International Journal of Introspections on Sustainable Development Goals

IJISDG Vol. 02 (Issue 02), June 2023,
Paper 05, pg. 47-52

Innovative Architecture and design thinking approach for Mitigating Impacts of Climate Change

Under Subtheme: Goal 11- Sustainable Cities and Communities

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Climate change scenarios at regional and global level are generating impacts on the local ecology. Subsequently planning and architectural answers are gaining recognition for the innovative and sensible tools they could offer to concurrently tackle the couple of social, environmental, cultural and monetary demanding situations in the face of climate trade. In the context of improvement and resilience to climate trade, such projects are a terrific opportunity to negotiate and re-establish partnerships among sustainable living projects each in the Island and Mainland territories of the Continent. The potential of human groups to come back together and co-design their very own pathway into the destiny may be a main using pressure for high-quality change underneath the legitimate inputs of planners and architects. The intentions and creativity of residents driven by expertise and backed via era in conjunction with their willingness to make a difference, is one of the maximum underutilized assets in now a days context. The paper proposes that, through recognition of progressive practices in the wider community, and via honoring deep-rooted traditional understanding and local cultures, architectural pass closer to a numerous but shared pool of understanding for sustainable dwelling at a global scale, combating the effects of weather extremes.

Key Words

Climate, Regional, Global, Local Ecology, Planning, Architectural, Social, Environmental, Cultural, Economic, Island. Mainland, Creativity, Technology, Innovative Practices, Sustainable Living

The Contribution of structures to weather Change

Buildings now account for more than half of the world energy consumption and up to a 3rd of the world's greenhouse gas emissions in developing countries. In developed countries, this share of consumption and emissions is much higher. Of particular concern is the rate of increase in emissions, especially carbon emissions, including electricity used in buildings. This is estimated to increase every other month for both commercial and residential buildings. The construction industry also contributes significantly to emissions of halocarbons and hydro fluorocarbons (HFCs). Under the current high growth scenario, this figure could nearly double in the next decade. A big relief, however, is that the construction sector has the highest potential to significantly reduce greenhouse gas emissions compared to other major emitting sectors. This means that proven traditional wisdom and current technology can significantly reduce energy consumption in the building sector.

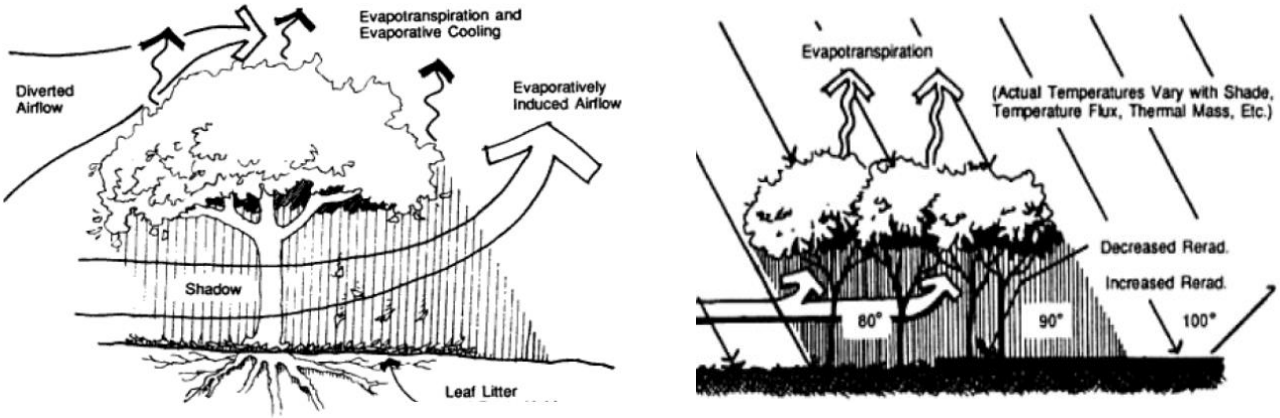

Figure 01: Vegetation and Relative summer Temperature

The Challenge

Combining Modern Technological Innovation with Traditional Wisdom

The entire architectural community has been working to address the negative effects of global climate change on local ecology by developing new architectural technologies. What appears to be evolving is the combination of our forefathers' wise solutions developed through traditional and indigenous vernacular building sciences Modern innovations to achieve meaningful results for sustainable living. This will undoubtedly result in greater efficiency than can be obtained through the use of modern technology on its own. The vernacular building sciences in the Indian context contain untapped gold mines of applied strategies that can assist in reducing energy consumption in buildings today. Vastu-ancient Shastra's principles integrated life and living with the cosmos, through magnetic fields, proving through a series of significant results that the processes of the cosmos had an impact on human existence. The ancient Indian civilization had always respected its environment because of this understanding and acceptance. Typical principles included basic sustainability

principles such as climate-responsive design, use of local materials, rainwater harvesting, and so on.

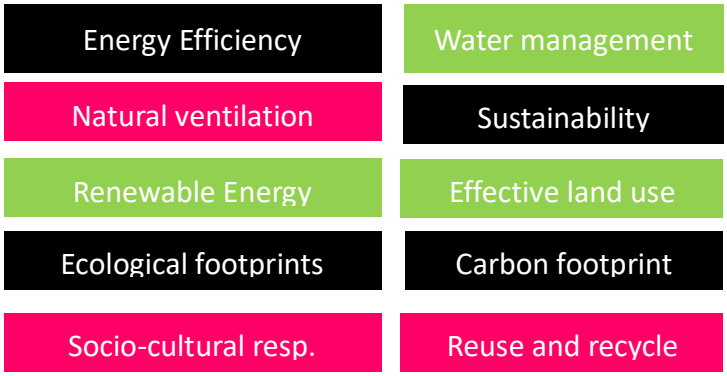

Figure: 02 Parameter considerations for climate change

Climate-responsive architectural design is highly sophisticated, with specially evolved features that cater to the multiple parameters of climate responses, such as wind, light, temperature variation, insulation, glare reduction, and rain. For effective climate control, architectural design evolved a series of design solutions such as courtyards, cluster planning, wind towers, roof terraces, stone jaalis, and others. These features not only successfully functioned as climate responsive design elements over time, but also evolved into major social and cultural elements at the community level, bonding them together towards socially sustainable units. The challenge before us it's about reconciling these ancient methods with modern innovations**.** This reinforces the relevance of traditional architectural knowledge to the sustainability concepts developed today.

Sustainable Design Initiatives

The LEED Green Building Rating System is Global recognized standard for high-performance green building design, construction, and operation. According to Sarah Vanita Gideon Infosys, India, a popular press release through Asia Pacific, Infosys is a global leader in consulting, technology, outsourcing, proudly owns the BPO building at Pune's Hinjewadi campus, awarded "Leadership in Energy and Environmental Design" (LEED) India's "Platinum" Fong Green Building Council of India. It's been rated. Highest rating for sustainable buildings. As a result, Infosys now owns eight of his buildings totaling over 2.5 million square feet and has a prestigious platinum rating.

About Infosys Green Initiatives in Pune

Over the past five years, Infosys has made great strides towards a more sustainable business. The group is committed to halving per capita electricity consumption from 2007-2008 levels by the end of 2017 and meeting all electricity demand from renewable sources. Infosys 40% reduction in power consumption per person between 2007 and 2013. Over the same period, the company's per capita water use decreased by 34% and greenhouse gas emissions decreased by 15.3%. The sustainability initiatives at Infosys

are focused on reducing energy and water consumption. The structure was designed with a sustainability perspective in mind. The building is highly energy efficient with features such as Solid windows, insulated walls and roofs, ventilation systems, cold water distribution systems, and efficient envelope with features such as reduced indoor lighting power density.

Figure 03: Photograph indicates Location of Infosys and its interior space

Key features of the award winning Infosys in Pune include

Efficient lighting

The use of LEDs and T5 lamps makes lighting 40% greener than ASHRAE's global requirements.

Innovative drainage technology

The building has two plumbing lines that allow water recycling for landscaping, air conditioning, and flushing.

Reducing water usage

Water consumption has been reduced by 60% through the use of low-flow taps and recycled water.

Using local materials

About two-thirds of the resources used in the project were manufactured within a range of 800 km of the project site.

Efficient HVAC design

The district energy system provides chilled water to chilled beams and dedicated outdoor air systems. When compared to ASHRAE baseline standards, this design resulted in a 46 percent increase in efficiency.

About CII-Godrej GBC Green Initiatives in Hyderabad

Hyderabad's CII-Godrej GBC is another proud feather in India's green building initiative. The Association of Indian Industries Sorabji Godrej Business Center (CII-Godrej GBC) in Hyderabad, India, was planned by renowned Indian architectural firm Karan Glover and Associates and was completed in 2004. Godrej and Boyce Manufacturing Company and the Government of Andhra Pradesh have been successful in both cultural and environmental contexts.

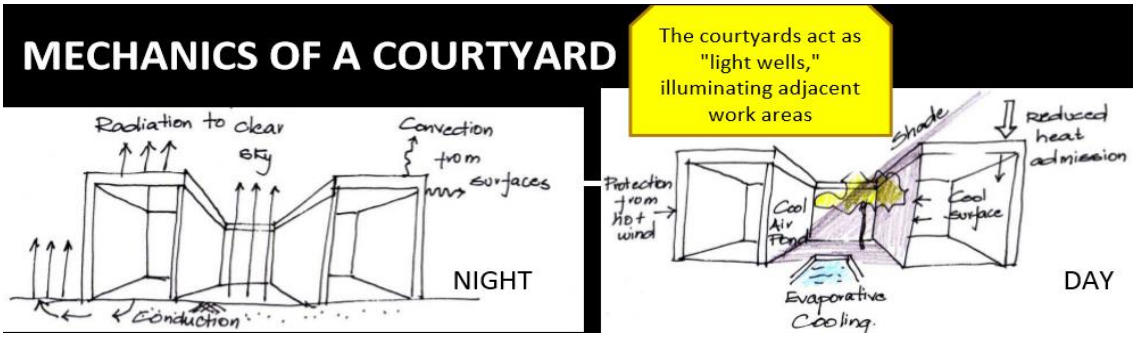

Figure 04: Mechanics of courtyard CII- Godrej GBC Hyderabad

Key features of the award winning CII-Godrej GBC Green Initiatives in Hyderabad include

Traditional Courtyard Design Concept

The 20,000-square-foot building is designed around a courtyard, a traditional gathering place for intellectual encounters, cultural events, and social interaction, and a 'well of light' that provides light to adjacent spaces increase. Also works as Support chimney ventilation and create a safe indoor and outdoor environment. Natural light from the courtyard combined with an energy efficient lighting system saves 88% more energy than a building of the same size with electric lighting. Sensors record the amount of light in the courtyard and activate efficient electric lighting. Dimmers adjust lighting levels by turning off unwanted lights. 90% of the building area has daylight and views to the outside.

Use of Jaalis

In certain areas, Jaalis is used to reduce glare and heat build-up and to allow ventilation and visual and acoustic connectivity to the outside.

Use of Wind Towers

Wind turbines also help reduce costs by "capturing" and cooling the air moving down the shaft. The air is supplied to the ventilation unit cooled up to 8°C, significantly reducing the load on the air conditioning system.

Use of Rain Water Harvesting

Another ancient strategy for reducing municipally supplied water consumption is to construct a rainwater collection pond. Rainwater is collected and channelled into a pond at the site's lower end. Glover claims that indigenous methods are used to purify water. For purification, Water flows from the roots of two plants, Phragmites Australis and Typha Latifolia. After water purify, the water is used for landscaping, a process known as "Root Zone" treatment; 100% of water consumed in buildings.

Use of Local Material

Additionally, local ancient Indian design principles are applied, material usage is used in the structure, with 60% of materials procured there (after cost) a 500-mile extent, with 95% extracted or harvested locally.

Conclusions

Infosys in Pune and CII-Godrej GBC in Hyderabad show that aesthetics need not be sacrificed when combining old-style and ethnic methods with fundamentals of contemporary technology. The activities of these and similar other projects clearly call on us to respect the past and carry forward its borrowings to the present and the near future, very well prompting us that there is a vast unexplored basin of traditional wisdom and knowledge in our past that holds immense potential and application value even today. The Costal Regulating Authorities can initiate dedicated design cells through its Town Planning and Municipal set-ups comprising of experts like Architects, Planners, Urban Designers, Construction Managers Landscape designers and Disaster Managing Experts, to avoid the pitfalls all the major Metro Cities in the Indian Sub-Continent have got themselves into. Green Audit boards comprising of the above mentioned experts can be formulated at City level to ensure zero carbon foot prints. This will also put the cities on the Smart-Cities Mapping and get visibility not only on National but on an International Scale.

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