AARD
Adaptation Action for Resilient Development

SUSTAINEDGE

Heat Action Plan (HAP) Toolkit

From Heat Risk Assessment to City-Level Action

Disclaimer: The methodologies, templates, examples, and recommendations presented in this Toolkit are intended as practical guidance for developing city-level Heat Action Plans (HAPs). Users are encouraged to adapt all approaches, thresholds, datasets, and interventions to local climatic conditions, governance arrangements, institutional capacities, and available resources.

While every effort has been made to ensure the accuracy and relevance of the information contained herein, Sustainedge and Adaptation Action for Resilient Development (AARD) accept no responsibility or liability for decisions, actions, or outcomes resulting from the application of this Toolkit without appropriate local validation, technical review, and contextual assessment.

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It is hoped that this Toolkit will serve as a practical resource for Urban Local Government Institutions (ULGIs) (e.g. municipalities, city corporations), planners, disaster management practitioners, health agencies, and community stakeholders in developing inclusive, evidence-based, and locally responsive Heat Action Plans for resilient urban futures.

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Abbreviations and Acronyms

AC	Adaptive Capacity
BCCSAP	Bangladesh Climate Change Strategy and Action Plan
BBS	Bangladesh Bureau of Statistics
CSO	Civil Society Organisation
DGHS	Directorate General of Health Services
DMC	Disaster Management Committee
DRR	Disaster Risk Reduction
EPA	United States Environmental Protection Agency
ESA	European Space Agency
FEMA	Federal Emergency Management Agency
FGD	Focus Group Discussion
GDP	Gross Domestic Product
GESI	Gender and Social Inclusion
GHHIN	Global Heat Health Information Network
GHSL	Global Human Settlement Layer
GIS	Geographic Information System
GoB	Government of Bangladesh
HAP	Heat Action Plan
HHEWS	Heat Health Early Warning System
HI	Heat Index
IPCC	Intergovernmental Panel on Climate Change
KII	Key Informant Interview
LST	Land Surface Temperature
LULC	Land Use and Land Cover
M&E	Monitoring and Evaluation
MOU	Memorandum of Understanding
NASA	National Aeronautics and Space Administration
NDBI	Normalised Difference Built-up Index
NDVI	Normalised Difference Vegetation Index
NGO	Non-Governmental Organisation
NOAA	National Oceanic and Atmospheric Administration
RCC	Rajshahi City Corporation
SOD	Standing Orders on Disaster (Government of Bangladesh)
UHI	Urban Heat Island
ULGI	Urban Local Government Institution
UNDRR	United Nations Office for Disaster Risk Reduction
USGS	United States Geological Survey
VIIRS	Visible Infrared Imaging Radiometer Suite
WBGT	Wet-Bulb Globe Temperature
WHO	World Health Organization
WMO	World Meteorological Organization

Glossary of Key Terms

Term	Definition
Adaptive Capacity	The ability of people, communities, institutions, and systems to cope with, adjust to, and recover from heat stress through access to services, infrastructure, information, and resources. (IPCC 2022)
Alert Level	A predefined category used in a HAP to indicate the severity of heat conditions and trigger specific preparedness and response actions (e.g. Safe, Caution, Danger). (WHO 2021)
Climate Change	Long-term changes in temperature and weather patterns increase the frequency, duration, and intensity of extreme heat events. (IPCC 2022)
Cooling Centre	A designated public or community facility that provides a cool, shaded, and safe space for people during extreme heat events. (WHO 2021)
Disaster Risk Reduction (DRR)	Policies and practices aimed at reducing disaster risks, including heatwaves, through preparedness, prevention, and resilience-building measures. (UNDRR 2015)
Early Warning System (EWS)	A system that monitors heat conditions, forecasts extreme heat, issues alerts, and enables timely action to reduce health and social impacts. (WHO 2020)
Exposure	The presence of people, infrastructure, services, or activities in areas that experience high temperatures or heatwaves. (FEMA 2013)
Heat Action Plan (HAP)	A coordinated framework of strategies, actions, roles, and procedures designed to reduce heat-related illness, mortality, and disruption at the city level. (GHHIN 2022)
Heat Alert Threshold	A locally defined temperature or heat index value at which a specific heat alert level is activated and response actions are triggered. (WHO 2021)
Heat Index (HI)	A measure combining air temperature and relative humidity to represent how hot it feels to the human body. (NOAA 2023)
Heat Hotspot	A specific location or neighbourhood that experiences higher temperatures and/or higher heat vulnerability compared to surrounding areas. [Global Heat Health Information Network (2022)]
Heat Risk	The potential for harm from heat exposure results from the interaction of exposure, sensitivity, and adaptive capacity. (FEMA 2013) (WHO 2021)
Heat Threshold	A temperature or heat index level above which adverse health and social impacts significantly increase in a specific city or context. (WHO 2021)
Heatwave	A prolonged period of abnormally high temperatures, often combined with high humidity, that exceeds normal climatic conditions for a given location. (WMO 2020)
Institutional Capacity	The ability of organisations and authorities to plan, coordinate, implement, and monitor heat risk reduction actions effectively. (UNDRR 2015)
Informal Settlement	A residential area with unplanned housing, limited services, and higher vulnerability to heat stress. (UN-Habitat 2023)
Monitoring and Evaluation (M&E)	The process of tracking implementation progress and assessing the effectiveness of HAP actions over time. (FEMA, 2013)
Sensitivity	The degree to which people or systems are affected by heat exposure due to age, health, occupation, housing, or social conditions. (IPCC 2022)
Standing Orders on Disaster (SOD)	The Government of Bangladesh framework defines disaster management roles and responsibilities at the national and local levels. (GoB 2019)

Term	Definition
Urban Heat Island (UHI) Effect	The phenomenon where urban areas experience higher temperatures than surrounding rural areas due to dense built surfaces and limited vegetation. (USEPA 2022)
Vulnerability	The likelihood of being harmed by heat exposure is influenced by sensitivity and limited adaptive capacity. (IPCC 2022)
Ward-wise Analysis	An assessment approach that evaluates heat risk and vulnerability at the ward or neighbourhood level. (GHHIN 2022)
Wet-Bulb Temperature	A heat stress indicator that accounts for temperature and humidity, representing the body's ability to cool itself through sweating. (NOAA 2023)
Heat Risk Formula	Heat Risk = (Exposure × Sensitivity) ÷ Adaptive Capacity, aligned with FEMA's probability × consequence model; used to prioritise areas and actions in the HAP. (FEMA 2013)
Apparent Temperature	The perceived air temperature felt by the human body accounts for humidity and wind speed. Equivalent to the Heat Index (HI) and used in threshold-based alert systems. (NOAA 2023)
Built-up Index (NDBI)	A remote sensing index calculated from shortwave infrared and near-infrared bands to quantify the density of built-up surfaces in an urban area. Higher NDBI values indicate greater impervious cover and higher Urban Heat Island (UHI) intensity. (USGS)
Climate Adaptation	Adjustments in human systems, cities, and institutions in response to actual or anticipated climate change and its effects, including the increased frequency and intensity of heatwaves. (IPCC 2022)
Climate Resilience	The capacity of a city, community, or institution to anticipate, absorb, accommodate, and recover from the effects of climate-related hazards, including extreme heat, without long-term damage to essential functions and services. (UNDRR 2015)
Composite Vulnerability Index	A combined score integrating exposure, sensitivity, and adaptive capacity across multiple dimensions to rank wards or communities by their overall vulnerability to heat stress. (FEMA 2013) (IPCC 2022)
Cool Roof	A roofing surface treated or constructed to reflect more sunlight and absorb less heat than a standard roof, reducing indoor temperatures and Urban Heat Island intensity. (USEPA 2022)
Evaporative Cooling	A natural or engineered process by which the evaporation of water from surfaces (vegetation, water bodies, wetted pavements) reduces ambient air temperature and perceived heat stress. (UN-Habitat 2023)
Focus Group Discussion (FGD)	A qualitative research method involving structured discussion among a small group of participants sharing similar characteristics, used in the HAP process to gather community-level knowledge about heat risks and impacts. (GHHIN 2022)
Gender and Social Inclusion (GESI)	An analytical framework that ensures heat risk assessments and interventions account for differential vulnerabilities based on gender, age, income, disability, and social status. (IPCC 2022) (WHO 2021)
Green Infrastructure	Natural or semi-natural systems, including urban parks, street trees, green roofs, and wetlands, that provide cooling, water management, and biodiversity benefits within cities. (UN-Habitat 2023)
Heat Health Early Warning System (HHEWS)	An integrated system that uses meteorological forecasts to detect approaching heat events, triggers alerts across relevant agencies and the public, and activates predefined response protocols. (WMO 2020) (WHO 2021)

Term	Definition
Heat Illness	A spectrum of heat-related medical conditions caused by overheating, including heat cramps, heat exhaustion, and heat stroke, the most severe form of which can be fatal if untreated. (WHO 2021)
Heat Mortality	Deaths attributable to excessive heat exposure, either directly (heat stroke) or indirectly (exacerbation of cardiovascular, respiratory, or renal conditions). Heat mortality is frequently underreported due to attribution challenges. (IPCC 2022)
Heat Season	The period of the year during which temperatures consistently exceed locally defined heat thresholds, triggering HAP preparedness and response activities. (WHO 2021)
Heat Stress	The overall physiological burden placed on the human body by heat exposure is determined by air temperature, humidity, solar radiation, wind speed, and physical activity level. (NOAA 2023)
Impact Indicator	A metric used in the HAP M&E framework to measure long-term changes in heat risk outcomes, such as reductions in ward-level heat risk scores or changes in city-wide tree canopy cover. (FEMA 2013)
Key Informant Interview (KII)	A qualitative data collection technique involving in-Departmenth interviews with selected individuals possessing specialist knowledge of the topic under investigation, used in Step 5 for stakeholder consultation. (GHHIN 2022)
Land Surface Temperature (LST)	The radiative temperature of the land surface as measured by satellite thermal sensors (e.g. Landsat Band 10). LST is a primary proxy indicator for Urban Heat Island intensity and ward-level heat exposure in HAP assessments. (USGS)
Land Use and Land Cover (LULC)	A classification of the physical surface of the earth (forests, cropland, built-up areas, water bodies) derived from satellite imagery. LULC analysis identifies heat-exposed zones in urban heat risk assessments. (USGS)
Risk Reduction Strategy	A planned set of actions designed to lower the probability or consequences of heat-related harm, encompassing emergency response, urban design, public health, and policy interventions. (WHO 2021)
Sendai Framework	The United Nations' global framework for disaster risk reduction (2015–2030) requires that heat be mainstreamed into national and local disaster risk governance strategies. (UNDRR 2015)
Urban Green-Blue Infrastructure	A network of green spaces (parks, trees, green roofs) and blue features (rivers, ponds, canals) that together provide cooling, flood management, and health benefits in cities. (UN-Habitat 2023)
Urban Heat Island (UHI) Intensity	The quantitative difference in surface or air temperature between urban and surrounding rural areas is driven by impervious surfaces, reduced vegetation, and waste-heat emissions. (USEPA 2022)
Vulnerable Group	A population subgroup with elevated susceptibility to heat-related harm due to biological, socio-economic, or situational factors, including the elderly, children under five, pregnant women, outdoor workers, people with chronic illness, and informal settlement residents. (WHO 2021) (IPCC 2022)
Wet-Bulb Globe Temperature (WBGT)	A composite heat stress indicator used for outdoor environments that accounts for temperature, humidity, wind speed, and solar radiation. WBGT is the internationally recommended standard for assessing occupational heat stress. (NOAA 2023) (WHO 2021)

1. Introduction

Bangladesh stands at a critical juncture in its climate adaptation journey. Extreme heat events are no longer exceptional occurrences; they are now a defining and escalating feature of the country's climate reality. According to the World Bank (2024), Bangladesh's heat index has increased by 4.5°C between 1980 and 2023, while the number of extreme heat days has doubled over the same period. Productivity losses linked to heat-related health impacts are estimated at 0.56 to 0.84 per cent of GDP annually, with projections suggesting losses could exceed 4.9 per cent of GDP by 2030 if current trends continue without targeted heat action.

The human impacts are equally severe. Heat exposure significantly increases the risk of heat exhaustion, diarrhoea, respiratory illness, and mental health stress, particularly on days exceeding 35°C. These impacts are disproportionately borne by outdoor workers, elderly populations, children, pregnant women, and residents of informal urban settlements with limited access to cooling, water, and health services.

Climate projections further highlight the urgency. The World Bank Climate Risk Country Profile for Bangladesh (2024) indicates that, under mid-century scenarios, the number of days exceeding a Heat Index of 35°C will increase from roughly two months per year to near-year-round exposure in several regions. In addition, tropical nights (minimum temperatures above 26°C) are expected to increase by approximately 55 days annually, removing critical night-time recovery periods and intensifying cumulative heat stress. Under SSP3-7.0 scenarios, temperature increases are expected across all divisions, with northwestern regions such as Rajshahi projected to experience the most severe heat intensity.

Against this backdrop, this toolkit has been developed as a structured and practical response to the rising risk of urban heat. It provides Urban Local Government Institutions, Disaster Management Committees, health departments, and urban practitioners with an evidence-based and replicable framework for developing city-level Heat Action Plans.

The Toolkit is aligned with globally recognised standards, including the World Health Organization's (WHO) Heat–Health Action Plan Guidelines, the Federal Emergency Management Agency (FEMA) Hazard Mitigation Planning Framework, the United Nations Office for Disaster Risk Reduction (UNDRR), the World Meteorological Organization (WMO), and the Global Heat Health Information Network (GHHIN).

Importantly, the toolkit is designed for real-world applications. It does not require perfect datasets or ideal institutional conditions. Instead, it supports cities in using available information, progressively strengthening systems, and leveraging existing institutional structures and open-access tools to initiate action immediately.

The Toolkit is structured as a five-year strategic framework. It is designed for full review every five years, with annual post-heat-season assessments to ensure continuous learning, improvement, and adaptation to emerging climate risks.

2. What is a Heat Action Plan (HAP)?

A Heat Action Plan (HAP) is a strategic, evidence-based, and action-oriented framework designed to protect urban populations from the escalating health and socio-economic risks of extreme heat.

According to the WHO, a well-designed HAP reduces heat-related illness and deaths, protects vulnerable populations, strengthens institutional preparedness, and integrates short-term emergency measures with long-term urban resilience strategies.

- Reduce heat-related illness and deaths
- Protect vulnerable populations from disproportionate impacts
- Strengthen institutional preparedness and coordinated response
- Integrate short-term emergency measures with long-term urban resilience strategies

3. Core Concept of the Heat Action Plan

The fundamental operating philosophy of a Heat Action Plan is encapsulated in four sequential actions: Anticipate. Prepare. Respond. Adapt. This proactive cycle, grounded in GHHIN standards, ensures cities are prepared for both current and future heat risks.

The GHHIN Assessment of Heat Action Plans identifies this four-phase framework as the gold standard for city-level heat governance.

1. Anticipates risk through scientific assessment of heat hazards, exposure, and vulnerability
2. Prepares institutions and communities using threshold-based triggers and clearly defined roles
3. Responds effectively during heat events through coordinated, multi-sectoral actions
4. Adapts over time by integrating lessons learned into urban planning and governance frameworks

The HAP is designed as a five-year strategic framework, subject to review and update at five-year intervals to incorporate new climate data, lessons learned, and evolving urban conditions. Cities should formally schedule a full HAP revision cycle every five years, with annual post-heat-season reviews in the intervening years.

4. Heat Threshold-Based Action Philosophy

A defining feature of the HAP is its use of scientifically defined heat thresholds and heat index-based triggers. Threshold-based approaches are essential for timely, accountable action.

- Early warnings are issued to the public and relevant agencies
- Health systems are placed on alert, and preparedness measures are activated
- City agencies implement predefined actions according to their assigned roles
- Communities receive targeted advisories appropriate to their risk level

5. People-Centred and Equity-Focused Approach

The Sixth Assessment Report of the Intergovernmental Panel on Climate Change confirms that heat does not affect all people equally. Age, gender, occupation, income, and housing conditions all determine who bears the greatest burden.

- Vulnerable population groups: the elderly, young children, pregnant women, and those with chronic illness

- High-risk neighbourhoods and hotspots, particularly informal settlements with limited infrastructure
- Gender, age, occupation, and socio-economic dimensions ensuring interventions reach those most affected

6. Institutional Integration and Governance

The HAP is designed to function within existing governance and disaster management systems. The FEMA's Local Hazard Mitigation Planning framework emphasises that plans embedded within existing institutional structures achieve significantly higher implementation rates.

- National and local Heat Health Action Plans and Standing Orders on Disaster (SOD).
- Disaster Management Committees (DMCs) at city and ward levels.
- Health, urban planning, and environmental management institutions.

7. Linkage with Urban Planning and Climate Resilience

Beyond emergency response, the HAP promotes structural risk reduction through urban planning and policy reform. UN-Habitat documents that cities integrating heat resilience into spatial planning achieve measurable reductions in Urban Heat Island (UHI) intensity over five-year cycles.

- Climate-responsive urban design that reduces the UHI effect.
- Green and blue infrastructure parks, street trees, and water bodies provide natural cooling.
- Heat-resilient housing and public spaces that protect residents from extreme temperatures.
- Policy and regulatory reforms that embed heat resilience into development planning.

8. Purpose of the Toolkit

This toolkit operationalises the HAP concept, aligned with WHO guidelines, the FEMA risk framework, UNDRR and WMO good practices, and GHHIN international standards, by providing structured, practical, and replicable guidance for cities to develop effective HAP.

9. Intended Users

This toolkit is designed for Urban Local Government Institutions (ULGIs), disaster management agencies, health departments, urban planners, architects, engineers, local non-governmental organisations, civil society organisations, and researchers and practitioners engaged in heat risk governance.

10. Overall Approach

The toolkit follows a seven-step, exercise-based approach. Each step builds logically on the previous one. Users are strongly encouraged to complete steps sequentially.

11. Step-wise Application Process

Step	Title	Key Activities	Key References
1	Preparation and Team Formation	• Form the core HAP working group • Designate a focal person • Compile baseline data • Identify data gaps	WHO (2021); FEMA (2013)
2	Heat Risk Assessment	• Define heat thresholds • Profile hazards; assess exposure, sensitivity, and adaptive capacity • Calculate risk scores using the FEMA-aligned approach	FEMA (2013); NOAA (2023)
3	Heat Vulnerability Assessment	• Identify vulnerable groups and hotspots • Develop spatial vulnerability maps • Consolidate city-wide profiles	IPCC (2022); WHO (2021)
4	Institutional and Capacity Gap Assessment	• Review policies • Map institutional roles • Assess technical capacity • Identify financial gaps	FEMA (2013); UNDRR (2015)
5	Stakeholder Consultation and Validation	• Identify and engage stakeholders • Conduct key informant interviews, focus group discussions, and workshops • Validate and document findings	GHHIN (2022)
6	Heat Risk Reduction Strategies	• Identify, categorise, and prioritise interventions • Assign lead agencies and timelines • Obtain formal approval	Heat Action Platform (2023); WHO (2021)
7	Implementation, Monitoring, and Review	• Operationalise the HAP • Establish monitoring and evaluation indicators • Conduct periodic reviews and updates	FEMA (2013); WHO (2021)

12. Expected Outputs

The implementation of this toolkit will support cities in developing a structured, evidence-based, and operational HAP tailored to local heat risks and institutional capacities. The key outputs expected from the process include:

- A city-specific HAP
- Clearly defined heat thresholds and alert protocols
- Ward-wise heat risk and vulnerability hotspot maps
- A prioritised, costed, and implementable action list
- A Monitoring and Evaluation framework

13. Flexible Use Options

- Option 1: Rapid HAP Development: Complete all steps through focused workshops over 2 to 4 weeks
- Option 2: Phased Approach: Complete steps incrementally over several months, aligned with planning and budget cycles
- Option 3: Update Existing Plans: Use selected steps to revise or strengthen an existing HAP

14. Step 1: Preparation and Team Formation (Establishing institutional readiness for HAP development)

14.1. Objective

To establish a strong institutional foundation and ensure technical and organisational readiness for initiating the HAP development process.

14.2. Purpose

This preparatory step ensures the HAP is developed through a coordinated, informed, and accountable process. By forming a dedicated working group, assigning clear leadership, and compiling essential baseline data at the outset, cities can reduce institutional fragmentation and improve data consistency. Identifying stakeholders at an early stage and aligning them in the process is one of the most important factors in ensuring successful plan implementation.

14.3. Activities

Activity 1.1: Formation of Core HAP Working Group

Heat risk management is inherently cross-sectoral. A formally constituted, multidisciplinary working group should be the first institutional step in any HAP development process.

Key Tasks

- Identify and nominate representatives from health, disaster management, urban planning, engineering, environment, water, and social services departments
- Define clear roles and responsibilities for each member, covering data provision, technical inputs, policy oversight, and ward-level coordination
- Establish regular coordination mechanisms, including scheduled meetings, reporting lines, and documentation practices

Outputs

- Core HAP Working Group formally established with documented terms of reference
- Roles and responsibilities of all working group members are documented and agreed upon

Activity 1.2: Designation of HAP Focal Person

A clearly designated focal point is essential to ensure continuity, timely communication, and accountability throughout the toolkit process. The absence of a designated focal person is a common cause of stalled HAP implementation.

Key Tasks

- Appoint a focal person with appropriate technical understanding and institutional authority
- Assign responsibilities, including cross-departmental coordination, stakeholder liaison, and progress tracking across all HAP steps
- Ensure formal recognition of the focal person's role within municipal administration

Outputs

- HAP Focal Person officially designated with a formal mandate
- Clear coordination and communication mechanisms established and communicated to all members

Activity 1.3: Compilation of Baseline Data and Resources

Early data compilation reduces delays during heat risk and vulnerability assessments. Datasets from the United States Geological Survey, the European Space Agency, and the National Aeronautics and Space Administration for land surface temperature, vegetation indices, and land cover are freely available and provide a strong starting point.

Key Tasks

- Collect and organise historical temperature and humidity records, heatwave data, ward-level maps, and population and demographic data
- Identify data sources, custodians, formats, and temporal coverage for all baseline datasets
- Establish a shared data repository accessible to all HAP Working Group members

Outputs

- Compiled baseline climate, spatial, and demographic datasets
- Preliminary data inventory for HAP development (see Templates below)

Activity 1.4: Identification of Data Gaps

Recognising data gaps early allows cities to plan alternative analytical approaches rather than delaying subsequent steps.

Key Tasks

- Review compiled datasets to identify missing variables, limited temporal or spatial coverage, and data quality or consistency issues
- Document technical and institutional capacity gaps related to data analysis, GIS, or climate modelling
- Note gaps addressable through stakeholder consultations, secondary data sources, or simplified qualitative approaches in later steps

Outputs

- Data gap and capacity needs summary note
- Inputs for methodological choices in Steps 2 and 3

14.4. Step 1: Guiding Templates

Table 1: HAP Working Group Composition and Roles (Example)

Department/ Institution	Representative	Role in HAP	Primary Responsibilities	Coordination Linkages
City Corporation/ Municipality	Chief Executive	Overall leadership	Approve the HAP; ensure coordination; integrate with policy	Mayor's Office, Standing Committees
Health Department	Medical Officer/ Public Health Specialist	Health risk and response	Provide heat morbidity and mortality data; define heat thresholds; coordinate preparedness	Hospitals, clinics, the Directorate General of Health Services, and non-governmental organisations
Disaster Management Committee	Member Secretary	Emergency preparedness	Align the HAP with SOD; coordinate emergency actions during heat alerts	Disaster Management Committee, Bangladesh Fire Service and Civil Defence
Urban Planning Department	Urban Planner/ Engineer	Built environment planning	Provide land-use and ward maps; identify UHI hotspots; integrate heat resilience into plans	Engineering Department, Geographic Information System Unit
Engineering/ Public Works Department	Executive Engineer	Infrastructure continuity	Assess heat impacts on infrastructure; support cooling centres and water points	Utilities, Transport Department
Environment/ Climate Unit	Environment Officer	Climate data and inputs	Support climate data analysis; advise on long-term adaptation strategies	Meteorological Department, research institutions
Water Supply and Sanitation Department	Utility Officer	Water access	Ensure drinking water availability; identify vulnerable service areas	Engineering Department, community groups
Social Services/ Welfare Department	Social Welfare Officer	Vulnerable group protection	Identify at-risk populations; coordinate targeted outreach	Non-governmental organisations, community leaders
Information/ Media Cell	Communication Officer	Risk communication	Disseminate heat advisories; support behaviour-change messaging	Media organisations, non-governmental organisations
Non-governmental Organisations/ Civil Society Organisations/ Community Representatives	Nominated Representative	Community inputs and validation	Provide local knowledge; support awareness and outreach	Ward Committees, volunteers

Table 2: Baseline Data Inventory Checklist (Example)

Category	Dataset	Spatial Scale	Time Period	Source/ Agency	Format	Availability	Quality	Notes/ Gaps
Climate	Daily max temperature	City/ Ward	1995 – 2025	Meteorological Department	Excel/ CSV	Available	High	30-year continuous series
Climate	Relative humidity	City/ Ward	1995 – 2025	Meteorological Department	Excel/ CSV	Available	High	–
Climate	Heatwave records	City	2015 – 2025	Meteorological Department	PDF/ Excel	Partial	Medium	Event definitions vary
Health	Heat illness cases	City/ Ward	2015 – 2025	Health Department/ hospitals	Excel	Partial	Medium	Underreporting possible
Health	Heat-related mortality	City	2015 – 2025	Health Department/ hospitals	Excel	Limited	Low	Attribution challenges
Demographics	Population by age group	Ward	Latest census	National Census/ City Corporation	Excel	Available	High	Needs projection
Socio-Economic	Informal settlements	Ward	Latest	City Corporation/ non-governmental organisations	GIS/ PDF	Partial	Medium	Mapping incomplete
Urban Form	Land use/land cover	City/ Ward	Latest	City Planning Department	GIS	Available	High	–
Urban Form	Built-up density	Ward	Latest	City Planning Department	GIS	Available	High	–
Environment	Green spaces/tree cover	City/ Ward	Latest	City Planning Department	GIS	Partial	Medium	Tree canopy not quantified
Infrastructure	Health facilities	City/ Ward	Latest	City Planning/ Health Department	GIS/ Excel	Available	High	–
Infrastructure	Water supply coverage	Ward	Latest	Water Supply Department	Excel/ GIS	Partial	Medium	Intermittent supply
Disaster Management	Emergency shelters	City/ Ward	Latest	Disaster Management Committee/ Disaster Management Department	Excel	Available	Medium	Cooling function unclear
Communication	Early warning systems	City	Current	Disaster Management Committee/ Meteorological Department	Narrative	Partial	Medium	Heat-specific alerts limited

Table 3: Remote Sensing Data Inventory (Example)

Index	Satellit/ Sensor	Resolution	Temporal Coverage	Source	Use in HAP	Availability	Notes
Normalised Difference Vegetation Index (NDVI)	Landsat 8/9 OLI	30 m	2013 – present	United States Geological Survey	Green cover; cooling potential	Available	Seasonal analysis needed
NDVI	Sentinel-2 MSI	10 m	2015 – present	European Space Agency	Ward-level vegetation mapping	Available	Cloud filtering needed

Index	Satellit/ Sensor	Resolution	Temporal Coverage	Source	Use in HAP	Availability	Notes
NDBI	Landsat 8/ 9 OLI	30 m	2013 – present	United States Geological Survey	Built-up density; heat exposure proxy	Available	Combine with NDVI
LST	Landsat 8/ 9 TIRS	100 m – 30 m	2013 – present	United States Geological Survey	Heat hotspot identification	Available	Daytime imagery only
LULC	Landsa/ Sentinel	10 – 30 m	Multi-year	United States Geological Survey/ European Space Agency	Exposure analysis and planning	Available	Classification required
NDWI	Landsat 8/ 9	30 m	2013 – present	United States Geological Survey	Water bodies; evaporative cooling	Available	Seasonal variability
Surface Albedo	MODIS	500 m	2000 – present	National Aeronautics and Space Administration	Heat retention assessment	Available	City-scale resolution only

Note: NDVI, NDBI, LST, and LULC are the minimum essential datasets for HAP development. All listed datasets are freely available from USGS, ESA, and NASA. Cities should use QGIS or equivalent open-source tools.

Table 4: Data Gaps and Capacity Assessment (Example)

Data/ Analysis Type	Available?	Source	Local Capacity	Key Issue	Support Needed	Priority
Temperature and Humidity Data	Meteorological Department	Meteorological Department	Limited	Not ward-level; limited access	Data-sharing arrangement	Critical
Heat Index Calculation	Meteorological Department (derived)	The Meteorological Department derived	Limited	No routine calculation	Calculation template and training	Critical
LST	United States Geological Survey	Landsat (USGS)	Limited	Lack of remote sensing skills	GIS and RS training	High
Vegetation Cover (NDVI)	European Space Agency	Sentinel-2 (ESA)	Limited	Processing complexity	Preprocessed datasets	High
Heat-related Health Data	–	–	No	No disaggregated reporting	Reporting protocol development	Critical
Vulnerable Population Data	National Census/ City Corporation	Census/ City Corporation	Limited	Outdated or aggregated	Proxy indicators	High
GIS Mapping and Analysis	City Development Authority	City Dev. Authority	Limited	Few trained staff	Basic GIS training	High

15. Step 2: Heat Risk Assessment (Building the evidence base for city-level heat action)

15.1. Objective

To systematically identify, quantify, and spatially map heat-related risks across the city based on temperature, humidity, exposure, sensitivity, and adaptive capacity.

15.2. Purpose

The Heat Risk Assessment provides the scientific foundation for the Heat Action Plan (HAP). It follows a risk-based approach adapted from the FEMA Hazard Mitigation Planning framework (2013), in which risk is defined as a function of hazard and vulnerability.

For urban heat contexts, the model is operationalised as:

Heat Risk (R) = (Exposure × Sensitivity × Heat Hazard) ÷ Adaptive Capacity

This framework ensures that heat risk is not defined by temperature alone, but by how people are exposed, how vulnerable they are, and how well they can cope.

Methodological Reference:

The detailed formulation, normalisation procedures, and indicator construction are provided in Annex A (Technical Heat Risk Model and Indicator Framework).

15.3. Activities

Activity 2.1: Define Heat Thresholds and Heat Index Levels

Heat thresholds translate meteorological data into operational decision points. The National Oceanic and Atmospheric Administration (NOAA)/ US National Weather Service Heat Index formula is the most widely used standard for calculating perceived heat stress from temperature and humidity data.

Key Tasks

- Identify relevant heat indicators: daily maximum temperature (°C), relative humidity (%), and Heat Index (HI)
- Calculate Heat Index using the standard formulation: HI = T + (0.33 × RH) − (0.7 × Wind Speed) − 4.0, where T = air temperature (°C), RH = relative humidity (%), and Wind Speed = m/s [NOAA, 2023]
- Review historical impact evidence: heat illness and mortality data, hospital admissions during heat events, and disruptions to essential services
- Review national and regional policy guidance, including disaster management advisories and public health protocols
- Adjust thresholds based on local acclimatisation, housing quality, and occupational exposure patterns

Outputs

- City-specific Heat Threshold Definition Table
- Clearly defined alert levels (Safe, Caution, Extreme Caution, Danger, Extreme Danger) linked to action triggers

Activity 2.2: Identify Heat Hazards

Understanding heat as a hazard requires analysing historical climate data and emerging climate change trends. The WMO Guidelines on Multi-Hazard Impact-Based Forecast and Warning Services provide the methodological basis for hazard characterisation.

Key Tasks

- Analyse historical and recent climate data on daily maximum temperature, heat index, and heatwave frequency and duration
- Identify seasonal heat patterns: peak heat months, typical onset and cessation, and length of sustained high-temperature periods
- Document major historical heat events, record-breaking temperature values, and years with exceptional heat stress
- Analyse long-term climate change trends in rising average temperatures and increasing heatwave frequency; review climate projections where available

Outputs

- City-level Heat Hazard Profile
- Summary of historical, current, and emerging heat hazards

Activity 2.3: Assess Exposure

Exposure assessment identifies where people, assets, and services are physically exposed to heat hazards. Freely available satellite data allow ward-level spatial analysis at no cost.

Key Tasks

- Conduct spatial analysis of land use and land cover (LULC), built-up density (NDBI), LST, and UHI indicators using Landsat/ Sentinel-2 data
- Identify areas of high residential density, informal settlements, and daytime population concentration
- Map critical infrastructure: hospitals, schools, transport hubs, water supply, and electricity systems
- Assign ward-wise exposure scores (1 – 5) based on heat intensity, population and asset density, and UHI conditions

Outputs

- Ward-wise Exposure Scoring Table
- Spatial maps of heat exposure distribution across wards

Activity 2.4: Assess Sensitivity

Sensitivity assessment examines who and which systems are most affected by heat, assuming exposure occurs. The IPCC Sixth Assessment Report (2022) identifies age, pre-existing health conditions, occupational exposure, and housing quality as the primary determinants of sensitivity.

Key Tasks

- Identify sensitive population groups: elderly people and young children, pregnant women, people with chronic illness or disability, outdoor and manual workers, and informal settlement residents
- Assess sectoral sensitivity: heat impacts on health systems, transport infrastructure, water supply, and energy demand
- Assign ward-wise sensitivity scores (1 – 5) based on the proportion of vulnerable populations and dependence on heat-sensitive services

Outputs

- Ward-wise Sensitivity Scoring Table
- Identification of highly sensitive wards and sectors

Activity 2.5: Assess Adaptive Capacity

Adaptive capacity assessment evaluates the ability of communities, institutions, and systems to cope with and respond to heat stress. Higher adaptive capacity can significantly reduce heat-related impacts even in highly exposed areas.

Key Tasks

- Review service availability and access: healthcare facilities and emergency services, safe drinking water, and reliable electricity supply
- Assess physical coping infrastructure: green spaces and tree cover, shaded public areas, and designated cooling centres or shelters
- Review institutional and social capacity: heat early warning systems, public communication mechanisms, and community networks and NGOs
- Assign ward-wise adaptive capacity scores (1 – 5), where higher scores indicate stronger coping capacity

Outputs

- Ward-wise Adaptive Capacity Scoring Table
- Identification of wards with limited coping mechanisms requiring priority support

Activity 2.6: Calculate Combined Heat Risk Scores

Integrates all components into a single risk score.

$R = (H \times E \times S) \div AC$

Where:

- H = Heat Hazard
- E = Exposure
- S = Sensitivity
- AC = Adaptive Capacity

Key Tasks

- Apply consistent scoring scales (1 – 5) for all dimensions across all wards
- Compute numerical heat risk scores using the agreed formula; cross-check results for anomalies or data gaps
- Classify wards into Very Low, Low, Medium, High, and Extreme risk categories using the Risk Classification Reference Table
- Rank wards by heat risk level and identify priority areas for immediate, short-term, and long-term interventions

Outputs

- Ward-wise Heat Risk Calculation Table
- Heat Risk Classification by Ward
- Heat Exposed Hotspot Wards/ Areas identified and mapped

15.4. Step 2: Guiding Templates

Table 5: Historical Climate Analysis (Example)

Year	Max Temperature (°C)	Relative Humidity (%)	Heat Index (°C)	Heatwave Days (> Threshold)
2015	36.8	68	38.5	4
2016	37.2	65	38.8	5
2017	37.8	70	39.8	6
2018	38.0	72	40.4	7
2019	37.5	69	39.5	5
2020	39.0	65	40.9	7
2021	38.0	60	39.3	5
2022	40.0	70	42.3	8
2023	40.5	74	43.4	10
2024	41.2	76	44.5	12

Table 6: Heat Hazard Profile (Example)

Hazard Indicator	Unit	Baseline 1991 – 2020	Recent (Last 10 Years)	Trend	Peak Months	Key Impacts Observed
Average Max Temperature	°C	33.5	34.8	Increasing	Apr – Jun	Higher daytime heat stress
Extreme Max Temperature	°C	38.2	41.2	Increasing sharply	May	Heat illness; work disruption
Average Heat Index	°C	36	39	Increasing	Apr – Jun	Increased discomfort and fatigue
Days > Heat Threshold	Days/year	12	28	Increasing	Apr – May	Health system pressure

Hazard Indicator	Unit	Baseline 1991 – 2020	Recent (Last 10 Years)	Trend	Peak Months	Key Impacts Observed
Heatwave Events	Events/year	1 – 2	3 – 5	Increasing	Apr – Jun	Emergency response activation
Heatwave Duration	Days/event	2 – 3	4 – 6	Increasing	Apr – Jun	Cumulative heat exposure
Night-time Min Temp	°C	26	28	Increasing	May – Jun	Reduced night-time recovery
Consecutive Hot Days	Days	4	8	Increasing	Apr – May	Increased mortality risk

Table 7: Heat Index Calculation and Stress Categories (Example)

Air Temp (°C)	Rel. Humidity (%)	Heat Index (°C)	Heat Stress Category	Likely Impacts
32	40	34	Safe	Minimal discomfort; normal activities
34	45	37	Caution	Mild fatigue during prolonged outdoor exposure
36	50	40	Extreme Caution	Heat cramps and exhaustion are possible
38	55	43	Danger	Heat illness likely; outdoor work risky
40	60	46+	Extreme Danger	Heat stroke is highly likely; life-threatening

Heat Index Formula: HI = T + (0.33 × RH) − (0.7 × Wind Speed) − 4.0 Where: T = air temperature (°C), RH = relative humidity (%), Wind Speed = m/s (optional). The NOAA/ US National Weather Service formula may be adopted for operational use where feasible.

Table 8: Heat Threshold Definition and Alert Levels (Example)

Alert Level	Heat Index Range	Typical Impacts	Immediate Actions Triggered
Safe	< 36°C	Minimal heat stress	Routine monitoring; public awareness messaging; seasonal preparedness
Caution	36 – 38°C	Mild heat discomfort; sensitive groups affected	Public advisories; hydration reminders; shade breaks for outdoor workers
Extreme Caution	38 – 40°C	Heat stress is likely; vulnerable groups are significantly affected	Alert healthcare providers; set up cooling points; monitor hospital admissions
Danger	40 – 42°C	Significant heat illness risk; moderate mortality risk	Activate cooling centres; emergency response readiness; restrict outdoor work
Extreme Danger	> 42°C	Severe health impacts; high mortality risk	Full emergency activation; public warnings; mobilise all health and municipal services

Table 9: Heat Risk Classification Reference

Risk Score	Risk Level	Meaning	Priority for Action
≤ 0.10	Very Low	Negligible heat risk	Routine monitoring only
> 0.10 – 0.25	Low	Manageable heat stress	Public awareness and seasonal preparedness
> 0.25 – 0.50	Medium	Increasing health risks	Targeted interventions and early warning activation
>0.50 – 0.75	High	Serious heat risk	Immediate preparedness; activate cooling centres
> 0.75	Extreme	Severe public health threat	Full emergency response activation

Table 10: Ward-wise Heat Risk Calculation (Example)

Ward	Key Zones/ Mahallas	H	E	S	AC	R	Risk Level	Typical Impacts	Alert Level
Ward 01	Kashiadanga Thana	1.0	0.9	0.85	0.4	1.91	Extreme	Life-threatening heat stress; very high risk for elderly and outdoor workers; high chance of heat stroke	Extreme Danger
Ward 02	Kashiadanga Thana	0.93	0.85	0.8	0.45	1.4	Extreme	Severe heat stress affecting market workers and dense settlements; high hospital admission risk	Extreme Danger
Ward 03	Rajpara Thana	0.85	0.8	0.75	0.5	1.02	Extreme	Severe heat illness likely in crowded market areas; acute stress for vulnerable groups	Extreme Danger
Ward 04	Rajpara Thana	0.78	0.75	0.7	0.55	0.74	High	Significant heat stress during daytime; moderate risk for outdoor workers	Danger
Ward 05	Rajpara Thana	0.7	0.7	0.65	0.6	0.53	High	Heat-related fatigue and dehydration likely in informal settlements	Danger
Ward 06	Rajpara Thana	0.63	0.65	0.6	0.65	0.38	Medium	Noticeable heat discomfort; increased stress in poorly shaded areas	Extreme Caution
Ward 07	Rajpara Thana	0.57	0.6	0.55	0.7	0.27	Medium	Moderate heat stress; manageable with basic precautions	Caution
Ward 08	Rajpara Thana	0.5	0.55	0.5	0.75	0.18	Low	Mild heat discomfort; limited health impacts expected	Caution
Ward 09	Boalia Thana	0.45	0.5	0.45	0.8	0.13	Low	Increasing heat stress in slum pockets; dehydration risk for outdoor workers	Caution
Ward 10	Boalia Thana	0.4	0.45	0.4	0.85	0.08	Very Low	Mild stress but rising exposure for outdoor labourers; monitoring required	Safe

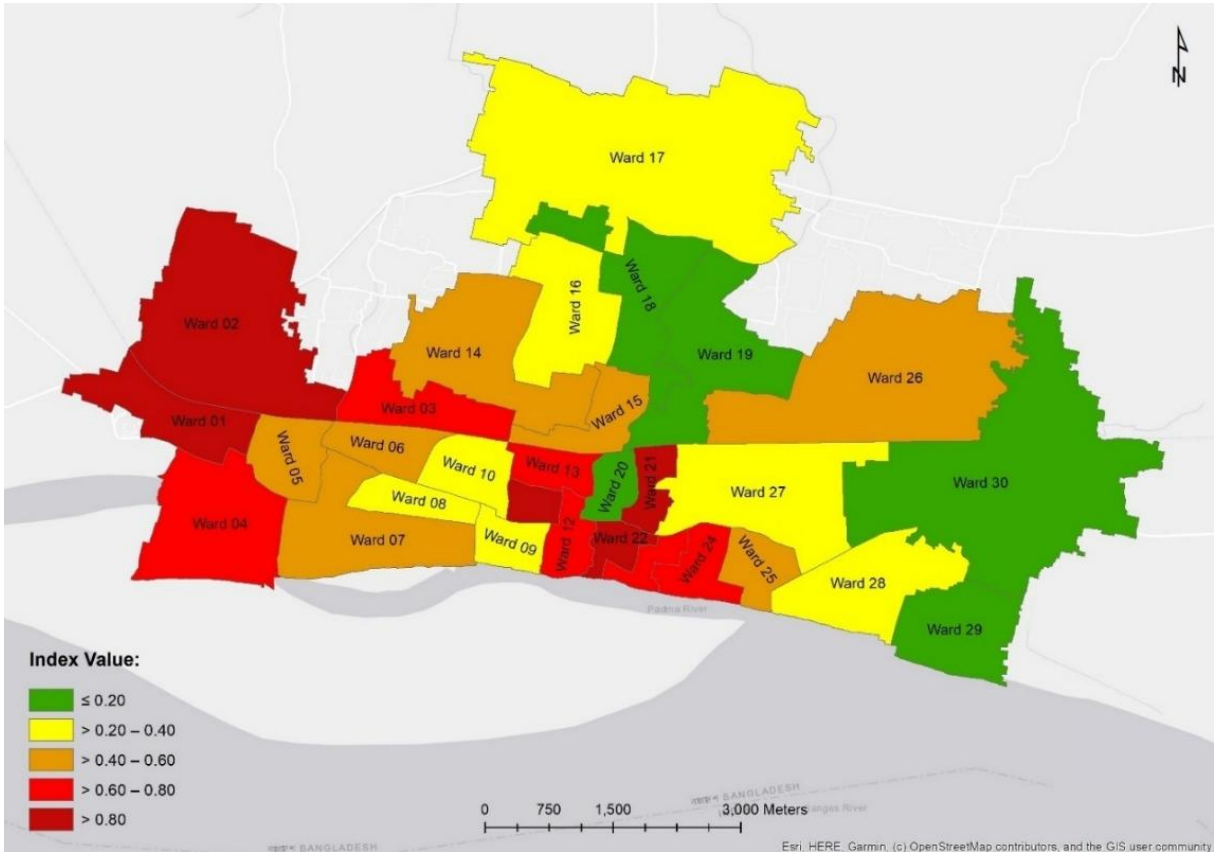
Ward	Key Zones/ Mahallas	H	E	S	AC	R	Risk Level	Typical Impacts	Alert Level
Ward 11	Boalia Thana	0.88	0.82	0.78	0.48	1.17	Extreme	Severe heat stress in dense residential areas; high mortality risk without intervention	Extreme Danger
Ward 12	Boalia Thana	0.8	0.78	0.72	0.52	0.86	Extreme	High heat illness risk; vulnerable groups significantly affected	Extreme Danger
Ward 13	Boalia Thana	0.73	0.72	0.68	0.58	0.62	High	Serious heat stress; housing quality increases indoor heat exposure	Danger
Ward 14	Rajpara Thana	0.66	0.68	0.63	0.62	0.45	Medium	Heat-related illness risk for riverbank and low-income settlements	Extreme Caution
Ward 15	Boalia Thana	0.57	0.64	0.6	0.65	0.34	Medium	Moderate heat stress; limited cooling access increases vulnerability	Caution
Ward 16	Boalia Thana	0.5	0.6	0.55	0.7	0.24	Low	Mild heat stress; generally tolerable conditions with minor discomfort	Caution
Ward 17	Shah Makhdum Thana	0.44	0.55	0.5	0.75	0.16	Low	Heat stress risk for poorly housed and water-stressed communities	Caution
Ward 18	Boalia Thana	0.38	0.5	0.45	0.8	0.11	Low	Low to moderate heat discomfort in mixed-use areas	Caution
Ward 19	Chandrima Thana	0.32	0.45	0.4	0.85	0.07	Very Low	Minimal heat stress; occasional discomfort during peak afternoons	Safe
Ward 20	Boalia Thana	0.25	0.4	0.35	0.88	0.04	Very Low	Very low risk; mostly tolerable conditions with minimal health impact	Safe
Ward 21	Boalia Thana	0.96	0.88	0.82	0.42	1.63	Extreme	Life-threatening heat exposure in informal settlements; urgent intervention required	Extreme Danger
Ward 22	Boalia Thana	0.9	0.84	0.78	0.46	1.28	Extreme	Severe heat stress despite partial tree cover; high vulnerability groups affected	Extreme Danger
Ward 23	Boalia Thana	0.83	0.8	0.74	0.5	0.98	Extreme	Very high heat stress in mixed-use dense urban zones	Extreme Danger
Ward 24	Boalia Thana	0.75	0.76	0.7	0.55	0.72	High	Significant heat stress; outdoor workers at risk during peak hours	Danger
Ward 25	Boalia Thana	0.68	0.7	0.65	0.6	0.52	High	High heat stress for slum dwellers and street vendors	Danger
Ward 26	Chandrima Thana	0.6	0.65	0.6	0.65	0.36	Medium	Moderate heat stress; increasing urban heat island effect	Extreme Caution

Ward	Key Zones/ Mahallas	H	E	S	AC	R	Risk Level	Typical Impacts	Alert Level
Ward 27	Boalia Thana	0.52	0.6	0.55	0.7	0.25	Low	Low heat stress; relatively stable and green residential areas	Caution
Ward 28	Matihar Thana	0.44	0.55	0.5	0.75	0.16	Low	Heat stress in markets and informal clusters during the daytime peak	Caution
Ward 29	Matihar Thana	0.35	0.5	0.45	0.8	0.1	Very Low	Moderate occupational heat stress for industrial outdoor workers	Safe
Ward 30	Matihar Thana	0.28	0.45	0.4	0.85	0.06	Very Low	Mild heat exposure; limited health impacts under normal conditions	Safe

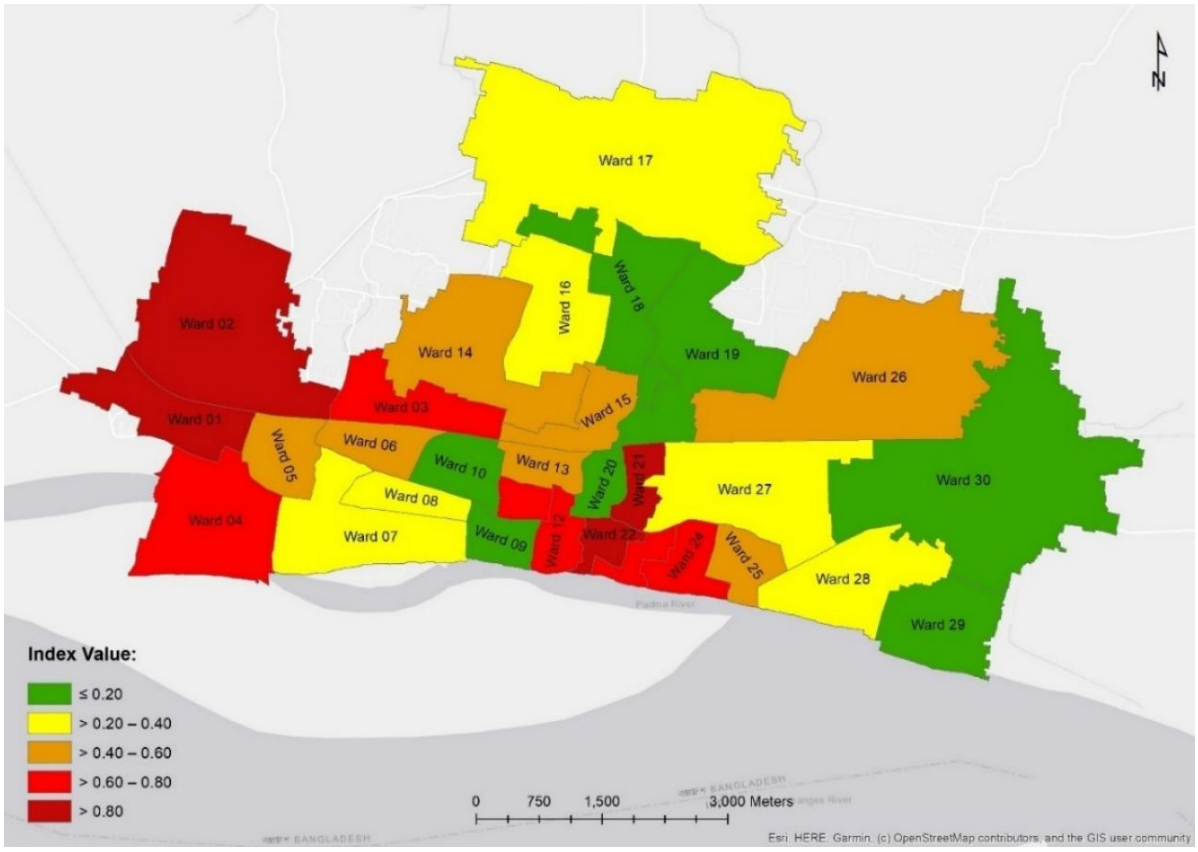
15.5. Index Maps (Example)

The following maps present the spatial distribution of heat hazard, exposure, sensitivity, adaptive capacity, and the resulting composite heat risk across wards. These maps are generated using the indicators and methodology described in Tables 7 – 10 and the heat risk calculation framework.

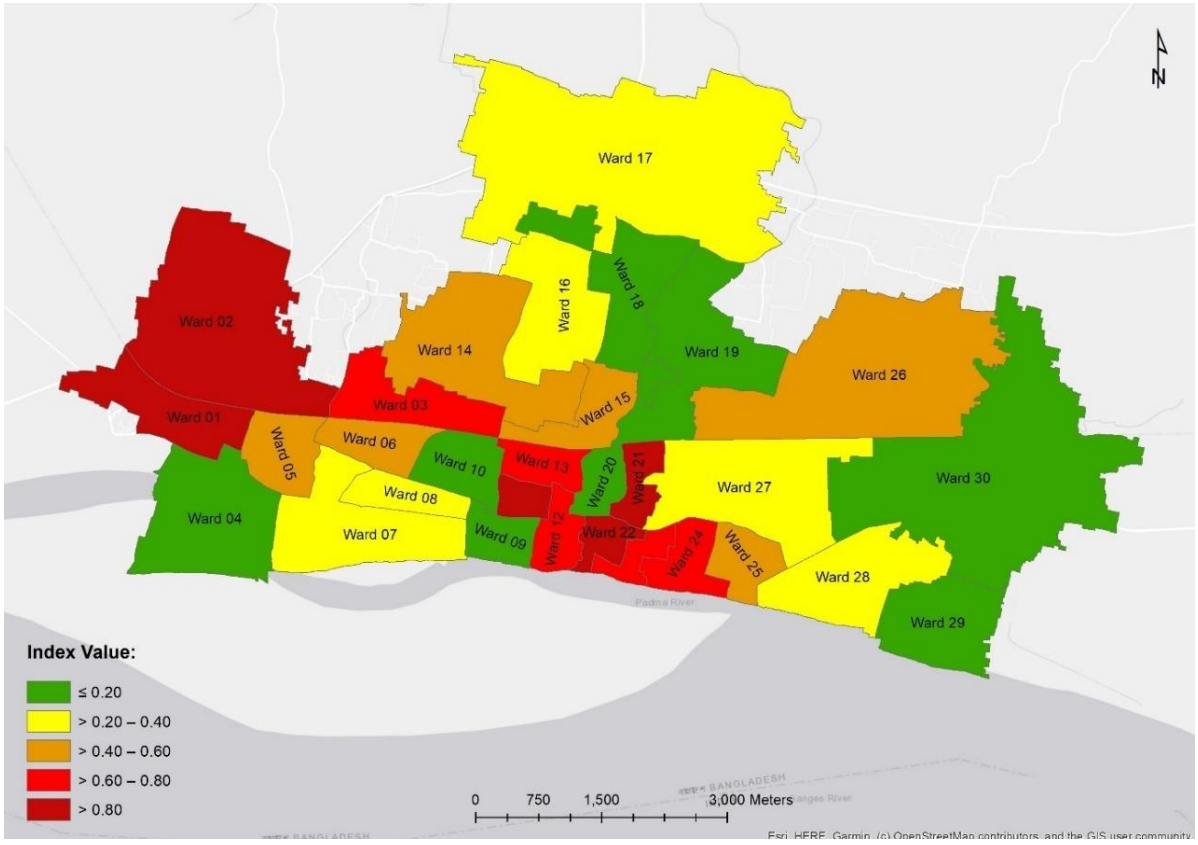
Map 1: Hazard Index Map (Example)



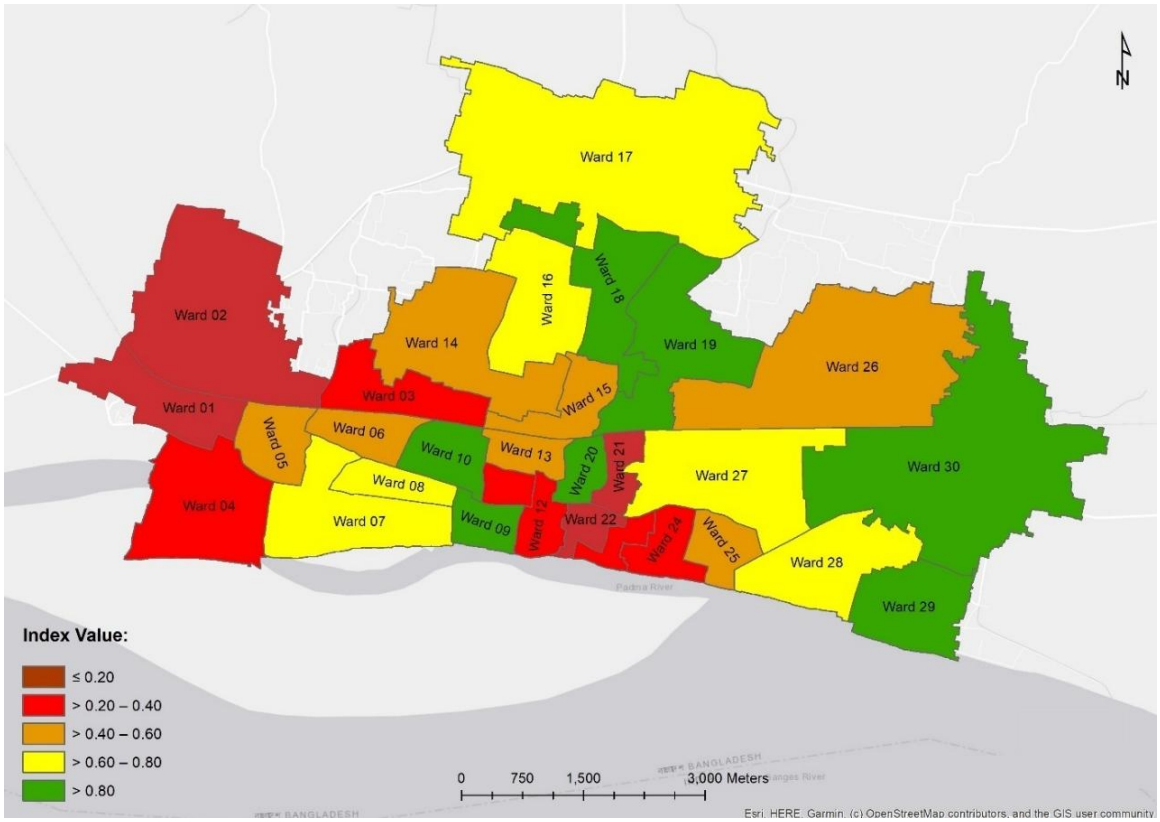
Map 2: Exposure Index Map (Example)



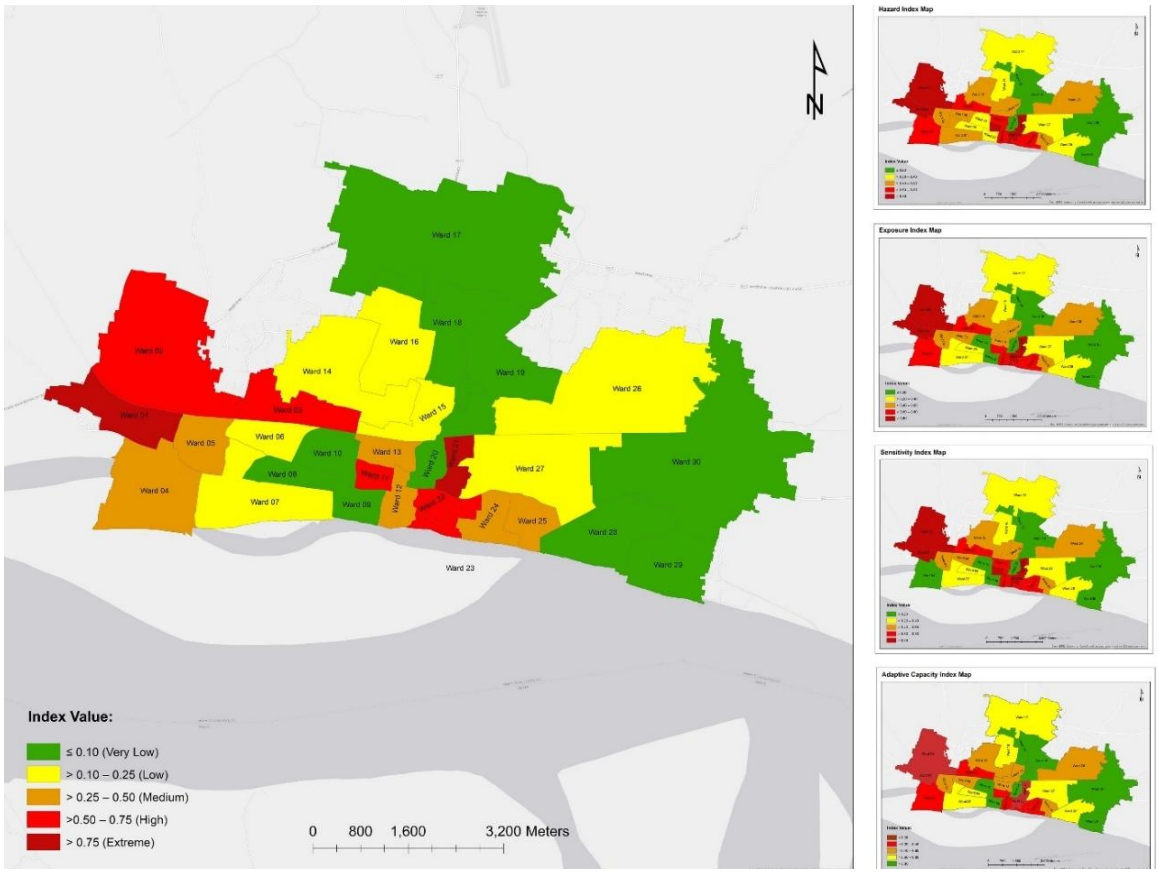
Map 3: Sensitivity Index Map (Example)



Map 4: Adaptive Capacity Index Map (Example)



Map 5: Combined Heat Risk Map (Example)



16. Step 3: Heat Vulnerability Assessment (Identifying who is most at risk and where)

16.1. Objective

To identify populations, locations, and systems that are most vulnerable to heat stress due to socio-economic, demographic, and infrastructural factors.

16.2. Purpose

While heat risk assessment highlights where danger exists, vulnerability assessment explains who is most affected and why. This step ensures equity and inclusion in heat planning. The IPCC (2022) emphasises that vulnerability assessments must be spatially explicit and disaggregated by social group to effectively guide resource allocation.

16.3. Activities

Activity 3.1: Identify Vulnerable Groups

The WHO Heat-Health Action Plan Guidelines (2021) identify elderly populations, young children, outdoor workers, and residents of informal settlements as the groups experiencing the greatest disproportionate heat burden.

Key Tasks

- Map vulnerable populations by age group (elderly 60+, children under 5), occupational exposure (construction workers, street vendors, rickshaw pullers), and health status (chronic illness, disability)
- Systematically consider gender and social inclusion dimensions that women-headed households, migrants, and socially isolated individuals face heightened risks

Outputs

- Ward-wise vulnerable population

Activity 3.2: Identify Heat Hotspots

Heat hotspots are locations where high exposure intersects with high vulnerability. Combining risk scores from Step 2 with vulnerability indicators provides a robust basis for spatial prioritisation.

Key Tasks

- Combine heat risk scores from Step 2 with vulnerability indicators to identify the highest-priority areas
- Identify neighbourhoods characterised by poor housing quality, limited-service access, high population density, and informal settlement patterns

Outputs

- Ward-ranked heat hotspot list
- Integrated risk and vulnerability classification per ward

Activity 3.3: City-Level Consolidation

Key Tasks

- Aggregate ward-level data to produce a comprehensive list
- Rank wards by composite vulnerability level to guide resource allocation and intervention prioritisation

Outputs

- Ward-wise vulnerability population rankings
- Priority ward list for targeted interventions

16.4. Step 3: Guiding Templates

Table 11: Ward-wise Heat Vulnerability Summary (Example)

Ward	Population Density	Informal Settlements	Vulnerable Groups	Health Accessibility	Water Accessibility
Ward 09	High	High	Elderly people, children	Low	Medium
Ward 12	Medium	Low	Moderate	High	High
Ward 14	High	Medium	Outdoor workers	Medium	Medium
Ward 22	Low	Low	A few vulnerable groups	High	High
Ward 25	Medium	High	Slum population	Low	Low

Note: Ward vulnerability is interpreted using the FEMA-aligned risk logic adopted in this toolkit. Higher exposure and sensitivity, together with lower adaptive capacity, indicate higher vulnerability and should be validated with local field knowledge before finalisation.

Table 12: Vulnerable Group Profiling (Example)

Ward	Vulnerable Group	Location/ Area	Reason for Vulnerability	Risk Level
Ward 09	Slum residents, children	Dense built-up zones	Poor housing; high heat exposure; limited ventilation	Low
Ward 12	Elderly population	Residential areas	Age-related physiological sensitivity	High
Ward 14	Outdoor workers	Market and road areas	Prolonged direct sun exposure; limited shade	Medium
Ward 22	General population	Low-density area	Better infrastructure; lower exposure	Extreme
Ward 25	Slum dwellers, labourers	Riverbank area	Poor water access; high density; limited services	Medium

17. Step 4: Institutional and Capacity Gap Assessment (Understanding what exists and what needs strengthening)

17.1. Objective

To assess institutional arrangements, governance systems, technical capacity, financial resources, and public preparedness for heat risk management.

17.2. Purpose

This step ensures that the HAP is realistic, implementable, and aligned with existing institutional capacity. It identifies gaps between current systems and required capabilities for effective heat risk management.

The assessment is structured into five core domains:

1. Existing Infrastructure
2. Heat Response Mechanisms
3. Public Awareness Level
4. Policy and Governance Framework
5. Financial Resources and Budget Allocation

Each category is scored on a 1 – 5 scale, where:

- 1 = Critical gap
- 5 = Fully functional system

(Full scoring definitions are provided in Annex B)

17.3. Activities

Activity 4.1: Policy and Institutional Review

Bangladesh's SOD 2019 provide the primary governance framework within which the HAP must be embedded. UNDRR's Sendai Framework (2015) also requires that heat be mainstreamed into national and local disaster risk reduction strategies.

Key Tasks

- Review the SOD 2019 and relevant national climate policies for heat-specific provisions
- Examine city disaster management plans, health protocols, and urban planning and building code policies
- Assess adequacy of existing provisions against HAP requirements
- Identify regulatory gaps and policy reforms required for effective heat action

Outputs

- Policy and Institutional Review Matrix
- List of regulatory gaps and recommended policy reforms

Activity 4.2: Institutional Mapping

Key Tasks

- Map all institutions with a relevant mandate for heat risk management: city corporation, health department, DMC, meteorological department, urban planning, engineering, water supply, and NGOs
- Document existing roles, reporting lines, and inter-agency coordination mechanisms
- Identify institutional overlaps and gaps in heat response coverage

Outputs

- Institutional Mapping Matrix
- Documented institutional roles and coordination gaps

Activity 4.3: Capacity Assessment

Key Tasks

- Assess technical capacity, human resources, data availability, and coordination mechanisms across all relevant institutions
- Use a simple Low/ Medium/ High scoring approach to ensure honest, realistic self-assessment
- Identify specific capacity investments needed before the HAP can be operationalised.

Outputs

- Capacity Gap Scoring Table
- Prioritised list of capacity development needs

Activity 4.4: Financial and Resource Gap Assessment

Key Tasks

- Identify existing heat-related expenditures: cooling, water distribution, emergency response
- Estimate the cost of priority HAP actions and compare against available municipal resources
- Identify potential financing sources: national government, climate funds, donor support, and cost-neutral actions

Outputs

- Gap Assessment Summary and Priority Actions Table
- Financing options and priority sequencing for HAP implementation

17.4. Step 4: Guiding Templates

Table 13: HAP Alignment with Existing National and Local Policies – Policy and Institutional Review Matrix (Example)

Policy/ Framework	Heat-Relevant Provisions	Current Alignment	Recommended HAP Alignment
SOD 2019 (Government of Bangladesh)	Defines disaster-coordination roles and emergency-management structures.	Low	Insert an explicit heat-alert annex and assign heat-response duties.
City Disaster Management Plan	General emergency preparedness; no dedicated heat annex.	Low	Add a city HAP as a formal annex and implementation protocol.
National Health Policy	Emphasises preventive health services and disease surveillance.	Low	Include heat illness surveillance, case reporting, and response guidance.
Urban Development Policy	Covers land use, building standards, and public open space.	Low	Integrate UHI mitigation, shade, and cool-roof standards.
Bangladesh Climate Change Strategy and Action Plan	Provides a national adaptation framework.	Medium	Prepare city-level heat implementation guidance and budget lines.
Local Development Planning Instruments	Used to guide annual and medium-term municipal investments.	Medium	Mainstream heat resilience into ward plans, capital budgets, and service delivery.

Table 14: Institutional Mapping Matrix (Example)

Institution/ Agency	Mandate/ Core Function	Current Role in Heat Response	Coordination Links	Recommended Role in the HAP
City Corporation/ Municipality	Urban governance; infrastructure; service delivery	Limited – no formal heat mandate	Health Department; Disaster Management Committee; Planning Department	Lead coordinating body; approve and implement the HAP
Disaster Management Committee	Coordinate disaster preparedness and response	Active for floods and cyclones; limited for heat	City Corporation; Health Department; Fire Service and Civil Defence	Activate heat alerts; coordinate emergency response
Health Department	Public health; disease surveillance	Manages heat illness cases reactively	Hospitals; Directorate General of Health Services; City Corporation	Define health thresholds; lead health surveillance
Meteorological Department	Weather forecasting and early warning	Issues with general temperature forecasts	City Corporation; Disaster Management	Issue city-specific heat alerts; provide climate data

Institution/ Agency	Mandate/ Core Function	Current Role in Heat Response	Coordination Links	Recommended Role in the HAP
			Committee; media	
Urban Planning Department	Land-use planning; development control	Limited integration of heat resilience	City Corporation; engineering units; Geographic Information System unit	Integrate heat resilience into plans and zoning
Engineering and Public Works Department	Infrastructure maintenance and project delivery	Responds during service breakdowns	Utilities; transport units; contractors	Support cooling centres, water points, and shaded public spaces
Water Supply Department	Drinking water supply and network management	Routine service delivery	Health Department; engineering units; community groups	Secure potable water access during heat events
Non-governmental Organisations and Civil Society Organisations	Community outreach; advocacy; service support	Ad hoc outreach during disasters	Ward Committees; City Corporation; volunteers	Support awareness, outreach, and vulnerable-group assistance

Note: Institutional roles should be assigned using existing mandates first, then formalised through the HAP working group and a written Terms of Reference (ToR).

Table 15: Capacity Gap Scoring Table (Example)

Category	Subcategory	Current Status	Score	Recommended Action
Existing Infrastructure	Green Spaces and Shading	No green spaces; severe heat issues; urgent action needed.	1	Prioritise tree planting, shaded corridors, and pocket parks.
Existing Infrastructure	Green Spaces and Shading	Some green areas, but coverage is inadequate; major improvements are required.	2	Increase canopy cover and expand shade in high-risk wards.
Existing Infrastructure	Green Spaces and Shading	Basic systems exist, but coverage is uneven and needs enhancement.	3	Strengthen maintenance and add shade where exposure is highest.
Existing Infrastructure	Green Spaces and Shading	Good implementation with minor gaps in certain zones.	4	Target remaining gaps in dense wards and transport corridors.
Existing Infrastructure	Green Spaces and Shading	Well-planned and effective green infrastructure	5	Maintain current performance and monitor canopy health.

Category	Subcategory	Current Status	Score	Recommended Action
		with minimal gaps.		
Current Heat Response System	Early Warning Systems	No city-specific heat-early-warning system; residents receive no alerts or preparedness guidance.	1	Develop a city heat alert protocol linked to meteorological data.
Current Heat Response System	Early Warning Systems	A basic warning system exists, but dissemination and public awareness are weak.	2	Improve channels, timing, and public guidance.
Current Heat Response System	Early Warning Systems	A functional warning system exists, but coverage and coordination remain uneven.	3	Standardise thresholds and response roles.
Current Heat Response System	Early Warning Systems	Well-developed early warning system with multi-channel dissemination.	4	Upgrade real-time updates and outreach to vulnerable groups.
Current Heat Response System	Early Warning Systems	Fully integrated early warning system with strong institutional coordination.	5	Maintain and test the system before each heat season.
Public Awareness Level	General Awareness of Heat Risks	Very low awareness; most people do not recognise heat illness or symptoms.	1	Launch basic heat-risk communication and symptom awareness campaigns.
Public Awareness Level	General Awareness of Heat Risks	Limited knowledge; some understand heat stress but not its health impacts.	2	Use schools, media, and ward outreach to expand awareness.
Public Awareness Level	General Awareness of Heat Risks	Moderate knowledge; people know common heat illnesses but gaps remain.	3	Refresh messaging before each heat season.

Category	Subcategory	Current Status	Score	Recommended Action
Public Awareness Level	General Awareness of Heat Risks	High awareness; most can identify heat risks and basic mitigation strategies.	4	Sustain campaigns and target hard-to-reach groups.
Public Awareness Level	General Awareness of Heat Risks	Very high awareness; widespread understanding across the population.	5	Maintain periodic campaigns and community feedback loops.

Note: The score scale runs from 1 (very low capacity, large gap) to 5 (strong capacity, minimal gap). Use the spreadsheet categories as the assessment template: Existing Infrastructure, Current Heat Response System, and Public Awareness Level.

Table 16: Gap Assessment Summary and Priority Actions (Example)

Priority	Gap Area	Key Issue	Short-term Action (0–6 months)	Medium-term Action (6–24 months)
Critical	Existing Infrastructure – Green Spaces and Shading	Low green cover and high surface heat	Map deficit wards and start shade interventions	Prepare an urban greening programme and monitor canopy cover
Critical	Current Heat Response System - Early Warning Systems	No city-specific heat alert system	Link municipal alerts to meteorological data	Build an automated heat alert protocol and testing routine
Critical	Current Heat Response System – Health Surveillance	No disaggregated heat illness data	Introduce heat case reporting in major hospitals	Train all health facilities and establish a dashboard
High	Public Awareness Level – General Awareness of Heat Risks	Limited public understanding	Run targeted awareness campaigns	Integrate heat messaging into schools and media
High	Existing Infrastructure – Cooling Centres	Insufficient designated cooling spaces	Map and designate public facilities	Expand permanent cooling shelters in high-risk wards
Medium	Budget Allocation	No dedicated budget line for heat response	Use existing disaster management funds	Include a dedicated HAP budget line in the next municipal cycle

18. Step 5: Stakeholder Consultation and Validation (Grounding the plan in local knowledge and building ownership)

18.1. Objective

To validate findings, incorporate local knowledge, and build ownership among key stakeholders for effective HAP implementation.

18.2. Purpose

Stakeholder engagement ensures that technical assessments are grounded in lived reality, socially acceptable, and politically feasible. The GHHIN Assessment of Heat Action Plans (2022) identifies lack of stakeholder buy-in as the leading cause of HAP implementation failure globally. Broad participation builds the legitimacy and ownership necessary for sustained implementation.

18.3. Activities

Activity 5.1: Stakeholder Identification

Key Tasks

- Map and engage stakeholders from government agencies, health services, NGOs and CSOs, community groups, academic institutions, and the private sector where relevant
- Ensure representation of marginalised and vulnerable communities, including women, informal settlement residents, and outdoor workers
- Use the Stakeholder Mapping Table to document each stakeholder's interest, influence level, and preferred engagement method

Outputs

- Comprehensive Stakeholder Mapping Table
- Confirmed engagement schedule and methods

Activity 5.2: Consultation Activities

The GHHIN (2022) recommends a mixed-methods consultation approach combining institutional KIIs, community FGDs, and participatory validation workshops to capture both technical and lived-experience perspectives.

Key Tasks

- Conduct Key Informant Interviews (KIIs) with senior officials and technical experts
- Facilitate Focus Group Discussions (FGDs) with community representatives, frontline workers, and marginalised groups

- Organise validation workshops to present and collectively refine findings, using accessible visual formats, including maps and infographics
- Consider World Café-style sessions and participatory mapping for community-level validation

Outputs

- KII and FGD records with key findings
- Validation workshop proceedings and agreements

Activity 5.3: Validation of Findings

Key Tasks

- Present heat risk, vulnerability, and gap analysis results in accessible formats to all stakeholder groups
- Collect structured feedback using the Validation Workshop Feedback Form
- Incorporate agreed revisions into data, hotspot maps, and priority actions

Outputs

- Validated heat risk and vulnerability findings
- Revised priority ward list and hotspot maps

Activity 5.4: Documentation

Key Tasks

- Document agreed priorities, institutional roles, and stakeholder recommendations from all consultation events
- Maintain a consultation log as an accountability and audit record for the HAP process

Outputs

- Consultation Summary
- Consultation log maintained as a formal accountability record

18.4. Step 5: Guiding Templates

Table 17: Stakeholder Mapping Table (Example)

Stakeholder/ Group	Institution	Role/ Interest	Influence	Engagement Method	Priority
City Corporation Officials	City Corporation/ Municipality	Decision-making; HAP approval	High	Working group; validation workshop	Essential
Health Department Officials	City Health Department	Health data; response protocols	High	KII; technical workshop	Essential

Stakeholder/ Group	Institution	Role/ Interest	Influence	Engagement Method	Priority
DMC Members	Disaster Management Committee	Emergency coordination	High	KII; validation meeting	Essential
Urban Planners	Planning Department	Spatial data; land use	Medium	Technical workshop; KII	High
Meteorological Officers	Bangladesh Methodological Department (BMD)	Climate data; forecasts	High	KII; data-sharing meeting	Essential
NGO Representatives	Local NGOs/ INGOs	Community outreach; field data	Medium	FGD; workshop	High
Ward Councillors/ Reps	City Ward Offices	Local knowledge; community access	Medium	FGD; community workshop	High
Community Leaders/ Residents	Informal settlements; high-risk wards	Lived experience; hotspot validation	Low–Medium	FGD; community consultation	High
Healthcare Workers	Hospitals; Clinics; CHC	Front-line heat health response	Medium	FGD; KII	High
Outdoor Workers/ Labourers	Construction sites; markets	Highly exposed; vulnerable group	Low	FGD; rapid survey	High
Academic/ Research Institutions	Universities; Research Centres	Technical expertise; data analysis	Medium	Expert consultation; workshop	Medium
Media Representatives	Print; broadcast; digital media	Risk communication; awareness	Medium	Briefing: validation workshop	Medium

Table 18: Consultation Summary Template (Example)

Consultation Event	Date/ Location	Participants	Method	Key Findings	Follow-up Actions
Inception Workshop	[Date]/ City Hall	20 (HAP WG members)	Workshop	Agreement on HAP scope; data gaps identified	Assign data collection tasks to each department
KII – Health Department	[Date]	3 (Senior Health Officers)	Key Informant Interview	Limited heat morbidity data; need improved reporting	Develop heat case reporting template
KII – Metrological Department	[Date]	2 (Meteorologists)	Key Informant Interview	Existing alert system not linked to municipal response	Draft MOU for data sharing and alert coordination
FGD – Outdoor Workers	[Date]/ Market area	10 (Construction workers, vendors)	Focus Group Discussion	No awareness of cooling centres; severe heat stress	Include outdoor workers in the awareness campaign
FGD – Slum Residents	[Date]/ Ward 09	12 (Women, elderly, youth)	Focus Group Discussion	Lack of shade and water points; unreliable electricity	Prioritise cooling infrastructure in Ward 09
Validation Workshop	[Date]/ City Hall	35 (Multi-stakeholder)	Workshop	Hotspot maps validated; interventions shortlisted	Finalise action prioritisation matrix

Table 19: Validation Workshop Feedback Form (Example)

Assessment Findings	Do You Agree? (Agree/ Partially/ Disagree)	Comments/ Suggested Corrections
Ward 14 is identified as an Extreme Heat Risk	<>	
Ward 09 is identified as High Heat Vulnerability	<>	
Elderly and outdoor workers are the most vulnerable groups	<>	
The cooling infrastructure gap is the highest priority	<>	
Early warning system identified as a critical gap	<>	
Proposed short-term actions are feasible	<>	
Proposed lead agencies are appropriate	<>	
Any missing hotspots or vulnerable groups?	<>	

19. Step 6: Heat Risk Reduction Strategies (Translating evidence into prioritised, actionable interventions)

19.1. Objective

To develop targeted, feasible, and prioritised heat risk reduction measures across short-, medium-, and long-term horizons.

19.2. Purpose

This step translates risk, vulnerability, and gap analysis into actionable strategies that reduce heat exposure, protect vulnerable populations, strengthen health systems, and build long-term urban resilience. The Heat Action Platform (2023) identifies four intervention categories – emergency response, urban design, public health, and policy/ regulatory measures – as the minimum scope for a comprehensive HAP strategy package.

19.3. Activities

Activity 6.1: Identify Intervention Options

Intervention options should be drawn from all four categories identified by the Heat Action Platform and the WHO Heat-Health Action Plan Guidelines, ensuring both immediate protective actions and structural long-term measures are included. Start with Emergency/ Immediate Response actions, then proceed to Short-term, Medium-term, and Long-term measures.

Key Tasks

- Emergency response and preparedness: early warning systems, cooling centres, and water distribution
- Urban design and infrastructure: green infrastructure, shade provision, cool roofs, and building standards
- Public health and behavioural interventions: community awareness campaigns and heat-safe practices
- Policy and regulatory measures: heat-responsive planning standards and inter-agency protocols

Outputs

- Long list of potential interventions across all four categories

Table 20: Heat Risk Reduction Intervention Long-List Template (Example)

Category	Intervention Option	Timeframe	Lead Agency	Estimated Cost
1. Emergency Response and Preparedness	Issue city-wide heat advisory at Caution threshold (≥36°C HI)	Immediate	City Corporation/ Meteorological Department	Minimal (existing systems)
	Designate and open public buildings as cooling centres in high-risk wards	Immediate	Engineering Department	Low
	Deploy mobile water distribution units in Extreme and high-risk wards	Immediate	Water Supply Authority	Low–Medium
	Establish a heat alert protocol linked to the Meteorological Department forecasts	Short-term (0 – 6 months)	City Corporation/ Meteorological Department	Low
2. Urban Design and Infrastructure	Plant shade trees along major roads and market areas in high-risk wards	Medium-term (1 – 3 years)	Urban Planning Department	Medium
	Install cool roof requirements in the building code for public buildings	Long-term (3 – 5+ years)	Urban Planning Department	Medium–High
	Develop green corridors connecting major parks in Extreme-risk wards	Long-term (3 – 5+ years)	Engineering/ Planning	High
3. Public Health and Behavioural Interventions	Train ward health volunteers on heat illness recognition and first response	Short-term (0 – 6 months)	Health Department/ NGOs	Low
	Develop multilingual heat advisory materials targeting outdoor workers and the elderly	Short-term (0 – 6 months)	Communication Cell/ NGOs	Low
	Establish a heat-related health surveillance system in major hospitals	Short-term (6 – 12 months)	Health Department	Low–Medium
4. Policy and Regulatory Measures	Develop a HAP as a formal annex to the City Disaster Management Plan	Short-term (0 – 6 months)	City Corporation	Minimal
	Integrate heat resilience standards into Urban Development Policy and Building Code	Long-term (3 – 5+ years)	City Corporation/ Planning	Medium (policy reform)
	Establish an MOU with the Meteorological Department for city-specific heat alert data sharing	Short-term (0 – 6 months)	City Corporation	Minimal

Note: This long list is indicative and should be adapted to the local context and findings from Steps 2 – 4. Timeframes: Immediate = within current heat season; Short-term = 0 – 12 months; Medium-term = 1 – 3 years; Long-term = 3 – 5+ years. Cost levels: Low = minimal additional expenditure; Medium = moderate capital or operational investment; High = significant capital investment required.

Activity 6.2: Categorise by Timeframe and Activation Phase

Key Tasks

- Emergency/ Immediate Response (triggered when Table 8 thresholds are reached): activate alerts, open cooling centres, mobilise health teams, and distribute drinking water
- Short-term (0 – 6 months): train ward volunteers, designate public facilities, and distribute heat-safety information
- Medium-term (6 – 24 months): strengthen early warning systems, expand shaded public areas, and improve surveillance
- Long-term (2+ years): integrate heat into urban planning, expand green infrastructure, and adopt policy reforms

Outputs

- Interventions categorised by implementation timeframe

Activity 6.3: Prioritise Actions

The FEMA Hazard Mitigation Planning framework recommends a multi-criteria feasibility scoring approach to ensure that prioritisation accounts for urgency, capacity, political will, and financial reality.

Key Tasks

- Assess each action against four feasibility criteria using the prioritisation matrix: Urgency (how soon is action needed?), Technical Feasibility (available technology and skills?), Political Feasibility (institutional support?), Financial Feasibility (within accessible budgets)
- Score each criterion 1 – 5 and calculate total scores to rank actions by priority tier

Outputs

- Heat Action Prioritisation Matrix with scored and ranked interventions

Activity 6.4: Finalise Strategy Package

Key Tasks

- Align prioritised actions with identified risks, vulnerability findings, and institutional gaps from Steps 2 – 4
- Assign lead agencies and supporting institutions with clear implementation timelines
- Submit the strategy package for approval through the appropriate municipal governance mechanism

Outputs

- Finalised Heat Action Strategy Package with assigned responsibilities and timelines
- Pre/ During/ Post-Heatwave Action Matrix

19.4. Step 6: Guiding Templates

Table 21: Heat Action Prioritisation Matrix (Example)

Proposed Action	Urgency (A)	Technical Feasibility (B)	Political Feasibility (C)	Financial Feasibility (D)	Total Score (A+B+C+D)	Priority Level
Issue public heat advisories	5	5	5	5	20	Immediate
Establish a heat alert protocol with the Meteorological Department	5	4	4	5	18	Immediate
Designate public buildings as cooling centres	5	4	4	4	17	Immediate
Train ward health volunteers on heat response	4	5	4	4	17	Short-term
Distribute water points in high-risk wards	4	4	4	4	16	Short-term
Develop ward-wise heat risk maps (GIS)	4	3	4	4	15	Short-term
Plant shade trees along major streets	3	4	4	3	14	Medium-term
Establish permanent city-wide heat surveillance	4	3	4	3	14	Medium-term
Install cool roof requirements in the national building code	3	3	3	3	12	Medium-term
Develop green corridors and urban parks	3	3	3	2	11 (see Table 9 for risk classification reference – score >10 = Extreme priority in risk matrix)	Long-term

Note: This step ensures the HAP moves beyond planning into effective, accountable, and sustained implementation. The FEMA Hazard Mitigation Planning framework (2013) emphasises that a plan without a monitoring and review mechanism is not a plan – it is a document. A well-designed M&E framework transforms the HAP from a one-time document into a living instrument of city governance.

20. Step 7: Implementation, Monitoring and Review

20.1. Objective

To establish a structured system for the implementation, coordination, monitoring, evaluation, and periodic review of the HAP, ensuring that planned interventions are effectively executed, responsibilities are clearly assigned, progress is regularly tracked, and the plan remains responsive to evolving heat risks, institutional capacities, and community needs.

20.2. Purpose

The purpose of this step is to operationalise the HAP through clear institutional arrangements, defined implementation pathways, and a robust monitoring and review mechanism. This step ensures that all responsible agencies understand their roles and coordination responsibilities during both preparedness and emergency response phases. It also provides a framework for tracking implementation progress, measuring outcomes and impacts, identifying gaps, and incorporating lessons learned into future revisions of the HAP. Through regular monitoring and periodic review, the HAP remains adaptive, evidence-based, and aligned with emerging climate risks, local priorities, and national disaster management frameworks.

20.3. Activities

Activity 7.1: Define Institutional Structure

Key Tasks

- Assign clear implementation roles to City Disaster Management Committees, health departments, urban planning agencies, and all relevant line agencies
- Establish formal coordination mechanisms for regular communication and joint decision-making across institutions

Outputs

- Formal institutional structure for HAP implementation documented
- Inter-agency coordination mechanism established

Activity 7.2: Develop Implementation Roadmap

Key Tasks

- Define action timelines specifying start dates, key milestones, and completion targets for each intervention
- Making a list of the emergency response team, aligning with the existing disaster management committee

- Identify responsible agencies and confirm human, financial, and technical resource requirements for each phase

Outputs

- Established a list of the emergency response team
- Implementation Roadmap Template completed
- Resource requirements confirmed per action.

Activity 7.3: Monitoring and Evaluation

The FEMA (2013) M&E framework distinguishes between process indicators (measuring implementation), outcome indicators (measuring short-term change), and impact indicators (measuring long-term change). All three levels should be tracked in the HAP.

Key Tasks

- Identify process indicators (e.g. number of advisories issued, cooling centres opened), outcome indicators (e.g. reduction in heat-related illness), and impact indicators (e.g. change in ward-wise heat risk score)
- Set data collection frequency and assign clear reporting responsibilities to relevant institutions
- Establish a centralised monitoring database or dashboard accessible to the HAP Working Group

Outputs

- Monitoring Indicator Matrix completed
- Data collection and reporting responsibilities assigned

Activity 7.4: Review and Update

The WHO (2021) recommends post-heat-season reviews as a minimum standard, with full HAP revision cycles every two to three years or following significant heat events.

Key Tasks

- Conduct post-heat-season reviews to assess what worked, what did not, and why – using the HAP Annual Review Checklist
- Update risk assessments, thresholds, vulnerability profiles, and strategies based on lessons learned and new data
- Ensure the HAP remains current through annual review and periodic full revision

Outputs

- Post-season review report completed and shared with all HAP partners
- Updated HAP is ready for the next heat season

20.4. Step 7: Guiding Templates

Table 22: Implementation Roadmap Template (Example)

Action	Lead Agency	Emergency/ Heatwave	Month 1 – 3 (Immediate)	Month 4 – 6 (Short-term)	Month 7 – 12 (Medium-term)
Activate emergency response and cooling centres	City Corporation/ Disaster Management Committee	√	√		Cooling supplies; staff time; transport
Define city-specific heat alert thresholds	Meteorological Department and Health Department	√			Technical expertise
Designate cooling centres in high-risk wards	Engineering Department	√			Building access; basic supplies
Launch public heat awareness campaign	Communication Cell	√			Printing; media budget
Conduct ward-level GIS heat risk mapping	Planning Department/ GIS Unit		√		QGIS training; satellite data
Train ward health volunteers	Health Department/ NGOs		√		Training materials; per diem
Establish MOU with the Meteorological Department	City Corporation		√		Legal/ admin support
Develop heat-related health surveillance system	Health Department			√	Reporting forms; database
Implement shade infrastructure in high-risk areas	Engineering/ Planning Department			√	Capital budget
Conduct first post-season HAP review	HAP Working Group			√	Staff time; review format
Submit the annual HAP progress report to the council	HAP Focal Person			√	Reporting template

Note: The implementation roadmap should include emergency activation upon reaching the Table 8 heat alert threshold.

Table 23: Heat Emergency Response Team – Roles and Activation Roster (Example)

Role/ Position	Institution	Key Responsibilities During Heat Emergency	Activation Trigger (Alert Level)	Contact/ Focal Person
Incident Commander	City Corporation/ Mayor's Office	Overall coordination; issue formal heat emergency declaration; activate all agencies; media statement	Extreme Caution (HI ≥38°C)	[Name/ Number]
Health Lead	City Health Department	Alert all health facilities; track heat morbidity	Caution (HI ≥36°C)	[Name/ Number]

Role/ Position	Institution	Key Responsibilities During Heat Emergency	Activation Trigger (Alert Level)	Contact/ Focal Person
		daily; deploy mobile health teams to Extreme-risk wards; coordinate hospital surge capacity		
DMC Emergency Coordinator	Disaster Management Committee	Activate cooling centres; coordinate ward-level emergency response; mobilise volunteer networks; report to Incident Commander every 6 hours	Extreme Caution (HI ≥38°C)	[Name/ Number]
Communications Officer	City Corporation/ Information Cell	Issue public heat advisories via SMS, radio, and public displays; disseminate cooling centre locations; provide daily situation updates	Caution (HI ≥36°C)	[Name/ Number]
Water Supply Lead	Water Supply Authority	Ensure continuous water supply to high-risk wards; deploy mobile water tankers to slum areas; operate a minimum of 2 water distribution points per Extreme-risk ward	Extreme Caution (HI ≥38°C)	[Name/ Number]
Infrastructure/ Engineering Lead	Engineering/ Public Works Department	Operate and maintain cooling centres; ensure electricity and water supply continuity; install temporary shade structures in public spaces	Extreme Caution (HI ≥38°C)	[Name/ Number]
NGO/ Community Liaison	Local NGOs/ CSOs/ Ward Committees	Conduct door-to-door checks on elderly, children, and sick residents in high-risk areas; refer cases to health teams; provide translation support for multilingual communities	Danger (HI ≥40°C)	[Name/ Number]
HAP Focal Person	City Corporation (Designated)	Coordinate all team leads; maintain situation log; prepare daily briefing notes for Incident Commander; ensure M&E data is captured during event for post-season review	Caution (HI ≥36°C)	[Name/ Number]

Note: All roles are aligned with the existing Disaster Management Committee (DMC) structure under Bangladesh's SOD 2019. Contact details must be filled in and updated annually. Activation thresholds are as in Table 8 (Heat Threshold and Alert Levels). Full emergency activation (all roles) occurs at the Danger threshold (HI ≥ 40°C). The team should conduct a joint simulation exercise before each heat season.

Table 24: Monitoring Indicator/ KPIs Matrix (Example)

Type	Indicator (KPIs)	Baseline	Target	Frequency	Responsible Agency
Process	Number of heat advisories issued per season	0	≥5/ season	Each heat event	City Corporation/ Meteorological Department
Process	Cooling centres are activated per heat event	0	≥1 per high-risk ward	Each heat event	Engineering Department/ City Corporation
Process	Ward volunteers trained on heat response	0	≥5 per ward	Annual	Health Department/ NGOs
Process	HAP Working Group meetings held	0	Monthly (pre-season)	Monthly	HAP Focal Person
Outcome	Heat-related illness cases per season	[Baseline]	10% reduction	Each heat event	Health Department
Outcome	Heat-related mortality per 100,000 population	[Baseline]	15% reduction in 3 years	Annual	Health Department
Outcome	Population reached by heat advisories	Unknown	≥80% of high-risk wards	Per event	Communication Cell
Outcome	% high-risk wards with cooling facilities	0%	100% within 2 years	Annual	Engineering Department
Impact	Change in ward-wise heat risk score	[Year 1 score]	Reduction in top risk tier wards	Annual	HAP Working Group
Impact	% city covered by green/ shaded infrastructure	[Baseline]	5% increase in 5 years	Annual	Urban Planning Department

Table 25: HAP Annual Review Checklist

Review Question	Status (Complete/ Partial/ Not Done)	Notes/ Follow-up Action
Were all heat advisories issued according to HAP threshold triggers?	<>	
Were cooling centres opened in all designated high-risk wards?	<>	
Were heat-related illness and mortality data collected and reported?	<>	
Were all HAP Working Group meetings held as scheduled?	<>	
Were ward-level volunteers trained and deployed during heat events?	<>	
Were monitoring indicators tracked and reported to the HAP Working Group?	<>	
Were any heat hotspots or vulnerable groups missed in the assessment?	<>	
Have risk scores been recalculated using the latest available data?	<>	
Have heat thresholds been reviewed against observed impacts?	<>	
Have lessons learned been documented and shared with all HAP partners?	<>	
Has the HAP been submitted for municipal council review and approval?	<>	
Is the HAP budget for next year confirmed and integrated into municipal planning?	<>	

21. References

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United Nations Office for Disaster Risk Reduction (UNDRR), (2015), Sendai Framework for Disaster Risk Reduction 2015 – 2030

United States Environmental Protection Agency (USEPA), (2022), Excessive Heat Events Guidebook

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22. Annexes

22.1. Annex A: Heat Risk Model and Indicator Framework

A1. Conceptual Model

The heat risk model is adapted from FEMA Hazard Mitigation Planning and expressed as:

$R_i = (\hat{H}_i \times E_i \times S_i) \div AC_i$

Where:

- $\hat{H}_i$ = Normalised heat hazard
- E_i = Exposure
- S_i = Sensitivity
- AC_i = Adaptive capacity

All variables are normalised to a 0–1 scale to ensure comparability.

A2. Heat Hazard ($\hat{H}_i$)

Formula (weighted FEMA-based structure)

H_i = 2(Historical) + 5(Vulnerability) + 10(Temperature Extremes) + 7(Probability)

Then normalised:

$\hat{H}_i = (H_i - \min(H)) \div (\max(H) - \min(H))$

A3. Exposure (E_i)

$E_i = (D_i^* + B_i^*) \div 2$

Where:

- D_i = population density
- B_i = built-up area

Indicators Used

Indicator	Measure Used	Why It Is Used	Data Source
Population Density (D_i)	Persons per km²	More people in a hot area means more individuals at risk. Dense wards have limited shade, airflow, and outdoor space, intensifying heat stress.	Bangladesh National Census; WorldPop 2025
Built-up Area (B_i)	% of ward covered by impervious surfaces	Roads, rooftops, and concrete surfaces absorb and retain heat, raising local temperatures and amplifying	Sentinel-2 NDBI; Global Human Settlement Layer (GHSL) JRC 2020

Indicator	Measure Used	Why It Is Used	Data Source
		the UHI effect. Wards with high built-up fraction typically record higher land surface temperatures.	

How to Interpret Exposure (E_i) Scores

High Exposure Score (E_i close to 1.0)

- Ward is densely populated with extensive concrete and rooftop surfaces
- Residents have limited access to natural cooling from vegetation or open ground.
- Heat is amplified by the UHI effect
- Action: Prioritise cooling centres, shaded public spaces, and emergency water distribution in this ward

Low Exposure Score (E_i close to 0)

- Ward has a lower population density and more open or vegetated land
- Fewer people are directly subjected to extreme heat conditions
- Standard seasonal health advisories are sufficient
- Action: Continue routine monitoring; no immediate infrastructure investment required

A4. Sensitivity (S_i)

$S_i = (Elderly_i^* + Slum_i^*) \div 2$

Indicators Used

Indicator	Measure Used	Why It Is Used	Data Source
Elderly Population (Eld_i)	% of ward population aged 60 and above	Older adults have reduced thermoregulatory capacity – their bodies are less efficient at managing heat through sweating and circulation. They are among the highest risk groups for heat-related illness and death globally (WHO, 2021).	Bangladesh Census; WorldPop age (sex) 2025
Slum/ Informal Settlement Population ($Slum_i$)	% of ward population in informal or low-income settlements	Residents of informal settlements live in kutcha housing with poor ventilation, corrugated metal roofing, and limited insulation. These conditions trap heat indoors and expose residents to higher indoor temperatures than outdoor air temperatures. Limited income also restricts access to fans, air conditioning, and medical care.	GHSLBuilding Height Proxy; City Corporation GIS; Bangladesh Bureau of Statistics (BBS) Census

Where data are available, the following indicators may be incorporated to strengthen sensitivity assessment:

- Children under 5: Young children cannot regulate body temperature effectively and are highly vulnerable to dehydration and heat stroke (WorldPop agesex data).
- Outdoor workers: Construction workers, rickshaw pullers, street vendors, and agricultural labourers face prolonged heat exposure without shade or protective equipment. Visible Infrared Imaging Radiometer Suite (VIIRS) nighttime lights density in commercial zones serves as a proxy.
- Pregnant women: Pregnancy increases physiological heat stress and risk of complications during heatwaves. Ward-level maternal health data from health facilities may be used.
- Persons with chronic illness: Cardiovascular, respiratory, and kidney conditions are worsened by heat. Ward-level hospital admission records can provide a proxy indicator.

How to Interpret Sensitivity (S_i) Scores

High Sensitivity Score (S_i close to 1.0)

- Ward has a high concentration of elderly residents, informal settlement dwellers, or other vulnerable groups
- Even moderate heat levels can result in serious health impacts in this ward
- Heat illness, hospitalisation, and mortality rates are likely to be disproportionately high
- Action: Deploy community health volunteers, establish ward-level cooling centres, and ensure targeted outreach to elderly households

Low Sensitivity Score (S_i close to 0)

- Ward population is predominantly working-age adults with formal housing and better access to healthcare
- Health impacts from heat exposure are likely to be less severe
- Action: Maintain seasonal public health advisories; focus resources on higher-sensitivity wards

A5. Adaptive Capacity (AC_i)

$AC_i = (Electricity_i^* + GreenSpace_i^*) \div 2$

Indicators Used

Indicator	Measure Used	Why It Is Used	Data Source
Electricity Access ($Elec_i$)	% of ward households with a reliable electricity supply	Access to electricity enables the use of fans and air conditioning the most effective household-level heat protection measures. Stable electricity also powers refrigeration for medicines and allows communities to receive early warnings via broadcast. Wards with unreliable supply are	VIIRS Nighttime Lights stability ratio; Bangladesh Power Development Board; BBS Census

Indicator	Measure Used	Why It Is Used	Data Source
		significantly more vulnerable during heatwaves.	
Green Space ($Green_i$)	% of ward area covered by vegetation (NDVI > 0.35)	Trees and vegetated surfaces reduce local air and surface temperatures through shading and evapotranspiration. Green spaces also provide cooling refugia – areas where residents can seek relief from extreme heat. Wards with higher tree canopy and park coverage consistently record lower land surface temperatures.	Sentinel-2 NDVI; Hansen Global Forest Cover 2023; ESA World Cover

Where data are available, the following may be added to strengthen adaptive capacity assessment:

- Water access: Distance to nearest safe drinking water point. Hydration is the primary defence against heat illness. Use JRC Global Surface Water distance analysis.
- Healthcare access: Distance to nearest health facility. Rapid medical response reduces heat-related mortality. Use OpenStreetMap health facility locations.
- Early warning reach: Mobile network or media coverage. Wards that can receive heat alerts allow residents to take protective action in advance.
- Community social networks: Presence of active NGOs, ward committees, or community health workers. Social cohesion significantly reduces heat mortality in vulnerable groups.

How to Interpret Adaptive Capacity (AC_i) Scores

High Adaptive Capacity (AC_i close to 1.0)

- Ward residents have reliable electricity, shaded green spaces, water access, and healthcare nearby
- Even if exposed to heat, residents have practical means to protect themselves.
- The risk model will return a lower composite risk score for this ward
- Action: Maintain and expand existing assets; use this ward as a model for capacity-building in lower-AC wards

Low Adaptive Capacity (AC_i close to 0)

- Ward has unreliable electricity, minimal green cover, and limited healthcare proximity
- When combined with high exposure and sensitivity, this creates a severe risk condition.
- The risk model will return a high or very high composite score for this ward
- Action: Prioritise urgent investment in cooling infrastructure, shade trees, water kiosks, and health outreach

A6. Final Model (Expanded Form)

$$R_i = ((H_i - \min(H)) / (\max(H) - \min(H))) \times E_i \times S_i \div AC_i$$

A7. Risk Classification

Risk Score	Category
≤ 0.10	Very Low
0.10 – 0.25	Low
0.25 – 0.50	Medium
0.50 – 0.75	High
> 0.75	Extreme

22.2. Annex B: Institutional and Capacity Gap Assessment Format

B1. Gap Assessment Format

1. Existing Infrastructure
2. Current Heat Response Mechanism/ System
3. Public Awareness Level
4. Policy and Governance Framework
5. Financial Resources and Budget Allocation

Score Interpretation

Score	Level	Status
1 – 1.9	Critical	Urgent action required across all categories
2 – 2.9	Low	Significant improvements needed
3 – 3.9	Moderate	Progress is being made, but there are still gaps
4 – 4.9	High	Good performance with minor gaps
5	Very High	Comprehensive and effective across all categories

B2. Existing Infrastructure

Category	Current Status	Score
Green Spaces and Shading	No green spaces, severe heat issues, urgent action needed.	1
	Some green areas, but inadequate coverage, major improvements required.	2
	Basic systems exist, but coverage is uneven and needs enhancement.	3
	Good implementation, minor gaps in certain zones.	4
	Well-planned and effective green infrastructure, with minimal or no gaps.	5
Cooling Centers	No designated cooling centres, lack of heat relief facilities, and high risk for vulnerable populations.	1
	Few cooling centres exist, and those that do are insufficient in number, poorly equipped, or inaccessible to all.	2
	Some cooling centres are operational, but coverage is uneven and awareness and accessibility are limited.	3
	Well-implemented cooling centres with reasonable coverage, but minor gaps in outreach or facility upgrades.	4
	Comprehensive network of cooling centres, well-maintained, easily accessible, and fully integrated into heat response plans.	5
Water Availability	Severe water shortages, no designated drinking water stations, and a high risk of dehydration during heat events.	1
	Limited water access, some public water points exist but are insufficient, unreliable, or poorly maintained.	2
	Basic water supply infrastructure is in place, but coverage is uneven, and supply disruptions occur.	3
	Reliable water access in most areas, functional drinking water stations, and minor gaps in coverage or maintenance.	4
	Well-planned, fully accessible water infrastructure with public drinking stations, strong supply resilience, and emergency backup systems.	5
Housing and Building Resilience	Most buildings lack heat-resistant design, have poor ventilation, retain heat indoors, and have no resilience measures in place.	1

Category	Current Status	Score
	Some buildings have basic cooling features, but most remain vulnerable due to limited insulation or heat-reflective materials.	2
	Moderate adoption of heat-resilient designs, some new buildings follow climate-responsive principles, but older structures remain a concern.	3
	The majority of buildings incorporate passive cooling, reflective roofing, or insulation, with only minor gaps in implementation.	4
	Widespread integration of heat-resilient building designs, strong enforcement of climate-adaptive construction codes, and high energy efficiency in both new and retrofitted buildings.	5
Road and Pavement Heat Mitigation	Predominantly dark, heat-absorbing surfaces with no heat mitigation measures, causing extreme surface temperatures and worsening UHI effects.	1
	Some heat mitigation efforts (e.g., light-coloured paint, tree-lined streets) exist, but coverage is minimal, and most roads and pavements contribute to heat retention.	2
	Moderate use of heat-reflective materials, tree canopies, and shaded walkways in select areas, but many roads still intensify heat exposure.	3
	Widespread implementation of cool pavements, permeable surfaces, and tree-lined streets, with minor gaps in high-traffic or densely built-up areas.	4
	Comprehensive adoption of heat-resilient road and pavement designs, including reflective materials, green corridors, and shaded pedestrian pathways, ensuring city-wide heat mitigation.	5
Average Score		

B3. Current Heat Response Mechanism/ System

Category	Current Status	Score
Early warning systems	No early-warning heat system in place; residents receive no alerts or preparedness guidance before extreme heat events.	1
	A basic warning system exists, but it lacks real-time data, effective dissemination channels, or public awareness, resulting in limited effectiveness.	2
	Functional early warning system with periodic heat alerts, but gaps remain in accessibility, coverage, or coordination with response agencies.	3
	Well-developed early warning system with multi-channel dissemination (SMS, radio, public displays, etc.), but minor improvements needed in outreach or real-time updates.	4
	Fully integrated, real-time heat early warning system with automated alerts, widespread public access, strong institutional coordination, and effective response mechanisms.	5
Emergency response capacity	No structured emergency response for heat-related incidents; lack of trained personnel, medical support, or coordination during heatwaves.	1
	A basic response system exists, but it is poorly coordinated, lacks resources, and has limited capacity to handle large-scale heat emergencies.	2
	Moderate emergency response capacity with trained personnel and some medical facilities, but gaps in coordination, equipment, or public awareness persist.	3

Category	Current Status	Score
	Well-structured heat emergency response system with trained teams, medical facilities, and interagency coordination, but minor improvements are needed in efficiency or coverage.	4
	Highly effective, well-coordinated emergency response system with rapid deployment, medical preparedness, community engagement, and strong institutional support.	5
Coordination among agencies	No coordination among agencies; fragmented efforts result in ineffective heat response and a lack of clear roles and responsibilities.	1
	Some agencies are involved, but coordination is weak, with overlapping mandates, poor communication, and a lack of joint planning	2
	Moderate coordination exists through periodic meetings or shared responsibilities, but gaps remain in communication, resource-sharing, or implementation.	3
	Well-established coordination mechanisms with clear roles, regular communication, and joint action plans, but minor gaps in efficiency or execution.	4
	Strong, institutionalised coordination among all relevant agencies, ensuring seamless collaboration, resource mobilisation, and an effective heat response strategy.	5
Healthcare System Preparedness	No preparedness for heat-related illnesses; hospitals and clinics lack resources, trained staff, and emergency protocols.	1
	Limited healthcare capacity with some medical facilities addressing heat stress, but no specialised protocols, training, or emergency response.	2
	Moderate preparedness with designated heat response teams, some training for healthcare workers, and limited heat-related medical supplies.	3
	Well-prepared healthcare system with trained personnel, dedicated cooling areas in hospitals, and accessible treatment options, but minor gaps remain.	4
	Fully equipped and responsive healthcare system with widespread heat-related illness management, early intervention, public guidance, and strong institutional support.	5
Community Engagement and Support Networks	No community awareness or engagement in heat response; vulnerable populations lack access to support networks.	1
	Some awareness campaigns exist, but community involvement is low, and outreach efforts do not effectively reach at-risk groups.	2
	Moderate engagement with periodic public outreach, volunteer networks, and partial community participation in heat response initiatives.	3
	Strong community involvement, with active networks, trained volunteers, and targeted programs to support vulnerable populations.	4
	Highly engaged and resilient communities with widespread participation in heat preparedness programs, strong social support networks, and inclusive response mechanisms.	5
Average Score		

B4. Public Awareness Level

Category	Current Status	Score
General Awareness of Heat Risks	Very low awareness; most people do not recognise heat-related illnesses or their symptoms.	1
	Limited knowledge; some understand heat stress but lack awareness of its serious health impacts.	2
	Moderate knowledge; people are aware of common heat-related illnesses but lack a detailed understanding of risks and prevention.	3
	High awareness; most can identify heat risks, symptoms, and basic mitigation strategies.	4
	Very high awareness and widespread understanding of heat risks, symptoms, and appropriate response actions across the population.	5
Access to Heat-Related Information	No heat-related information is available to the public; no early warnings or advisories exist.	1
	Some information exists, but access is limited, and few people receive early warnings.	2
	Moderate access; heat warnings and advisories are available but not consistently distributed or understood.	3
	High access; heat-related information is widely shared through various channels (TV, radio, social media), reaching most of the population.	4
	Full access; reliable early warnings, advisories, and heat action plans are effectively communicated to all, including vulnerable groups.	5
Adoption of Preventive Measures	No adoption of preventive measures; people do not take action to protect themselves from extreme heat.	1
	Limited adoption: Some individuals use cooling methods or stay hydrated, but most do not take the necessary precautions.	2
	Moderate adoption; many people use basic protective measures, but gaps remain in consistent practices.	3
	High adoption: the majority follow preventive strategies such as wearing appropriate clothing, staying hydrated, and using cooling spaces.	4
	Widespread adoption; nearly all individuals actively use heat-prevention measures, with strong adherence across different social groups.	5
Engagement in Public Campaigns	No public engagement; no community campaigns or awareness programs exist.	1
	Limited engagement; occasional awareness efforts occur, but public participation is minimal.	2
	Moderate engagement; some community-led initiatives exist, and a portion of the population actively participates.	3
	High engagement; public campaigns are frequent, well-received, and involve a large proportion of the community.	4
	Very high engagement; widespread community involvement in heat awareness programs, with sustained participation and impact.	5
Targeted Outreach for Vulnerable Groups	No targeted outreach; vulnerable groups are unaware of heat-related risks and lack access to specific support.	1
	Limited outreach; some efforts exist, but information does not effectively reach or address the needs of at-risk populations.	2
	Moderate outreach; some programs are in place, but coverage is inconsistent, and many vulnerable individuals remain uninformed.	3
	Strong outreach; well-structured programs effectively reach most at-risk groups, providing essential information and support.	4

Category	Current Status	Score
	Comprehensive outreach; highly effective, inclusive, and sustained efforts ensure that all vulnerable groups are well-informed and protected.	5
Average Score		

B5. Policy and Governance Framework

Category	Current Status	Score
Existence of Heat-Related Policies	No heat-specific policies or regulations exist.	1
	Limited policies address heat risks, but they are neither comprehensive nor enforced.	2
	Some policies are in place, but gaps exist in implementation and enforcement.	3
	Strong policies with clear guidelines, though some areas still lack full implementation.	4
	Comprehensive heat action policies, with full enforcement and clear responsibility assigned to agencies.	5
Coordination Among Stakeholders	No coordination among relevant agencies, with disjointed efforts.	1
	Coordination exists on a limited scale, but with gaps in responsibility and communication.	2
	Coordination is somewhat established, with defined roles, but communication gaps persist.	3
	Strong coordination and roles defined, but with some minor overlaps or gaps.	4
	Excellent inter-agency coordination with clear roles and effective communication among all stakeholders.	5
Heat Action Planning and Budgeting	No specific budget or funding for heat action planning.	1
	Small, insufficient budget with no clear allocation for heat-related activities.	2
	Adequate budget allocation for some activities, but not fully integrated into the overall governance framework.	3
	Significant funding was allocated to heat action planning, but some gaps in resource distribution.	4
	Well-funded heat action plans with clear, sustainable financial resources and dedicated personnel.	5
Institutional Capacity and Training	No institutional capacity for heat action, and no dedicated training for relevant stakeholders.	1
	Limited institutional capacity, with few trained staff for heat response activities.	2
	Adequate institutional capacity with some staff trained in heat-related issues.	3
	Strong institutional capacity with regular training programs for key stakeholders on heat risk management.	4
	Highly skilled and well-trained institutional teams with robust capacity-building mechanisms in place.	5
Monitoring and Accountability	No system in place to monitor heat risk policies or hold agencies accountable.	1
	Limited monitoring and accountability mechanisms with no formal process for tracking performance.	2
	Monitoring mechanisms exist, but are not fully operational or lack transparency.	3
	Monitoring and accountability systems are in place and largely operational, though some areas need improvement.	4

Category	Current Status	Score
	Comprehensive monitoring and accountability systems in place with full transparency and regular evaluations.	5
Average Score		

B6. Financial Resources and Budget Allocation

Category	Current Status	Score
Availability of Budget	No budget allocation for heat action plans or related activities.	1
	Small, ad-hoc budget allocations are insufficient to address heat-related issues.	2
	Adequate budget allocation for some heat-related activities, but not comprehensive.	3
	Sufficient budget allocated to heat action plans, though some areas still face resource constraints.	4
	Comprehensive and sustainable budget allocation with dedicated funding for all aspects of heat action planning.	5
Consistency in Funding	No consistent funding for heat action programs; resources are sporadic and unpredictable.	1
	Irregular funding with occasional resources allocated, but no long-term planning.	2
	Moderate funding consistency, but gaps remain in long-term funding stability.	3
	Consistent funding is allocated annually for heat action activities, though some areas may need more resources.	4
	Stable, long-term funding sources with a clear commitment to financing heat action plans and resilience initiatives.	5
Resource Allocation for Vulnerable Groups	No specific allocation for vulnerable populations (e.g., elderly, outdoor workers, low-income communities).	1
	Limited allocation for vulnerable groups, insufficient for comprehensive outreach or protection.	2
	Adequate allocation for vulnerable populations, though gaps remain in some areas.	3
	Significant funding is directed towards vulnerable groups, but coverage still needs minor improvements.	4
	Comprehensive and targeted funding for vulnerable populations with full coverage across all needs.	5
Multi-Stakeholder Funding Partnerships	No funding partnerships with other organisations, agencies, or the private sector.	1
	Some partnerships exist but lack coordination or effective resource-sharing mechanisms.	2
	Moderate level of collaboration with external stakeholders for funding and resource-sharing.	3
	Strong partnerships with clear agreements for funding and resources from multiple sectors.	4
	Highly effective multi-stakeholder partnerships with robust resource mobilisation and joint funding efforts.	5
Funding for Monitoring and Evaluation	No dedicated budget for monitoring and evaluating heat action plans or programs.	1
	Limited funds for monitoring and evaluation, with little to no impact assessment conducted.	2
	Adequate budget allocated for monitoring and evaluation, but gaps exist in terms of implementation.	3
	Sufficient resources allocated for regular monitoring and evaluation, with some areas needing improvement.	4

Category	Current Status	Score
	Dedicated and sustainable funding for comprehensive monitoring, evaluation, and performance assessments.	5
Average Score		

22.3. Annex C: City Heat Action Plan Format

The full Table of Contents (TOC) and structure of the City Heat Action Plan (HAP) is available at this link: City Heat Action Plan (HAP) Format (ToC).

About Sustainedge

Sustainedge is an impact-focused organisation specialising in social sustainability, ESG and sustainability reporting, gender equality, climate change, and urban development. By integrating assessment, research, policy, advocacy, training, and implementation, we address complex social, environmental and governance challenges holistically. In collaboration with a wide range of stakeholders, we equip individuals, institutions, industries, and communities with the knowledge and tools to drive transformative, long-term sustainability initiatives that foster equity, resilience, and real-world change.

About AARD

Adaptation Action for Resilient Development (AARD) is a sustainability and resilience-focused organisation advancing climate adaptation, urban resilience, and adaptive development through research, policy, and action. AARD works with governments, institutions, and communities to design innovative, inclusive, and future-ready solutions for resilient cities and sustainable futures.

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