to acclimatize to extreme temperatures. This Visual Guide is intended for use by local authorities and other stakeholders in large Asian cities who are involved in extreme temperature and heatwave mitigation. Keeping a focus on the Asian context, the Visual Guide builds on regional and international best practices to offer guidance and resources for the development of heatwave management strategies at the municipal level. This Visual Guide has a modular structure and guides the reader through the key steps and considerations needed to develop and implement heatwave management plans. It highlights simple tools and knowledge resources to help move from theory to action.

ACKNOWLEDGEMENT

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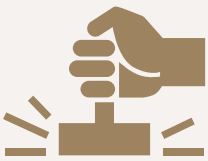
1 CULTIVATING INSTITUTIONAL SUPPORT

GENERATING CITY-LEVEL COMMITMENT

OBTAIN ENDORSEMENT AND COMMITMENT



by the city executive to participate in the heatwave management planning process.

ESTABLISH STEERING COMMITTEES

of municipal leaders and representatives from external agencies to oversee the planning process.

PRESENT ROBUST EVIDENCE

to increase the relevance of heatwaves to decision makers and the public.

ENHANCING INSTITUTIONAL CAPACITIES

ENHANCE LOCAL DISASTER RESPONCE CAPACITIES

STRENGTHEN INSTITUTIONS AND COMMUNITY ASSETS

UNDERSTAND EXTERNAL INFLUENCE FACTORS

POLICY INTEGRATION OF HEATWAVE MANAGEMENT

Explicit recognition and integration of heatwave management issues into existing policies and practices is part of a robust response to heatwaves.

Reflect on opportunities

and challenges for integration of heatwave management activities.

Integrate heat-health communications

by public agencies.

Embed generation of information

on impacts from extreme heat in research and development.

VICTORIA HEAT ACTION PLAN

2014

An intense heatwave hit the region. The Victoria Police, was unprepared to delegate roles and responsibilities.

2009

Vitoria police, was assigned the lead role which was not fully recognized by stake-holders.

Over the past
20 years
Heatwaves
have increased in frequency and intensity in the state of
VICTORIA
AUSTRALIA

2015

Shortcoming addressed in heat-health plan which clearly sets out the actions for new lead agency.

S-W-O-T ANALYSIS FRAMEWORK FOR KARACHI

S – Strengths

- Improved Emergency Responce.
- Collaboration of local stakeholders.
- Strong stakeholder appetite and interest.

W – Weaknesses

- Extreme heat not priority hazard.
- Insufficient institutional capacity and leadership.
- Inadequate public communication.
- Reactive institutional approach.

O – Opportunities

- Emergency plans and SOPs in place.
- Buy in for long term heat mitigation measures.
- Perception that resources are sufficients.

T – Threats

- Sensationalist media.
- Religious practices not harmonized with public health safety.

2 IDENTIFICATION OF GOALS AND STRATEGIES

URBAN AREAS AND EXTREME HEAT

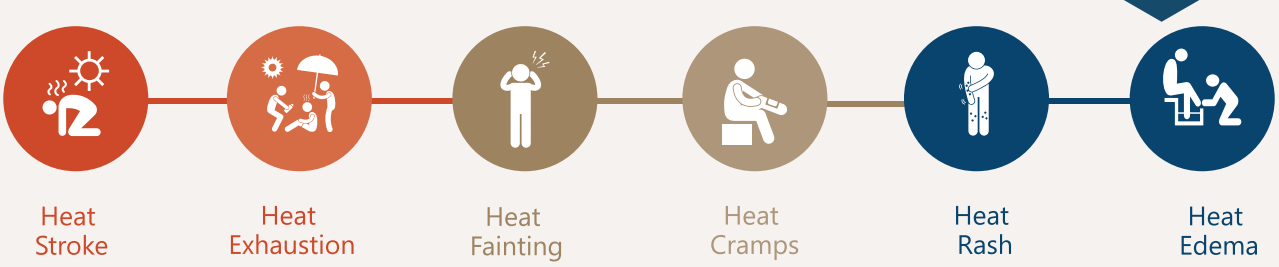
Heatwave intensity and frequency is expected to increase in future.

Urban areas are highly vulnerable to extreme heat impacts.

Urban heat island effectn is a major risk factor for cities.

FACTORS CAUSING URBAN HEAT ISLAND EFFECT

HEALTH EFFECTS AND VULNERABILITIES



ASIAN CITIES AND EXTREME HEAT: A COMPARISON

TEHRAN

- 17 — Heatwave reported Between 2001-2010.
- 37.8°C — At or above, reported temperature for 16 days in 2010.
- Temperature reached upto 40°C in 2009.

KARACHI

- Affected people in 2015 heatwave. 65,000
- People treated in hospitals. 40,000
- People died during heatwave. 1200
- 40°C-49°C — Temperature reported during heatwave.

AHMEDBAD

- National heatwave Threshold. 45°C
- Temperature reported during 2010 heatwave. 46.8°C
- 43.1% — More deaths were reported in 2010 as compared to 2009 and 2011.

SHANGHAI

- Temperature exceeding from 35°C for 09 consecutive days in august 1998.
- Temperature reached at 39.4°C on August 15th and 16th.
- 752 — Three times the daily average of deaths as compared to non-heat days average.

ASIA'S VULNERABILITY TO HEATWAVES

13 Asian Megacities with **10** Million Population

59 Heatwaves Reported Between 1953-2015

Causing More Than **15,876** Fatalities

ASIAN COUNTRIES HIGHLY VULNERABLE TO HEATWAVES

CHINA

INDIA

JAPAN

NEPAL

PAKISTAN

SOUTH KOREA

3 DEVELOPING HEATWAVE MANAGEMENT STRATEGY

IDENTIFYING AN ALERT TRIGGER OR THRESHOLD

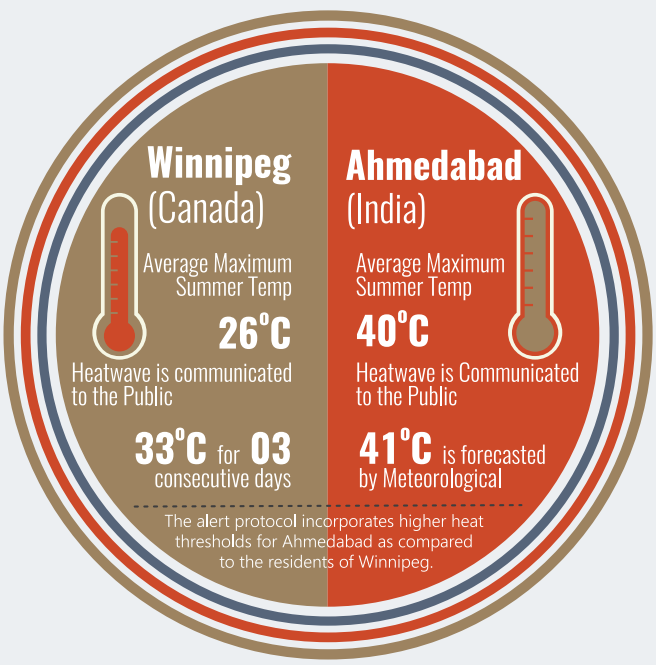
Thresholds are numerical values derived from one or more weather parameters.

When thresholds are exceeded, an alert is issued.

The benchmark for issuing an alert varies from place to place because local responses to extreme weather differ markedly.

The intensity and duration of the event reflects an increased risk of morbidity and mortality of a specific population.

THRESHOLD VARIATIONS ACROSS REGIONS



TYPES OF HEAT ALERT SYSTEMS

1

SINGLE OR FEW ALERT SYSTEM METHODS

based on a single temperature metric or a modified form of temperature.

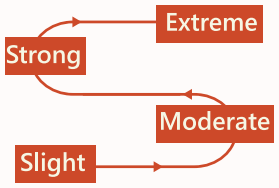
CITIES USING THIS METHOD:

- Melbourne
- Victoria
- Odisha

2

HEAT BUDGET METHOD

based on perceived temperature (PT), rather than focus on local climate conditions. Germany uses this model at the national level defines four levels of heat stress:



3

SYNOPTIC BASED SYSTEMS

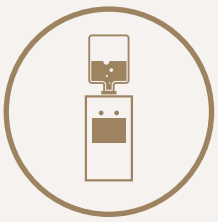
incorporate multiple variables (e.g., temperature, dew point, wind direction, wind speed, cloud cover and pressure) to classify air masses into a pre-defined category of ambient conditions.

The City of Toronto formerly used a synoptic approach to establish heat alerts.

FACTORS FOR ESCALATING HIGH ALERT LEVELS

Increase in mortality and morbidity

Worsened air quality



Limited availability of drinking water

Likelihood of an electrical emergency

CHARACTERIZATION OF ALERT PROTOCOL

Leading Authority

Identify responsible authority for issuing an alert.

Communication

Outline communication activities and information flows.

Deactivation Point

Specify deactivation point where weather conditions are normalized.

PRINCIPLES FOR EFFECTIVE HEAT RISK COMMUNICATION

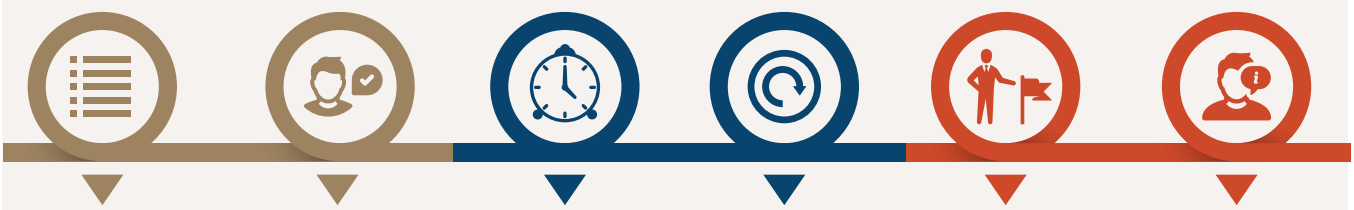
Trust: Communicate with public in ways that build, maintain or restore trust.

Announcing early warnings: Establishing trust begins with the first official notification.

Transparency: Transparent approaches for information gathering, risk-assessing and decision making.

Understanding the public: It is usually difficult to change pre-existing beliefs without addressing them explicitly.

EVALUATING THE ALERT PROTOCOL



Simplicity

The alert protocol should be as simple as possible, while still meeting objectives.

Acceptability

The willingness of individuals and organizations to participate in it.

Timeliness

Related to the different response activities.

Sensitivity

The number of times a warning is issued.

Specificity

The accuracy of the meteorological forecasts on which they depend.

Reach

Who is getting the information and what are their main takeaways?

4 DESIGNING THE EVALUATION STRATEGY

Evaluations help validate the effectiveness of heatwave management interventions and provide ***learnings*** to improve heat alert protocols.

TYPES OF EVALUATION

OUTCOME EVALUATION

Assess whether the plan made a difference. Focuses on mortality and morbidity as outcome measure.

PROCESS EVALUATION

Assess that how the plan is being implemented. Focuses on examining the process of an intervention.

ISSUES TO BE ASSESSED

- Health care utilization
- Health behavior
- Temperature-mortality
- Productivity and absenteeism
- Morbidity

- Awareness about plan
- Issuance of warnings
- stakeholders uptake of the plan
- Possible unintended consequences
- Barriers for implementation

METHODS

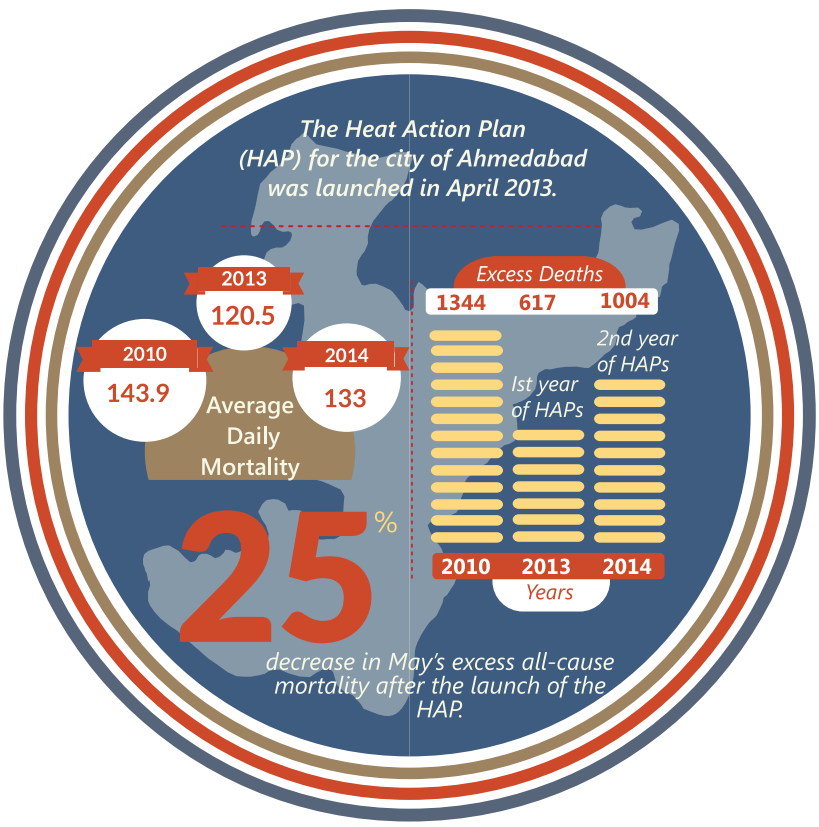
- Quantitative & qualitative
- Formal assessment of epidemiological data
- Quantitative & semi-qualitative
- Data collectection through multiple sources
- Contextual Analysis

LIMITATIONS

- Difficulties to identify and acquire required data.
- Challenges related to the attribution.
- Ethical issues for experimental studies.
- Need to identify key players in advance.
- Selection of small number of people.
- Cannot provide definitive answers.

FACTORS AFFECTING THE EVALUTION

AHMEDABAD HEAT MORTALITY EVALUATION



FACTORS AFFECTING HEAT MORTALITY COMPARISON ACROSS YEARS

5 IMPLEMENTING HEATWAVE MANAGEMENT STRATEGY

Successful implementation of heatwave management plans at the city level relies on :

Leadership from local governments.

Coordinated action of key stakeholders.

DEVELOPING STANDARD OPERATING PROCEDURES

SOPs are essential guidance for implementation partners to carry out preparedness and response measures.

Karachi Heatwave Management Plan

The city's first heatwave management plan incorporates strategies to empower implementation agencies to enable supply of required coordinated services.

Ahmedbad Heat Action Plan

Ahmedabad's HAP includes a series of seasonal checklists by implementation agencies.

- Pre-season.
- During the heat season.
- Post season.

DATA COLLECTION AND MONITORING

Collecting "real-time" data (less than 48 hours) and reporting unusual

- All-cause mortality
- Morbidity
- Demand on the healthcare systems
- Emergecny calls
- Heat line calls
- Emergency department visits

Challenges For Data Collection

- Systematic and centralized collection of data is limited in some cities and regions.
- Weather monitoring stations lack coverage to register spatial differences in heat conditions.
- The cities new to heatwave dont have standardized data collection templates among health practitioners and emergency responders.

Initiatives For Data Collection

PAKISTAN

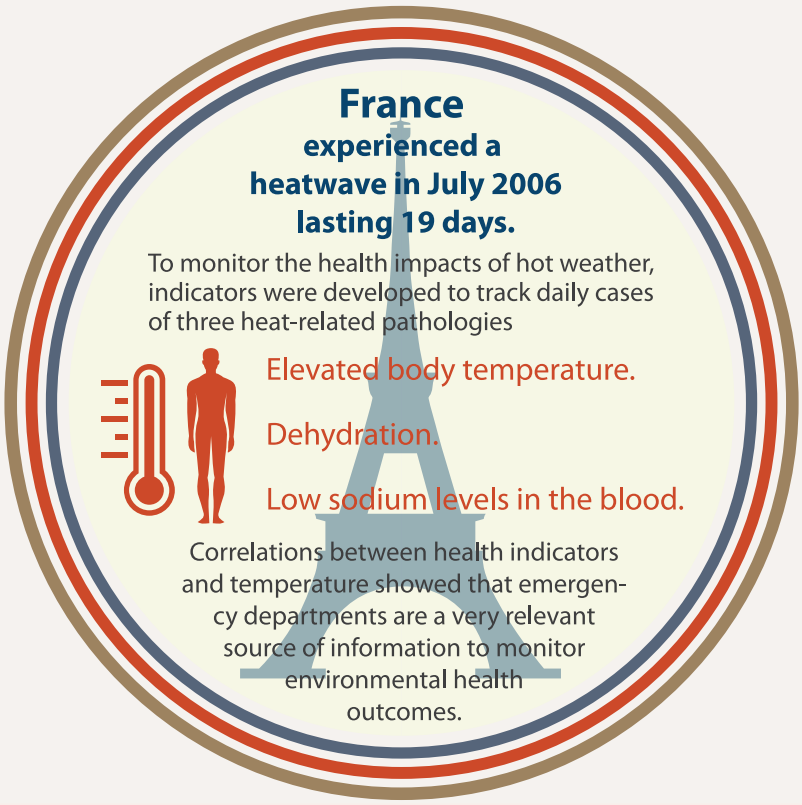
Karachi city heatwave management plan includes a commitment by the lead agency for *installation of at least one weather monitoring station per district to be able to register microclimates shaped by built infrastructure.*

INDIA

The think tank TARU is promoting a data collection approach for efficient heat action planning.

Would rely on crowd-sourced data collection to log temperature and humidity.

FRANCE HEATWAVE: A CASE STUDY



France
experienced a heatwave in July 2006 lasting 19 days.

To monitor the health impacts of hot weather, indicators were developed to track daily cases of three heat-related pathologies

- Elevated body temperature.
- Dehydration.
- Low sodium levels in the blood.

Correlations between health indicators and temperature showed that emergency departments are a very relevant source of information to monitor environmental health outcomes.

AHMEDABAD HAP AND INTERCONNECTED AGENCIES

- Ahmedabad Municipal Corporations
- Medical Colleges And Hospitals
- Public Health Managers
- Urban Health Centres
- Public Press Office
- Labor Department
- Emergency Services

ENABLERS FOR SUCCESSFUL IMPLEMENTATION

Agreement on Lead Agency
To coordinate activities of multiple agencies and direct responses during a heatwave emergency.

Accurate & Timely Alert Protocols
That define thresholds for action and orient communication of the risks.

A Communication Plan
That describes what is communicated, to whom and when.

Response Measure to Reduce Indoor Heat Exposure,
Such as advice on how to keep indoor temperatures low during heat episodes.

Protecting Vulnerables
Particular care for vulnerable population groups.

Preparedness of the Health and Social Care System
Including staff training and planning, and appropriate, accessible health care.

Long-term Urban Planning
To address building design and energy and transport policies that will ultimately reduce heat exposure.

Real-time M&E
Real-time monitoring and evaluation will highlight about the efficiency and effectiveness of the plan.

6 ENGAGING STAKEHOLDERS FOR HEATWAVE MANAGEMENT

Stakeholder role and engagement from the earliest planning development stagesto the final delivery is critical for the successful implementation of heatwave management plans.

STAKEHOLDER ENGAGEMENT GUIDANCE

Stakeholder roles, capacities, and contributions should be woven throughout planning and delivery.

STAKEHOLDER ENGAGEMNET PROCESS

1 List Stakeholders

Characteristics of stakeholders to be listed

- Address an existing need
- Contribute required network
- Contribute experience and expertise
- Liaise between the initiative and parent organization
- Cater to heat-vulnerable groups
- Present an opportunity to leverge resources

2 Analyze the List of Stakeholders

To identify, for each:

- Existing level of interest in heatwave management
- Expected level of influence
- Level of partnering ability

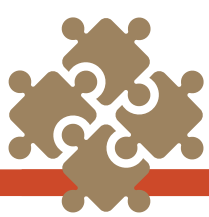
3 Develop the Engagement Plan

The plan identifies stakeholders that should be:

- Active partners
- Kept involved
- Consulted
- Regularly informed of progress.

4 Update the Engagement Plan

- Throughout the initiative ensure all relevant groups are engaged at the right time, using the right format.



IDENTIFYING VULNERABLE GROUPS

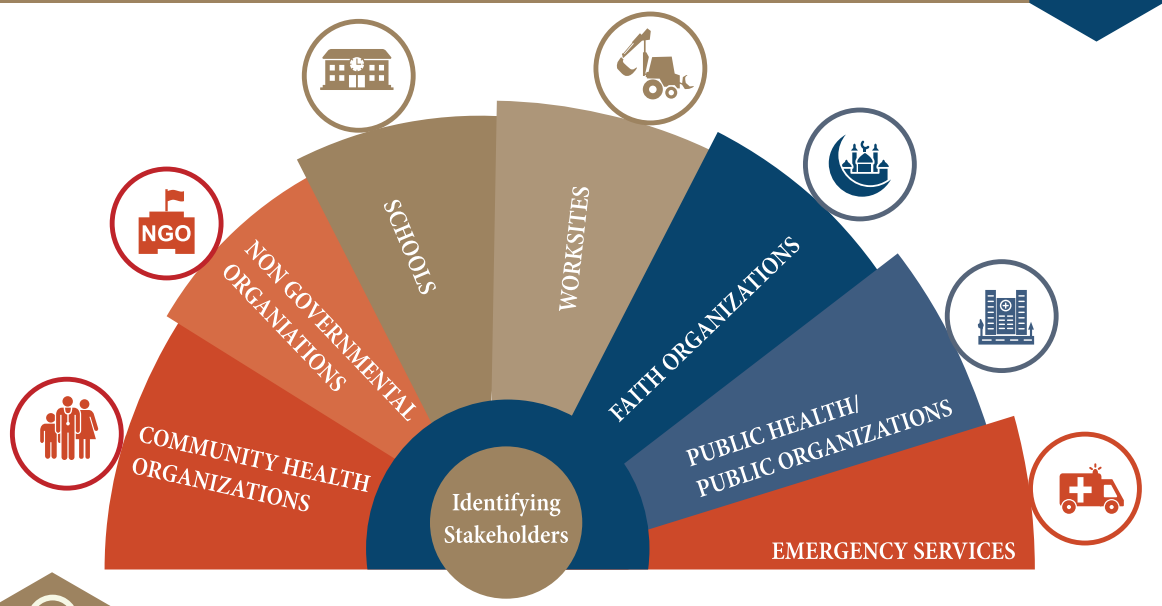
An important step in planning and engagement is to determine who the vulnerable groups are and where they are located. Stakeholder agencies can use several methods to collect data for heat vulnerability assessments.

Household surveys

Focus group discussions

Geographics information systems

IDENTIFYING STAKEHOLDERS



BENEFITS OF INVOLVING LOCAL STAKEHOLDERS

Local stakeholders are usually aware of the effects of the hot weather.

Vested interest in mitigating heat events & can be readily available for seasonal planning.

Tend to be adept at identifying relevant measures for their city and the region.

Identifying vulnerable local stakeholders can be helpful in identifying vulnerable groups.

FUNCTIONS OF HEAT-HEALTH COMMUNICATIONS

The communication should be easily accessible, credible and relevant.

- Alerting public about weather conditions.
- Developing public-health messages.
- Possible health impacts and protection measures
- Disseminating messages using different channels.

EXAMPLES OF HEAT COMMUNICATIONS

Social Media

Twitter

> Follow @NWS for heat advisories & excessive heat warnings so you can #BeatTheHeat this summer

> Listen to local weather forecasts to prepare for extreme heat #BeatTheHeat

> Extreme heat makes the body work extra hard to maintain normal temperature. Know the fact & prepare: www.ready.gov/heat(hhtp://www.ready/gov/heat)//HeatSafety

Print Media

REGIONAL SNAPSHOT ON

ENGLAND

England has developed a heatwave plan that local governments can adapt to their own strategies:

HEAT-HEALTH WATCH ALERT SYSTEM that operates during summer season with

Five alert levels – from 0-4

The plan contains extensive tables for actions that could be taken at various levels of implementation

The Commissioners of health and social care are to use media to communicate public health messages tailored to vulnerable groups upon a level-2 alert.

KARACHI HEATWAVE MANAGEMENT PLAN 2017

Karachi Commissioner Office
As the lead agency, is responsible for overseeing the plan's implementation and refinement over time.

The plan comprises three strategies to solidify the City's heat alert and response system:

1. ***Timely communication of the specific information Before, During and After extreme heat;***
2. ***Uninterrupted supply of the required level of services and support.***
3. ***Increasing knowledge of the heat-related outcomes.***

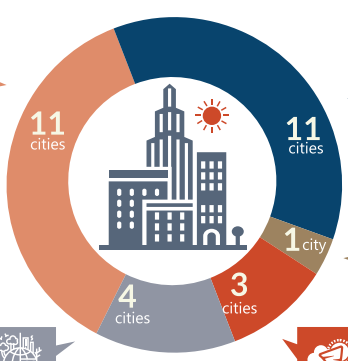
Partners

Climate & Development Knowledge Network

ESSA

lead

DIFFERENT HEATWAVE APPROACHES TAKEN BY 30 LARGE ASIAN CITIES



Not addressed/ unclear.

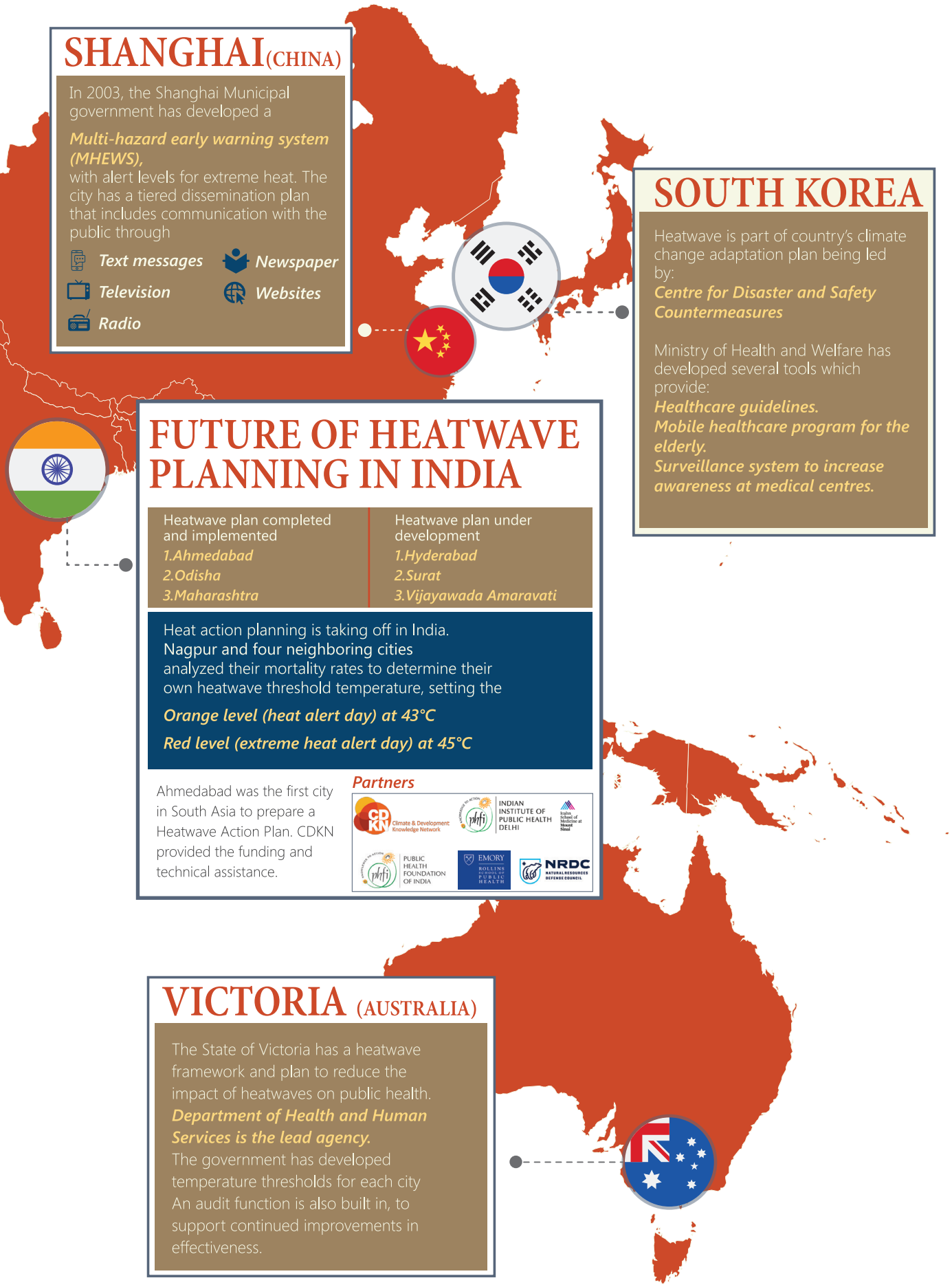
Research (epidemiology heat-health risk assessment, UHI).

Heatwave plan or heat alert.

Heat health integrated in climate change adaptation plan.

Heat health integrated in environmental and urban development policy and plans.

HEATWAVE MANAGEMENT



SHANGHAI (CHINA)

In 2003, the Shanghai Municipal government has developed a

Multi-hazard early warning system (MHEWS),

with alert levels for extreme heat. The city has a tiered dissemination plan that includes communication with the public through

- *Text messages*
- *Newspaper*
- *Television*
- *Websites*
- *Radio*

SOUTH KOREA

Heatwave is part of country's climate change adaptation plan being led by:

Centre for Disaster and Safety Countermeasures

Ministry of Health and Welfare has developed several tools which provide:

Healthcare guidelines.
Mobile healthcare program for the elderly.
Surveillance system to increase awareness at medical centres.

FUTURE OF HEATWAVE PLANNING IN INDIA

Heatwave plan completed and implemented	Heatwave plan under development
1.Ahmedabad	*1.Hyderabad*
2.Odisha	*2.Surat*
3.Maharashtra	*3.Vijayawada Amaravati*

Heat action planning is taking off in India. Nagpur and four neighboring cities analyzed their mortality rates to determine their own heatwave threshold temperature, setting the

Orange level (heat alert day) at 43°C

Red level (extreme heat alert day) at 45°C

Ahmedabad was the first city in South Asia to prepare a Heatwave Action Plan. CDKN provided the funding and technical assistance.

Partners

CDKN Climate & Development Knowledge Network
phfi INDIAN INSTITUTE OF PUBLIC HEALTH DELHI
phfi PUBLIC HEALTH FOUNDATION OF INDIA
EMORY ROLLINS SCHOOL OF PUBLIC HEALTH
NRDC NATURAL RESOURCES DEFENSE COUNCIL

VICTORIA (AUSTRALIA)

The State of Victoria has a heatwave framework and plan to reduce the impact of heatwaves on public health.

Department of Health and Human Services is the lead agency.

The government has developed temperature thresholds for each city An audit function is also built in, to support continued improvements in effectiveness.

ABOUT

National Disaster Management Authority (NDMA) is the lead agency at the Federal level to deal with the whole spectrum of Disaster Management activities. It is the executive arm of the National Disaster Management Commission (NDMC) which has been established under the Chairmanship of the Prime Minister as the apex policy making body in the field of Disaster Management.

The Climate and Development Knowledge Network supports decisionmakers in designing and delivering climate compatible development. We do this by combining research, advisory services and knowledge management in support of locally owned and managed policy processes.We work in partnership with decision-makers in the public, private and non-governmental sectors nationally, regionally and globally. We hold strongly to the ideals of human development and environmental. sustainability. It is managed by an alliance of organisations led by Pricewaterhouse-Coopers LLP (PwC), and including Fundación Futuro Latinoamericano, LEAD International, LEAD Pakistan, the Overseas Development Institute, and SouthSouthNorth.

Leadership for Environment and Development (LEAD) Pakistan, is a leading international think tank, inspiring sustainable development across diverse sectors, with a focus on environment, climate change and development issues, since 1995. Our programmes, comprise Climate Action Programme, Water Programme, Environmental Management, Special Initiatives, Leadership Development Programme, and Social Capital Development.

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