

Introduction to PRiTHVi

Passive – design Response in Increasing Thermal Comfort with Viable Solutions

Volume 1: Single -family Affordable Housing

WHY?

Rapid construction is happening in the affordable housing with single family house (Beneficiary Led Construction - BLC) as the biggest component. These single-family houses will last for next 50-60 years. It is important that these buildings:

- Provide maximum comfort via passive measures
- Reduce the need of active measures thus optimize energy demand
- Adapt to the local sustainable architecture specific to climate zone.

This document puts together the **concepts of thermal comfort** and **simple affordable measures of passive design** that can be adopted to achieve thermal comfort within affordable housing with no/ low-cost solutions.

HOW IS IT MADE?

MoHUA and GIZ has done extensive study on single family house in terms of

- how is the BLC level construction done, planning and preferences, and passive design principals of our local architecture.
- The BLC design mapping helped in understanding typical design requirements and how passive measures (simple and the one applicable at small scale construction) can help in making house more thermally comfortable.

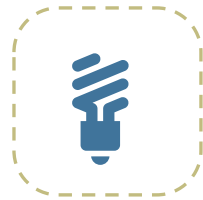
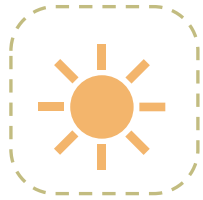
The Given the size of plot and the flexibility of layout, it's important to focus on the passive measures based on local architecture and climate zone requirements only for BLC construction. These

WHAT IT SAYS?

This Volume 1 caters to passive and resilient recommendations for Single-Family Affordable Housing to enhance thermal comfort in affordable housing.

This document lays emphasis on the simple passive principals which are naturally available, applicable in small plot sizes, and need no major cost implication. All it needs is simple steps to be followed from the design stage itself.

1. **Passive measures at site level - site planning & Built form**
2. **Internal planning – flexibility, layout, landscaping & future expansion**
3. **Building Element planning - Windows, natural ventilation**
4. **Building material selection - Walls & Roofs**



FOR WHOM?

This document is written for a wide range of audience and supported by informative graphics and a plethora of working examples for easy understanding and adoption.



Architects & contractor of small-scale construction



Home-owners, Builders, Developers

Government officials, Policy makers, Students & young professionals may also benefit from this document

OUTCOME

This document leads to:

- A simple and easy to use recommendations that can be adopted without financial implication
- Design and Construction of Affordable Houses what would be significantly better in terms of its thermal performance, indoor air quality, and internal spaces

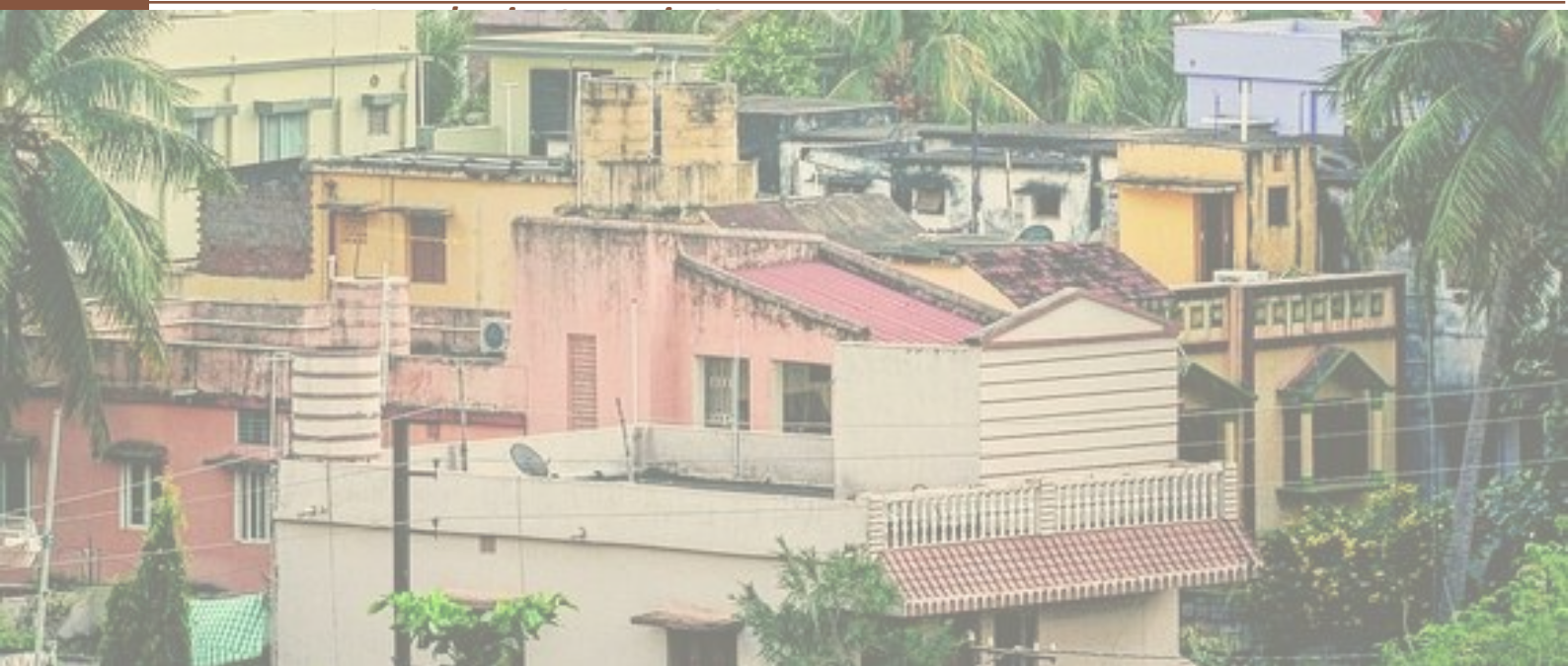
Thermally Comfortable Pucca House for our Citizen and ensuring a sustainable and resilient future by avoiding need of active measures to meet our comfort requirement

WHAT NEXT?

This document would be instrumental in:

- Support State Government in understanding PRiTHVi and spreading the awareness for the end users to adopt it
- Further develop PRiTHVi in regional language for reaching out at very corner of the country
- Ensuring beneficiaries of single-family house comprehend and understand PRiTHVi.
- Help in fast-tracking the adoption of Thermally Comfortable Affordable Housing

The goal is to enable implementation of these recommendations in all



PRiTHVi for better LiFE in Affordable Housing

A result of Living Laboratory Experiments at Light House Projects

Introduction to PRiTHVi

Passive – design Response in Increasing Thermal Comfort with Viable Solutions

Volume 2: Multifamily Affordable Housing

WHY?

India is witnessing rapid construction in the affordable housing segment to meet the growing demands. These buildings will last for next 50-60 years. It is important that these buildings:

- Provide maximum thermal comfort via passive measures
- Reduce the need of active measures thus optimize energy demand
- Are sustainable and resilient in their lifespan

This document puts together the **concepts of thermal comfort** and **simple affordable measures of passive design** that can be adopted to achieve thermal comfort within affordable housing with no/ low-cost implication.

HOW IS IT MADE?

MoHUA and GIZ has conducted extensive living laboratory experiments on all the 6 Light House Projects to

- Study the performance of these LHPs in different climate zones in attaining the desired level of thermal comfort inside the building.
- Experiments were conducted in all LHPs to test the impact of various passive measures along with the level of impact of each passive measure.

PRiTHVi prescribes the recommendations derived from the experiments done on the 6 Light House Projects and concluded results



Living Laboratory Experiments



Impact of Passive Measures

WHAT IT SAYS?

This Volume 2 caters to passive and resilient recommendations for Multi-Family Affordable Housing to enhance thermal comfort in affordable housing.

PRiTHVi lays emphasis on the following **5** passive principals which are naturally available and need no major cost implication. All it needs is simple steps to be followed from the design stage itself.

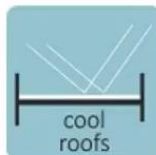
1. **Orientation and Mutual Shading of Building Blocks as per Sun path**
2. **Shading of Windows to Optimize Solar Radiations**
3. **Correct Glass Selection for Windows to Optimize Solar Heat Gains**
4. **Enhance Natural Ventilation inside the home**
5. **Application of Cool Roof**



form & orientation



shading



cool roofs



evaporative cooling



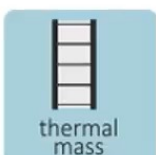
thermal comfort



vegetation



daylighting



thermal mass



natural ventilation

FOR WHOM?

This document is written for a wide range of audience and supported by informative graphics and a plethora of working examples for easy understanding and adoption. This is for the reference and use by:



Professionals,
Architects, Engineers



Home-owners,
Builders, Developers



Government officials
and Policy makers



Students & young
professionals

OUTCOME

This document leads to:

- An easy to apply recommendations that can be adopted without financial implication
- Design and Construction of Affordable Houses what would be 25-30% better in terms of its thermal performance compared to typical design practiced today in India

Thermally Comfortable Pucca House for our Citizen and ensuring a sustainable and resilient future by avoiding need of active measures to meet our comfort requirement

WHAT NEXT?

This document would be instrumental in:

- Application of PRiTHVi in public and private projects in different climate zones
- Support State Government in understanding and Adoption of PRiTHVi
- Ensuring a vast majority of the stakeholders comprehend and implement PRiTHVi.
- Help in fast-tracking the adoption of Thermally Comfortable Affordable Housing

The goal is to enable implementation of these recommendations in all government and private projects

