

Low Carbon Climate Resilient Construction In Coastal Spaces: Odisha

The construction sector particularly shares an intertwined relationship with climate change. The construction sector meets one of our basic needs i.e. habitat and shelter. Also, construction and operation activities have extensive direct and indirect impacts on the environment as the sector is very resource intensive. The sector also contributes to 22% of the national Green House Gas (GHG) emissions. On the other hand, impacts of changing climate are keenly felt by the sector. An increased tendency of extreme climatic events places additional demands of durability and performance on buildings.

Odisha, a representative of coastal regions is highly vulnerable to impacts of climate change due to bio-physical aspects as well as the low resilience of communities to the change. The existing housing deficient combined with the reconstruction burden due to calamity damage puts a lot of pressure on the limited natural resources. The construction sector has an immense potential to mitigate this damage while building resilience. Low carbon climate resilience (LCCR) construction can help the sector achieve this potential, however in order to do so there is a need for

Research & Customisation

Alternate technologies are an oft discussed concept but remain limited to workshops and pilots. The engineers among the participants, specifically questioned the strength and durability of these parallel systems as compared to conventional ones. Appropriate design cuts down on the excessive use of energy intensive materials without compromising on strength and safety of the building.

- Forecasting what are the materials and resources available and finding economically viable way of applying
 - Customization of alternate technologies to local conditions
 - Research on aspects of strength and cost to build a case for alternate technologies.
 - Research on embodied energy of building materials in the Indian context
 - Quality control of alternate technologies to increase acceptance among users.
- Regular testing and upholding quality standard by production units is required.

Effective implementation of Codes and Guidelines

Conventional technologies ignore the environmental impacts they cause putting excessive pressure on limited resources. While there are alternate technologies available, there is a need to standardize these practices and technologies.

- Inclusion of standardized alternate technologies into the Odisha building codes, without which such technologies cannot be mainstreamed.
- Setting energy performance targets and mandatory demonstration of low carbon construction in public sector buildings
- Revise codes and rules in light of new technologies entering the arena. For example, the strength of cement has improved over the years however the mortar composition remains the same.
- A regulatory authority, with relevant expertise should be formed to formulate guidelines and monitor implementation.
- Building and strengthening the capacities of government offices is needed to ensure alternate projects see the light of day.

Temperature Fluctuation

Over the last 50 years, the mean temperature of Odisha has increased by 1° as compared to 0.5° global average.

Predicted Sea Level Rise

Expected increase in levels of inundation and storm flooding, accelerated coastal erosion, sea water intrusion and tidal encroachment into river systems

High risk of calamities

Odisha declared disaster affected for 95 of last 105 years, flood in 50 years, droughts in 32 and floods in 11.

Changing zones of vulnerability

Increased frequency of natural calamities since 1965, striking areas not previously thought vulnerable

Rapid Industrialization

Uncontrolled mining, rampant deforestation, soil degradation, large scale pollution and waste generation in mineral rich Odisha

Skill Development & Technical Capacity Building

Capacity building was identified as one of the top priorities in the state. This opinion, also voiced in the professionals' workshop found resonance with all the stakeholders. The need for building capacities is at various levels. A cadre of skilled masons, engineers and architects are needed to promote these technologies in a cost effective and quality manner.

- Introduction of LCCR concepts in the technical curriculum will help shape the new generation
- Technical trainings for masons and engineers need to be organised on a regular basis. Revival of building centres as demonstration units and training centres
- Facilitating knowledge sharing mechanisms among various governmental departments.

Awareness Generation

While architects have heard of alternate technologies, most developers and home builders have not and are unwilling to deviate from conventional energy and resource intensive technologies. A pull factor will be created when people demand or accept alternate technologies on par with conventional ones with respect to quality, costs and aesthetics.

- Government buildings and Social housing scheme houses should be built using LCCR principles to build confidence in the technology. Exposure visits to such buildings will aid.
- Benefits of LCCR concepts and existing policies promoting them in terms of social, economic and financial aspects need to be explained to local bodies.
- Users need to be made aware of the options available to them as an alternative to conventional energy intensive construction techniques.

Inter-governmental Synergy

The need for co-operation between various governments was highlighted by both the government as well as civil society representatives. Bamboo as an example highlighted this issue. The use of bamboo an alternative to steel and locally available has declined over the last few years. The initial prevalence of social forestry initiatives drove the use of bamboo. But such schemes have died out and there have not been efforts to refresh them. Thus there is a need for social forestry schemes and social housing schemes to be synced in order to provide maximum benefit to beneficiaries.

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A series of workshops were held for Policy Makers and Building Professionals in Himachal Pradesh. The workshops were part of a larger initiative that seeks to generate knowledge support for LC-CR solutions for small towns and rural spaces. The aim was to influence policies and building practices in response to imminent climate change trends and need for low carbon construction. The recommendations are culled out of these discussions and workshops.

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