Edible Rooftop Gardens as a Climate Adaptation Solution?

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CHENNAI RESILIENCE CENTRE
OKAPI
Global Disaster Preparedness Center

Chennai Urban Farming Initiative (CUFI)

Goal: To build resilience to climate change, specifically increasing heat, and create healthy, self - reliant communities by improving food security & livelihoods, especially among the urban poor in the city.

Components

- Implement using Mobile Vegetable Garden Kits (MVGK)
- Train, set up and maintain gardens
- Create green livelihoods
- Monitor, evaluate, incentivise

~ 30 Rooftop gardens set up / maintained by CRC in 2024 - 25

Benefits

The whole is greater than the sum of its parts!

Increases access to fresh & nutritious food in *Anganwadis* & schools

Serves as educational tool

Improves mental health and well-being

Strengthens the Livelihood Linkage and Empowers Women

Encourages pro-environmental behaviour

Creates greener and cooler roofs

Measuring Heat Adaptation Potential of Edible Rooftop Gardens

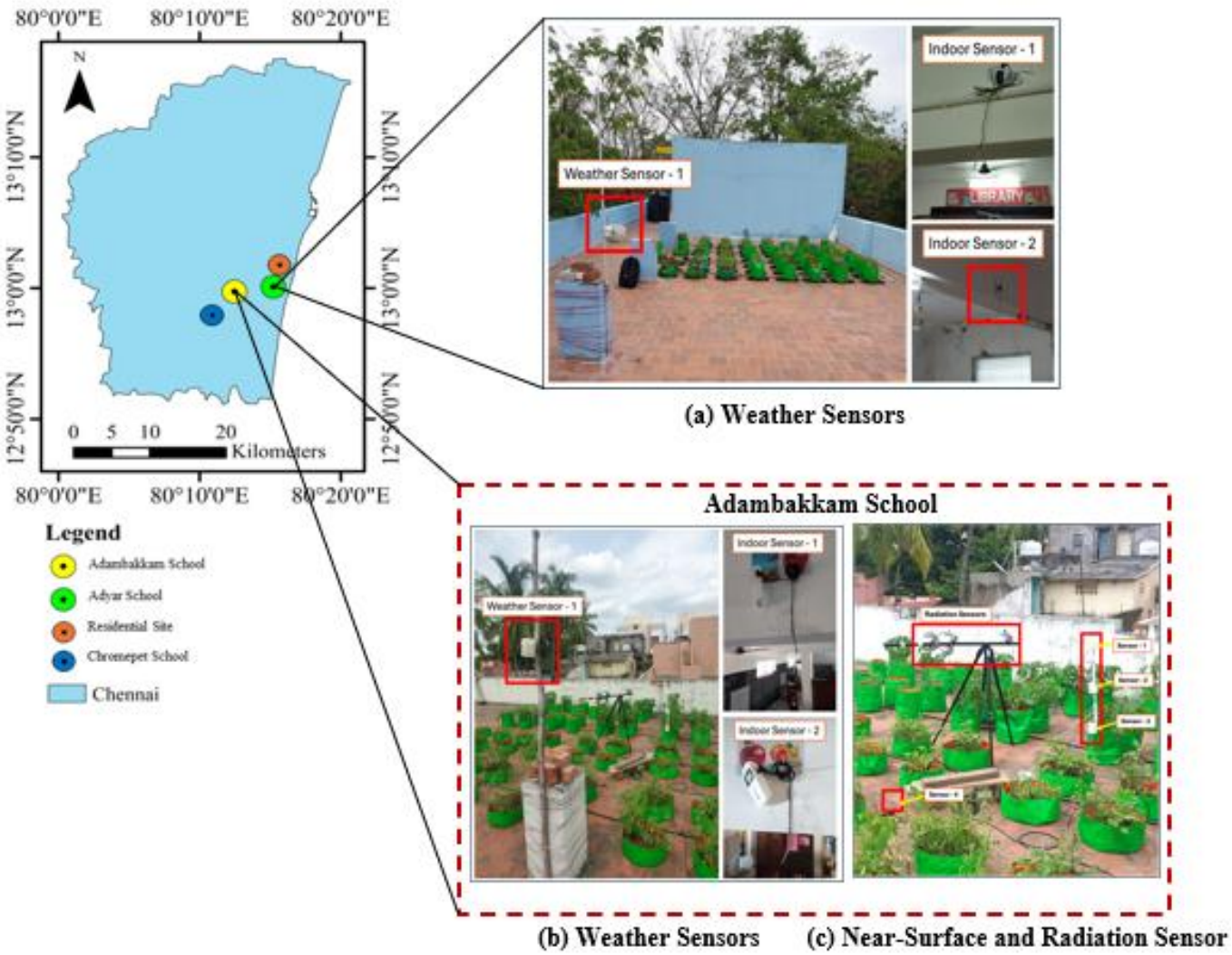
Methodology

Sensors deployed

- Weather Sensors on the roof space with garden, roofspace without garden, room below the garden and room below exposed surface.
- Near surface & radiation sensors – an experiment in one site, Adambakkam: Sensors installed on roof surfaces with and without the garden and ceiling of rooms below the garden and exposed surface.

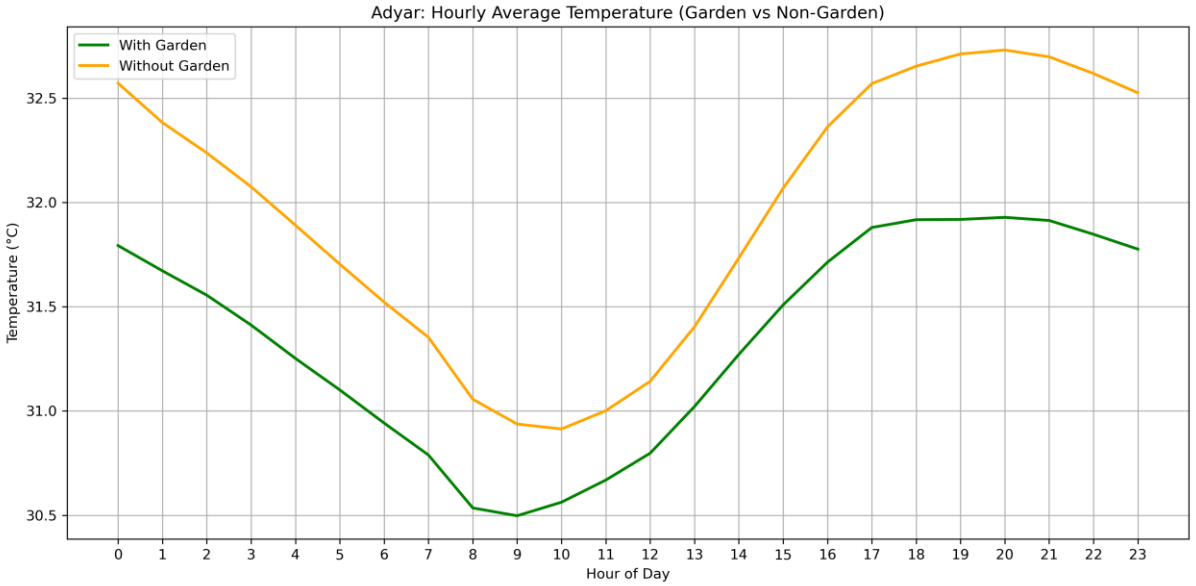
Parameters Measured

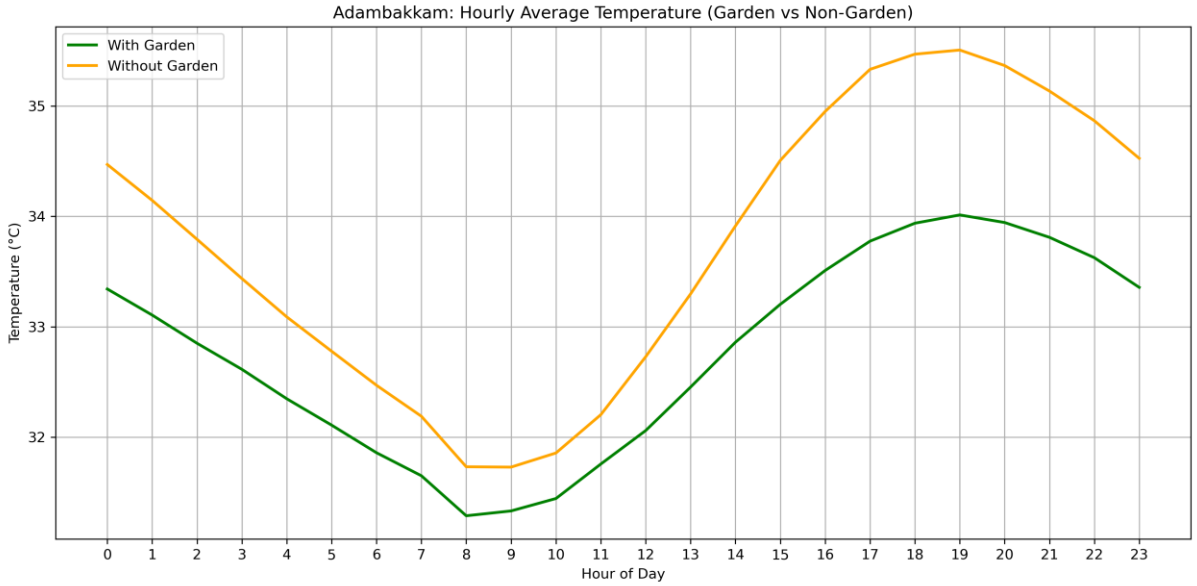
- Ambient Air Temperature
- Relative Humidity
- Surface Temperatures



Two study sites zoomed in: GCC school in Adyar (top); Little Flower Nursury and Primary School, Adambakkam (bottom)

Key Findings | Schools in Adyar and Adambakkam

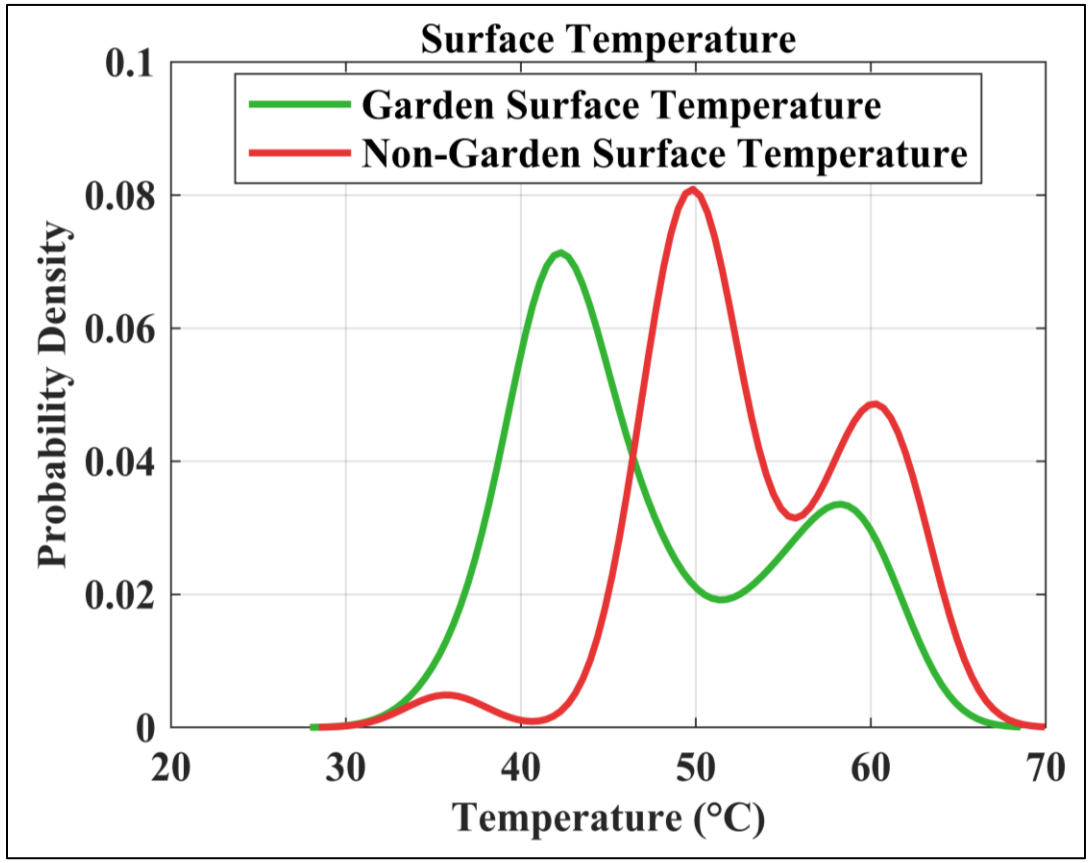


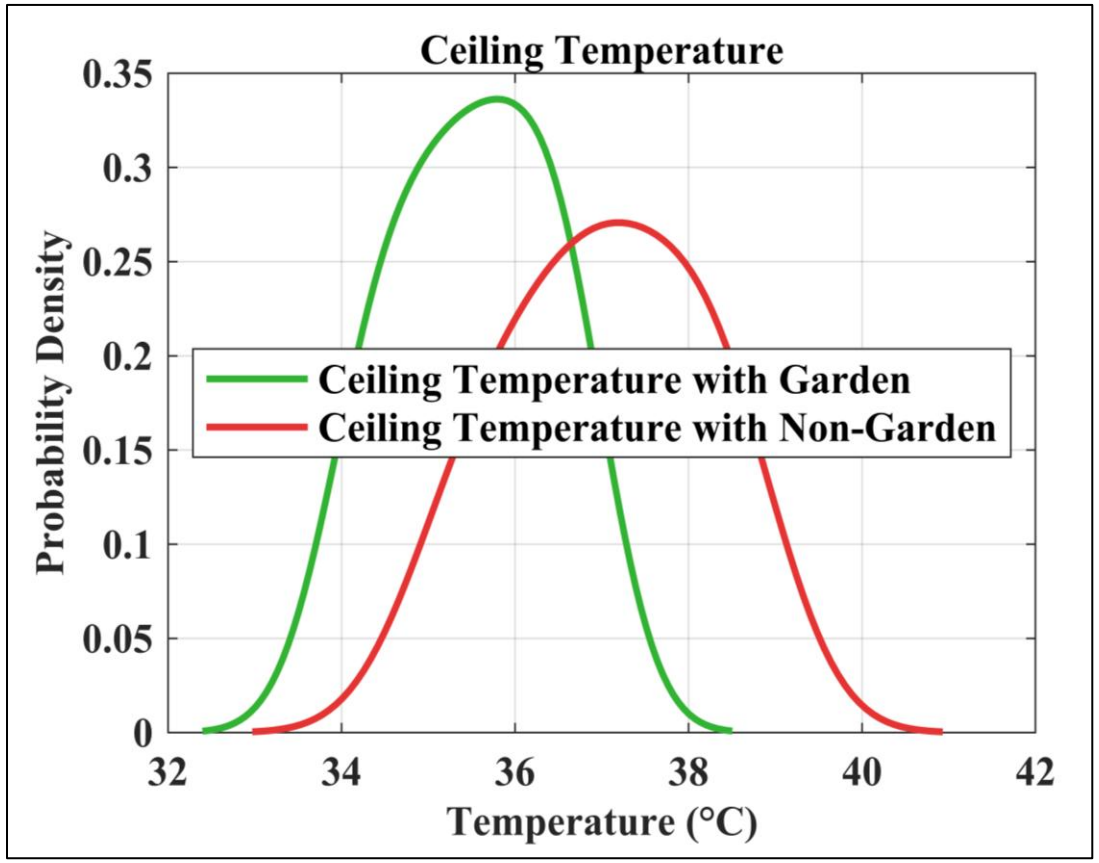


Cooling Effect

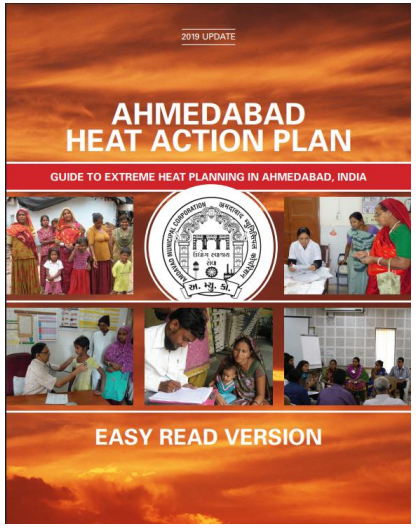
- Ambient air temperature in the room below the **rooftop garden** is lower than the room below exposed roof by **0.3 to 1.2°C on an average** with variation roughly ±0.3 to 0.6°C
- The cooling **strongest from late afternoon to evening** (16 to 20 h) and is least around late morning (10 to 12 h).

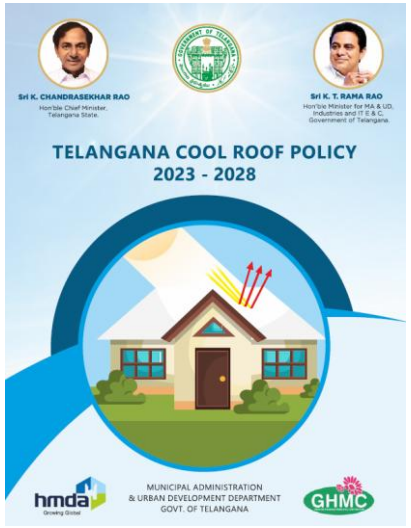
Key Findings | Adambakkam School

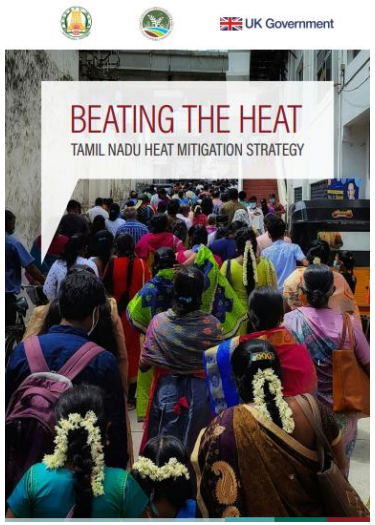




Graphs showing the overall effect of the gardens which results in a 5–10 °C lower surface temperature and ~2 °C lower ceiling temperature at the peak temperature.







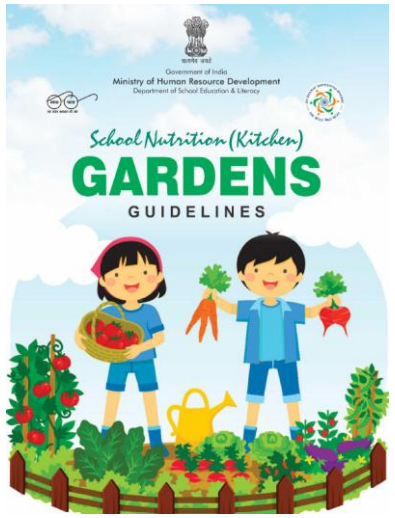
National/ State Policy Framework
Heat Action

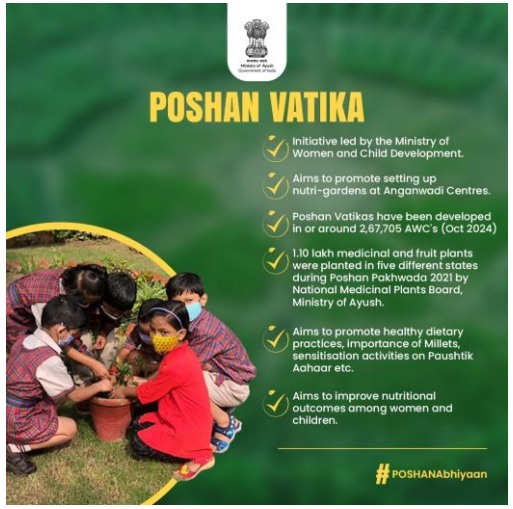
National Context

- **Heat waves were formally declared a disaster by the Ministry of Home Affairs (2024)**. India's response: 100's of city/ state/ district level Heat Action Plans (HAPs).
- **Vijayawada's Heat Action Plan** – one of the rare ones to mention rooftop gardening as a cooling strategy (Singh et al. 2024).

Tamil Nadu/ Chennai Context

- **TN Heat Mitigation Strategy 2023** recognizes NbS as a cooling strategy but emphasis lies on large-scale afforestation, while green roofs are cited only as voluntary, individual actions
- **Chennai City Action Plan 2023** recognizes heat mainly through temperature mapping and risk projections, no dedicated cooling strategies.





A green school in Nagapattinam (The Hindu, 2025)

National/ State Program Framework
School Gardening

National Context

- National School Nutrition Gardens Guidelines 2019 encourages schools to implement kitchen gardens for increased access to nutritious food, education tool.
- Poshan Vatika Scheme, ICDS – all centres encouraged to set up their own gardens for similar reasons.

Tamil Nadu/ Chennai Context

- TN Green Schools Program: Initiated in 2023 to foster environmental sustainability in schools. Mission components include setting up veg gardens based on land availability, installing solar panels, creating mini forests, creating SUP free environs etc.
- Rs 20 lakh allocated to each school. In 2024-25 100 new schools were targeted

Challenges with Edible Rooftop Gardens

- **Maintenance & Upkeep:** Edible gardens need regular watering, management of pests, good soil management, good quality inputs, more time and effort; schools face scheduling and staff constraints.
- **Structural Concerns:** Risks of water seepage, increased load on roofs, and competing terrace uses.
- **Limited Incentives:** Current horticulture schemes limited in cities. Exception: Bihar, Odisha, TN.
- **Weak Policy Support:** Green building codes (e.g., IGBC) only mention green roofs, with no enforceable standards or maintenance guidelines

Examples of Cities Adopting Rooftop Gardens

Toronto's eco roof Incentive Program

A building with a green roof in Shanghai
(Dialogue Earth, 2017)

Nature Urbaine, Paris
(The Guardian, 2020)