

Mapping UNSW Impact Global Development

Primary SDG	3: GOOD HEALTH AND WELLBEING
Broad theme	Reducing urban heat vulnerability
Research	Using cool roofs to reduce urban heat vulnerability in low-income households in India
Impact region	India
Faculty	Built Environment
School/Institute	Built Environment
Academic	Dr Komali Yenneti
Project partners	Administrative Staff College of India (ASCI; local contacts), DuPont (materials), CRC for Low Carbon Living, Australia-India Institute
Related SDGs	10: Reduced Inequalities
	11: Sustainable Cities and Communities

Elevator pitch

Komali is trialling the use of a cool reflective sheet on low-income housing roofs to reduce interior temperatures during heatwaves, in response to an increase in heatwaves across India which are proving to be fatal, particularly among the poor.

The Challenge: India's poor are suffering and dying from an increasing number of heatwaves

India is in the midst of a 'smart cities' revolution which promises to make cities more liveable, sustainable and resilient. But Indian cities are getting hotter. According to the India Meteorological Department, the largest number of heatwaves in India occurred in the last decade. Heatwaves results in deaths. Out of all natural disasters, heatwaves are the number one killer in India. The majority of victims are the poor.

Unlike the middle and upper classes who can access air conditioning, the poor live in brittle housing conditions. Their homes lack ventilation, insulation and they are ill equipped to keep out rain and running water. Roofs are often made from asbestos material, increasing the risk of illness or death. During a heatwave, the temperature inside these houses is often hotter than outside, creating near fatal conditions for residents.

UNSW's solution: Use heat deflecting sheets on roofs to reduce interior temperatures

Komali is researching techniques to cool temperatures in low income homes. Initially, she considered the use of white paint on top of houses to reflect heat, but the paint is expensive and may have to be applied each year for it to be effective. Working in partnership with ASCI and DuPont, Komali and her team decided to trial DuPont's 'Tyvek' sheets. Tyvek is a removable all-weather polymer sheet made by DuPont that is light in colour and designed to deflect heat. It can be placed on the roof and removed when not desired.

To trial these sheets, Komali selected low income areas in Hyderabad. Hyderabad has experienced the highest and most frequent heatwaves in India in the last three years. From September 2017 until April/May 2018 the sheet is being trialled on around 15 'slum houses' (nearly 1,000 square metres). Sensors have been installed inside the houses to provide up-to-the-moment readings to Komali's desktop and phone. When the test period finishes, Komali will compare results with IMD data. Preliminary tests indicate a reduction in temperature of around 2-3 degrees Celsius. The sheets also appear to be reducing interior humidity, as they are helping to keep out water that was previously finding its way inside.

After the Hyderabad test, Komali is looking to perform a second test in Delhi where the weather can be just as hot as it can be cold. She is looking to see whether the sheets act as insulation against the cold weather and actually increase interior temperatures during the winter months. With more funding, Komali can upscale testing to larger sample sizes and different cities. Komali is also working with ASCI to support the Government of Hyderabad in their development of a heat action plan/cool roof strategy, which will hopefully result in better health and housing outcomes for poor residents.

The Impact: Reduce interior temperatures, cases of illness and death

If early results prove right, Tyvek sheets can help the poor to reduce the interior temperatures of their homes, minimising deaths during heatwaves. The sheets may also reduce humidity, and they could increase interior temperatures during the winter months, increasing the health and wellbeing of the poor. Her work with ASCI and the Hyderabad government could result in large scale improvements to housing temperatures for the poor.

Researcher

Dr Komali Yenneti is a Lecturer and 'New Generation Network (NGN) Scholar – Smart Cities' at UNSW and at the Australia India Institute. She is a trained Architect and Environmental Planner, and has a PhD in Geography and Environmental Sciences. Her research focuses on contemporary environmental policy. This includes projects on sustainable smart cities, low-carbon development, and energy transitions across cities, regions and communities in the Asia-Pacific. Komali is passionate about inequality and spatial planning, and influencing governments to act on both.

Ben Falkenmire 20.02.18