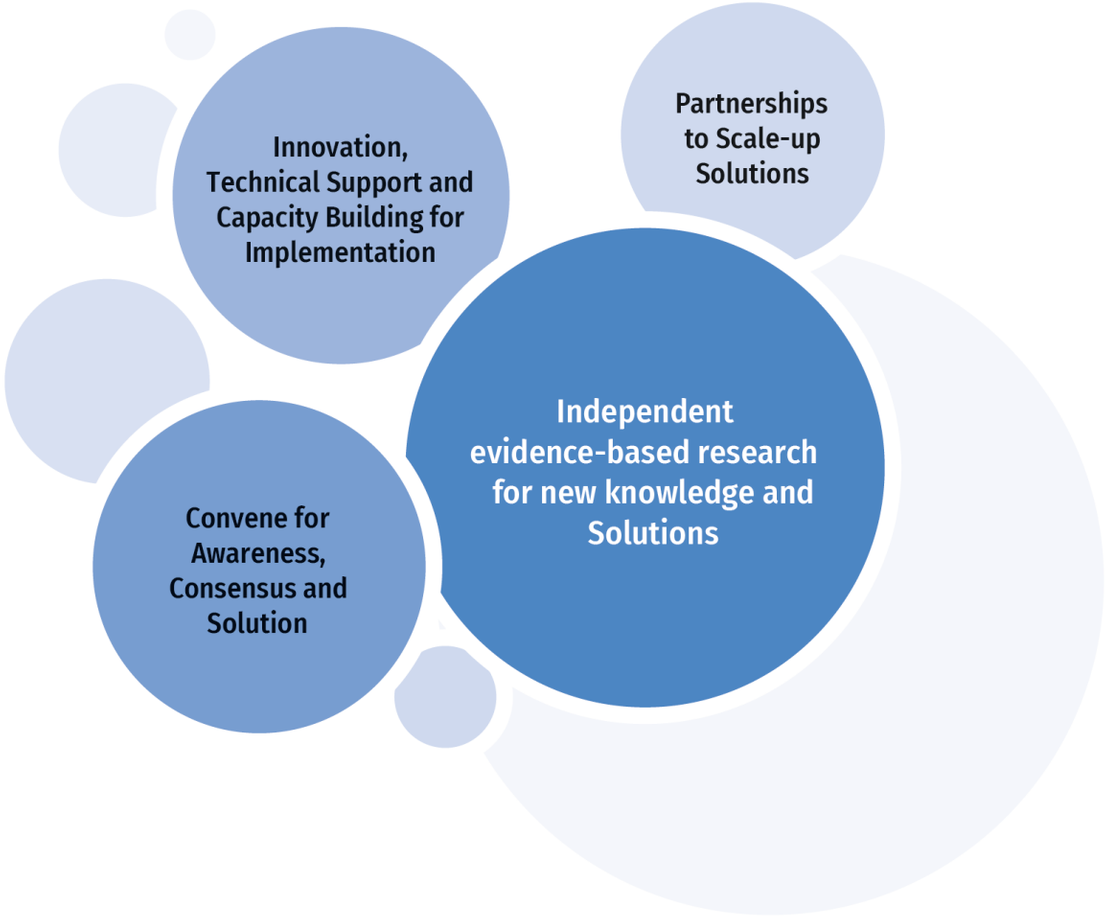
iFOREST

INTERNATIONAL
FORUM
FOR ENVIRONMENT,
SUSTAINABILITY
& TECHNOLOGY

Making climate action &
environmental protection a peoples' movement

About us

- An **independent non-profit research** and **innovation** organisation, established in 2019 to identify, promote and scale-up solutions for pressing environment-development challenges in the **global south**.
- Our work is guided by a commitment to **sustainability** and **equity**, ensuring that our solutions are socially just, environmentally responsible and economically affordable.
- We conduct evidence-based research, develop **new knowledge** and **innovative solutions**, **convene** stakeholders to increase awareness and **build consensus**, and **partner** with think tanks, civil society, government agencies, philanthropies and industry to **scale up solutions**.



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Strategic Priorities & Programmes

Just Transition
- Just Energy Transition
- Industrial Decarbonisation

Green Energy
- Green Energy in 'Non-RE' states
- DRE for livelihoods

Urban Transition
- Climate Resilient Cities
- Green Mobility Transition

Natural Resource Management
- Forest Fire
- Climate-resilient Agriculture

Waste & Pollution
- Clean Air Action Plan
- Municipal Waste & Methane
- Single-Use Plastic & EPR Management

Strengthening Environmental Governance
- Climate Law & Institutions
- International Climate Governance
- Domestic Environmental Governance & Institutions

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Side Event

Integrated Heat and Cooling Action Plan

Panellists

1. Chandra Bhushan, iFOREST, India
2. Cornelius Rhein, European Commission
3. Dr. Ezzat Lewis, Egypt
4. Joseph Amankwa, Ghana
5. Leslie Smith, Grenada
6. Sukumar Devotta, TEAP, India

Thursday, 11th July 2024

Integrated Heat and Cooling Action Plan

Dr Chandra Bhushan
President & CEO
International Forum for Environment, Sustainability & Technology (iFOREST)
New Delhi, India

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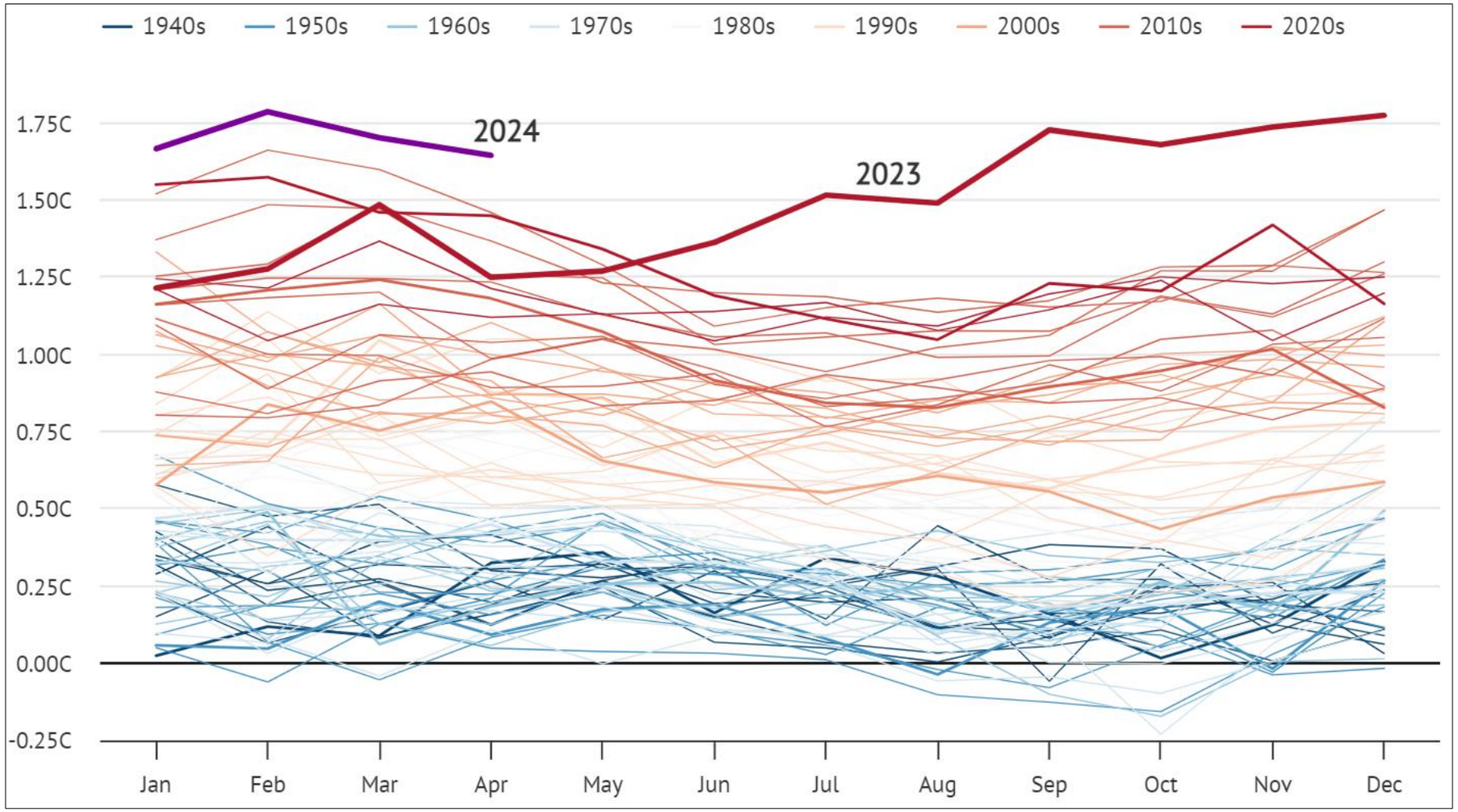
Facing the Heat

2023: 1.45°C above the pre-industrial baseline, hottest year on record.

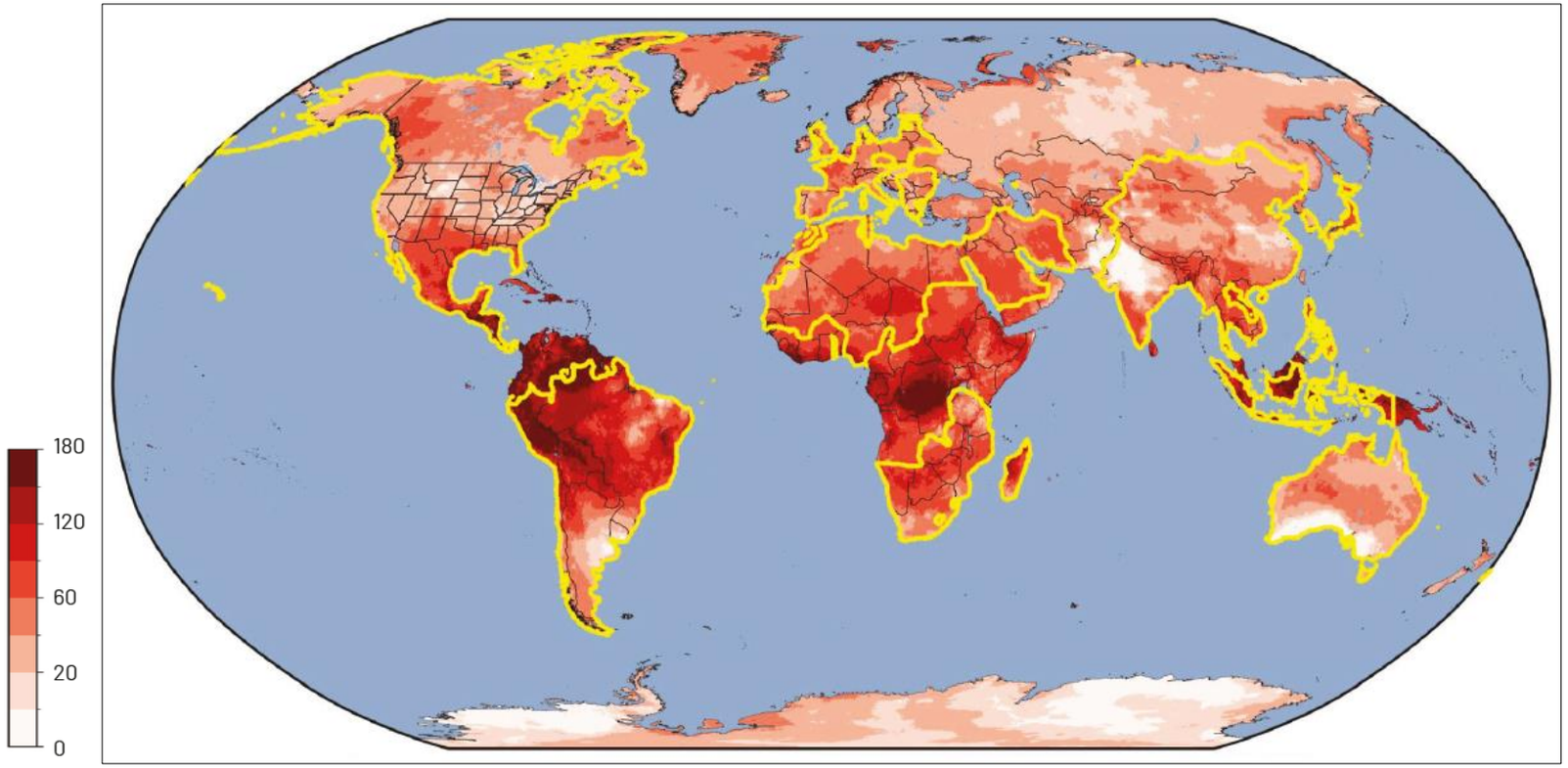
2024–2030: High probability to surpass the 1.5°C guardrail.



Monthly global average temperature anomaly from the 1940s to 2024

Facing the Heat

More than 6.3 billion people -- 78% of the global population -- experienced at least 31 extreme heat days between May 2023 to May 2024 *(defined as days hotter than 90% of temperatures observed in their local area over the 1991-2020 period)*.

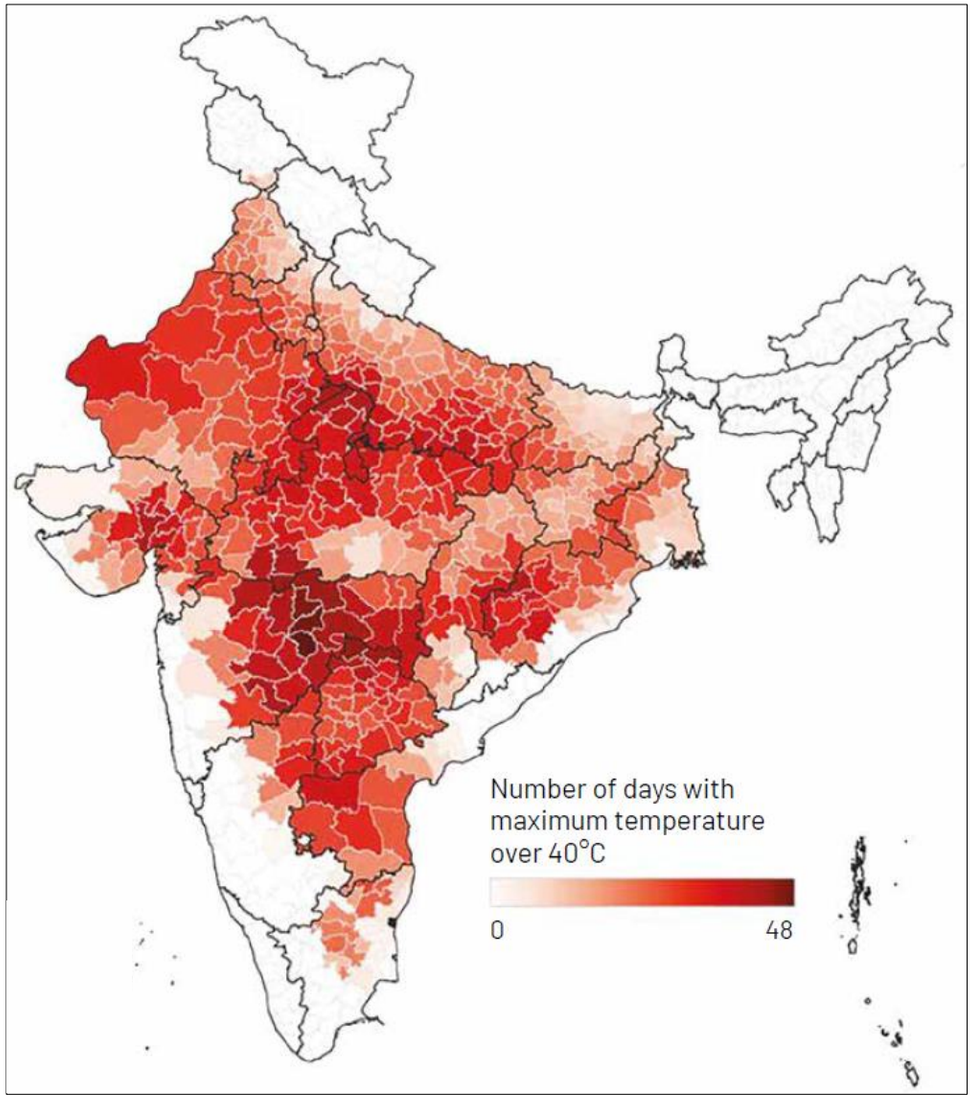


Number of increased extreme heat days across the world in 2023-2024

Unprecedented Heat Extreme in India in 2024

From April until July, India experienced one of its worst-ever and longest-running heat waves.

- Temperatures during this period reached 50°C, with a night-time low of 37°C, the highest ever recorded.
- It left at least 40,000 people with heatstroke and over 100 dead (an underestimation).
- During April and May, over 500 of the 741 districts in India, 70% of the total districts, reported a daily maximum temperature of 40°C at least once.

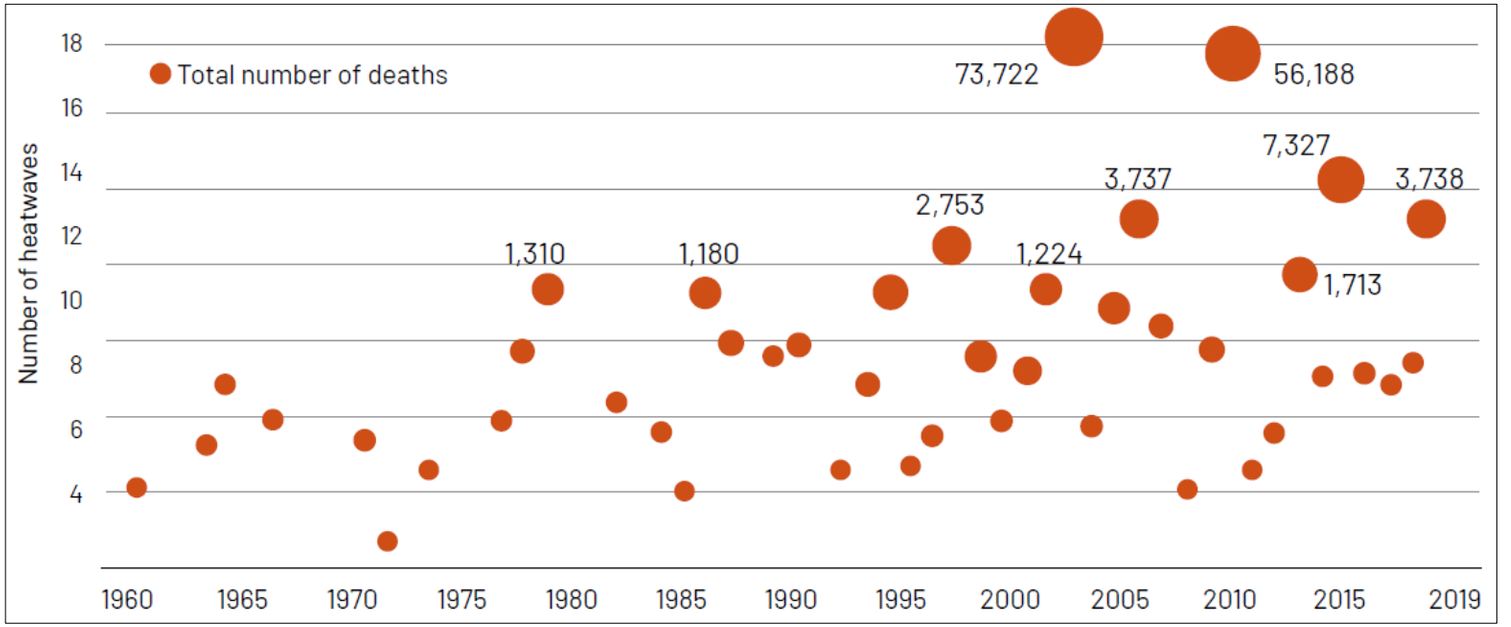


Number of days with maximum temperature over 40°C

Escalating Impact of Heat Waves

Heat stress has significant impacts, ranging from mortality, morbidity, labour productivity, and well-being in general.

Heat stress claims more lives worldwide than any other climate-related disaster.



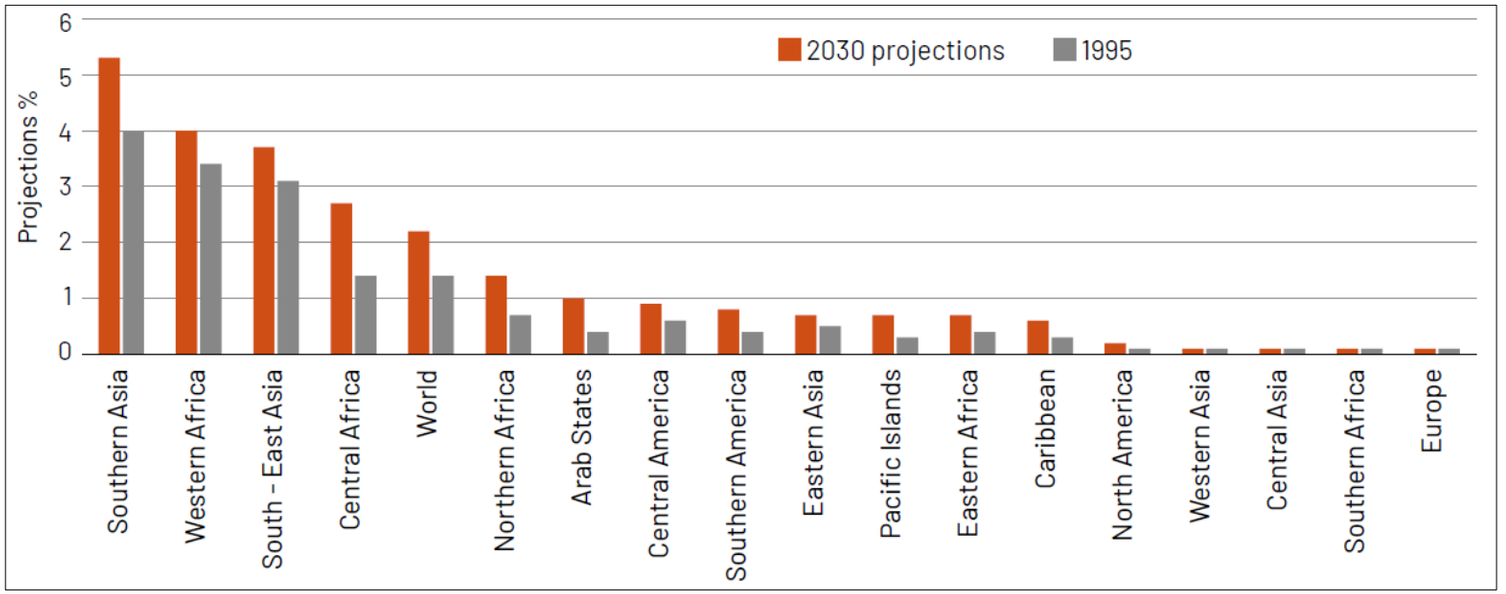
Total number of heat wave days and deaths from 1960 to 2019

Escalating Impact of Heat Waves

By 2030, it is projected that more than 2% of total working hours worldwide will be lost annually due to heat stress.

The loss of working hours is expected to reach 5% in parts of Southern Asia and Western Africa.

This will cost trillions of dollars to the economy.



Working hours lost to heat stress (by subregion)

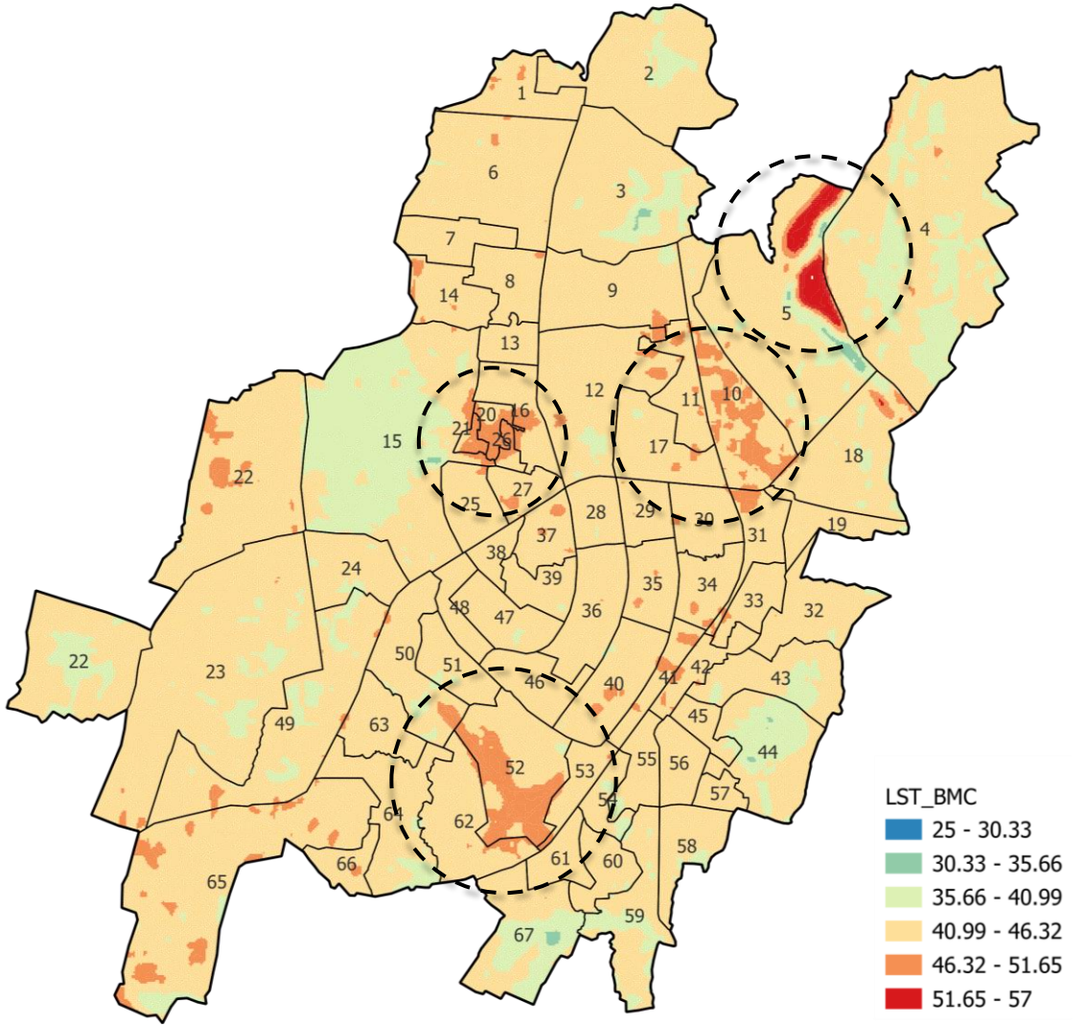
Cities on the Brink

Urban areas encounter higher temperatures than their surrounding areas due to the urban heat island (UHI) effect.

UHI primarily due to:

- **Urban surfaces:** Absorbs more heat and poor albedo.
- **Urban geometries:** Reduced circulation & heat trapping.
- **Anthropogenic heat:** Waste heat from vehicles and cooling devices.

Research done by iFOREST on Indian cities has revealed that UHI can lead to temperature increase by up to 8°C.



Heat hotspots for the city of Bhubaneswar

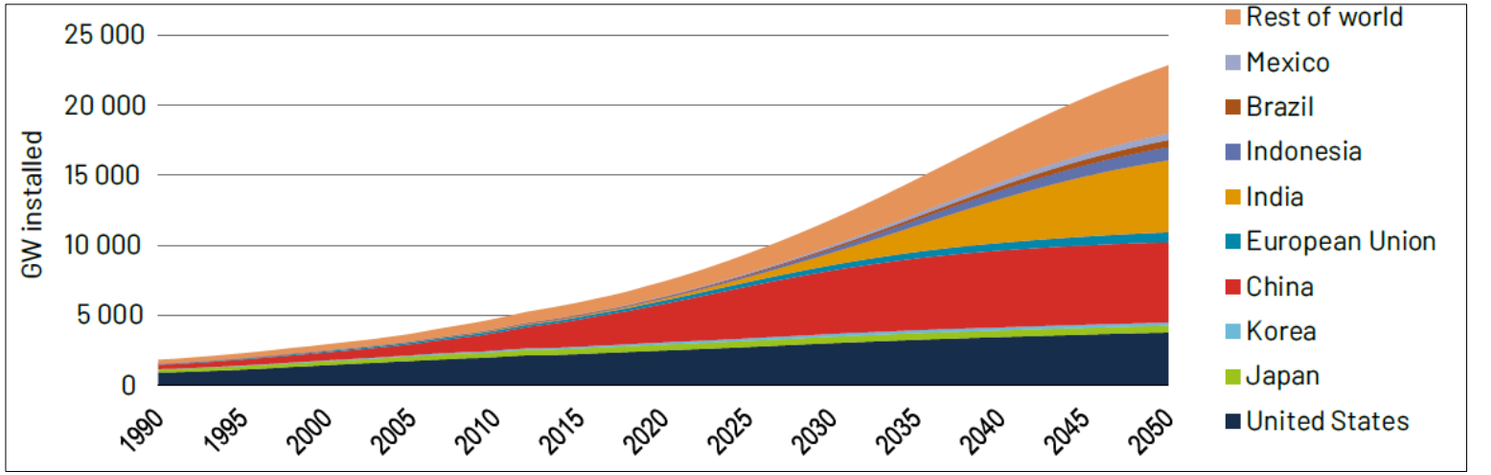
The Cooling Challenge

Vicious cycle of increasing heat and cooling demand.

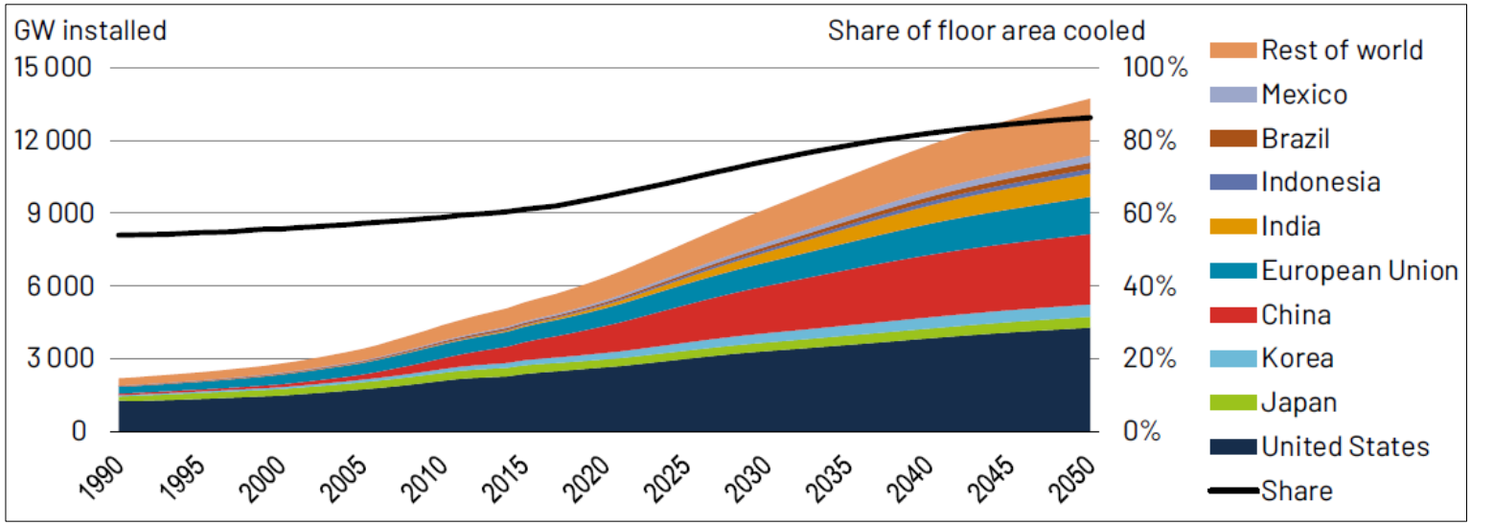
IEA projections:

- In the residential sector, space cooling is expected to increase nearly fourfold from 6,200 gigawatts (GW) in 2016 to almost 23,000 GW in 2050.
- In the commercial sector, the cooling capacity grows from 5,500 GW to slightly less than 14,000 GW.

An underestimation for northern hemisphere?



Increase in residential cooling capacity by country/region

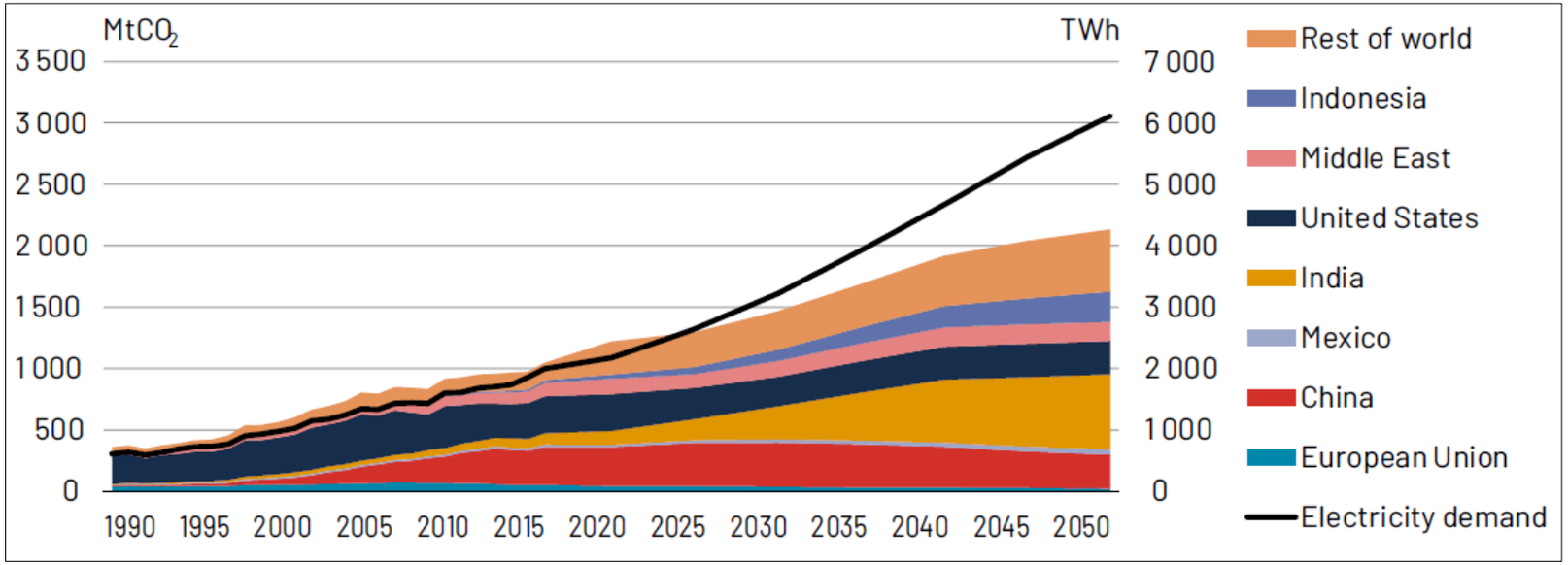


Increase in commercial cooling capacity by country/region

The Cooling Challenge

The increased energy demands for cooling have led to the installation of new fossil-fuel power plants. **This has slowed the decarbonisation process and heightened reliance on fossil fuels for power generation.**

Emissions are expected to double from 1,135 million tonnes (Mt) in 2016 to 2,070 Mt in 2050.



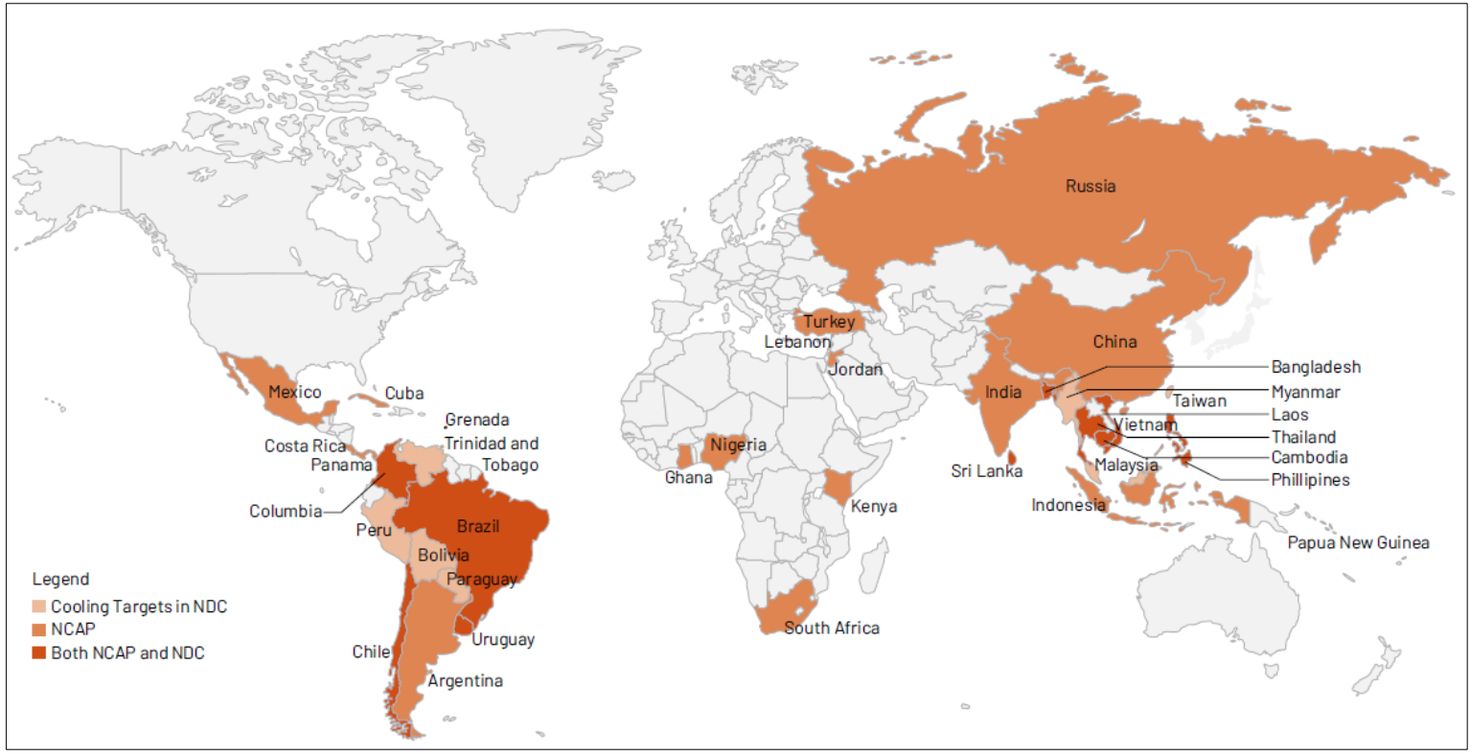
Increase in electricity demand and CO2 emissions from space cooling by country/region

National Cooling Action Plans

Long-term strategies for achieving sustainable cooling objectives at the national level. This includes enhancing energy efficiency, reducing cooling and refrigeration demands, green building targets etc.

Presently, about 39 countries are at different stages of NCAP development.

Several countries are integrating cooling into their NDCs.

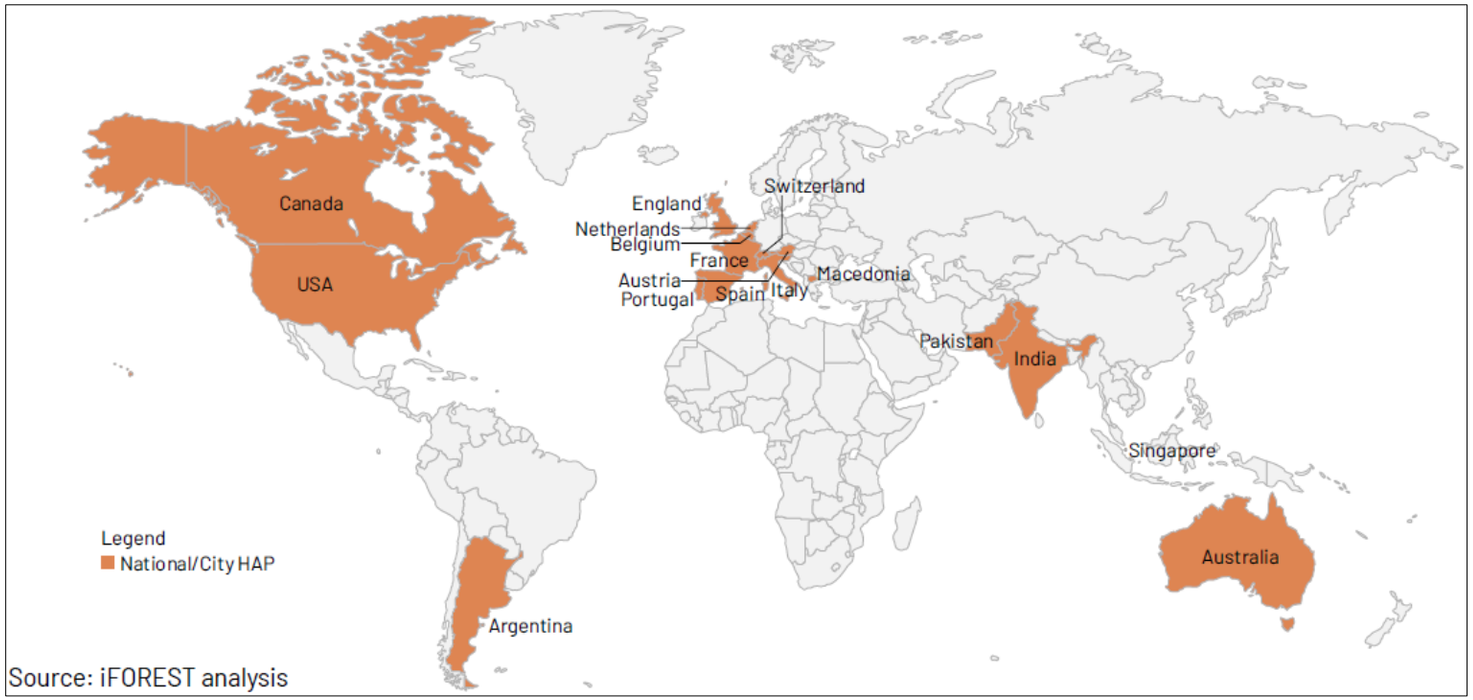


Countries which have developed the NCAP

Heat Action Plans

HAPs are developed at the sub-national/ city level to establish a framework for preparing for, responding to, recovering from, and learning from heat waves. **At least 700 cities worldwide have developed HAPs.**

- Early warning system
- Action plan for vulnerable areas and populations
- Provision for cooling
- Building critical health, water, & energy infrastructure.
- Establishing nodal agency, defining agency-wise responsibility and coordination
- Public Awareness, community outreach & capacity building



Countries which have developed city level HAP

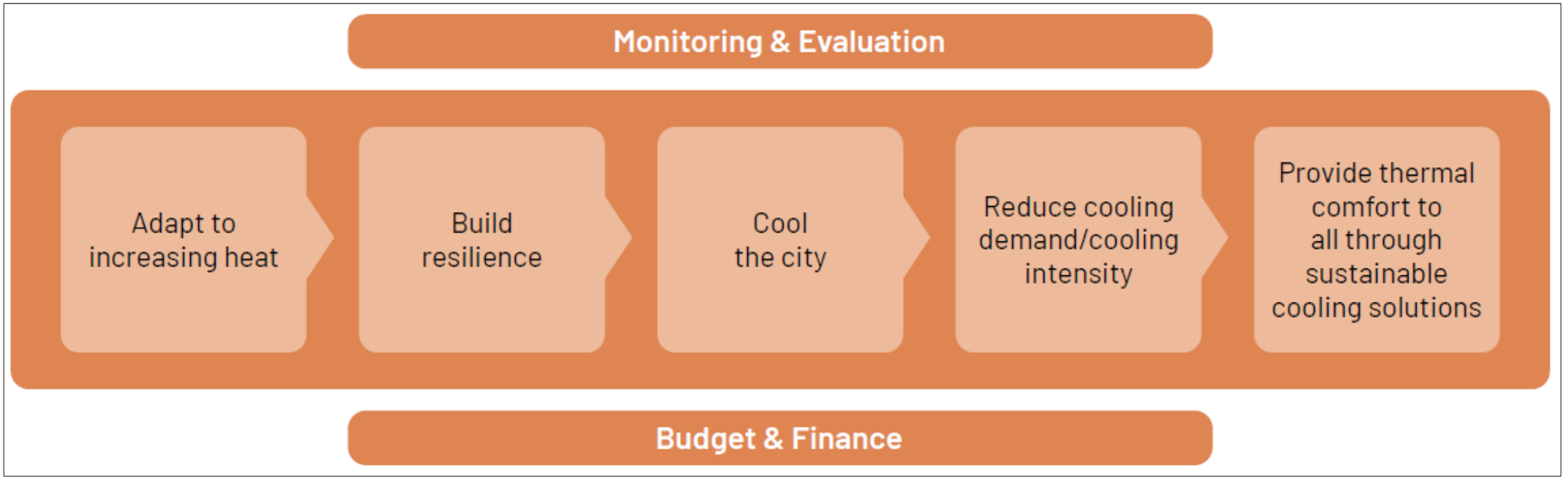
Disconnect between HAP and NCAP

1. **HAPs:** Only focusing on heat management and protecting people from extreme heat, overlooking sustainable cooling solutions and measures to reduce heat within urban areas and buildings.
2. **NCAPs:** Promotes sustainable cooling, but overlooks the essential aspect of reducing heat, which is critical in reducing cities' growing cooling demand.
3. **Spatial and policy disconnect:** While HAPs are essentially implementable at the city-level, NCAPs are country-level strategies.

To overcome the existing gaps and inefficiencies and to address the dual challenge of increasing heat and cooling demand, we are proposing a framework for Integrated Heat and Cooling Action Plan (IHCAP) at the city level.

Proposed framework for IHCAP

Five Pillars of IHCAP



Budgeting and Finance and Monitoring and Evaluation are overarching aspects to ensure the action plans achieve their intended goals.

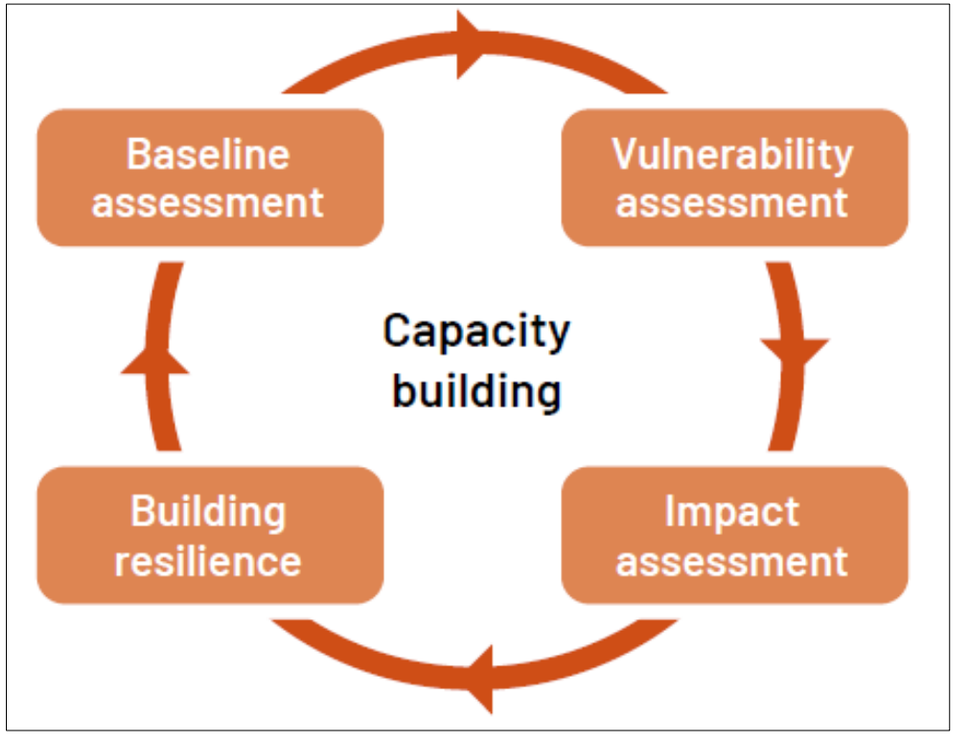
1. Adapt to increasing heat

Immediate interventions to save lives.

Key components related to extreme heat adaptation

2. Building resilience

Involves understanding the vulnerabilities and impacts, predicting future heat waves and their impacts on various sectors, improving infrastructure, and identifying the population which is at a higher vulnerability to the impacts and finding specific solutions for them.



Key components related to extreme heat resilience

3. Cool the city

Developing strategies to reduce the UHI effect and urban hotspots. Emphasis is placed on heat-minimising planning, using thermally favourable materials, and expanding nature-based spaces.

- **Promoting cool surfaces:** This involves a shift towards using reflective urban surfaces for building rooftops and pavements.
- **Integrating blue-green infrastructure:** Land use planning to integrate vegetation and water bodies into the urban fabric to mitigate the UHI effect and reduce local and ambient temperature.
- **Including nature into the urban fabric:** It is important to incentivise policies and community initiatives to introduce nature into the urban fabric through various means such as urban farming, urban greening initiatives, installing vertical greens, and so on.
- **Improve Urban Geometries:** Future developments to take into consideration wind circulation and avoid heat trapping zones.

4. Reduce cooling demand

Focus on improving buildings' thermal performance and reducing their need for mechanical cooling, as well as decreasing their overall energy consumption and emissions footprint, through the use of thermally efficient building design and construction and promoting passive cooling techniques.

- **Mandatory building energy codes are the key policy mechanism for thermally efficient design and construction in buildings.**

5. Providing thermal comfort to all through sustainable cooling solutions

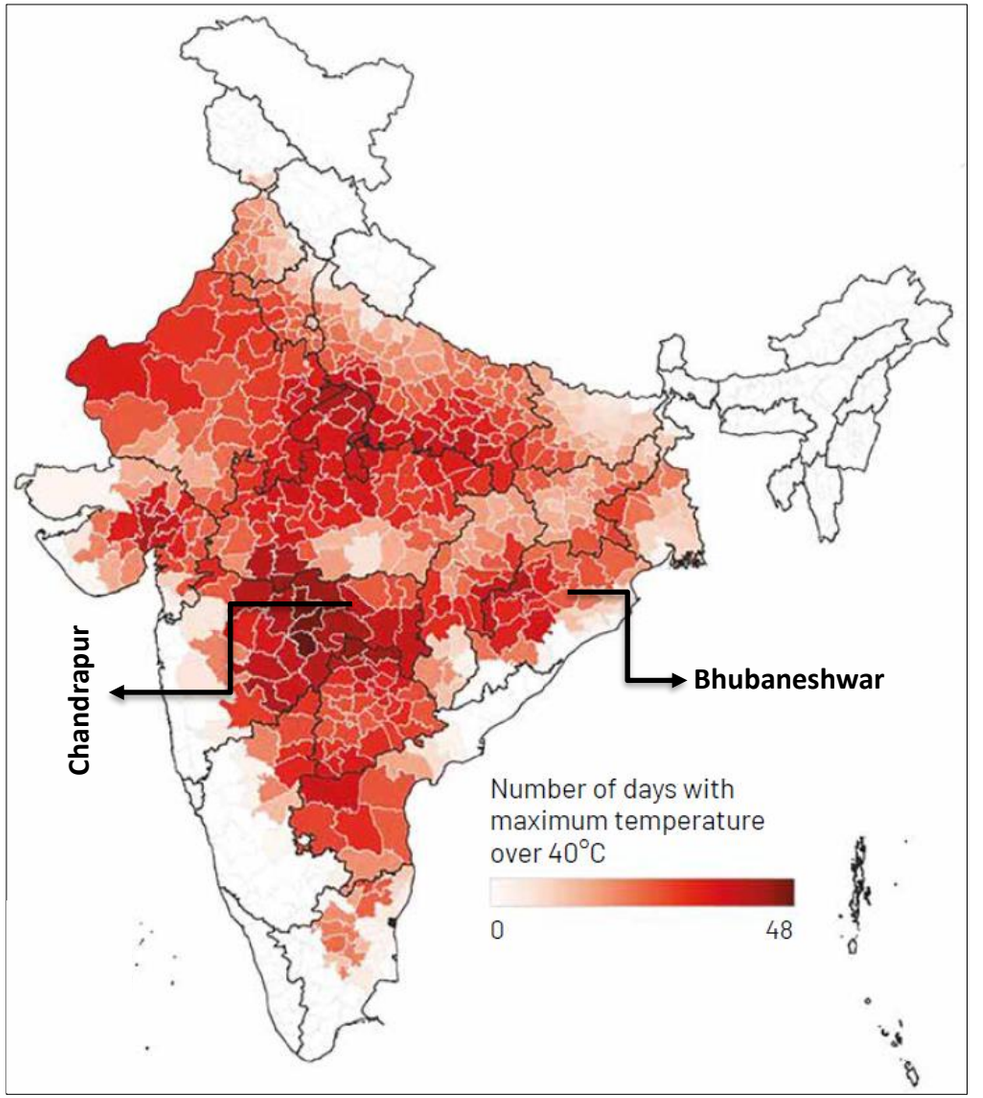
Providing cooling through the most appropriate and efficient cooling system that deliver the required cooling with the least amount of energy and emissions. It also entails strategies for efficient operations and optimizing user behaviour.

- **Develop incentives to promote energy-efficient and not-in-kind cooling technologies**
- **Promotion of centralised cooling systems:** Centralised systems offer improved efficiency and easier maintenance and are a viable option for large office buildings, commercial complexes, and industrial facilities. As the scale expands, district cooling also becomes a sustainable choice.
- **User adaptations and behaviour changes:** Encouraging energy-saving habits and adopting technologies like controllers and sensors can significantly lower energy consumption.
- **Capacity-building in the service sector:** Proper maintenance and servicing of cooling equipment can help reduce the environmental impact associated with refrigerant leakage during servicing.

Pilot Project

Launched in 2024 in 2 cities in India

1. High temperature: Chandrapur, Maharashtra
2. High temperature & humidly: Bhubaneshwar, Odisha



Relevance for the Montreal Protocol & Kigali Amendments

- **Cooling demand is and will increase exponentially in cities, and so will electricity demand from fossil fuel assets to meet cooling loads.**
- **Just by reducing HFCs & enhancing energy efficiency of RACHP will not be sufficient to meet 1.5 ^{O}C target.**
- **An integrated approach bringing HAP & CAP at city level promises far higher reduction in cooling loads, refrigeration demand and energy requirements. It also enhances heat resilience, thereby saving lives.**
- **Promotion of an integrated heat and cooling action plan at city level will fulfil the objectives of the Kigali amendments.**

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Download Policy Brief

https://iforest.global/wp-content/uploads/2024/07/OEWG46-Policy-Brief.pdf