MASTER OF PUBLIC HEALTH

Johns Hopkins Bloomberg School of Public Health & IIHMR University

PRACTICUM REPORT

By

Shrutika Rane

Cohort-11

(2023-2025)

Under the Guidance of

Dr Seema Mehta

Professor, IIHMR University, Jaipur, Rajasthan

&

Dr Vishwas Chitale

Senior Programme Lead, Council on Energy, Environment & Water, New Delhi

CERTIFICATE FROM FACULTY ADVISOR

TO WHOM IT MAY CONCERN

This is to certify that Shrutika Rane, a student of the Master of Public Health Program offered by IIHMR University, Jaipur in cooperation with Johns Hopkins Bloomberg School of Public Health, Baltimore has undergone Practicum Training at the Council on Energy, Environment and Water (CEEW), New Delhi, India from 10th February 2025 to 9th May 2025.

The candidate successfully carried out the study designated to her during practicum training, and her approach to the study was sincere, scientific, and analytical.

The Practicum Training is in fulfillment of the course requirements.

I wish her success in all her future endeavours.

Dr. Seema Mehta
Practicum Advisor
Professor, IIHMR University, Jaipur

CERTIFICATE BY SCHOLAR

This is to certify that the Practicum Project submitted by me, Shrutika Rane, with Enrolment No. IIHMR-U/07/2023-2025/0065 and Hopkins ID: CE00CB under the supervision of Dr. Seema Mehta (my practicum advisor) and Dr Vishwas Chitale (my preceptor) for the award of Master of Public Health carried out during the period 10th February 2025 to 9th May 2025 embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other Institute or other similar institution of higher learning.

Shrutika Rane
MPH Cohort 11
2023-25

CERTIFICATE FROM ORGANIZATION

Dr Vishwas Chitale
Senior Programme Lead - Climate Resilience

19 April 2025

To Whom It May Concern:

This is to certify that Dr. Shrutika Rane, a student of Master of Public Health at IIHMR University and Johns Hopkins Bloomberg School of Public Health, was posted at the Council of Energy, Environment and Water for Practicum Training under my guidance from 10th February 2025 to 15th April 2025.

During her Practicum Training at CEEW, Dr. Shrutika Rane showed good competency and dedication towards her work on heat resilience. She was found to be hard-working, highly motivated and proactive to pick up on new work.

My best wishes for her endeavors.

Dr. Vishwas Chitale
Senior Program Lead
CEEW, New Delhi

ACKNOWLEDGEMENT

This practicum report was done under the guidance of Dr Seema Mehta (Professor, IIHMR University, Jaipur, India) and Dr Vishwas Chitale (Senior Programme Lead, CEEW, New Delhi). I would like to express my sincere gratitude to my mentor and professor, Dr Seema Mehta, for her constant support and guidance throughout my MPH journey. I would also like to thank Dr Vishwas Chitale for allowing me to work under this organization, and I am fortunate enough to have had a national level exposure towards the development of Heat Action Plans of various cities in India.

I am thankful to my colleagues at JHU-BSPH, IIHMR University, and CEEW, who helped me make my MPH journey a memorable one.

Lastly, I would like to take this opportunity to thank my parents, siblings, and friends, who have always inspired and supported me in all of my academic endeavours. I'm also grateful to my partner for always believing in me and guiding my future steps.

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ABBREVIATIONS

CEEW- Council on energy, environment and water

HAP- Heat Action Plan

HSBC- Hongkong and Shanghai Banking Corporation

IMD- Indian Meteorological Department

IMDAA- Indian Monsoon Data Assimilation and Analysis

IPCC- Intergovernmental Panel on Climate Change

MoES- Ministry of Earth Sciences

NCDC- National Center for Disease Control

NDMA- National Disaster Management Authority

NPCCHH- National Program on Climate Change and Human Health

RCM- Regional Climate Model

RNP- Rohini Nilekani Philanthropies

SDMA- State Disaster Management Authority

WMO- World Meteorological Organization

1. Practicum Details

Duration: 10th February 2025 to 9th May 2025

Hours:160+ hours

Name of the Institute: Council on Energy, Environment and Water, New Delhi.

Name of the Division of Internship: Climate Resilience

Supervisor: Dr Vishwas Chitale, Senior Program Lead

Faculty Advisor: Dr Seema Mehta, Professor, IIHMR University, Jaipur

2. Learning Objectives

1. To gain a deeper understanding of developing city-specific Heat Action Plans at a granular level.
2. To analyze the intersection of climate resilience and public health and find gaps to develop appropriate heat risk-reducing strategies.
3. To perceive the importance of multisectoral collaborations in boosting urban climate adaptation and resilience efforts.

3. About the Organization

The Council of Energy, Environment, and Water (CEEW) is a prestigious think tank situated in New Delhi, India. The organization is a pioneer in Asia for climate-related public policy research and advocacy in the not-for-profit sector. Established in 2010 to form a world-class institute, focusing on real-life challenges with a cross-border and collaborative approach to finding evidence-based solutions[2]. CEEW has three verticals under which public policy research is conducted:

1. Transformations: Low carbon economy, Power markets, Industrial Sustainability, and Sustainable Livelihoods[1]
2. Quality of Life: Clean air, Sustainable water, Sustainable food systems, and Sustainable mobility[1]
3. Enablers: Sustainable finance, Technology futures, Circular economy, Climate resilience, and International Cooperation[1].

With offices also based in Lucknow, Uttar Pradesh, CEEW has conducted research in 22 plus states of India, 680 plus state collaborations, and additionally has been catalogued twice in the 20 best climate think tanks globally. CEEW is a self-governing research institute securing its capital resources through public grants, philanthropic foundations, private organizations, and CSR funds[1,2].

a) Mission Statement:

"To identify integrated solutions for achieving balanced growth and development in India, focusing on energy, environment, and water as interconnected issues."[1]

b) Core Values:

CEEW conducts its research and advocacy based on these three foundational values

1. Integrated: collective and collaborative action to be based with due regard for different disciplines, cultures, groups, and points of view
2. International: conducting relevant global research through the understanding of international challenges
3. Independent: there is no overlap in the research findings and the organization sponsoring the project.

c) Some of the projects undertaken by CEEW:

1. Mapping India's energy policies
2. Strengthening climate-resilient water supply in Gujarat
3. National Dialogue: Green Finance in Urban Local Bodies
4. Powering India's Future: Policy, Markets, and Innovation for a Clean Grid
5. How can India meet its rising power demand? Pathways to 2030
6. Enhancing India's Urban Heat Resilience
7. Trust and transparency in climate action: Revealing developed countries' emission trajectories
8. Multistakeholder workshop between CEEW and UK Government: Leveraging innovative financial solutions to build climate resilience of urban infrastructure
9. How can India enable a people-centric clean energy transition? Framework for responsible renewable energy deployment
10. How can India make its health sector climate resilient? A district level assessment
11. Making India's healthcare sector climate resilient. A district level framework
12. Enhancing India's disaster preparedness with technology
13. Managing forest fires in changing climates
14. Climate change, air pollution, and human health in Delhi

15. Predicted increases in heat-related mortality in urban India
16. Catalyzing local action for clean air
17. Healthy soil for a prosperous India: A roadmap for sustainable soil management
18. Mainstreaming micro solar pumps to improve incomes of marginal farmers
19. Are G20 countries delivering on climate goals? Tracking progress of commitments to strengthen the Paris Agreement
20. What gets measured, gets done: Leveraging transparency to improve loss and damage response
21. Supporting climate policy for Indian states: learnings from long-term modelling
22. How can India enable a people-centric clean energy transition? Framework for responsible renewable energy development
23. How a green economy can deliver jobs, growth, and sustainability in Odisha
24. Unlocking India's circular waste economy potential for sustainability
25. Policy study on energy transition roadmap 2030
26. Strengthening India's clean energy supply chains: Building manufacturing competitiveness in a globally fragmented market
27. Vietnam grid integration guarantee: A financial solution to mitigate curtailment risk for renewable energy projects
28. Reach for the sun: the emerging market electricity leapfrog
29. Cheaper finance is key to lowering RE tariff in Indonesia
30. Assessing Risks to India's Drinking Water, Sanitation, and Hygiene Systems from Extreme Climate Events

d) Involvement of the intern in the ongoing project at CEEW:

Per the discussion with the practicum preceptor, Dr. Vishwas Chitale, it was finalized that the trainee will work on the project "Enabling Urban Heat Resilience". The project is funded by the Hong Kong and Shanghai Banking Corporation (HSBC) and Rohini Nilekani Philanthropies (RNP) from 2024 through 2026.

e) About the project

This practicum work is based on the ongoing project "Enhancing India's Urban Heat Resilience" by the CEEW, New Delhi climate resilience team, under the leadership of Dr. Vishwas Chitale. The project aims to develop an integrated city-level Heat Action Plan (HAP) to reduce heat-related morbidity and mortality across 300 cities in heatwave-prone states of India over three years. The policy document utilizes granular data provided by the municipality/ municipal corporation level to identify heat-vulnerable wards of the city. It takes on a multifold assessment of contributing factors for the increased heat risk in the wards, along with context-specific heat mitigation and adaptation strategies.

The HAP is developed using the National Disaster Management Authority's (NDMA) framework of "when-where-who-how" which outlines the strategies for safeguarding, readiness, risk reduction, multisectoral collaboration, and impact assessment of the heatwave counteraction response activities[9]. The focus of these HAPs is to aid city administrators in planning, implementing, monitoring, and evaluating evidence-based, organized heatwave response activities to reduce the heat health burden in the context of the rise in warm days and nights as forecasted by the Indian Meteorological Department (IMD) and World Meteorological Organization (WMO).

The Objectives of the project is

1. To address gaps in the existing heat action plans and formulate an enhanced heat mitigation plan utilizing robust, context-specific data.
2. To assess the amalgamation of heat resilience into the conventional urban policies by developing an inclusive theory of change devised by adopting quantitative indicators such as the number of cities adopting the HAP and a reduction in heat-related morbidity and mortality.
3. To conduct consultations with city officials to secure their buy-in on the implementation of heat action plans.

4. Practicum report

a) About the practicum project

- Title of the practicum project

Strengthening Gujarat's Urban Heat Resilience- a focus on 10 cities

- Project-specific responsibilities of the intern

As a team member, I contributed to the project through collaborative planning and stakeholder engagement. My involvement included:

- Reviewing internal documents
- Participating in implementation activities
- Supporting the review of scalable heat resilience interventions.
- Assisting in planning and coordinating stakeholder consultation workshops with government representatives from high-risk city areas.

- Objectives of the project

1. To review the status of heat resilience in Gujarat.
2. To study the project plan and implementation methodology, including timelines, as a team member
3. To boost resilience and mitigate heatwave-related health outcomes, emphasizing protecting vulnerable and marginalized populations.
4. To conduct stakeholder consultations by organizing workshops with government representatives from the city's most at-risk areas using Morgan's 4P methodology

b) Current Status in Gujarat

The IMD announced February 2025 to be the hottest month in the past 125 years, with states such as Goa and Maharashtra declaring heat waves before the commencement of the summer season. The top meteorological office of the nation, IMD, in 2024, for the first time, released data on warm nights. Collecting and analysing nighttime temperatures is crucial as high thermal levels at night prevent the body from recovering from the physiological stresses experienced during the day. In February 2025, 31 states and UTs of India recorded nighttime temperatures 1°C higher than the average, of which 22 states and UTs recorded an increase of 3 to 5°C rise in nighttime temperatures above normal[3].

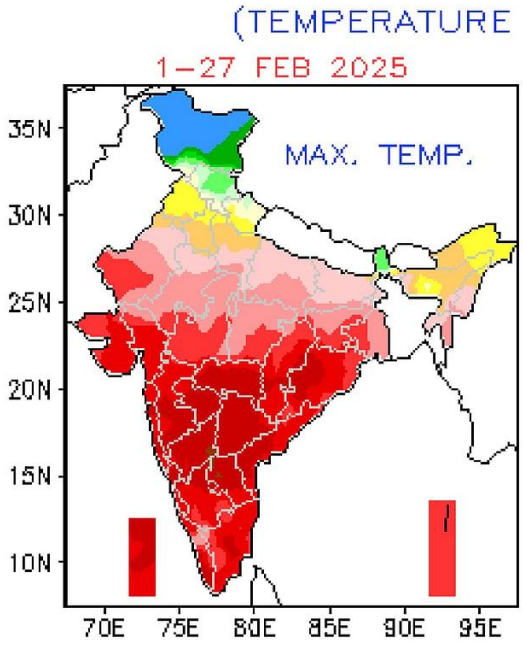
Figure 1: States and UTs recording nighttime temperatures above 5°C in February 2025

10 States/UTs where night temperature was above normal by 5.1 °C or more at least once during Feb 11 t0 23, 2025	• **2 states** in the Central region (Gujarat, Odisha • **5 states** in East and North East region (Assam, Bihar, Meghalaya, Tripura,West Bengal) • **2 states** in the Northwest region (Jammu and Kashmir, Rajasthan) • **1 state** in Southern Peninsula (Karnataka)

Source: Down to Earth, 2025[3]

As predicted by climate assessment models and findings from the Intergovernmental Panel on Climate Change (IPCC) AR 6, there is an alarming trend in the rise of daytime and nighttime temperatures exacerbated by climate change factors[5]. The brunt of this is faced by the vulnerable and marginalized sections of society with poor access to cooling technology. There have been nearly 25,716 heat-related deaths in India between 1992 to 2016, and with an increase in the intensity and frequency of hot days and nights, this number is expected to rise[6].

Figure 2: Temperature variation across India from 1st to 27th February 2025



Source: Down to Earth[7]

India ranks amongst the most susceptible to climate change impacts, as per the 2024 Climate Change Performance Index[10]. Of these, Gujarat is the second most susceptible to climate threats across the nation, according to studies by the Indian Council of Agricultural Research. Out of 33 districts, 14 districts rank in the “very high” and 6 districts in the “high” category of vulnerability indices[17].

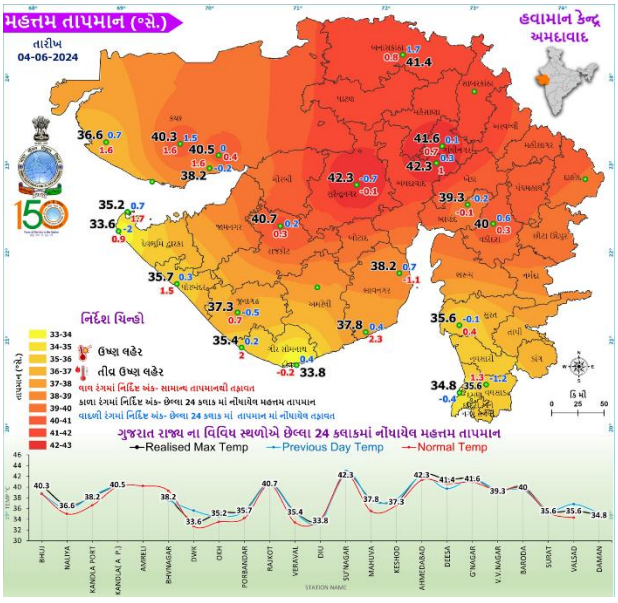
In these concerning scenarios, the nation must be prepared to develop policies incorporating the now, through climate adaptation guidelines, and the tomorrow, through climate mitigation strategies. Building climate resilience in the fabric of society is the only way forward to reduce the impact of climate change, shield vulnerable communities, and establish an equitable future while ensuring sustainability.

In 2024, intense and frequent heat waves were recorded in 23 heatwave-prone states, of which 37 cities recorded a consistent daytime temperature of 45 C and above, resulting in

25000 heatstroke cases across the nation in May and June alone. However, as per NDMA records, even though the frequency of these silent disasters- heatwaves has been on the rise, heat-related morbidity has been declining. The debut and acceptance of Heat Action Plans are primarily responsible for this minimization[10]. HAPs are guidelines provided at the administrative level to undertake pre-heat, during heat, and post-heat evidence-based strategic activities to mitigate heat health outcomes whilst focusing on the protection of vulnerable and marginalized populations who are at a greater risk[11].

The first heat action plan of South Asia was rolled out in 2013 by Ahmedabad Municipal Corporation after documenting several heatwave-related deaths in 2010. The plan is recognized as a victorious model in reducing heatwave-related mortality in the city of Ahmedabad during the peak summer season. It has attributed to 1100 fewer heat-related mortalities every year, with the largest decline of 27% in deaths during the most blazing days of summers.

Figure 3: Maximum temperature for the state of Gujarat, 2024



Source: IMD, Ahmedabad, Gujarat

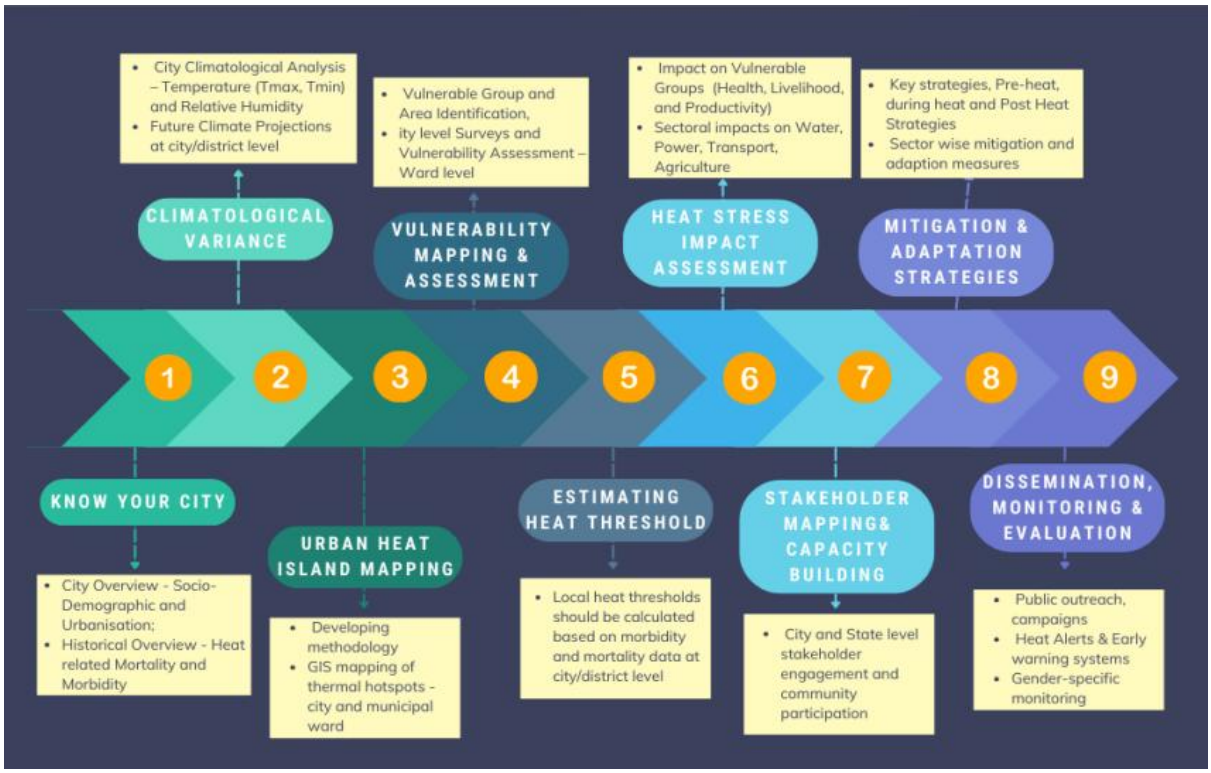
After the success of Ahmedabad HAP, NDMA advised 23 other heatwave-prone states to develop HAPs of their own and provided guidelines for the same[13]. As of 2023, 23 states and over 120 districts of India have operational HAPs[8]. An evaluation of 37 HAPs by the Center for Policy Research reported a lack of capital resources for the implementation of strategies, poor consideration for regional settings, and a low focus on susceptible groups[15]. HAPs are vital for awareness creation and providing administrators with data-driven, contextual short and long-term strategies for building climate resilience with the sole purpose of no loss of life to be incurred due to heat[14].

c) Project Plan and Implementation Methodology

Developing HAPs utilizing various climate datasets and projections provided by Indian Monsoon Data Assimilation and Analysis (IMDAA) and Regional Climate Models (RCMs) from the Ministry of Earth Sciences (MoES) based on the NDMA guidelines and the formats provided by the National Center for Disease Control (NCDC) and National Program on Climate Change and Human Health (NPCCHH).

The project is to be carried out in a phased manner, with overlapping of some activities over 33 months. The intern joined in the second year of the implementation of the project. Per the discussions with the project leader and other team members, as well as the access granted to project-related documents, the trainee was to get a comprehensive understanding of the project by navigating NDMA's HAP guidelines, IPCC AR 6 findings, NPCCHH modules on HAP implementation, and the Sendai framework.

Figure 4: Guideline for developing Heat Action Plan



Source: SOPs for developing a climate adaptive and inclusive Heat Action Plan[10]

Table 1: Implementation month and activities to be performed

Sr. No.	Activity to be undertaken	Month
1	Selection of cities based on heatwave proneness	Month 1
2	Modelling of Heat Hazards in Cities	Month 2,3, 4
3	Developing Bio-Meteorological city-specific heat thresholds	Months 4, 5, 6
4	Data collection and multistakeholder consultations for ward-level heat risk quantification	Months 2 to 12
5	Developing the Heat Risk Index at ward level	Months 13, 14, 15
6	Multistakeholder consultations	Month 14, 15, 16, 17, 18, 19

7	Development of short-term and medium-term actions focused on preparedness and response for heat waves	Months 13 to 19
8	Developing long-term actions for Heatwave Risk Mitigation strategies	Months 13 to 19
9	Stakeholder consultation	Month 20, 21, 22, 23, 24, 25
10	Development of innovative IEC materials	Months 2 to 8
11	Capacity building initiatives	Months 20 to 30
12	Writing and designing the HAPs	Months 24 to 33
13	Developing an integrated web-based decision support system and mobile app for HAP for 300 cities	Months 6 to 33

Source: Project Proposal

d) Stakeholder consultation methodology:

The objectives of conducting consultation workshops with the governmental representative of the city's most at-risk are:

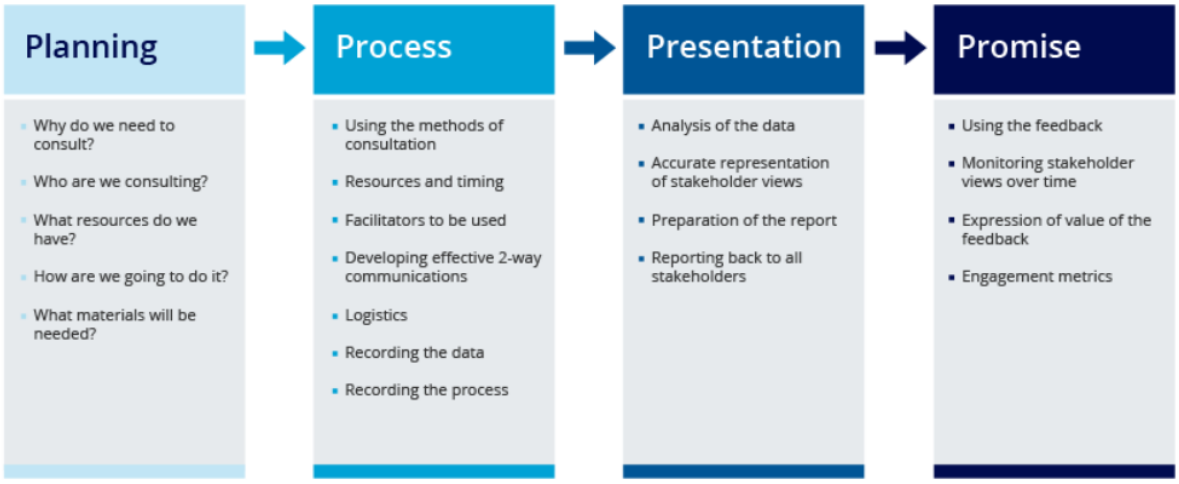
i. Confirm the data analysis conducted by the team, whether it matches the ground reality and lived experience of the residents of these cities,

ii. Find gaps in the data analysis and contextual understanding

iii. Form the heatwave taskforce committee comprising of different departmental representatives who will undertake various roles and responsibilities

iv. Present context-based solutions for heat mitigation.

Figure 5: Stakeholder consultation methodology



Source: Morgan, 2024[16]

1. Stakeholder Participation

   The Climate Resilience team at CEEW conducts consultation workshops in collaboration with the State Disaster Management Authority (SDMA) under the guidance of the relevant authorities, such as the CEO and the Deputy Officers. They circulate letters to the chiefs of the municipalities/ municipal corporations to nominate relevant city officials for the consultation on confirming and finalizing the HAP.

2. Context setting with a mini-quiz

   On the day of the workshop, experts from the CEEW Climate Resilience team present the analysis from the data provided by the cities on various socio-economic indicators, the trends in extreme heat events for the state as well as the city, health system preparedness and response, urban climate adaptation and mitigation planning solutions, and financial modes to fund the heat mitigation solutions. Prior to the presentation, a mentimeter quiz is conducted to create awareness on the facts of the implications of climate-related heat waves on the environment as well as human health.

3. Focus Group Discussions

In the second half of the workshop, each member of the CEEW team convenes with the city officials and confirms whether the analysis made by the team aligns with their day to day experience as residents of the city, the contributing factors for particular wards to be at high or very high risk conforms with their understanding of the locality, the mitigating solutions that they find most applicable and contextual to their city, additions based on the recommendations made by the officials, along with the formation of Heatwave Taskforce Committee and the roles and responsibilities to be assigned in the stakeholder responsibility matrix of the plan.

4. HAP finalization

In the final leg of drafting the HAP, the recommendations from the SDMA and city officials are taken under consideration, data analysis not aligning with representatives subjective experience is reassessed, local contextual solutions are added and then sent to the SDMA for final approval, who then sends out these plans to the relevant municipalities/ municipal corporation executives to then implement the plan during heatwave season.

Expected outcomes:

- The workshop aims to understand the lived experiences of the city representatives and translate them into context-specific heat mitigation strategies that align with the needs and expectations of the residents
- Involving city administrators in the formation of the Heatwave Taskforce Committee ensures that decision-making powers lie with the appropriate department or individuals and promotes accountability.
- Frequent consultations with the government executives facilitate inclusive and sustainable solutions

5. Roles and responsibilities during internship

1. Drafting and analysis of 10 city HAPs for Gujarat
2. Supporting and reviewing 10 city HAPs of Odisha before their launch
3. Supporting the team with literature reviews
4. Writing reports to support governmental requests on regional climate adaptation and mitigation efforts.
5. Analysing the intersection of climate change and public health resilience for undertaking future research projects
6. Participating in multistakeholder consultation workshops conducted in collaboration with the Gujarat and Odisha State Disaster Management Authority on HAP development.
7. Responding to research requests from senior researchers, discuss research needs, and prepare responses that synthesize and analyze information.
8. Aiding in the preparation of factsheets and other reports

6. Challenges faced

Climate resilience is a field requiring a multidisciplinary skill set that is not necessarily a part of the intern's formal education training. An added effort had to be taken to understand the frameworks and guidelines that are vital for the preparation of HAPs.

7. Key learning from the practicum

My time at CEEW has taught me the importance of multisectoral collaborations between agencies for the smooth adoption of any policy document. I was fortunate enough to have been exposed to the consultation workshops to understand the behind-the-scenes know-how of the development of city-specific heat adaptation and mitigation plans.

8. **References**

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