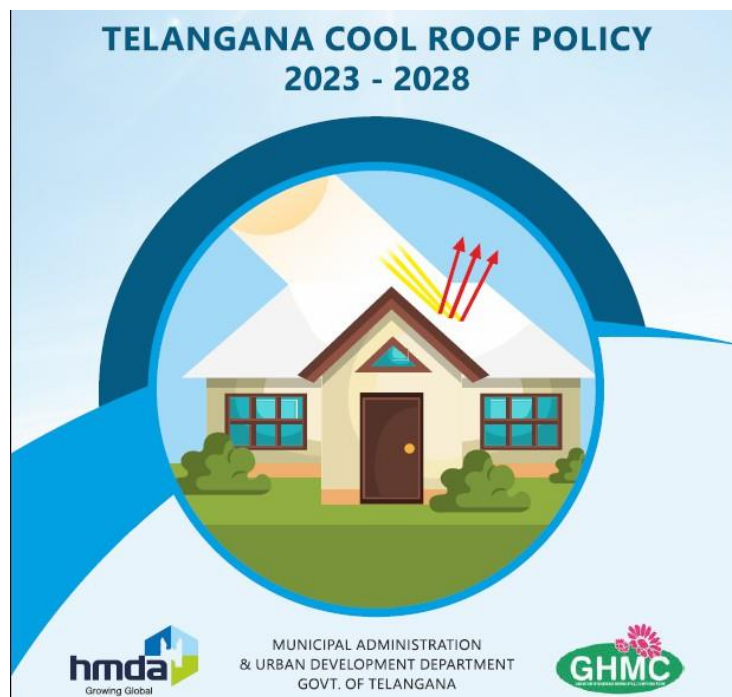


# POLICY MEMORANDUM

## CRITICAL REVIEW OF TELANGANA COOL ROOF POLICY 2023-2028



AUGUST 2023

*f*AIR CONDITIONING

## 1. Expand definition of 'Cool Roof'

The policy currently asserts the following definition of 'Cool Roof':



Expand the definition of 'Cool Roofs' beyond this singular, prescriptive definition of cooling through one of the multitudes of heat transfer processes: reflection (i.e. enabled through solar reflective paint applied on roof surfaces). Complete this partial definition by including all contextually relevant heat transfer processes that mitigate solar heat gain through the roof (i.e. keeping the roof and the interiors below cool). The missing heat transfer processes that also translate to cool roofs are: ventilation (stack; as enabled through dormer windows/chimneys), roof insulation, roof shading, roof radiant barriers, night-sky radiation, evaporation and thermal mass (eg. as made possible by Green roofs). As a corollary, the proposed definition reorients the focus of cool-roof solutions away from a fixation with specific 'means' to the more meaningful orientation of strategies to the 'ends' (i.e. thermal comfort experienced in interior spaces) and focusses on thermal comfort performance as a guiding parameter.

## 2. Housing occupied by the most vulnerable residents in the state, not just 'low-income' housing, should be the most urgently served beneficiaries of a 'cool roof policy'

The heat stress impacts the communities in Informal settlements the most, making them more vulnerable. Half of our population dwells in informal housing, and are largely self built with scarce resources, which are largely underserved by the government initiated programs and policies. Most of the policy, schemes and programs designed to address climate change and sustainability such as ECBC, green rating systems, affordable housing programs serve the formal built projects.

Thermal measurements of informal structures in India cities have revealed roof temperatures in excess of 50°C when air temperatures are 32°C, insides are too hot to inhabit and often do not cool down adequately till about 12 midnight. Initial research has revealed that inhabitants suffer intense thermal stress compounded by lack of adequate rest and sleep, from spending time outdoors while waiting for tolerable internal temperatures. This disproportionately affects women dwellers who must often wake up much earlier than most household members to fetch water from municipal taps and cook food for the household

and hence suffer protracted sleep deprivation. These perturbing narratives that have emerged from numerous active listening story-circles conducted by us are corroborated by a study published in May 2022 which concluded that warmer temperatures reduce sleep globally, amplifying the risk of insufficient sleep, that the elderly, women, and residents of lower-income countries are impacted most and moreover climate breakdown is projected to unequally erode sleep, widening global inequalities<sup>1</sup>.

It is therefore a moral imperative that social protection programs such as Heat Action Plans, Climate Change Adaptation, and Cool Roof Policies need to privilege residents in Informal settlements as the first beneficiaries of all programs conceived from here on as we collectively grapple with an escalating climate emergency.

### 3. A preoccupation with materials exhibiting high-albedo is not a resilient strategy, and if applied indiscriminately can lead to hazardous unintended consequences

Having high reflectance as a singular strategy of cooling the roof has poses severe limitations of maintenance as it need to be exposed to sun and not covered or hampered through activities, especially in Informal settlements, where the roofs are used for a plurality of purposes and quite often covered with plastic sheets. This makes it imperative to have a diverse set of materials, solutions, mechanisms that can cool the roofs. White roofs as a single solution increases dependence on industrial products. There is a potential of tapping local wisdom and practices of building resilience towards increasing temperatures and enhance local economy, by diversifying solutions and materials.

Monocultures of white painted roofs in Ahmedabad as part of its heat action plan, now covering broad swathes of the city's surface area, have already started manifesting in the form of alarming unintended consequences; initial studies of the interrelated systemic perturbances precipitated by altering the color of the city's surface to an unnatural white color in a brutally short span of time (as opposed to the natural green color of vegetation which has enduring evolutionary precedence) has started to adversely affect the stable pattern of navigational trajectories adopted by the locally adapted avian population. Furthermore, this ecological perturbation is starting to have cascading disruptive effects on pollination and seed-dispersal activities in surrounding pre-urban food growing regions.

### 4. Broaden the spectrum of funding and implementation models, beyond the conventional product-oriented centralized finance mechanisms facilitated by state finance institutions, to enable robust decentralized diffusion of capacities and resources directly into the most vulnerable communities in need of cool roofs.

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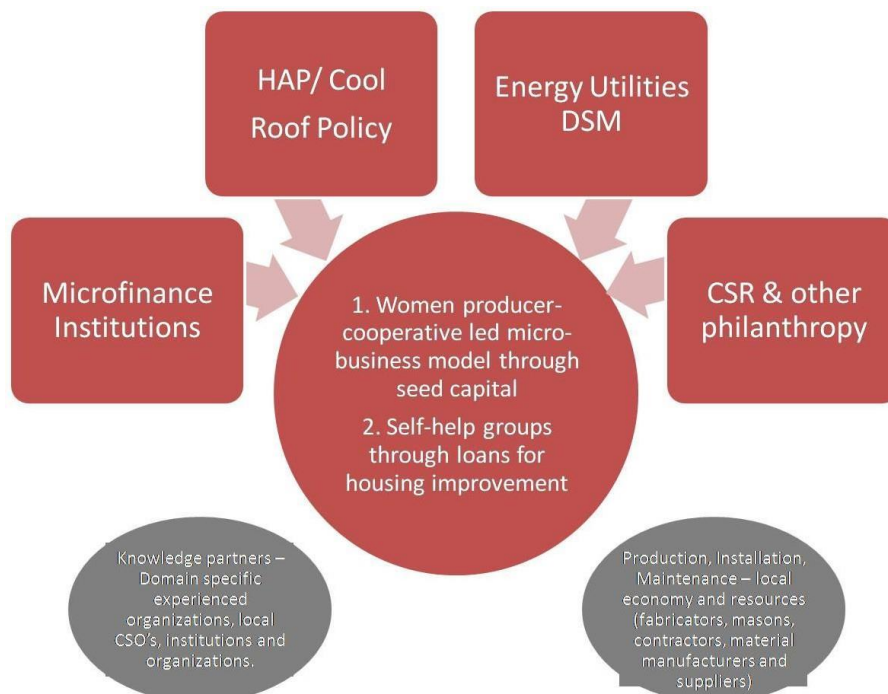
<sup>1</sup> Minor et al., 2022, *One Earth* 5, 534–549 May 20, 2022 <sup>a</sup> 2022 Elsevier Inc. <https://doi.org/10.1016/j.oneear.2022.04.008>

An imaginative, plural, and grassroots-evidence-based implementation model that is informed by relevant successes in related fields of decentralized renewable energy generation, other housing quality upgrade efforts should encompass the following salient features:

- A. Women's producer-cooperative led micro-business model (collaborations with local fabricators, masons, contractors, material manufacturers and suppliers) through seed capital as business investment
- B. Women's self-help groups (SHG) serving as nodal/coordination entities that amplifies the reach and agency of producer cooperatives, for facilitating the micro-business activities of producer cooperatives and can further stimulate uptake of contextually relevant appropriate technology cool-roof solutions through disbursing near-zero or zero-interest loans for housing improvement.

The above civil society-rooted local-economic entities can be financially supported through:

- 1. Specially established city-scale HAP/Cool Roof Scheme operating as a revolving seed-fund.
- 2. Micro-finance based direct lending for home improvements with Microfinance institutions
- 3. Regional energy utilities (such as TSGENCO) establishing a cool-roof upgrade fund/subsidy as part of its demand-side management (DSM) obligations; this hinges on the empirically verifiable reduced air conditioning energy consumption in weatherized informal settlement homes relative to the norm. This 'demand management' therefore be leveraged and financed by DSM programmes as it would be embedded in the sound economic argument of the greater economic utility of selling electrical energy avoided/saved in informal settlements (that are projected to be an 'aggressively growing AC market' by RAMA etc. stemming from its unsaturated uptake potential in the near to immediate term future), to industrial consumers at a higher tariff.
- 4. Corporate Social Responsibility and other philanthropic activities in the State.



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