



GLOBAL COOLING PLEDGE ASSEMBLY

SINGAPORE 15 - 18 SEPTEMBER 2026

Parallel Session: Beat the Heat Training

Session 2: Nature-based Passive Cooling Solutions

09:00-10:30, 16 September 2026



Ministry of Sustainability
and the Environment
— SINGAPORE —

BEAT THE HEAT

Welcome & session objectives



Srinidhi Ravishankar

Cooling Policy Specialist
UNEP



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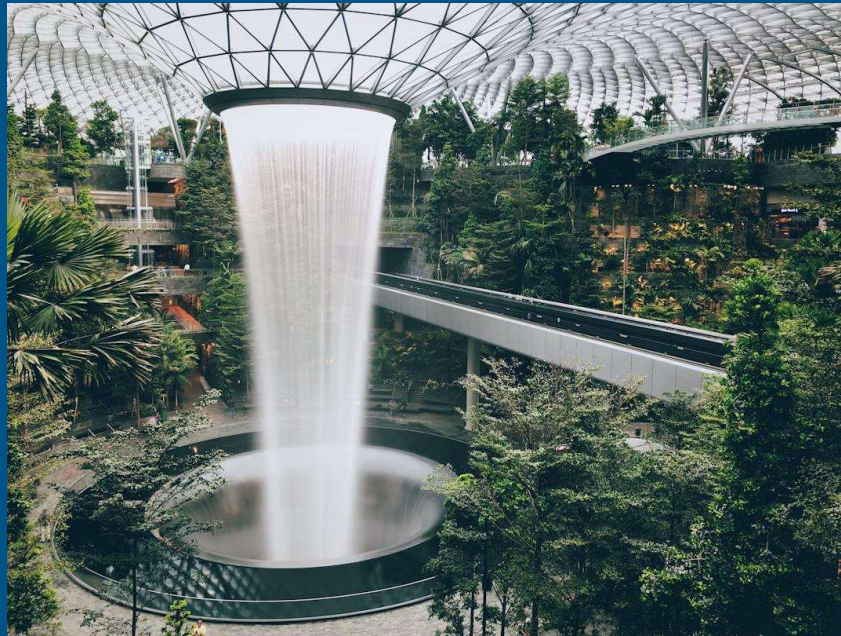
GLOBAL COOLING PLEDGE ASSEMBLY

SINGAPORE 15 - 18 SEPTEMBER 2026

Day 1 Reflections



Session 2C. Nature-based & Passive Cooling Solutions



Co-lead:

ARUP

What this session looks at:

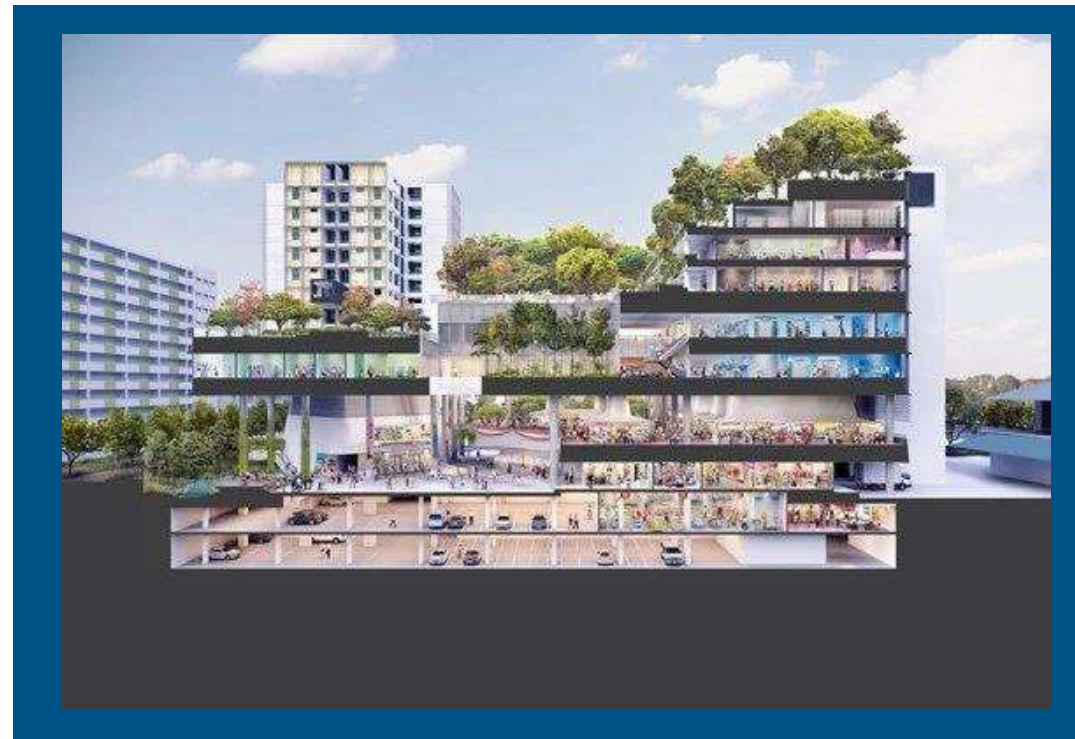
- How cities are reducing urban heat through design, vegetation, and materials
- Real examples of nature-based and passive interventions at different scales
- How these solutions interact with — and often reduce the need for — mechanical cooling downstream

Session 2C. Nature-based Passive Cooling Solutions



Definitions

- **Nature-based solutions (NBS):** using vegetation, water, and natural systems to reduce heat — urban tree canopy, green roofs and walls, restored wetlands, permeable green corridors
- **Passive cooling:** reducing heat gain through design and materials, without energy input — building orientation, shading and overhangs, natural ventilation, high-albedo (reflective) roofing and paving, thermal mass
- Both are most effective in combination — and both come before mechanical cooling in the mitigation hierarchy, not after

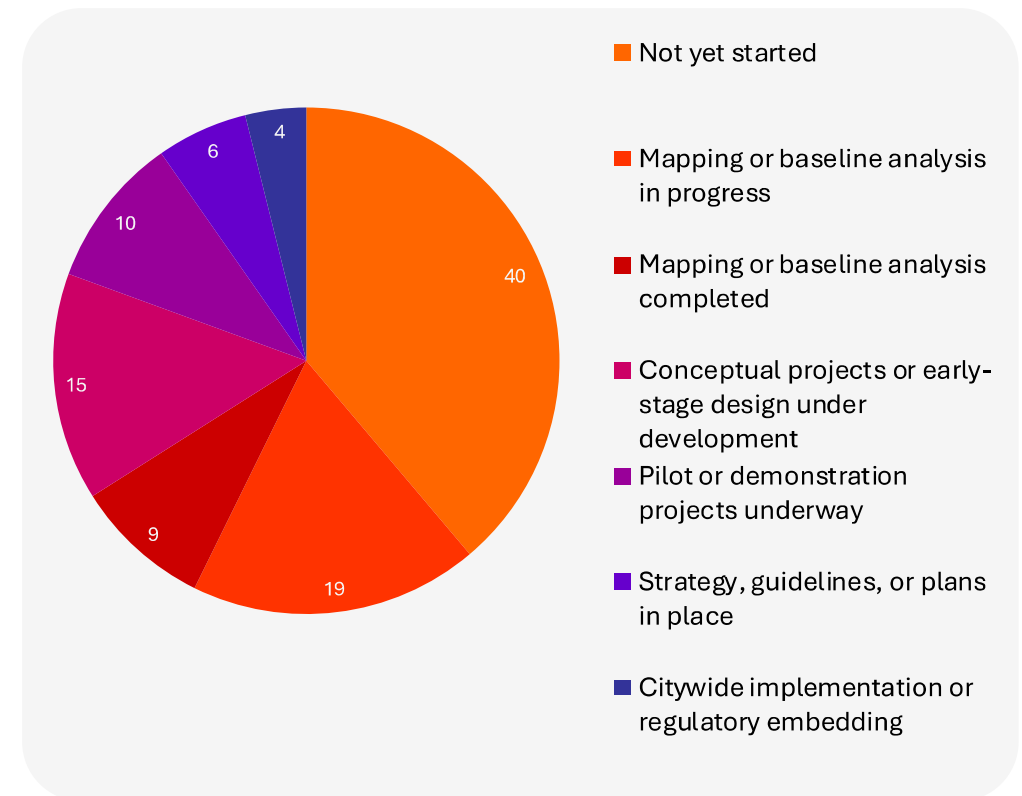


Survey results:

NbS and Passive Cooling implementation

61% of respondents have taken at least basic action towards NbS or passive cooling implementation

Only 4% have city wide implementation or regulatory embedding of NbS or passive cooling solutions



Framing presentation



Dimple Rana

Heat Resilience Leader,
Arup



Passive and Nature-Based Cooling Solutions

From Understanding Heat to Action



GLOBAL COOLING
PLEDGE ASSEMBLY
SINGAPORE 15 - 18 SEPTEMBER 2026



Green Building
Council of Singapore
www.sgbc.com.sg

Agenda

Part 1 — Understanding heat

Part 2 — Building the cooling toolbox

Part 3 — From Solutions to Strategy

Part 1



Understanding heat

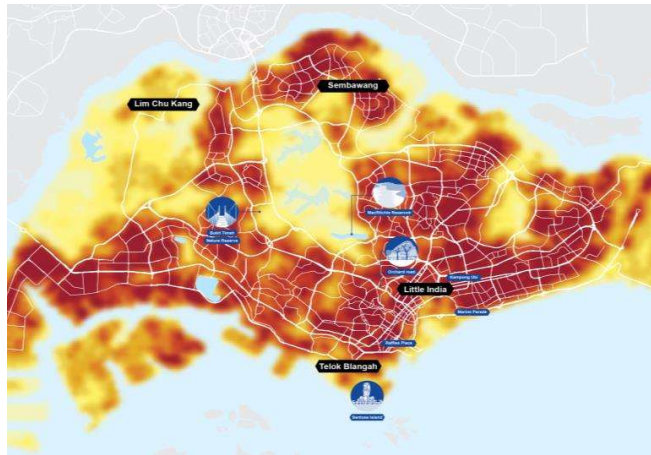
Understanding what drives heat stress, how people experience heat, and the mechanisms through which passive and nature-based solutions improve comfort and resilience.

What makes a city hot?

Three scales of urban heat



Extreme temperatures



Urban heat island

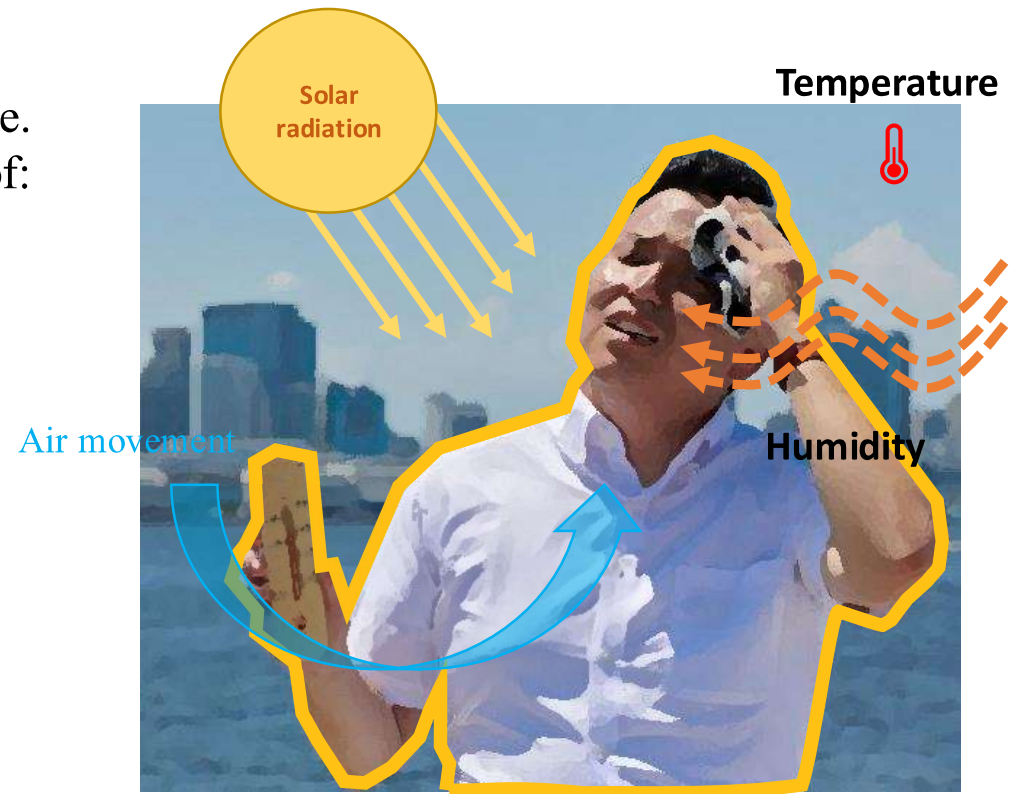


Overheating in buildings

Temperature alone doesn't tell you how hot it feels

Thermal comfort is more than temperature

- People do not experience air temperature alone. Heat stress depends on the combined effects of:
 - Air temperature
 - Solar and radiant heat
 - Humidity
 - Air movement
- Different cooling strategies act on different drivers



What drives heat stress?

Other factors that impact thermal sensation

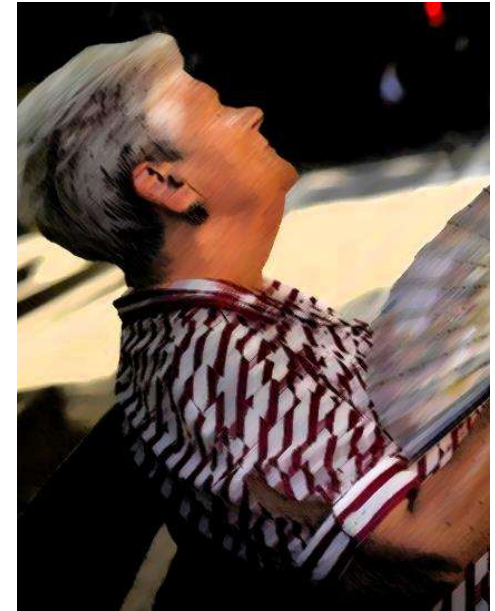
Where to prioritise



Psychology



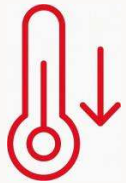
Activity



Physiology and health

Cooling mechanisms

How passive and nature-based solutions reduce heat



Reduce temperature



Reduce solar
radiation



Increase air
movement



Reduce humidity



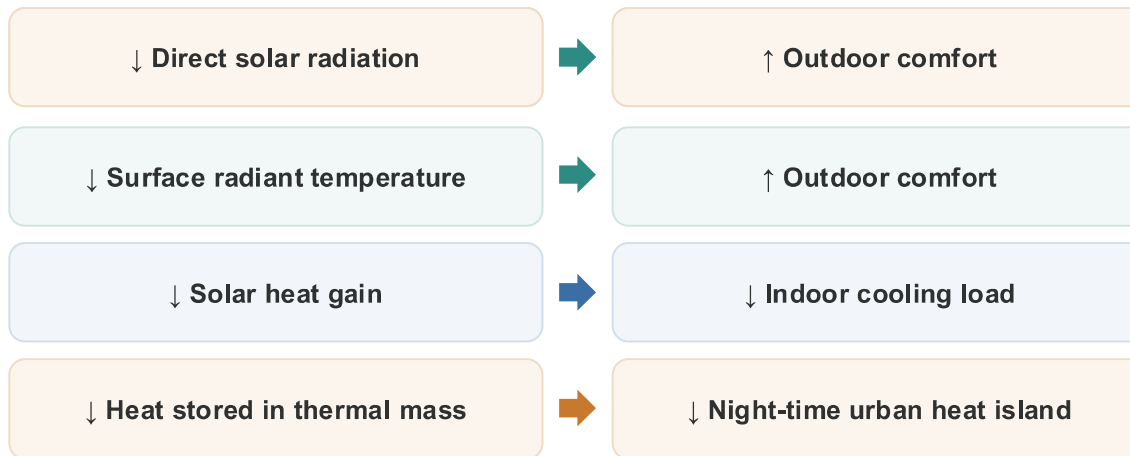
Lower heat stress and improve thermal comfort

Cooling mechanisms

How passive and nature-based solutions reduce heat

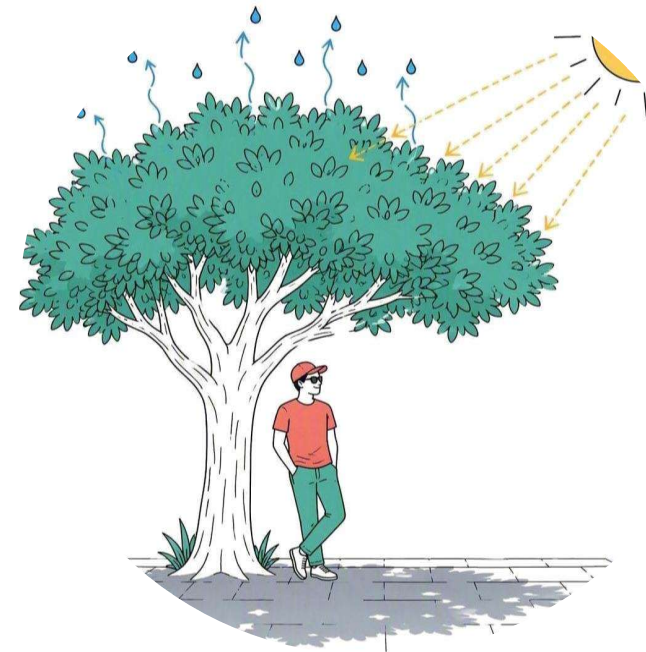
Shade

Blocks solar radiation before it reaches people and surfaces



Evaporative cooling

Reduces temperature through evaporation (green and blue infrastructure)



Examples from the toolbox

Street trees and urban forests • External shutters, overhangs and solar control glass • Shaded walkways and street shading • Green roofs, green walls and parks • Misting, water features, ponds and wetlands

Cooling mechanisms

How passive and nature-based solutions reduce heat

Reflection

Reflects solar radiation back to the sky

↑ Surface albedo



↑ Solar radiation reflected

↓ Heat stored in thermal mass



↓ Night-time urban heat island

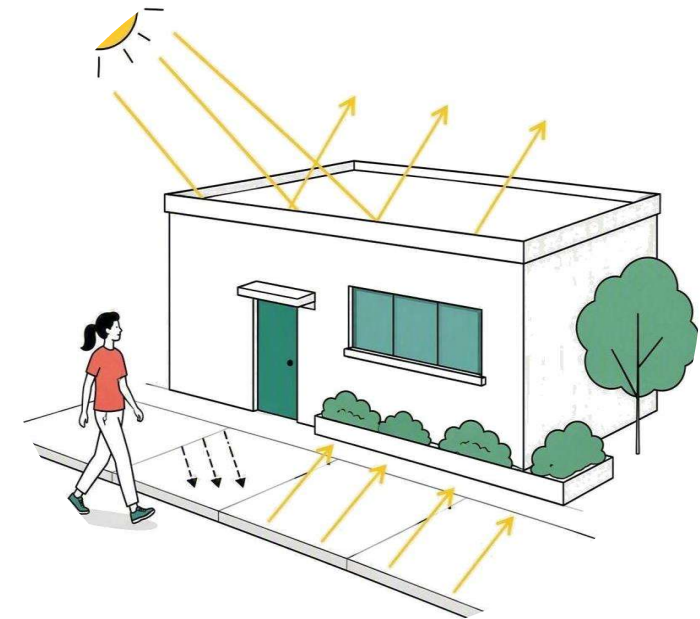
↓ Surface radiant temperature



↓ Solar heat gain



↓ Indoor cooling load



Examples from the toolbox

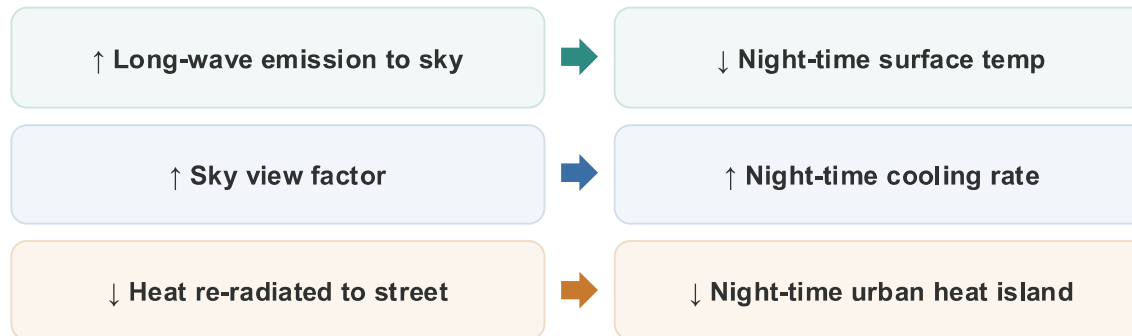
Cool roofs and cool pavements • Reflective materials and cool coatings • Low-e glazing • Light-coloured facades • Permeable surfaces

Cooling mechanisms

How passive and nature-based solutions reduce heat

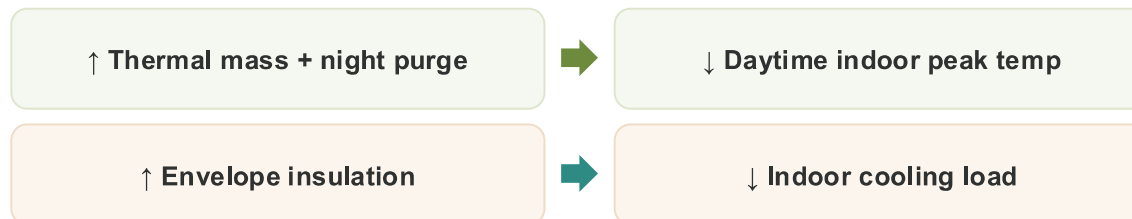
Radiative cooling

Releases stored heat to the sky as long-wave radiation at night



Thermal mass and insulation

Controls how much heat enters and when it is released



Examples from the toolbox

Open sky view in streets and courtyards · Night purge ventilation ·
Exposed thermal mass · Insulation and low-e glazing · Cool roofs

Cooling mechanisms

How passive and nature-based solutions reduce heat

Ventilation

Moves heat away from people and surfaces

↑ Air movement



↑ Convective heat loss from the body

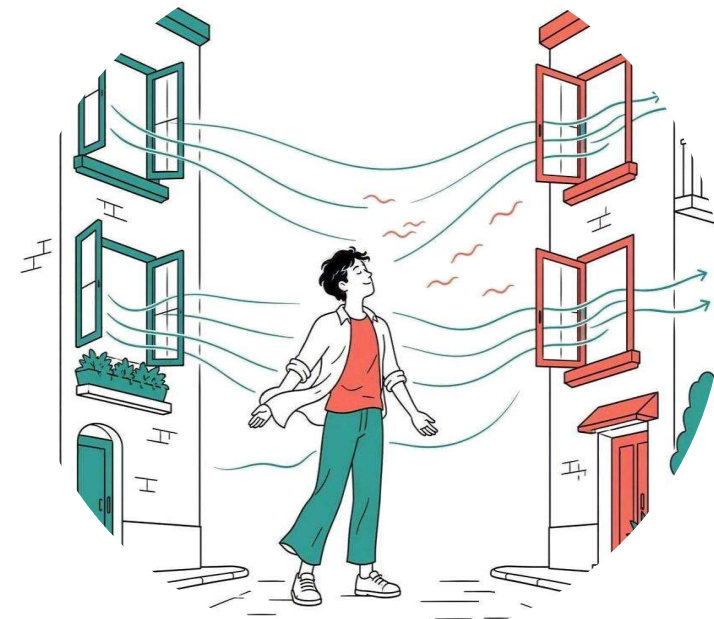
↑ Sweat evaporation



↓ Perceived heat stress

Flushes trapped heat from buildings and streets

Improves comfort even when air temperature barely changes



Examples from the toolbox

Cross and stack ventilation • Operable facades • Wind corridors • Porous massing • Street orientation and massing • Ceiling fans

Part 2

Building the Cooling Toolbox

From individual measures to urban-scale interventions, understanding the solutions available to address different heat challenges and contexts.

The cooling toolbox

Cooling mechanisms	Building Actions implemented at a single site				City Actions implemented across districts or the city				
									
Materiality	 Reflective materials	 Low e-glazing	 Insulation	 Thermal mass	 Cool coatings	 Cool pavements	 Cool roofs	 Permeable	
Shade	 External shutters	 Internal shading	 Solar control glass			 Street shading	 Shaded walkways		
Form	 Orientation	 Glazing shape	 Overhangs	 Courtyards		 Massing	 Street orientation		
Nature-based solutions	 Green roofs	 Green walls	 Trees/planting			 Urban forests	 Green surfaces	 Tree/planting	 Parks
Ventilation	 Cross ventilation	 Stack ventilation	 Operable facades			 Wind corridors	 Porous massing		
Water and evaporation	 Misting	 Water features				 Ponds and lakes	 Wetlands		
Active cooling	 Ceiling fans	 Air conditioning				 District cooling			

Vernacular architecture

Long-standing responses to heat



Buildings

Rumah Melayu (Malaysia). Raised floors, high ceilings and permeable façades maximise natural ventilation and enhance thermal comfort in hot-humid climates.



Urban form

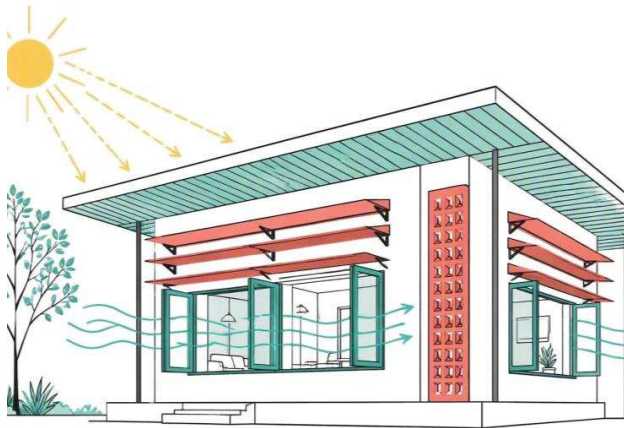
Kasbah of Mazara del Vallo (Sicily). Compact urban form and narrow shaded streets reduce solar exposure and create cooler pedestrian environments.

Applying solutions at different stages

Designing for heat in new buildings and retrofitting the existing stock

New buildings

Set at design stage — lowest cost, highest leverage



- Siting and orientation
- Massing, form and self-shading
- Glazing ratio and solar control
- Thermal mass and construction
- Natural ventilation strategy

Retrofits

Limited to envelope and services



- External shading and shutters
- Glazing upgrade and solar film
- Roof and wall insulation
- Reflective roof and wall coatings
- Fans and mechanical upgrades

Applying solutions at different stages

Working with existing urban fabric versus shaping new development

New masterplan



Cooling designed in from the start Musereib Downtown. New masterplans can set street and building orientation, wind and green corridors and porous massing before anything is built — the cheapest point to lock in cooling.

Retrofits



Freetown Market Cover Shade Project, Sierra Leone. Shade covers retrofitted into a working market protect female vendors from the physical, economic and social risks of extreme heat — delivered with local leaders and a newly formed market women's association.

Scaling up solutions

Materiality

Buildings



Reflective roofs can reduce roof surface temperatures by up to 10°C compared with conventional dark roofs, helping to reduce indoor overheating and cooling demand.

City



NYC Cool Roofs Programme Since 2009, New York City has coated more than 6.7 million ft² ($\approx 625,000$ m²) of rooftops with reflective coatings as part of its city-wide heat mitigation strategy.

Image credits: NYC GOV

Scaling up solutions

Nature-based solutions

Buildings



Green roofs and vegetated façades shade and insulate the building surface, and cool through evapotranspiration — reducing rooftop temperatures and indoor cooling demand

Image credits: [CC BY-NC-ND](#)

City



Scaled up, individual green spaces become a connected cooling infrastructure. Since 2016, Medellín has linked roads, waterways and parks into 30 interconnected green corridors — a continuous network that has reduced average city temperatures by around 2-3°C.

Image credits: [C40. Medellín Green Corridors](#)

Part 3

From Solutions to Strategy

Moving from individual interventions to integrated cooling strategies through multi-criteria assessment, prioritisation and consideration of wider co-benefits.

Selecting the right solutions

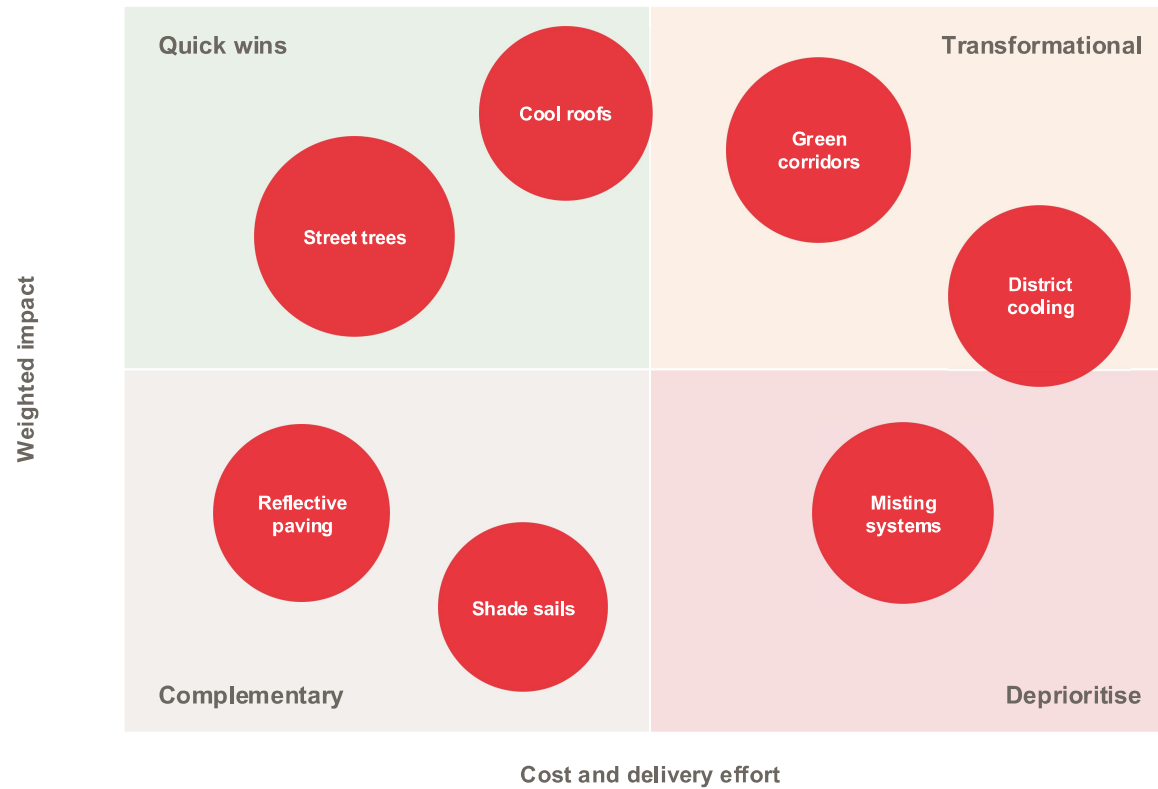
Multi-criteria assessments



Selecting the right solutions

Multi-criteria assessments

Example scoring matrix



From measures to strategy

From individual measures to integrated cooling strategies

1

Combining solutions across scales

What works at a building only goes so far without the street and the city.



Building



Street



City

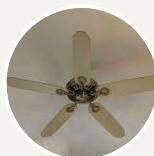
Effects compound across scales

One joined-up strategy

2

Short, medium and long term

Quick wins buy time while slower, structural measures mature.



Short term
fans, shading, shelters



Medium term
retrofit, cool surfaces



Long term
urban form and canopy

Sequenced, not all at once

A phased pipeline

3

Packages, not single fixes

Measures chosen to reinforce each other across mechanisms.



Shade and
evaporation



Efficient
active cooling

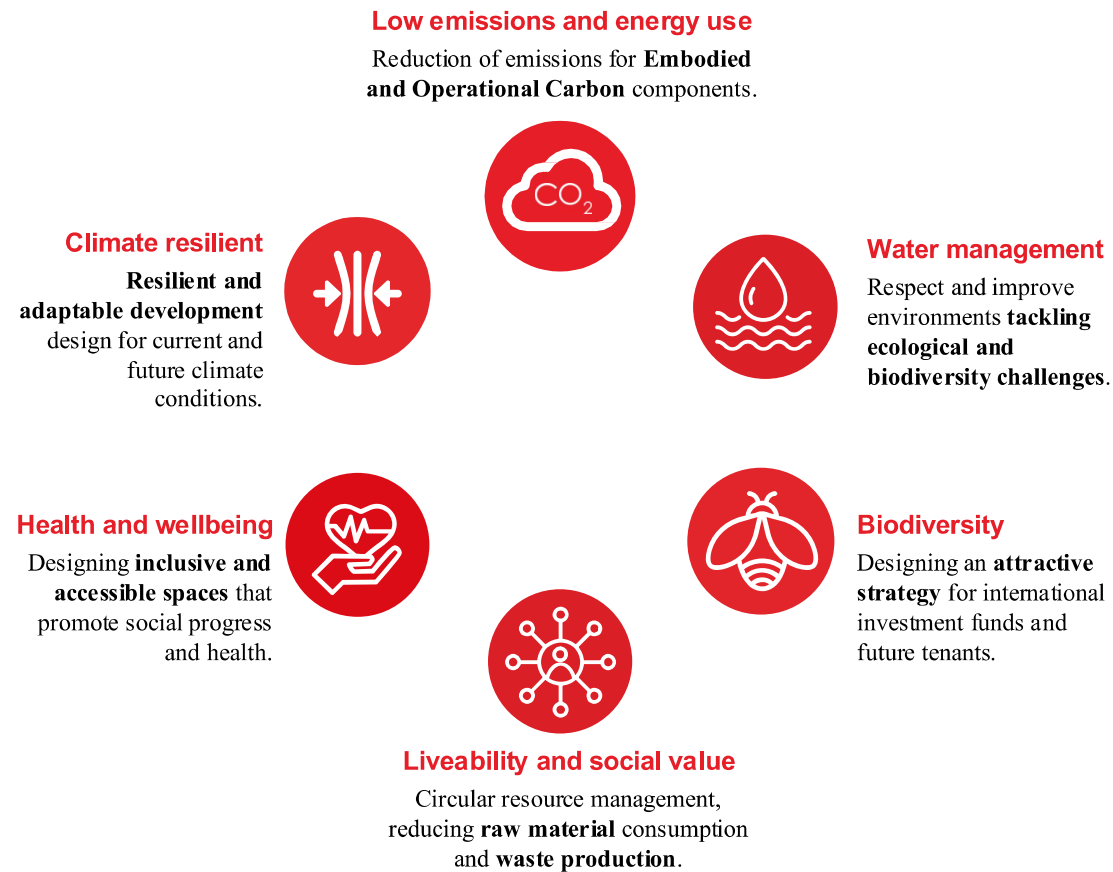


Reflective
surfaces

Combined in one package

Greater cooling together

Beyond cooling: wider benefits



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Contact

Dimple Rana

Dimple.Rana@arup.com

Thank you



Connect on LinkedIn

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Case study 1: Tamil Nadu's Passive Cooling and Heat Resilience Programme



Bakan Jagdhish Sudhakar

CEO,
Tamil Nadu Green Climate Company,
State of Tamil Nadu State,
India



**Tamil Nadu Green
Climate Company**

SCALING PASSIVE COOLING IN BUILDINGS

Mr. BAKAN JAGDISH SUDHAKAR, I.F.S.,
CEO, TAMIL NADU GREEN CLIMATE COMPANY
GOVERNMENT OF TAMIL NADU



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Coalition**
a UNEP-convened initiative



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INTRODUCTION

The Government of Tamil Nadu under Department of Environment, Climate Change and Forest established TNGCC as

First of its Kind

Ambitious SPV in India

Special Purpose Vehicle

Climate Policy Action Platform

Not-for-Profit

Section 8 Company

- Responds to Climate Change across Tamil Nadu
- Addresses challenges with immediate policy attention
- Develops purposeful long-term climate solutions
- Acts as central platform for climate finance
- Bridges government, private sector & civil society



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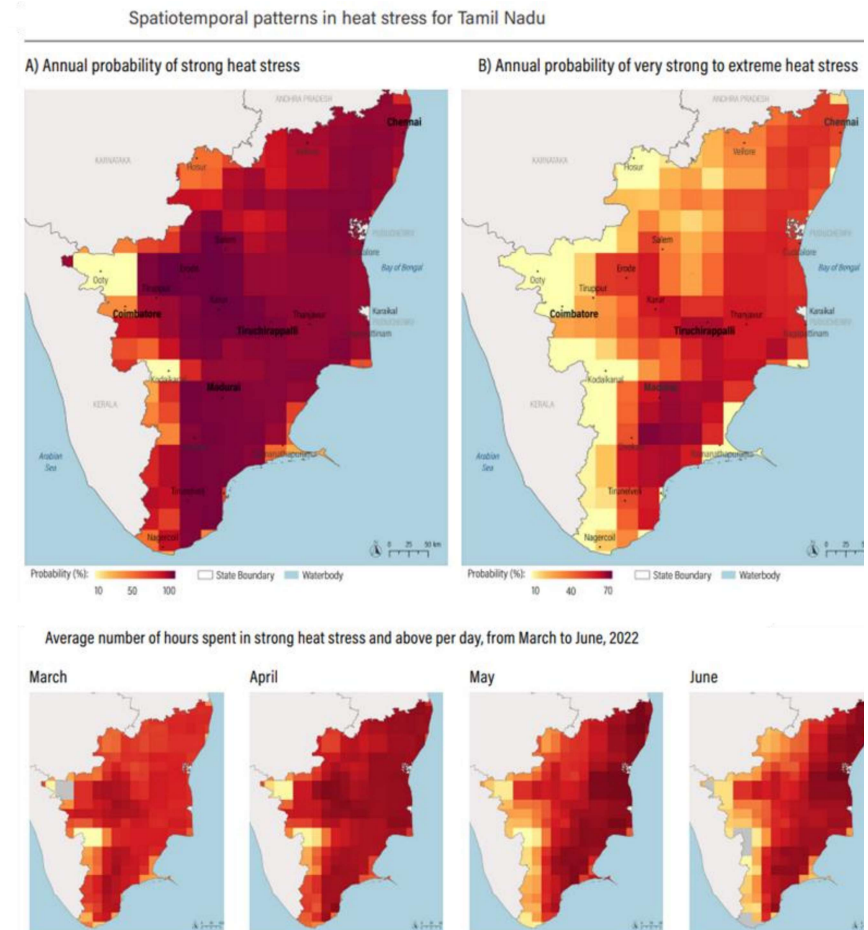
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Climate Company

Heat Stress & Population Exposure in Tamil Nadu

- **High Heat Exposure:** 74% of Tamil Nadu's population experiences temperatures above 35°C, with 68% facing 8–9 hours of strong heat stress daily during summer.
- **Peak Summer Stress:** 55% of the population experiences approximately 4 hours of very strong to extreme heat stress during April–May.
- **Rising Nighttime Heat:** Nighttime land surface temperatures have increased by up to 4°C in dense urban areas, with 27% of the population exposed to severe Urban Heat Island effects.



Source: [Beat the heat - TN Heat Mitigation Strategy](#)



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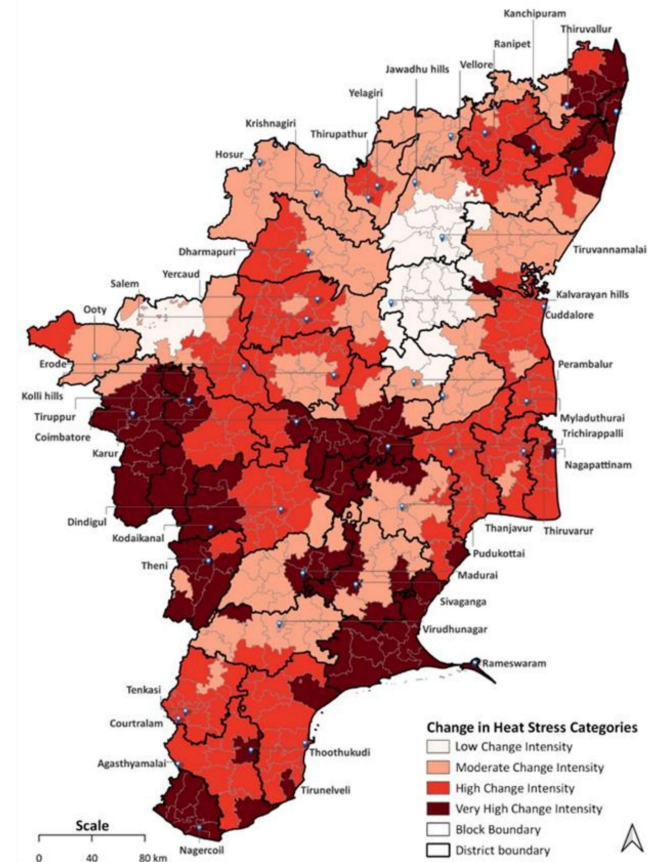


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Extreme Heat Challenges in Tamil Nadu

- **300 Thermal Discomfort Days:** Recorded an average of 300 days annually (2021-2023), impacting productivity by 3-4 hours daily.
- **Rising Heat Stress:** Thermal discomfort days are projected to increase from 107 to 150 days annually by 2050.
- **Frequent Heatwaves:** Over 40% area experienced at least 15 heatwave days annually (2011-2019).
- **Heat Wave Fatalities:** 591 disastrous heatwave days were recorded (1969-2021).

Mapping the Decadal Change in Heat Stress at Block level



Source: [Urban Growth and Thermal Stress: A Decadal Assessment of Built-Up Area and Climate Interactions in Tamil Nadu](#)



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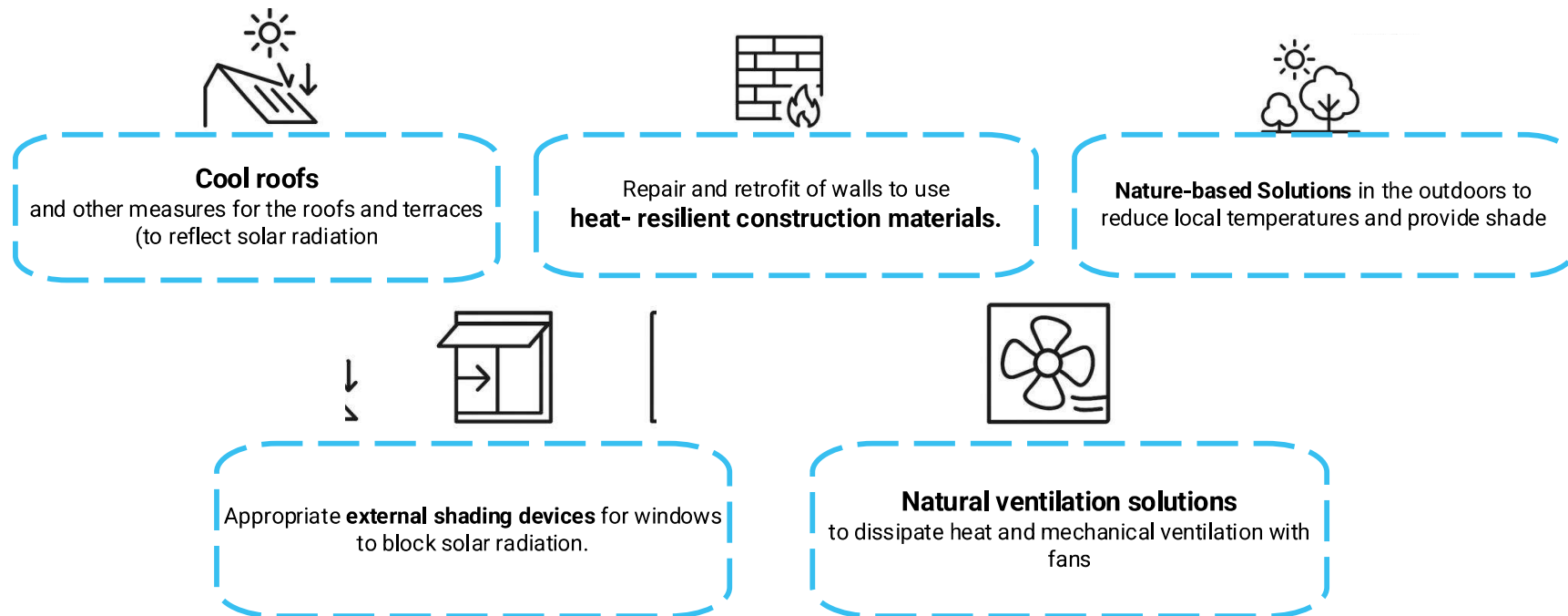


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TNGCC Passive Cooling Initiatives

The initiative involves, Implementation of cool roofs and additional Passive Cooling, Nature-based Solutions as per the UNEP PCS & Cool Roof Guidelines.

Passive cooling solutions for Green Schools & Housing



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Integrating PCS in Affordable Housing Projects in Perumbakkam Cool Roof



* Led by partners: Rocky Mountain Institute

9-12°C Roof surface temperature reduction_peak hours
1.5-3°C Internal room temperature reduction_peak hours
20% Increased comfort hours
12% Energy savings

102	Solar Reflectance Index (SRI)
0.81	Reflectivity
0.90	Emissivity
7 years	Life span
70% reduction	Transmittance

Low-cost roof retrofits can improve thermal comfort in affordable housing while reducing cooling energy demand.



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TNGCC's Priority Initiatives of Passive Cooling in Green Schools

1. Baseline Study

Current energy use
Current thermal comfort
(temperature, humidity)
Student survey
Existing PCS

2. PCS & Thermal Comfort Analysis

Heat pattern analysis (spatial)
Energy savings analysis
Thermal comfort analysis

PCS recommendations
Performance specifications
Tender Specifications
On-site guidance

3. Full PCS Implementation

Cool Roof
BLDC Fans
External Shading
Additional Green
Solar Rooftop PV ~ 15kW



Perunthalaivar Kamarajar Government
Girls Higher Secondary School, Ambattur;



Chennai Higher Secondary School,
Thiruvanmiyur



Chennai Higher Secondary School,
Shenoy Nagar.



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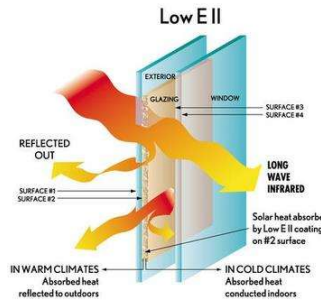
Building Climate-Ready Schools



Wall Envelope



Envelope Insulations



Solar Glazing Control



Shading Devices



- **Pilot Study:** Passive Cooling Strategies (PCS) being tested in one Green School based on Tamil Nadu's PCS Guidelines.
- **Phase I under progress:** Green School Cool Roof Implementation Program completed 7 Green Schools and 10 GCC Schools and further it will scaled up in 300 Green Schools and 55 GCC Schools in 1st Phase.
- **Scaling Potential:** Generate evidence to support climate-responsive cooling measures across government schools.

300

Green Schools
with Cool Roofs

3-4°C

Indoor Temp
Reduction

4-5°C

ceiling surface
temperature
reduction

29°C

Below Maximum
Temperature
Limit



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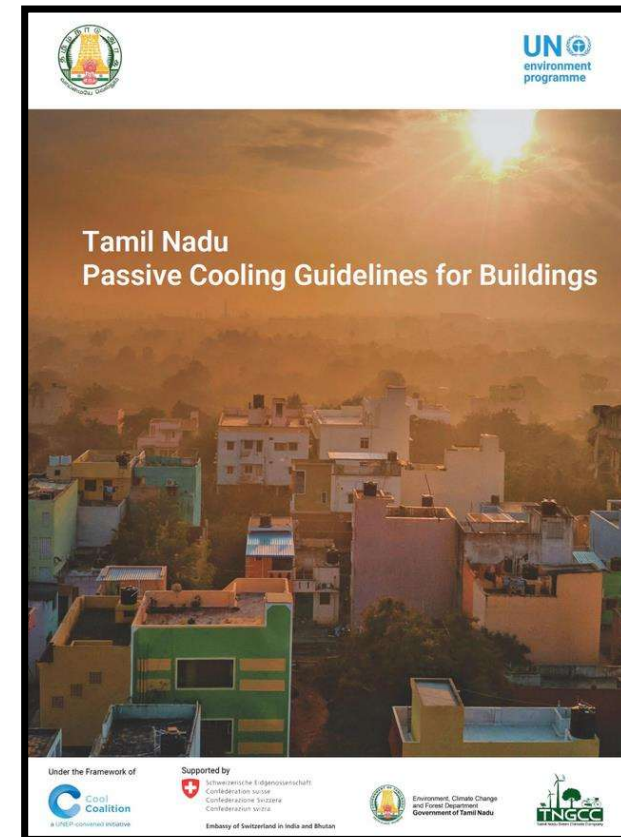
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Tamil Nadu Passive Cooling Guidelines

India's first state-level passive cooling regulatory framework

- Tamil Nadu has developed a state-level framework to integrate passive cooling into building planning, design and implementation.
- **Core measures:** Orientation, natural ventilation, cool roofs, shading and green facades.
- **Purpose:** Move passive cooling beyond voluntary demonstration projects toward routine practice in public and private development.

**Guidelines → Designs → Approvals →
Procurement → Buildings.**



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From Policy to Practice

Passive cooling can scale only when materials and construction assemblies are technically specified, priced and available in procurement systems.

20+

Institutions and
Departments
Engaged

11

City Platforms
Strengthened

01

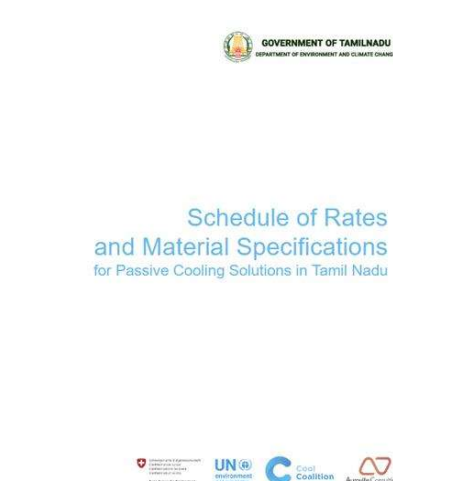
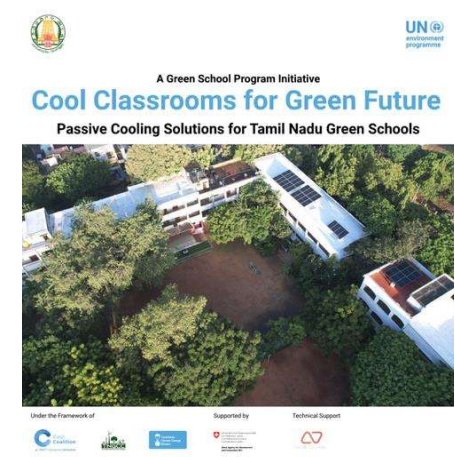
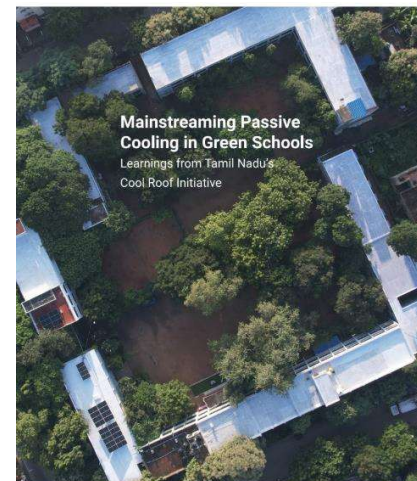
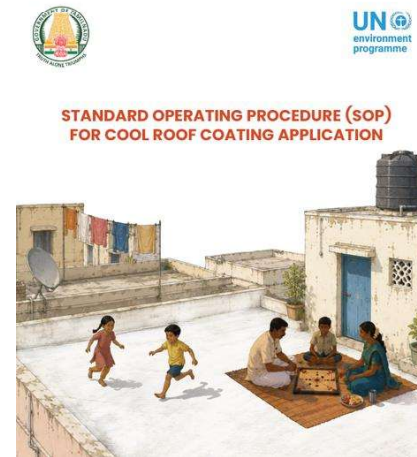
Policies, Strategies,
and Technical
Standards

13

SoR integration and
Procurement
Guidelines

03

Codes, Guidelines
and Standards.



Material Specifications and Schedule of Rates (SoR)

UNEP, in collaboration with technical experts, has co-developed **35 material** specifications and corresponding Schedules of Rates (SoR) for passive cooling solutions in Tamil Nadu.

UNEP developed 28 Material Specifications for Passive Cooling Solutions in Tamil Nadu

Submitted and Presented to PWD through ECCFD / TNGCC for inclusion in the upcoming Tamil Nadu PWD Schedule of Rates (SoR)

Technical site visit organized for PWD officials to Auroville to showcase the materials and their application in buildings

PWD reviewed the 28 material specifications and shortlisted 13 Materials for inclusion in the upcoming PWD SoR

Other 15 Materials Kept under review, awaiting BIS accreditation before further consideration

List of Included in PWD SoR 2026-27

- 1. Autoclaved Aerated Concrete (ACC) Blockwork**
- 2. Wall Assembly: Brickwork + Polyurethane Foam**
- 3. Insulated Roof Assembly**
- 4. Cool Roof: Paint**
- 5. Cool Roof: Tiles**
- 6. Compressed Stabilized Earth Block (CSEB)**
- 7. Poured earth wall**
- 8. Waste Cuddapah wall**
- 9. Rammed earth wall**
- 10. Rat Trap bond wall**
- 11. Extruded hollow clay brick wall (Porotherm)**
- 12. Ferrocement overhang**
- 13. Ferrocement channel intermediate floor and**





TN Urban Greening Policy

Target: 15% Municipal Green Cover & 33% Statewide Green Cover

15%

Municipal Green Cover

33%

Statewide Target

23.7%

Current Green Cover

3-30-300

Urban Greening Guideline

- 3-30-300 Guideline:** 3 trees visible from every home, 30% canopy cover in every neighborhood, 300m distance to nearest green space
- Native Species Priority:** 121 native species prioritized, 42 "Sangam" tree species, 6.9 crore saplings planted
- GIS-Based Planning:** Using ArcGIS to identify potential plantation sites in heat-stressed, low-green urban zones



Native Species

Heat Reduction

Water Recharge



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Sponge Parks & Urban Greening

Nature-Based Heat Mitigation & Climate Resilience

2

Mega Sponge Park by
CMDA

88

Mini Sponge Park by
GCC

- ✓ **Porur Eco-Wetland Park:**

Dr. M.S. Swaminathan Eco-Wetland Park - first wetland sponge park in Chennai

- ✓ **Blue-Green Infrastructure:** Converting neighbourhood parks into spaces that absorb stormwater, recharge groundwater and cool microclimates

- ✓ **Native Species Priority:** 121 native species prioritized, 6.9 crore saplings planted, 1000 mini-forest clusters in the Industrial Areas

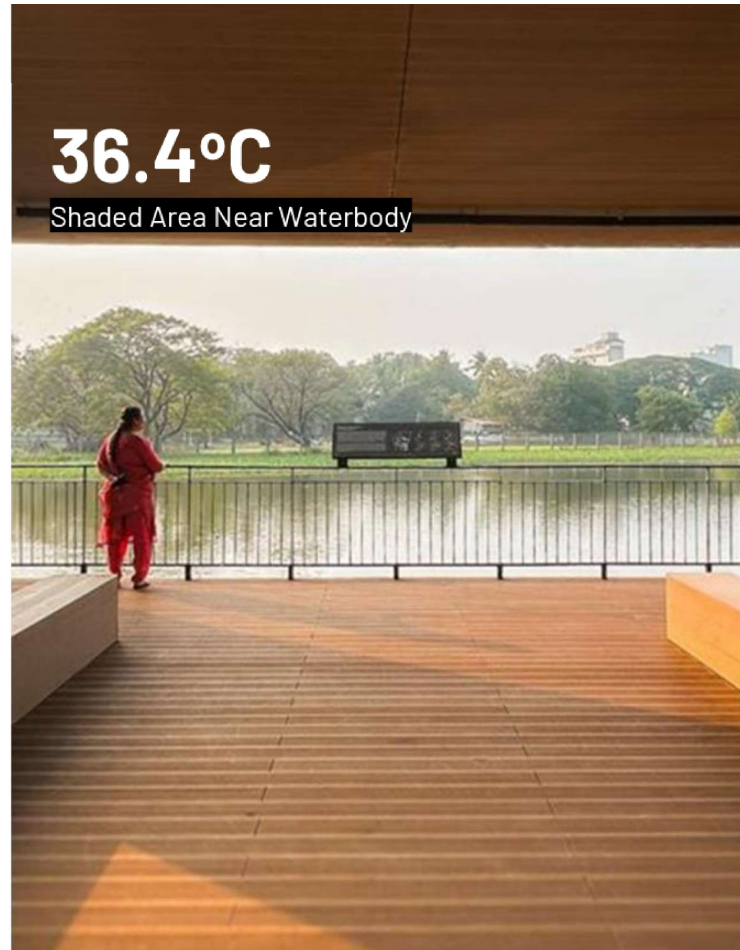
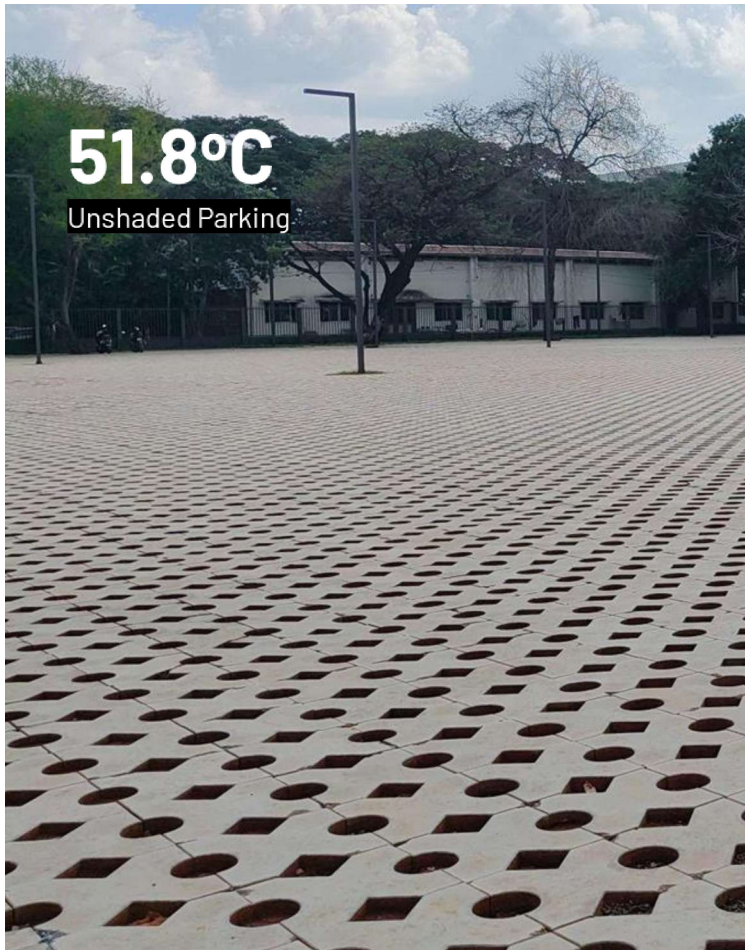


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Climate Benefits based on a Heat Impact Study Conducted at the Sponge Park



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Chennai Urban Farming Initiative (CUFI)

Edible rood gardens as holistic cool roof solutions



144 ICDS
Centres



10 Schools
including Govt.
schools



2 Resident
Welfare
Associations



340 Kg of Spinac &
vegetables
harvested from
schools & ICDS
centres



Rs 2,49,650
earned by ~10
women Malis



247 teachers,
children, residents,
staff trained in
rooftop gardening



- **Ambient temperature** inside room below on an avg 1–3°C cooler
- **Ceiling temperature** of room below: 2–4 °C cooler
- **Terrace surface temperature**: 8–12 °C cooler



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GIG Workers AC Lounges

India's First Dedicated Air-Conditioned Rest Spaces for Delivery Workers

Greater Chennai Corporation Initiative First-of-its-kind facility for gig workers



Air-Conditioned

Fans, benches, drinking water, and welfare facilities, along with dedicated AC lounges offering safe and dignified rest spaces



24/7 Access

Round-the-clock availability for gig workers to rest and recover



Health & Safety

Reduces occupational heat exposure and dehydration risk

2

Active Locations

24/7

Operating Hours

500+

Daily Users



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Construction Workers Resting Shelters

India's First Dedicated Air-Conditioned Rest Spaces for Construction Workers

Municipal Administration and Water Supply Department Initiative

First-of-its-kind facility for construction workers in Municipal Areas

Air-Conditioned

Fans, benches, drinking water, and welfare facilities, along with dedicated AC lounges offering safe and dignified rest spaces

24/7 Access

Round-the-clock availability for gig workers to rest and recover



Health & Safety

Reduces occupational heat exposure and dehydration risk



23

Active Locations

24/7

Operating Hours

500+

Daily Users



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From Heat Risk to Climate-Responsive Cities

Scaling evidence into policy and practice

Upscaling Priorities

- **Mainstream Passive Cooling:** Integrate into public buildings, housing and urban development programmes.
- **Target Heat Vulnerability:** Scale across high-risk wards and the 11 Beat the Heat cities.
- **Enable Data-Driven Action:** Use heat maps, building typologies and vulnerability data to guide investments.
- **Strengthen Delivery Systems:** Align standards, technical capacity, financing and performance monitoring.
- **Deliver Co-Benefits:** Reduce heat stress, cooling demand and emissions while advancing climate equity.

**Science-led planning | Passive cooling | Equitable implementation |
Scalable policy action |**



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Tamil Nadu Green
Climate Company



Tamil Nadu is ready to scale passive cooling through evidence-based pilots, enabling policy, procurement reform and partnerships.

Let us align technical assistance, finance and implementation support with priority delivery needs.

Thank you!

Case study 2: Ramboll Nature-based and Passive Cooling



Jia Xin Chum

Director of Landscape,
APAC,
Henning Larsen, Ramboll Group



GLOBAL COOLING PLEDGE ASSEMBLY

SINGAPORE 15 - 18 SEPTEMBER 2026

PROGRAMME TITLE

Everything is Nature

The Nature-First Approach



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Rooted in Nature



Designing with Systems



Shaping Stories of Place





42
Stre

Planned Work
Workdays & Evenings
① will not run all weekend
Weeknight will end
Please take ① Franklin Av for ②









3 Key Mindset Shifts for Nature-Positive Urbanism

- 1 From objects to systems**
Buildings as part of watersheds, habitats, heat networks.
- 2 From mitigation to regeneration**
Not just reducing runoff or heat, but restoring soils, hydrology, and habitats.
- 3 From nature as backdrop to nature as driver**
Landscape and ecology shaping massing, datums, phasing, and public life.

An aerial photograph of a lush green park. A winding wooden boardwalk with glass railings crosses a pond. The boardwalk has several people walking on it. The pond is surrounded by dense green trees and vegetation. In the background, a city skyline with various buildings is visible under a clear sky. The sun is low in the sky, creating a warm, golden light across the scene.

Nature-based solutions could provide 37% of the mitigation needed between now and 2030 to keep global warming below 2 degrees Celsius- the target of the Paris Agreement. But these interventions currently receive just 3% of climate funding.

Erica Gies, Water Always Wins, 2022



The Business Case

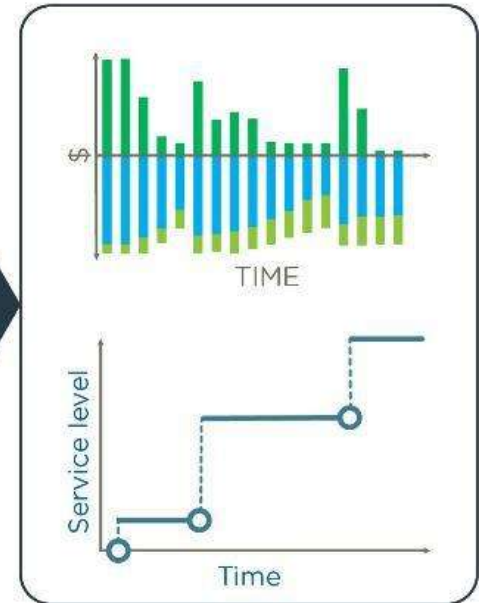
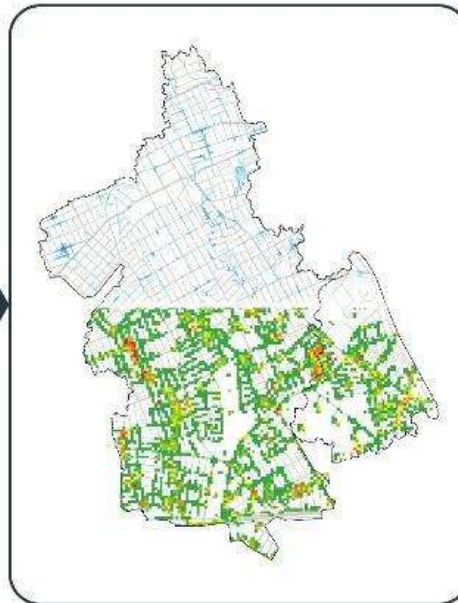
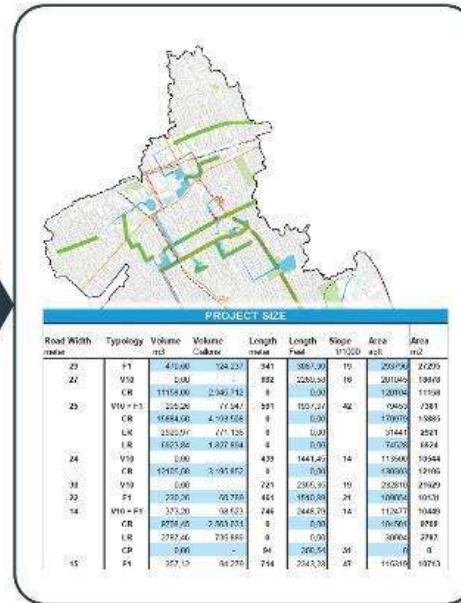
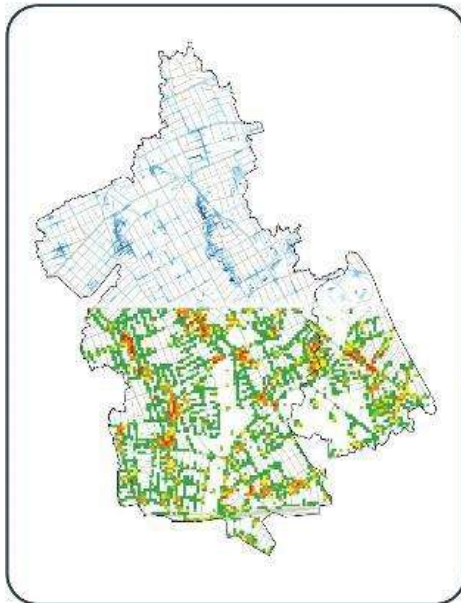


1 BASELINE
SIMULATIONS & RISK

2 DESIGN, COSTS &
CO-BENEFITS

3 PLAN
SIMULATIONS & RISK

4 COST-BENEFIT
ANALYSIS & PATHWAYS





Cost Benefit Analysis

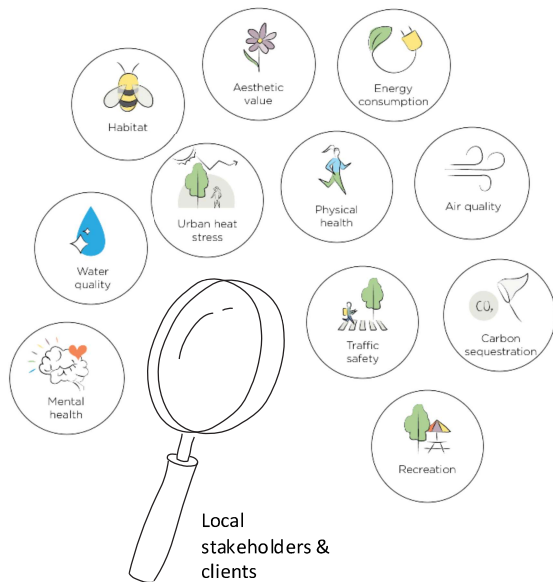




Steps & Processes

1 Visioning

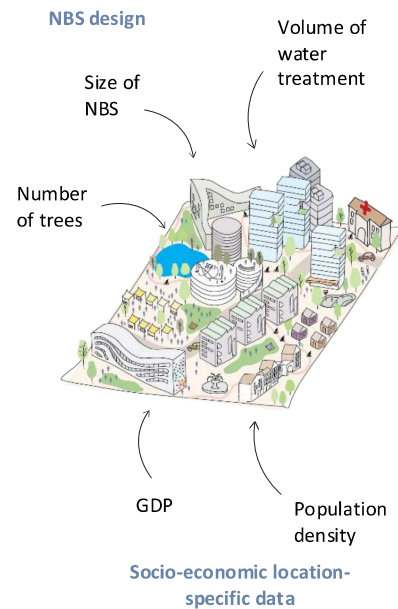
Co-benefit identification/
prioritization



Local
stakeholders &
clients

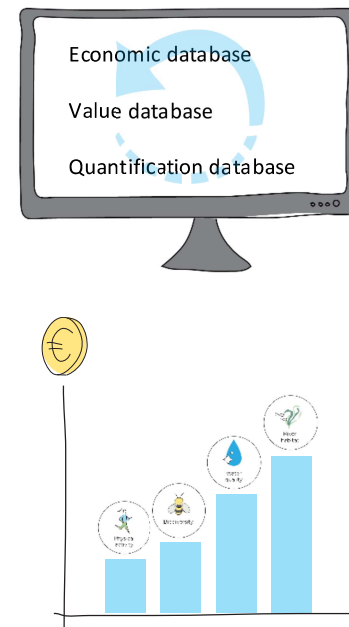
2 Data collection

Project specific
input data



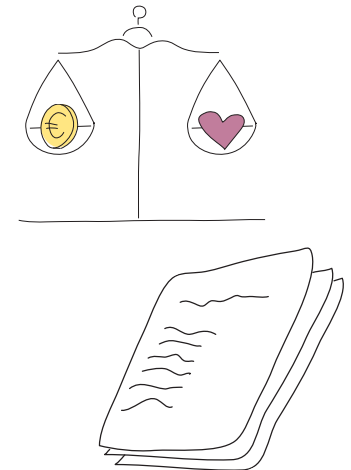
3 Co-benefit assessment

Tool application &
output



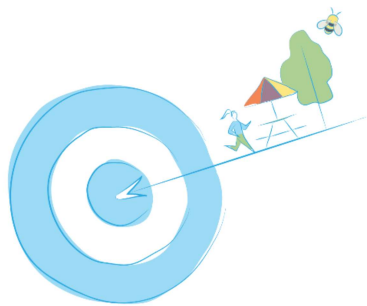
4 Decision making

Cost benefit analysis





Strengthening the case for Nature-based Solutions



Outcome showcase

Helps to demonstrate the value of NBS interventions, by showcasing the multiple benefits they can deliver across environmental, social, economic dimensions.



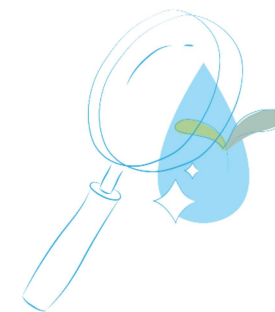
Funding opportunities

Opens the door to co-financing, by attracting multiple stakeholders.



Business justification

Inclusion of co-benefits in a cost benefit analysis (CBA) can provide a stronger business case for the uptake of NBS as climate adaptation measures.



Decision support

Informs decision-making that advocates for more sustainable solutions.

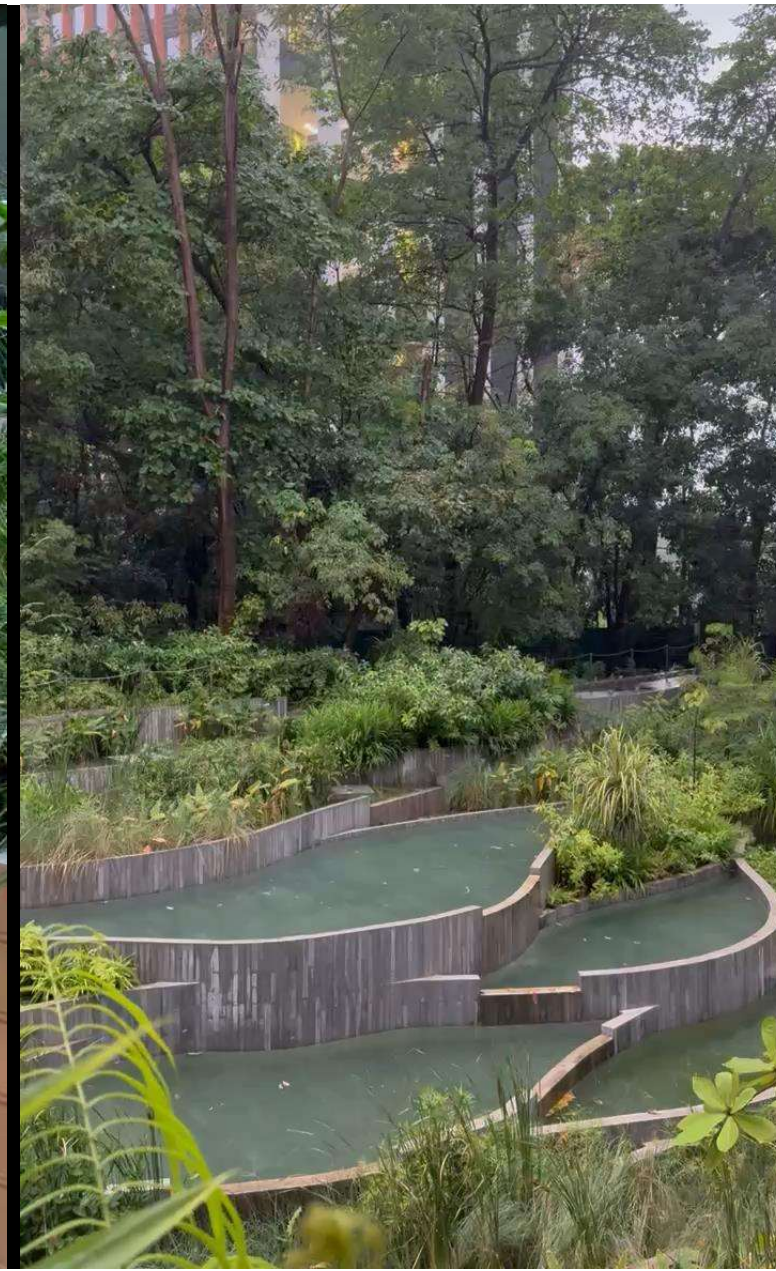


Public empowerment

Provides clear, shareable data that reaches diverse social groups. By providing the public with clear data, they gain the power to monitor progress and advocate for expanding NBS to other areas









Bishan-Ang Mo Kio Park after heavy rain on Jan 1, 2021

Credit: Straits Times



The Straits Times

January 1 · 🌐



Heavy rain on New Year's Day caused rising water levels at Bishan-Ang Mo Kio Park. The prolonged rain...
[See More](#)

Most Relevant ▾



May Chong

Oh please. Its suppose to be like this during heavy rain. That's the purpose of this drain, so that other areas don't flood so much.



Like · Reply · 28w



Vig Nesh

It was built for this purpose. Let the greenery enjoy the wet weather. Stay Home Stay safe.



Like · Reply · 28w



Yeo Wang Ping

Vig Nesh yes , that's our ABC: active, beautiful and clean

Like · Reply · 28w

↳ 4 Replies





2008

2020

Video Credit: Brice Li

Case study 3: Quezon's Oasis Schoolyards



Maricris F. Veloso

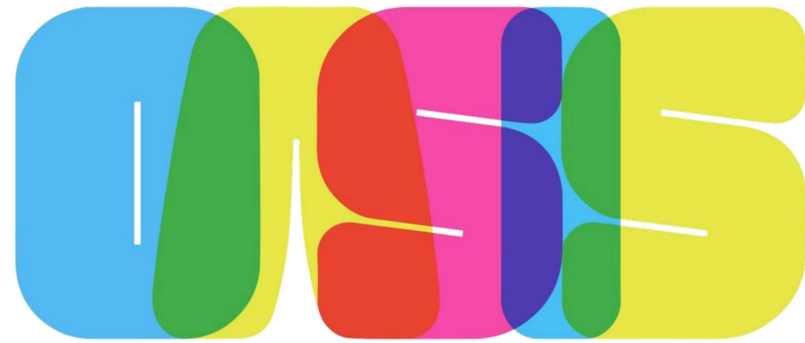
Officer in Charge,
Education Affairs Unit,
Office of the Mayor
Quezon City,
Philippines



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SCHOOLYARDS

Quezon City, Philippines

*Nature-based school spaces
responding to heat, flooding,
and children's everyday needs*

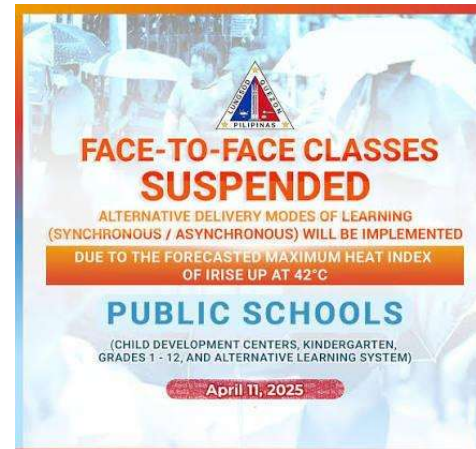
Maricris F. Veloso



Global Cooling Pledge Assembly | 16 September 2026 | Singapore



Peak flood volume can reach 26 million cubic meters—**over 10,000 Olympic-size swimming pools**



Source: Philippine News Agency (Joan Bondoc)



O **penness**
Provides accessible outdoor space

A **daptation**
Responds to heat and flooding

S **ensitization**
Builds climate awareness

I **nnovation**
Tests practical nature-based solutions

S **ocial ties**
Connects school and community



School Selection and Baseline Assessment

Setting the Foundations



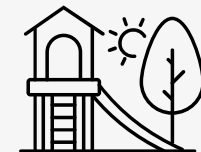
Vision Development and Capacity Building

Co-design Workshops and School Exhibitions



Resilience Design

Design Finalization



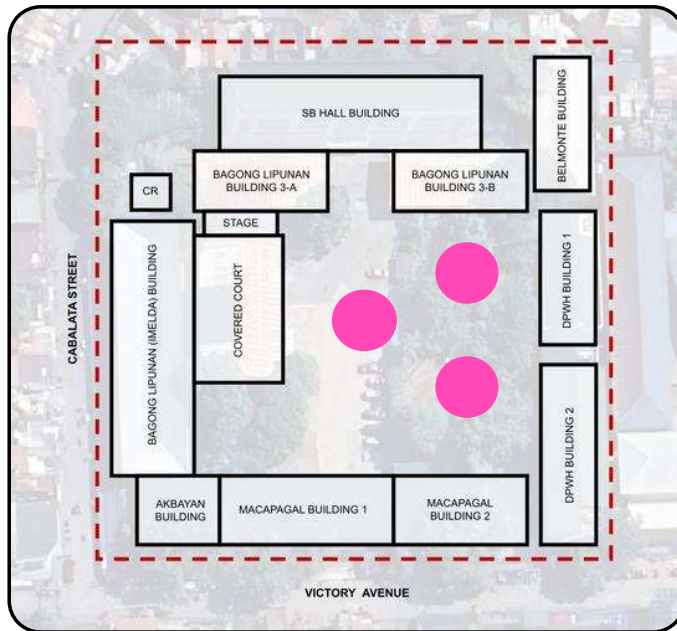
Schoolyard Transformation

*Construction Work
Schoolyard Activation
Schoolyard Launch*

1

Diosdado Macapagal Elementary School

Brgy. Tatalon, District 1, Quezon City



Location of the schoolyard

Address: 40 Victory Ave, Brgy. Tatalon

Schoolyard Area: 1,308 sq.m.

Project Cost: Php 4,967,309.75

Student population: 4,459

Workshops



Site Conditions



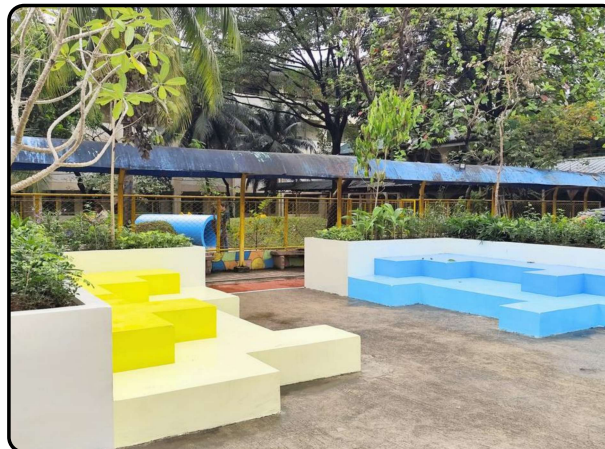
1

Diosdado Macapagal Elementary School

Brgy. Tatalon, District 1, Quezon City



Final Design

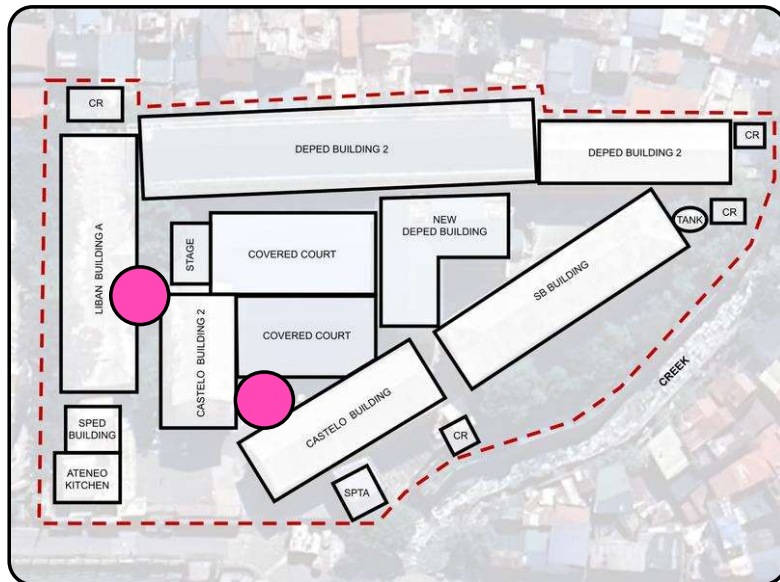


**creative visualization*

2

Manuel L. Quezon Elementary School

Brgy. Commonwealth, District 2, Quezon City



● Location of the schoolyard

Address: Lawin Street, MRB Compound, Pilot Area, Commonwealth, Quezon City

Schoolyard Area: 307.8 sq.m.

Project Cost: Php 3,318,004.80

Student population: 7,803

Workshops



Site Conditions



2

Manuel L. Quezon Elementary School

Brgy. Commonwealth, District 2, Quezon City



Final Design

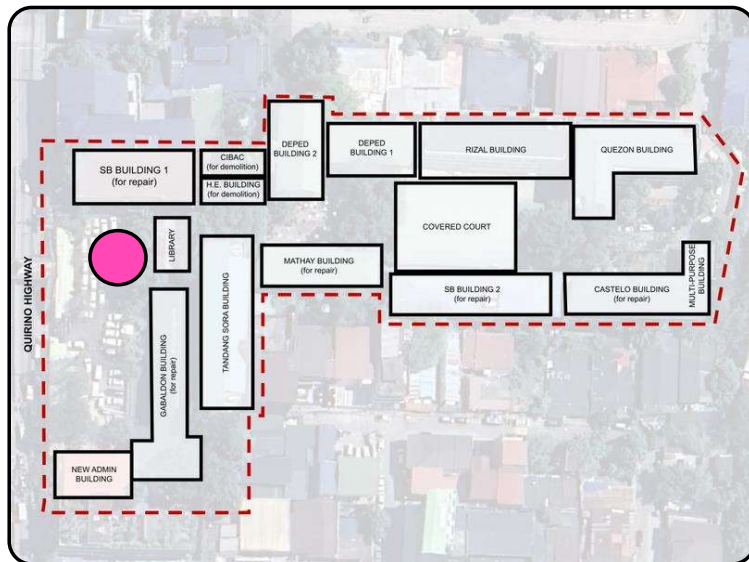


**creative visualization*

3

Placido del Mundo Elementary School

Brgy. Talipapa, District 6, Quezon City



● Location of the schoolyard

Address: 1116 Quirino Highway, Barangay Talipapa, Novaliches, Quezon City

Schoolyard Area: 642.9 sq.m.

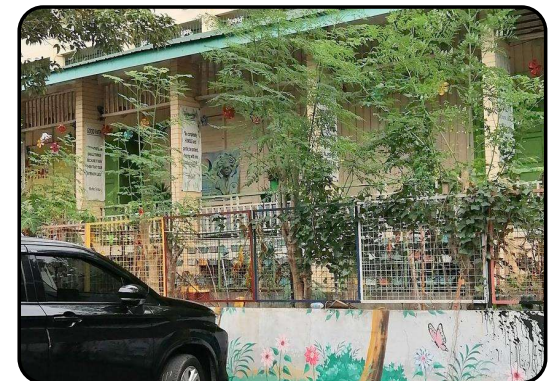
Project Cost: Php 2,200,053.20

Student population: 4,578

Workshops



Site Conditions



3

Placido del Mundo Elementary School

Brgy. Talipapa, District 6, Quezon City



Final Design



**creative visualization*



Outputs and Outcomes

Program Outputs

- 3 new OASIS schoolyards
- 2,351 square meters of new greener and vibrant areas
- Approximately 15,000 students reached across the three schools
- 318 square meters of new seating spaces
- 730 additional trees, shrubs, and plant species planted
- 560 square meters of hard surface converted into soil-based playground areas
- 22 co-design workshops and design exhibitions conducted
- 118 students serving as OASIS ambassadors
- Approximately 70 other school communities—including teachers, principals, school staff, and parents—reached across the three schools

Program Outcomes

Through the co-design approach and physical transformation, the program achieved the following outcomes:

- Created cooler and greener spaces
- Created new opportunities for outdoor learning
- Strengthened community ownership
- Built climate awareness and environmental stewardship
- Improved well-being
- Strengthened institutional collaboration
- Built a new local ecosystem
- Created a model for replication

Ways Forward | Shoolyard Upscaling



Ramon Magsaysay Elementary School

Area: 1,015.77 sq. m.

Student Population: 1,300



Quirino High School

Area: 1,190.75 sq. m.

Student Population: 3,300



San Bartolome High School

Area: 870 sq. m.

Student Population: 6,000

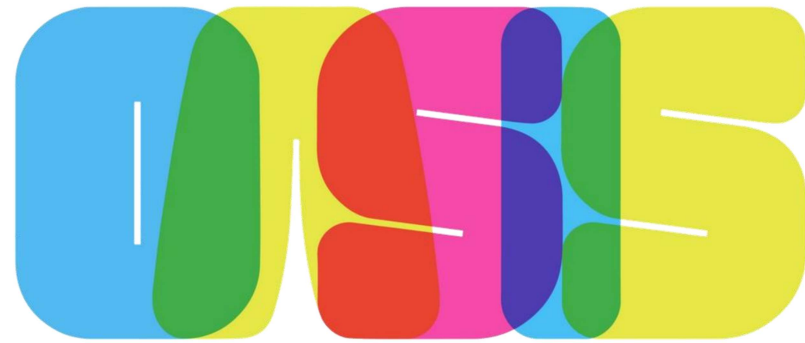
Existing Site Conditions







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SCHOOLYARDS

Quezon City, Philippines

*Nature-based school spaces
responding to heat, flooding,
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Maricris F. Veloso



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Group activity – Assessing the potential of NBS

1. Informal settlement in Sub-Saharan Africa
2. New development in South-East Asia
3. Public buildings in Latin America



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1

Consider the context and stakeholders in your scenario.

2

Multi-Criteria Assessment		Cost	Impact	Implementation		Final Evaluation	
IMPROVE SOLAR CONTROL Reduce energy bills, reduce carbon footprint	Ceiling, Doors, Repels	Cost risk reduction for future, carbon aware investment	Cost benefits: reduction in energy, energy bills, energy value	Scalability risk: money across the city, planning, delivery time	Feasibility to overcome community, technology	Flexibility to learn from others	What category does this solution fall into? Transformation, Quick win, complementary or deprioritise?
GREEN SURFACES							
Solution 3							
Solution 4							

1

Selecting the right solutions

Multi-criteria assessments

Example scoring matrix:

	Direct wins	Transformational
High priority	- High priority - High priority - High priority	- High priority - High priority - High priority
Low priority	- High priority - High priority - High priority	- High priority - High priority - High priority

Complementary: Cost wins, then after

Direct wins: then after

Regional context

Cost	Impact	Implementation	Final Evaluation
- High priority - High priority - High priority	- High priority - High priority - High priority	- High priority - High priority - High priority	- High priority - High priority - High priority
- High priority - High priority - High priority	- High priority - High priority - High priority	- High priority - High priority - High priority	- High priority - High priority - High priority
- High priority - High priority - High priority	- High priority - High priority - High priority	- High priority - High priority - High priority	- High priority - High priority - High priority
- High priority - High priority - High priority	- High priority - High priority - High priority	- High priority - High priority - High priority	- High priority - High priority - High priority

Section 3

Compare the cost & delivery effort against the weighted impact for each solution.

Scenario 1

Informal Settlement

Nairobi, Kenya

Subtropical highland climate. During a 2015 heatwave, informal settlements in Nairobi were reported to be 3 to 5°C hotter than other parts of the city.

Home to approximately 300,000 to 400,000 informal settlers, this settlement comprise densely packed structures constructed from galvanised iron sheets, with limited access to quality public spaces, tree cover, and essential infrastructure. Residents face multiple climate-related risks, including flooding, extreme heat, water scarcity, and health impacts associated with poor housing conditions. Increasing concern has emerged around the impacts of extreme heat on residents, particularly children, older persons, and people operating small businesses from their homes.

The city has secured funding for a pilot programme to improve thermal comfort and reduce heat exposure within selected neighbourhoods. However, solutions must work within the realities of this informal settlement: extremely high density, limited public land, constrained budgets, uncertain tenure arrangements and limited capacity for ongoing maintenance. **Officials can fund only one or two interventions and are seeking options that can deliver visible benefits within three years while supporting wider resilience objectives.**



Image source: Unsplash / Evans Dims

©evans o.
dimsphotography.com

Scenario 2

Mixed-use Development Ho Chi Minh City, Vietnam

Tropical monsoon climate with consistently high temperatures, high humidity, intense solar exposure, and seasonal flooding.

One of Ho Chi Minh City's mixed-use neighbourhoods is undergoing major rejuvenation and redevelopment. City planners are concerned that extensive hard surfaces, dense building clusters and high levels of vehicular activity could intensify urban heat island effects and increase demand for air conditioning. Recent district-level modelling undertaken by the city indicated that without intervention, many public spaces within the neighbourhood could experience unsafe thermal comfort conditions during the hottest months of the year. Planners are particularly concerned about outdoor heat exposure affecting pedestrians, cyclists, public transport users, older persons, and outdoor workers. Rising cooling demand is also expected to place additional pressure on the city's power infrastructure and decarbonisation goals.

In line with new participatory planning approaches, city planners have the opportunity to mandate developers to integrate one or two major passive or nature-based cooling strategies into rejuvenation masterplans and is seeking evidence-based recommendations that balance thermal comfort, economic viability, and long-term resilience.



Image source: Unsplash / Dang Cong

Scenario 3

Public Primary School Medellín, Colombia

Tropical climate with warm temperatures throughout the year. Urbanisation and climate change are increasing heat stress in some parts of the city despite Medellín's relatively moderate mountain climate.

A recent assessment of municipal schools identified growing concerns regarding heat stress in classrooms, assembly areas, school yards, and outdoor waiting spaces. Teachers have reported that thermal discomfort can affect concentration, learning outcomes, and use of outdoor recreational areas, particularly during the hottest periods of the day.

At the same time, the city's education department is facing increasing energy costs and cannot afford large-scale deployment of air conditioning across its school portfolio. Any cooling solution must therefore be cost-effective, easy to maintain, and scalable across dozens of schools serving different neighbourhoods and socio-economic groups.

The municipality has secured funding for a pilot programme and will test only one or two passive or nature-based cooling interventions before considering broader implementation across the city's school network. The solutions could consider classrooms, assembly areas, school yards, or outdoor waiting spaces.



Image source: Unsplash / Halimebora

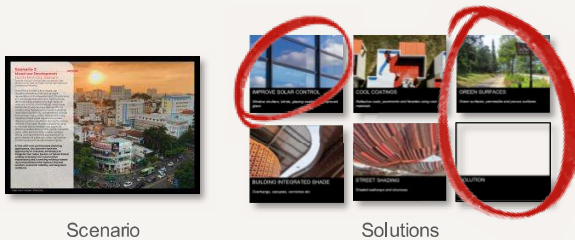
Group Activity

Select solutions for your scenarios

1

Shortlist 3 solutions for your scenario

What solutions might work for your scenario?



Scenario

Solutions

Consider the context and stakeholders in your scenario.

2

Conduct a simplified multi-criteria assessment for these 3 solutions

How do the solutions compare relative to each other in these criteria?

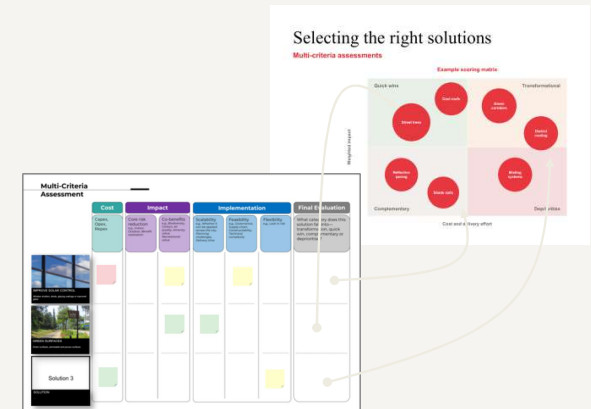
Multi-Criteria Assessment						
	Cost	Impact	Implementation		Final Evaluation	
	Capex, Opex, Repex	Core risk reduction E.g. health, pollution, benefits	Co-benefits E.g. biodiversity, carbon, air quality, energy, urban, amenity, recreational value	Scalability E.g. volume of solution required, impact on the city, planning, delivery time	Feasibility E.g. governance, cash flow, commercial, community	Flexibility E.g. lock-in risk
						
						
						
						
Solution 3						
SOLUTION						

Use the red, amber, green post-its to rank them in each column. Take notes on the post-its

3

Discuss your final evaluation for these 3 solutions for your scenario

How might the solutions fit into a larger strategy?



Compare the cost & delivery effort against the weighted impact for each solution.



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Group report-back & wrap up



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