

Tackling heatwaves

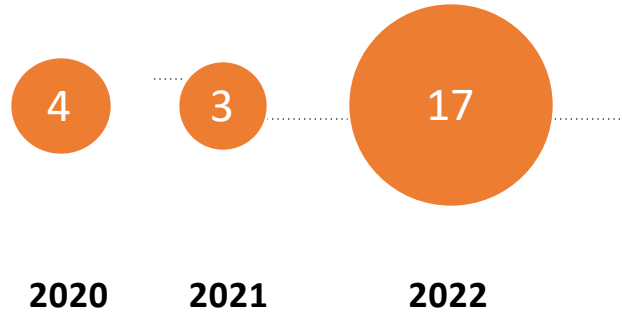
National Workshop 2024 -NDMA

Presenter: Manu Gupta
Feb 2024

It is getting hotter.. Very fast

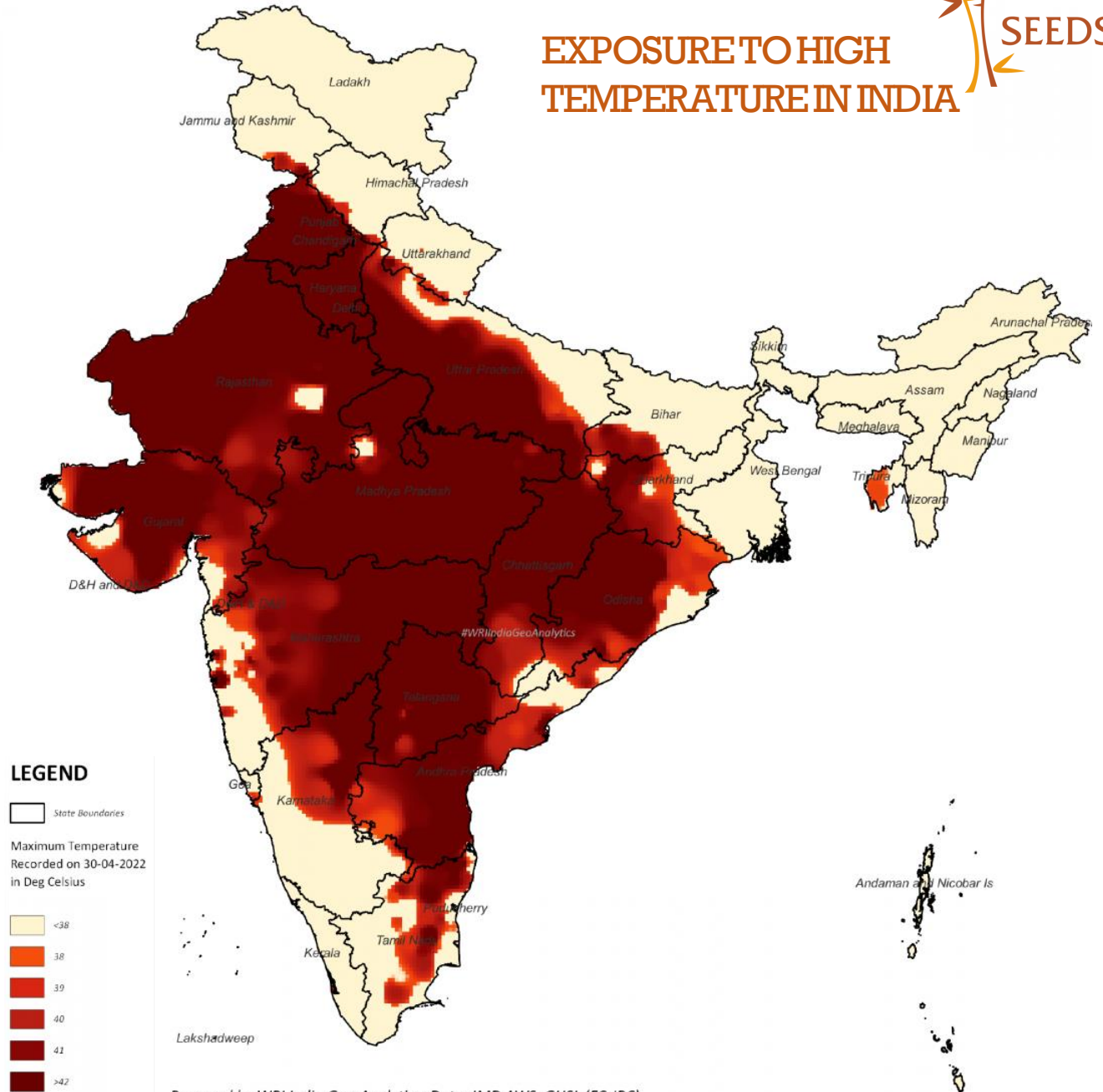


Heat-wave days in North India



**May 14, 2022: unprecedented
LST of 51.8°C**
In previous years, maximum
was in mid-40s

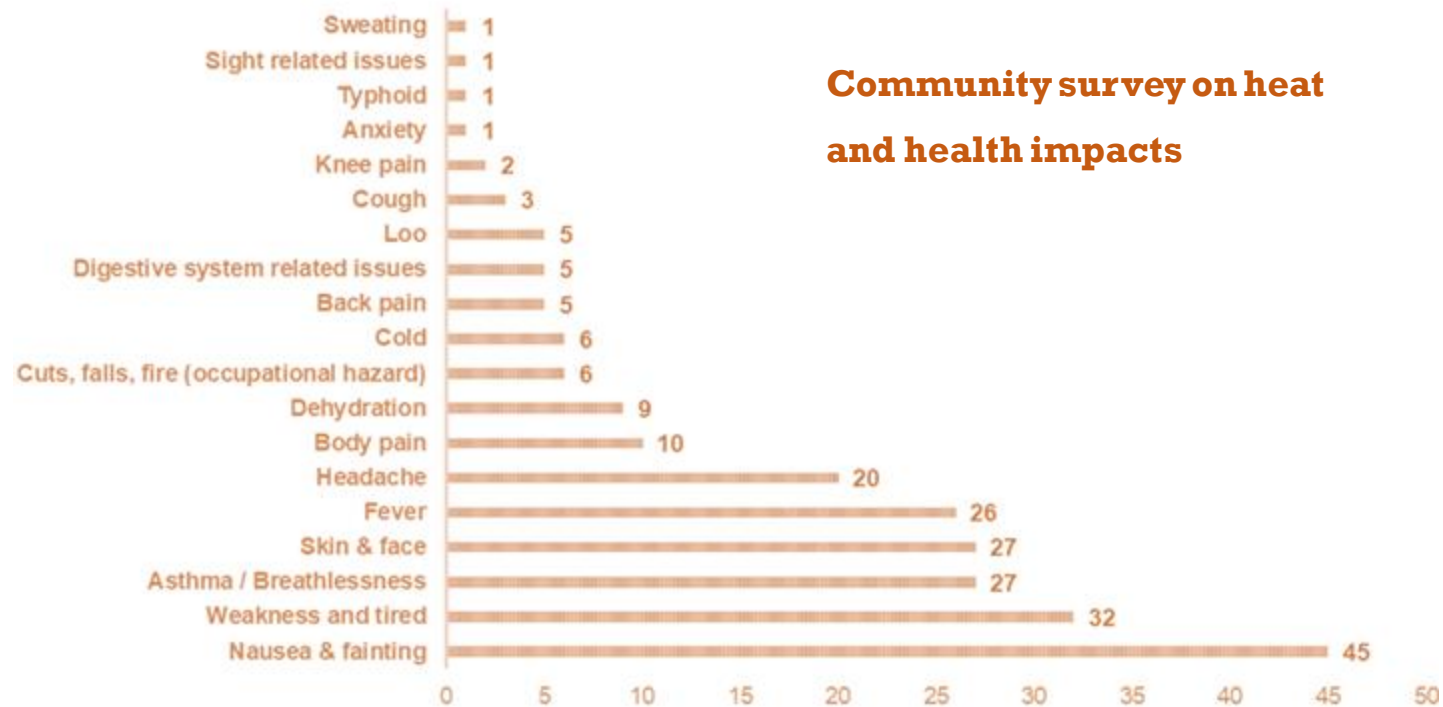
EXPOSURE TO HIGH TEMPERATURE IN INDIA



Recorded April 30th 2022

Unveiling the Toll on Urban Slum Dwellers

Community survey on heat and health impacts



Major health impacts by number of respondents. Many of them suffer from fainting, skin problem, breathlessness, body pain, eye infections, backache, and injuries.

N=484

A secondary impact is loss of productivity – at work and in learning

Heatwaves – Impact on humans

In India, the National Disaster Management Authority (NDMA) classified heatwaves as a disaster in 2021. Heatwaves have a number of serious health impacts on humans



Heat exhaustion and heatstroke



Reduced productivity



Respiratory problems



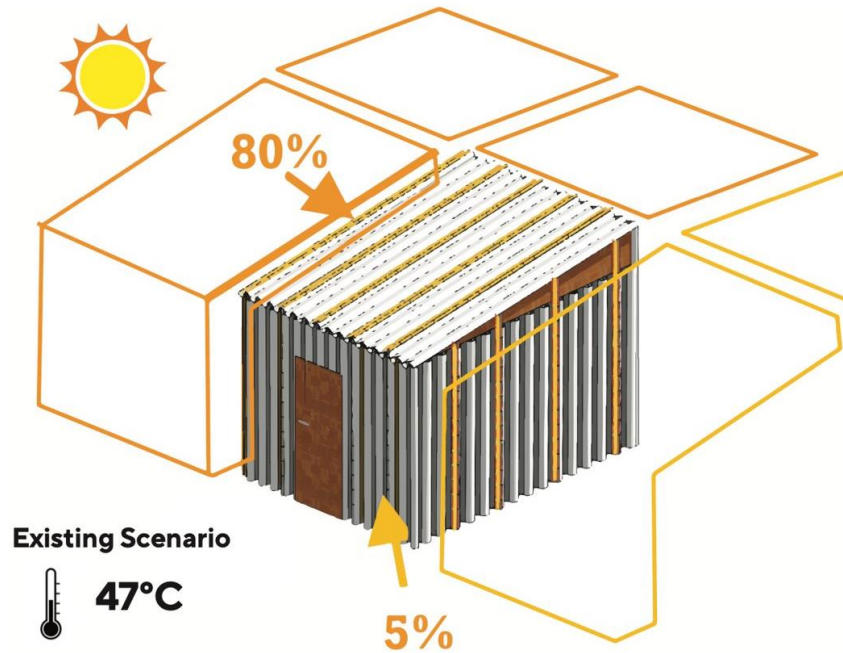
Mental health issues



Skin diseases

Imagine over thousand families under direct impact of heatwave...

Heatwave Havoc in Urban Slums



Indoor heat, and NOT outdoor heat, is the real killer

Maximum heat gain - **80%** - occurs from the roof

Indoor temperature can be as much as **47° C** when outdoor temperature is 40° C

Individuals spend at least 13 hours per day or 90% of their week indoors, inside buildings



Increased humidity and decreased temperatures are posing indirect health risks for residents staying indoors during heat waves



Climate change - Coping Mechanism



ARTIFICIAL INTELLIGENCE

AI-powered models can provide early warning systems to alert communities about impending disasters



MACHINE LEARNING

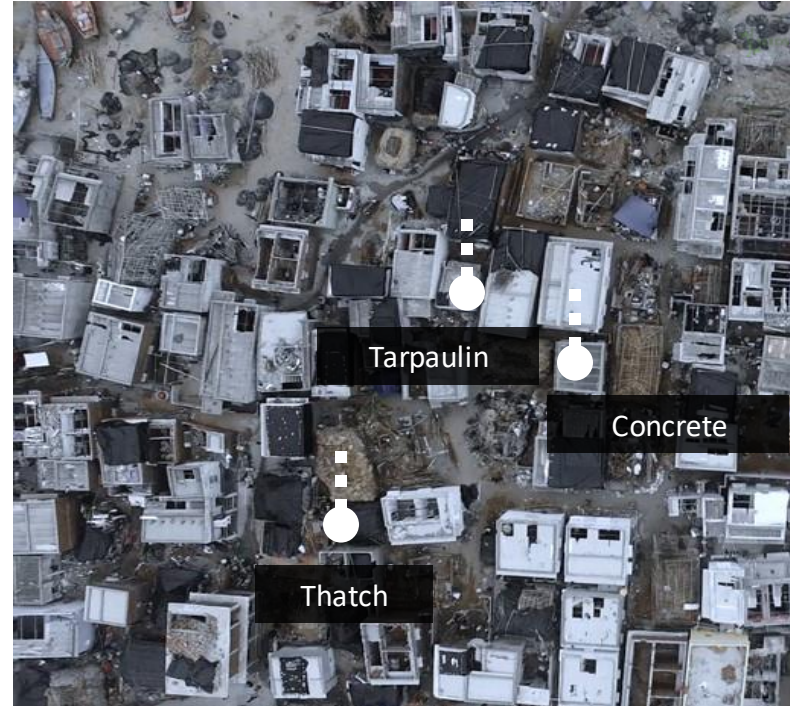
Forecasting & simulation with historical data and imagery to predict extreme weather events. **Automated decision-making**- as optimizing buildings' heating & cooling systems based on weather conditions and usage patterns



GEO-SPATIAL DATASETS

Facilitates monitoring initiatives & temporal analysis for identifying high risk areas

How can Tech help us with heat waves?

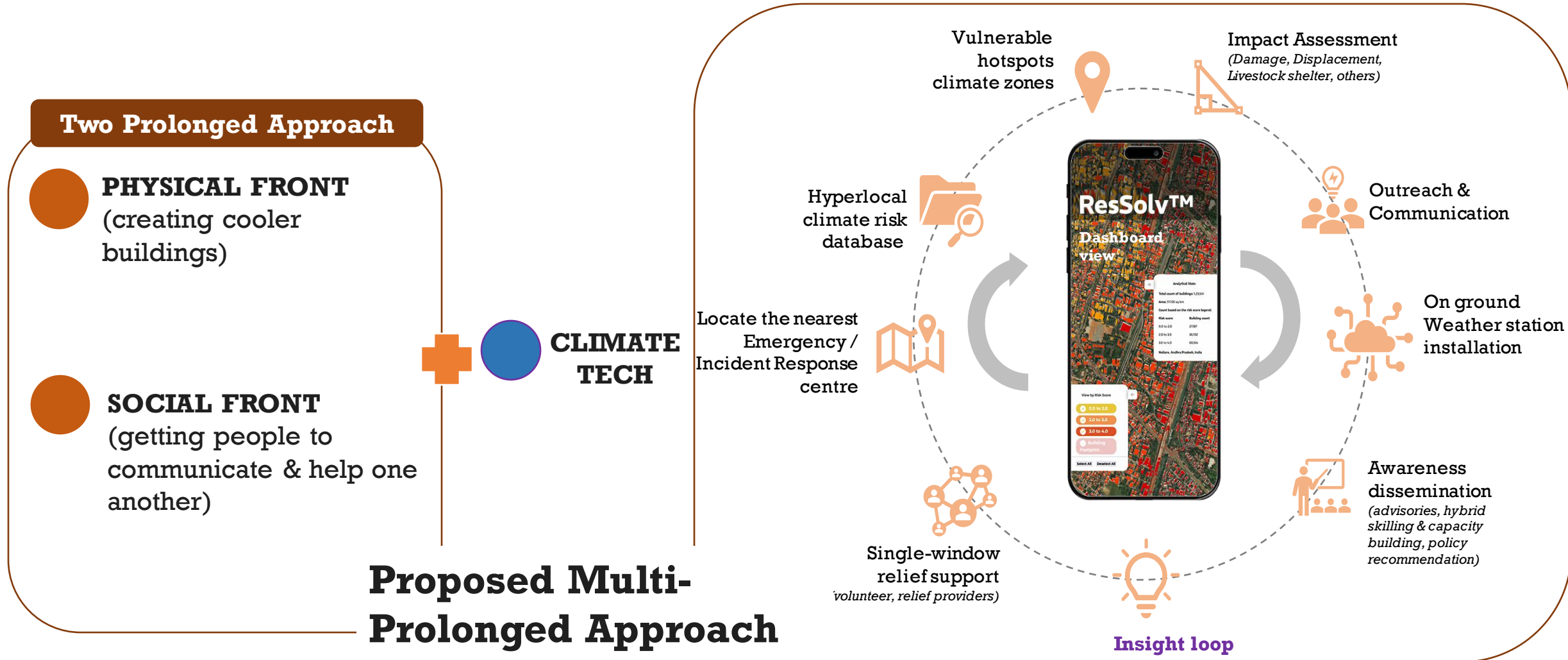


There is a need to redesign our cities beyond energy efficiency and cutting carbon emissions using technologies that leverage current practices

Climate Tech is already being used by SEEDS to help forecast and calculate the risk of heatwaves, to prevent homes from becoming furnaces

Climate tech to the rescue

Buildings and homes in the most LIG area are old and ill-equipped to protect people from extreme heat spreading throughout the region. And that's not only going to affect high-risk groups



Methodology followed

1 Artificial Intelligence (AI) based heat risk scores



2 Assessment & Selection of intervention sites



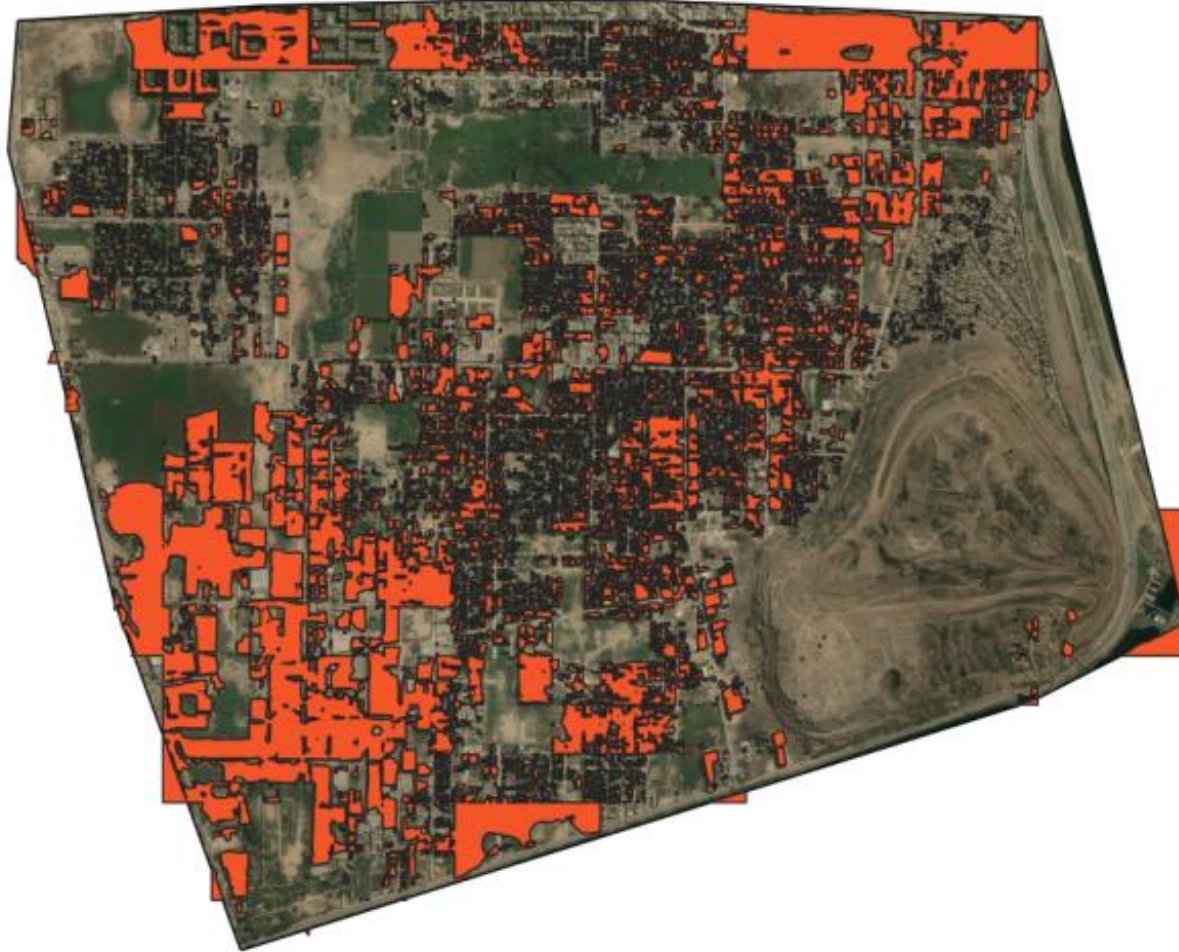
3 Design & Planning of Intervention



4 Implementation & Scaling Strategisation



AI Based Heatwave High Risk Area Visualization



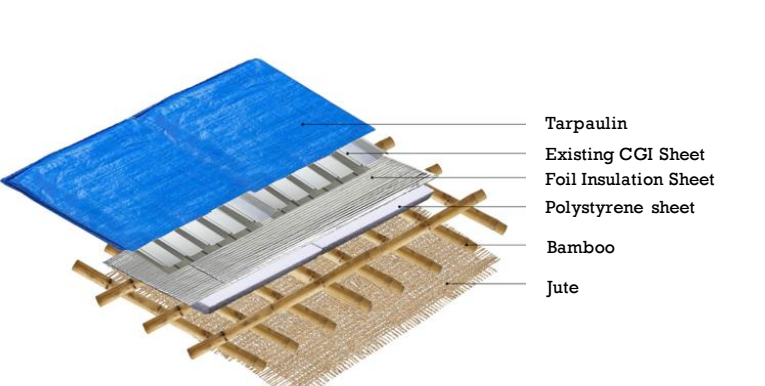
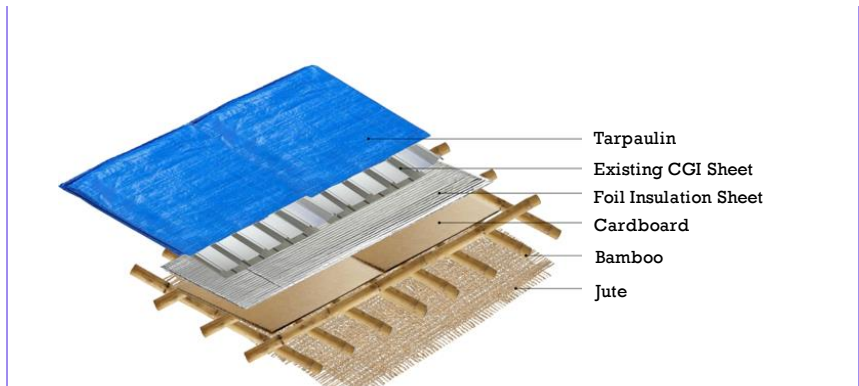
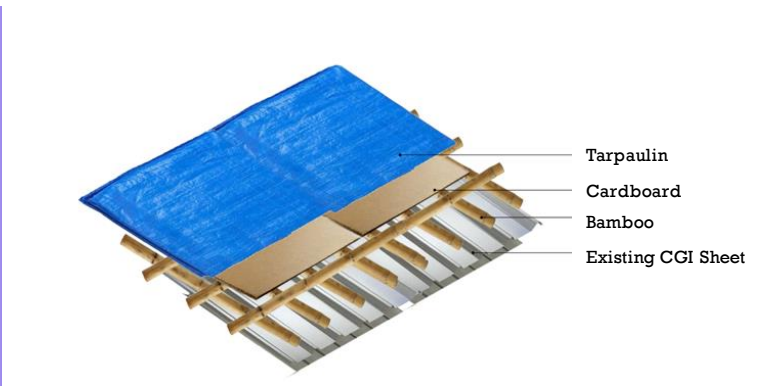
- AI-based, hyper-local risk assessment for Urban Low-Income area at the building level.
- Low-income, highly dense areas are up to **6° C hotter** than the rest of the city
- In other words, the same conditions (temperature) affect different parts of the city differently

Retrofit of urban low-income housing to combat heatwaves using AI-enabled climate-tech

The Intervention – Low-cost, cool roof solutions

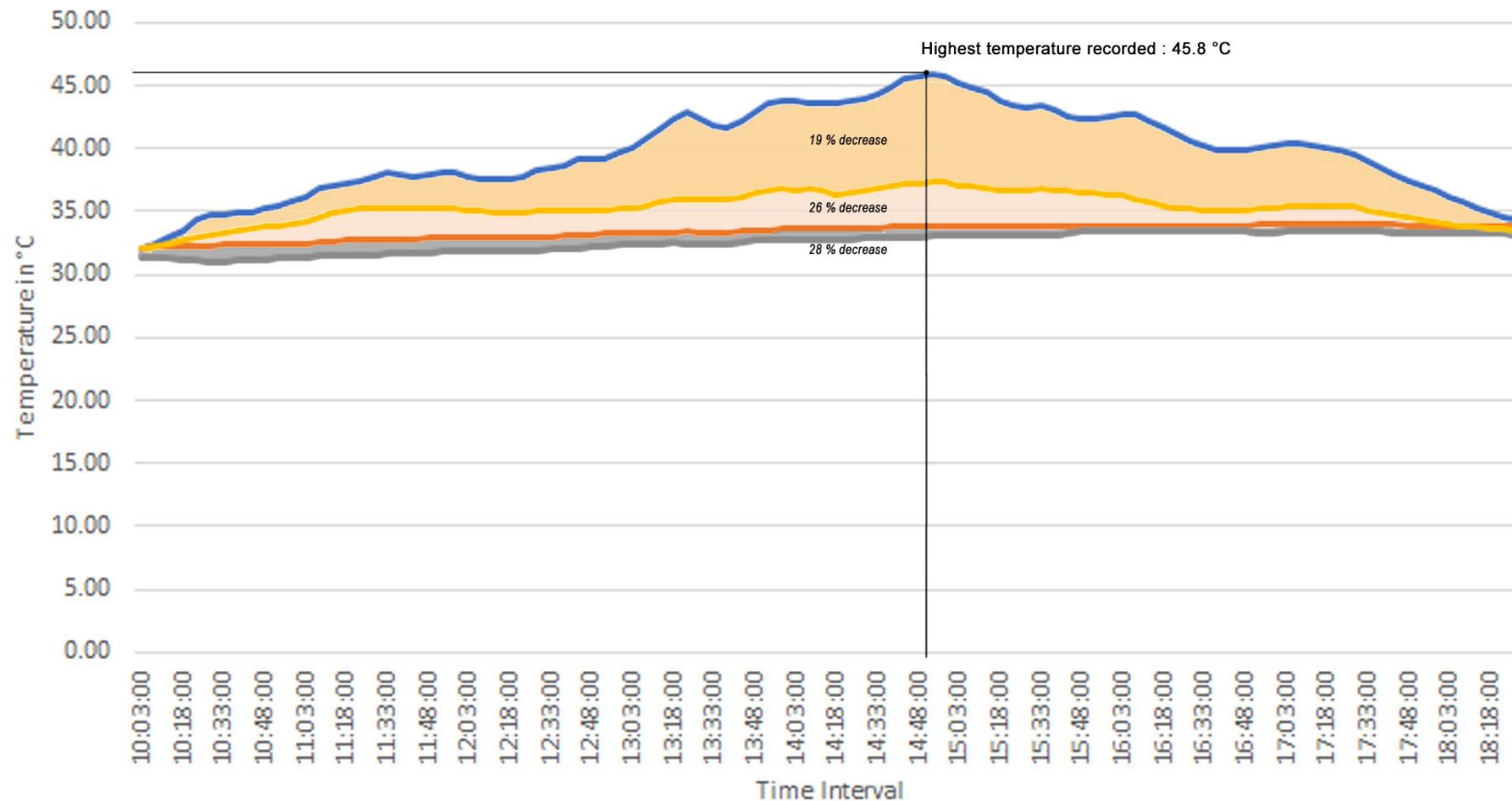
3 models were designed, prototyped and tested in collaboration with the community, as shown below.

The choice to retrofit was based on the search for a low-cost, sustainable and local solution.

 <p>Labels for Model 1:</p> <ul style="list-style-type: none"> Tarpaulin Existing CGI Sheet Foil Insulation Sheet Polystyrene sheet Bamboo Jute 	 <p>Labels for Model 2:</p> <ul style="list-style-type: none"> Tarpaulin Existing CGI Sheet Foil Insulation Sheet Cardboard Bamboo Jute 	 <p>Labels for Model 3:</p> <ul style="list-style-type: none"> Tarpaulin Cardboard Bamboo Existing CGI Sheet
<p>Model 1</p> <p>12° C cooler than existing roof (control temperature)</p>	<p>Model 2</p> <p>12.7° C cooler than existing roof (control temperature)</p>	<p>Model 3</p> <p>8.5° C cooler than existing roof (control temperature)</p>

12°C Cooler Homes Transformation

Hourly Temperature Variation



Control
(No action)

45.8C

Model 1

33.8C

Model 2

33.1C

Model 3

37.3C

Interventions for Heatwaves (1/2)



Innovative approach to create shelter from the scorching heat. By using discarded plastic bottles to craft a shelter.



Resourceful approach devised that involved using recycled fabrics such as chunni (scarves), dupatta (stoles), or saree (traditional attire) to provide effective shading solutions



Better shelter's location, strategically positioned near the community, ensured easy access for those seeking refuge from the heat



Green nets installed in Kishan Kunj

Interventions for Heatwaves (2/2)



Housing Façade solution in retrofitting



Cool roofing solutions



Community level Awareness sessions



Monitoring indoor temperature & humidity



Women & Children- Focused Group discussion

Implementation guidelines for community



Paint walls and roofs with white paint



Shading devices like green shade nets



Increasing vegetation



Fire-retardant insulation

Multi-lingual Advisories



SEEDS Cyclone Advisories

ପଦକ୍ଷେପ: ଖିସିବ ଏବଂ ଯେଉଁଠାରେ ସମ ସମ୍ଭବ ସମୟରେ ଅପରାଧ କାର୍ଯ୍ୟକୁ ରୋକିବା ପାଇଁ ପଦକ୍ଷେପ ଗ୍ରହଣ କରନ୍ତୁ।

- ଅପରାଧ ଘରକୁ ଯିବାକୁ ନିଷିଦ୍ଧ କରନ୍ତୁ।
- ନିୟମିତ ଭାବରେ ପାଣି ପୂରଣ କରନ୍ତୁ।
- ପଶୁପାଳନ ପାଇଁ ସଜ୍ଜା କରନ୍ତୁ।

72 ଘଣ୍ଟା ପୂର୍ବରୁ
ବାର୍ତ୍ତା ସଚରଣ

48 ଘଣ୍ଟା ପୂର୍ବରୁ
ବାର୍ତ୍ତା ସଚରଣ

ଆରମ୍ଭକୁ
କ୍ଷେପଣ

ବାର୍ତ୍ତା ସଚରଣ
24 ଘଣ୍ଟା ପୂର୍ବରୁ

ଉତ୍ସାହନ ଦୃଷ୍ଟିକୋଣ
12 ଘଣ୍ଟା ପୂର୍ବରୁ

- ଶୁଣା କିମ୍ବା ପାଣି ଯୋଗ୍ୟ ପୂରଣ କରନ୍ତୁ।
- କେଉଁଠାରେ ବିଭିନ୍ନ ପ୍ରକାରର ପାଣି ଯୋଗ୍ୟ କରନ୍ତୁ।
- ପୂରଣ କରନ୍ତୁ ଏବଂ ସଫା କରନ୍ତୁ।
- ପୂରଣ କରନ୍ତୁ ଏବଂ ସଫା କରନ୍ତୁ।

Source: Unicef / All For Humanitarian Action

SEEDS Cyclone Advisories

କ୍ଷେପଣ 1
ଅନ୍ତରାଳ ପ୍ରାୟ 10-15 ମିନିଟ୍ ପାଇଁ ସଜ୍ଜା କରନ୍ତୁ।

କ୍ଷେପଣ 2: ଯାତ୍ରା ପୂର୍ବରୁ ପିନ୍ଧିବା ଯିବା-ଏବଂ ପଶୁପାଳନ ପାଇଁ ସଜ୍ଜା କରନ୍ତୁ। ଅନ୍ତରାଳ ପ୍ରାୟ 10-15 ମିନିଟ୍ ପାଇଁ ସଜ୍ଜା କରନ୍ତୁ।

କ୍ଷେପଣ 3: ଯାତ୍ରା ପୂର୍ବରୁ ସଜ୍ଜା କରନ୍ତୁ ଏବଂ ଅନ୍ତରାଳ ପ୍ରାୟ 10-15 ମିନିଟ୍ ପାଇଁ ସଜ୍ଜା କରନ୍ତୁ।

ପ୍ରାଣାନ୍ତରଣ ପାଇଁ ପଦକ୍ଷେପ

କ୍ଷେପଣ 4: ଯାତ୍ରା ପୂର୍ବରୁ ପଶୁପାଳନ ପାଇଁ ସଜ୍ଜା କରନ୍ତୁ ଏବଂ ଅନ୍ତରାଳ ପ୍ରାୟ 10-15 ମିନିଟ୍ ପାଇଁ ସଜ୍ଜା କରନ୍ତୁ।

କ୍ଷେପଣ 5: ନିୟମିତ ଭାବରେ ଅନ୍ତରାଳ ପ୍ରାୟ 10-15 ମିନିଟ୍ ପାଇଁ ସଜ୍ଜା କରନ୍ତୁ।

ସ୍ତରୀକରଣ: ଯେଉଁଠାରେ COVID ରୋଗ ଅଧିକ ପ୍ରଚଳିତ ଅଟେ, ସେଠାରେ ସଜ୍ଜା କରନ୍ତୁ ଏବଂ ଅନ୍ତରାଳ ପ୍ରାୟ 10-15 ମିନିଟ୍ ପାଇଁ ସଜ୍ଜା କରନ୍ତୁ।

Source: Unicef / All For Humanitarian Action

SEEDS Cyclone Advisories

ସବୁ କାମକୁ ଯାତ୍ରା ପୂର୍ବରୁ ସଜ୍ଜା କରନ୍ତୁ।

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ପାଦଚୋଡ଼ିତ ହେବାକୁ ଏବଂ ଚାଲିବାକୁ ନାହିଁ

ପଦକ୍ଷେପ ପୂର୍ବରୁ ସଜ୍ଜା କରନ୍ତୁ ଏବଂ ଅନ୍ତରାଳ ପ୍ରାୟ 10-15 ମିନିଟ୍ ପାଇଁ ସଜ୍ଜା କରନ୍ତୁ।

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SEEDS Cyclone Advisories

କମ୍ପାନୀ ଘର

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Source: Unicef / All For Humanitarian Action

Stages of Cyclone Warning and steps to take at each level

Key steps during evacuation

Do's and Don'ts for cyclone and linked flooding

Roofing typologies in cyclone high risk zones



SEEDS (Sustainable Environment and Ecological Development Society) is a not-for-profit organisation that enables community resilience through practical solutions in the areas of disaster readiness, response and rehabilitation. Since 1994, the organization has worked extensively on every major disaster in the Indian subcontinent – grafting innovative technology on to traditional wisdom. It has reached out to families affected by disasters and climate stresses; strengthened and rebuilt schools and homes; and has invariably put its faith in skill-building, planning and communications to foster long-term resilience.

SEEDS has been awarded the **United Nations Sasakawa Award 2022** for Disaster Risk Reduction and the prestigious **Subhash Chandra Bose Aapda Prabandhan Puraskar 2021** by the Ministry of Home Affairs, Government of India

For more information, visit www.seedsindia.org

