DURABILITY AND FEASIBILITY OF STABILIZED MUD BLOCKS, TREATED BAMBOO, AND TERAFIL WATER IN GREEN BUILDING PROJECTS, A FOCUS ON RURAL AREAS OF CHIKKABALLAPURA DISTRICT

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Introduction:

In Chikkaballapura, Stabilized mud blocks (SMBs), treated bamboo, and terra-filled water systems are highly significant and relevant for slashing emissions (60-90%), conserving scarce resources (soil, water, forests), and enhancing climate resilience. Their relevance lies in tackling local needs like affordable housing, water security, and ecological balance, while aligning with global sustainability goals (SDGs, net-zero). These methods transform construction into a regenerative process, making them not just viable but essential for the region's sustainable future. This student project focuses on how the above resources can be implemented as a project, and their relevance in uplifting common people through theoretical approach and sharing the information with Chikkaballapura people to use the data for gaining the benefits.

Environmentally, all the above minimize quarrying, deforestation, and runoff, enhancing thermal efficiency, water recharge, and biodiversity. Sustainability wise, they align with Karnataka's Green Building Policy. A 540 square feet house could save ₹50,000-₹1,00,000, cut emissions 60-90%, and strengthen local resilience. These

methods transform construction into a sustainable, community-driven process for Chikkaballapura's future.

Objectives:

- Evaluate the viability of using Stabilized mud blocks (SMBs), treated bamboo, and other eco-friendly materials
- Measure the level of awareness about green technologies such as SMBs, treated bamboo, and energy efficient practices in rural Chikkaballapura areas
- Explore how green building technologies can be integrated into ongoing government housing schemes like Pradhan Mantri Awas Yojana (PMAY) & Karnataka State Rural Livelihood Mission (KSRLM)
- Assess the role of local builders, artisans, and construction workers in implementing and adapting green technologies in rural homes
- Conduct a comprehensive environmental and economic assessment of green building technologies, focusing on cost-effective and energy savings

Methodology:

Research Design will be combination of qualitative and quantitative methods in the process of collecting comprehensive data on the benefits and challenges of green building technology adoption in rural areas. The research design will support to focus on examining green building practices of using stabilized mud block, treated bamboos, terafil water etc. in rural construction and the barriers to their wide spread adoption.

Result and Conclusion:

In conclusion, will identify the awareness on green building technologies that help the rural people to improve their livelihood, barriers if any for adoption, and financial constraints. Understand the availability of raw materials, production processes, and costs associated with these materials in comparison to traditional construction materials like bricks and concrete. Explore the potential for local production of green material (e.g., SMBs, treated bamboo) and renewable energy products to boost local economies.

Future Scope:

- Optimize SMB stabilizers (e.g., bio-enzymes, lime) to surpass 10 MPa strength and 50-year durability using Chikkaballapura's soils, integrating CMSPGHS's eco-friendly material focus and GRIHA's low-carbon credits to support KHB's affordable housing goals.
- Develop sustainable bamboo treatments and local cultivation to extend lifespan beyond 30 years, aligning with the National Bamboo Mission and PMAY's seismic-safe housing, enhancing KHB's rural schemes like Basava Housing Scheme.
- Innovate cost-effective (<₹41,500), smart terra-filled water systems with >95% filtration, incorporating CMSPGHS's rainwater harvesting and Jal Jeevan Mission's water security goals for KHB's urban and rural projects.
- Research hybrid SMB-bamboo designs for multi-story, energy-efficient (>20% savings) structures, leveraging Karnataka's Green Building Policy and Smart Cities Mission, supporting KHB's planned 25,000 homes across five townships.
- Assess socio-economic impacts—1000+ jobs, ₹1-1.5 lakh/house savings—tying into PMAY subsidies (₹1.2-2.67 lakh) and KHB's Dr. B.R. Ambedkar Nivas Yojana, boosting employment and affordability for Chikkaballapura's poor people.