India: Thermal Comfort for Community Buildings in Informal Settlements

Background

Rapid urbanization and insufficient infrastructure in the past decades have resulted in poor living conditions in some dense, informal settlements in Indian urban areas. Measurements of thermal conditions in housing for the poor in Indian cities reveal roof temperatures of up to 50°C even when air temperatures are around 30°C making these dwelling units uninhabitable, particularly during summers. Residents suffer intense thermal stress, compounded by inadequate rest and sleep, with indoor temperatures bordering 40°C amidst widespread power cuts. Installation of any artificial cooling system has enormous cost implications on the poor besides emissions and adverse effects on the surrounding micro-climate.

461 million	people are living in urban areas
2030	marks the year, when rural population starts to decline whereas urban population continues to rise rapidly
17	per cent of India's urban population live in informal settlements
45	per cent of Mumbai's population live in slums
40°C	degrees can be reached indoor within summer in informal settlements

Project Intervention

Innovative solutions and appropriate building materials and technology have proven positive results in reducing energy requirements, mitigating potential greenhouse gas emissions besides being cost-effective. This project demonstrates these innovative approaches at community building level and spurs design responses in neighboring residential structures with the aim to address neglected cooling needs in informal settlements. Women residents and entrepreneurs will be primary interlocutors and problem solvers of these co-created design solutions. Thus the objective is to inclusively co-create and pilot retrofitted passive design solutions for dwelling units and community structures through local women's cooperatives in collaboration with academic institutions, national and local governments, and other institutions dealing with housing and building materials. The purpose is to address extreme heat stress and space cooling needs of community structures (like schools, health centers, etc.) that will serve as demonstration projects in informal settlements in Coimbatore and Chennai.

Expected Results

First and foremost, it is expected that the temperature in the respective buildings would decrease measurably and noticeably regardless of the outside temperature. The community

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buildings therefore would be well equipped to be used for different activities by different groups throughout the day. Beyond that community members would be better informed about building technologies and empowered to build climate and economic resilience by offering low-cost construction solutions to their own communities. Additionally public housing missions will be better informed about how to incorporate climate responsive construction technologies in public housing programmes. The knowledge gap between the communities, constructing informal housing, and municipal engineers are bridged.

Implementation Partner

cBalance is a knowledge-centric solutions hub that specializes in tool building and strategy development on sustainable roadmaps. cBalance builds on their ongoing endeavours of promoting thermal comfort and reducing carbon emissions as well as ecological costs by working with local communities. Their work includes formal field engagements, working model design, and academic partnerships. cBalance has also worked to upgrade the SmartEnergy Building Energy Modelling Software, which will form a heat load simulation tool built for city slum-development engineers.

Academia, especially architectural schools will be involved to enhance climate responsive design skills through participatory design workshops for cocreating passive design solutions and enhancing academic curricula.

By promoting energy efficient construction in national, state, and local level government's housing programmes, the national and local level will be included.

Lastly, local NGOs will be included in the cooperation to enhance ability to beneficially impact lives of community members, and potential incubators of women's cooperatives.

Financing

The project implementation takes place from March 2022 to February 2022. BMZ provides EUR 100.000 through the GIZ Sector Project "Cities"; K-CEP (Climateworks)/Ashden will support the project with EUR 82,160.

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