

OPINION

Creating an environmentally sustainable future

Indian architects have a glorious opportunity to look back into the past and learn from building with limited resources, and find solutions for a sustainable future.

By **MANIT RASTOGI**, Jan 29, 2020

5 min read



Image: Singkham from Pexels



According to the UN environment program, Buildings are currently responsible for more than 40% of global energy and one-third of global greenhouse gas emissions, primarily due to the use of fossil fuels like coal and oil that have increased the concentration of atmospheric carbon dioxide (CO₂). This has brought about an enormous toll on humanity and the environment from air and water pollution to climate change.

To outpace global warming, we need to change the way we think, from the highest levels of government, policy and education to the grassroot levels of the common man. This cannot be achieved as isolated events. Since the construction and infrastructure industry play a vital role in producing greenhouse gas emissions, there is also a potential for the industry to dramatically reduce carbon emissions. The way forward is to find a model of sustainable urbanism, architecture, and design.

Today, 55% of the world's population lives in urban areas, a proportion that is expected to increase to 68% by 2050. Projections show that urbanisation, combined with the overall growth of the world's population could add another 2.5 billion people to urban areas by 2050, with close to 90% of this increase taking place in Asia and Africa. It is further projected that by 2050, India would have added 416 million urban dwellers, China 255 million and Nigeria 189 million.

India's per capita consumption is one of the lowest in the world and that is where we have a hidden opportunity. In order to combat the growing rate of urbanisation we need to adopt a closed loop building approach where all that is

houses would be approximately 98,000 sq. km. which amounts to approximately 9% of India's landmass. If we draw energy from clean renewable sources, the amount of land required to house the solar panels would amount to roughly 10,000 sq. km. or 2.2% of India's wasteland, i.e. 0.1% of India's land mass. Based on the country's annual rainfall, proper storage and utilisation of rainwater can result in availability of 2,000 litres of water per day per person. It is evident, we have land, water and energy resources in abundance. Despite that, Indian cities have the poorest air quality, and are facing an acute shortage of water and energy.

This narrows down to how we build. Traditional Indian architecture has always been green as interventions have always been built within a localized/regionalized context. Today, environmentally sensitive architecture is no longer a choice, or a "layer" that can be applied to the design of a building. Rather, it must be integral to the process of design, from concept to completion and to the entire lifecycle of the development. The need of the hour is to implement passive design strategies to create conducive microclimates; to reduce perceptible temperature in the hot-dry season; augment wind movement in humid climates; enable evaporative cooling and shading in hot climates and maximise solar ingress in cold climates. Orientation of the building and optimisation of form are fundamental strategies that must be deployed with the aim of maximising daylighting while controlling glare, heat ingress and the use of mechanical methods. Landscape design and horticulture selection are key design tools and can play a significant rôle in creating environmental buffers, facilitating effective microclimates. Greenery also makes for much nicer views than concrete or tarred surfaces. If green roofs are not feasible another approach could be to plant more trees on site. There is nothing quite like trees to reduce dust and cool a site. Adopting all the parameters can result in lowering the energy consumption by 50%.

The goal when building green is also to pay special attention to detailing and vernacular methods of construction. Incorporation of local techniques of craft and construction and an inclusive approach to local materials can result in promoting a low carbon footprint. Inspired by traditional methods of construction, such as earthen pot insulation, earth-bermed strategy, high thermal mass walls, cooling ponds and windcatchers, can impart a distinct identity and character to the building while tackling the affordability aspect of construction. This sensitivity to the local conditions can aim to not only generate a robust and durable form but make a building socio-culturally sustainable. Rain-water harvesting should be encouraged at a community level so that collected rainwater can be used for daily operations and can be fed to a neighbourhood park which can act as a natural sump. This will as a result facilitate reduction for freshwater demand by 30%.

Today we have glorious opportunity – to take what we had learnt from building with limited resources over centuries and from the mistakes of the architecture of excess of the West, and leap frog into an architecture that is sustainable, not only environmentally, but financially, socially, culturally and technologically – an architecture that is global yet local. It is imperative that we, as Indian architects, take a few steps back into the past, to be able to find solutions for creating an environmentally sustainable future.

Views are personal. The author is founder partner, Morphogenesis.

