

Low Carbon Climate Resilient Construction In Wet Hilly Spaces: Himachal Pradesh

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.

Himachal Pradesh, is highly vulnerable to impacts of climate change due to its physiographic features. The growing urbanisation trend, coupled with regular reconstruction demands 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

Material Research & Adaptation

Appropriate design cuts down on the excessive use of energy intensive materials without compromising on strength and safety of the building. Due to lack of availability of raw material and the growing popularity of cement, there is a need to look at composite materials and technologies.

- Research on the strength and durability of composite systems as compared to conventional ones.
- Studies on strength and feasibility of vernacular technologies with an aim of standardization
- Research in terms of monitoring studies, risk analysis, cost comparisons between alternate and conventional RCC technologies and dissemination of results among users.

Another major concern is the sufficient availability of raw material to meet construction demands of the state. Research needs to take into account this ground reality and work on practical solutions. There is also a need to look at sustainable harvesting practices for timber and bamboo.

Effective implementation of 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. There is also concern around implementation of existing codes.

- Inclusion of standardized alternate & vernacular technologies into the state building codes
- Inclusion of LCCR concepts in the Town and Country Planning Department Guidelines, so all new buildings conform to them.
- Comprehensive guidelines including sketches / models for easy adoption customized to local areas.
- Sites / plots cut keeping in mind passive design concepts to enable building with correct orientation.
- Regularize guidelines for peri-urban and rural areas as well as urban areas, keeping in mind expanding urban boundaries.
- Dedicated plantation of native plants, with guidelines and inventories based on construction and geographies and nurseries to ensure access to supply of seedlings to combat deforestation.

Global Warming in the Himalayan Region

Average temperature of Shimla increased by 1° in the last 100 years

Decreasing seasonal precipitation

17% decrease in rainfall in Shimla in was observed from 1996-200 till 2007

Natural calamities

Numerous cloud bursts, flash floods, landslides, earthquakes resulting in considerable loss of habitats and livelihoods

Illegal deforestation

Over the last decade, 9,00,000 trees were felled, more than 1/3rd illegally by cement plants, power plants, etc.

Extensive quarrying

Reckless and unscientific mining to fuel cement plants and large scale construction

- Strengthen the town planning, public works and Housing departments for implementation of policies that already exist.

Incentives

One of the foremost recommendations involved providing incentives for people adopting such practices. Incentives in the form of bank rebates, reduced interest rates, government subsidies, reduced taxation for using LC-CR construction will go a long way in promoting uptake. Awareness about these incentives among users is also important.

Skill Development & Technical Capacity Building

One of the key barriers faced by architects who convince their clients to opt for alternative technologies is to source skilled labour capable of executing them. Technical specifications and structural details of these technologies are hard to come by. 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
- Updating building section departments in urban local bodies through capacity building is a must in accordance with current issues and challenges.
- On-site testing tools and training imparted to engineers especially to test alternate materials and technologies to build confidence in them.
- Technical institutes in each district can function as support cells for local users.

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.

- All government buildings should be built using LCCR principles to build confidence in the technology.
- Users need to be aware of the options available to them as an alternative to conventional energy intensive construction techniques.
- Enabling easy access to research information on benefits and comparisons.
- Creation of an inventory of buildings that already use these principles available and a list of local people (vendors, contractors, architects, engineers, material suppliers) who are equipped to deal with solar passive concepts will enable interested parties to avail these services.
- Newspapers were proposed as a good medium to propagate this information. Incentives could be offered to suppliers for advertisements.

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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.

These series were organized by the Development Alternatives Group in association with the Himachal Pradesh State Council of Science, Technology and Environment and the National Institute of Technology, Hamirpur, It was supported by the Climate and Development Knowledge Network.