



Theme of Hackathon

**Innovation in Construction
Sustainability**

Supported by



Office of the Principal Scientific Adviser
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Manthan
Ideas and implementation through
Science, Technology, and Innovation

Initiative partners



NIUA
National Institute of Urban Affairs



Background

India's construction industry is one of the fastest-growing in the world, contributing nearly **9% of the national GDP** and employing more than **50 million people**. However, it is also one of the largest consumers of natural resources — responsible for nearly **40% of global carbon emissions, 30% of raw material consumption, and 20% of water usage**.

With India's commitment to achieve **Net Zero by 2070**, the construction sector must urgently transform its materials, methods, and management practices to become more **sustainable, circular, and resilient**. This demands **innovation at every level** — from design and material science to project execution and lifecycle management.

The Challenge

Develop **innovative, scalable, and implementable solutions** that can **reduce the environmental footprint** of construction activities in India, while **maintaining economic viability and ensuring performance and safety standards**.

Problem Areas to Explore

Your innovation should aim to address **one or more of the following focus areas**.

Sustainable Construction Materials

- Develop or propose alternative low-carbon materials (e.g., geopolymer concrete, recycled aggregates, bamboo composites, fly-ash or slag-based cement).
- Design material reuse/recycling systems for demolition waste and industrial by-products.
- Create methods for local sourcing and vernacular material integration to minimize embodied energy.

Water and Energy Efficiency

- Innovate technologies for reducing water consumption in construction (e.g., water recycling on sites, curing alternatives, moisture retention systems).
- Design energy-efficient site operations using renewable or hybrid power solutions.
- Develop smart monitoring tools for real-time tracking of energy and water usage during construction.

Expected Outcomes

Empower the next generation of civil engineers to **reimagine sustainable construction practices** — making India a global leader in **green infrastructure innovation** and accelerating the transition toward a **Net-Zero, resource-efficient future**.

Evaluation Criteria

Innovation & Creativity

Feasibility & Technical Soundness

Impact Potential

Scalability & Sustainability

Implementation (Roadmap)

Presentation & Clarity

Inspiration Examples

- Use of **3D printed recycled concrete** for low-cost housing.
- **AI-based energy and material tracking dashboards** for construction sites.
- **Modular bamboo housing systems** for rural infrastructure.
- **Geo-polymer-based road pavements** reducing cement consumption.