"Empowering Senior Citizens For Powerful Living"

"Let's change ourselves
to change the world,
the seeds of change lie within us."

गुणवत्तापुर्ण उत्तरायुष्य

Improving the Quality
of Life of Senior Citizens

CONTENTS


Mrs Nirmalatai Sovani
Dr Dilip Deodhar
Mrs Bhygashree Bhide
Ms Vidya Godbole
Mr Vivek Velankar
Dr Sarika Kulkarni
Ms Roshni Abraham
Mr Anup Thorat
Ms Mangala Godbole
Dr Ashish Tavkar
Mr Anil Kachkedikar
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Green buildings, Environmental Architecture and Eco-housing – are different names of the trend towards efficiency and conservation of resources - that emerged in the last decade, challenging current wasteful practices, materials and even designs used in modern architecture.

The Indian Green Building Council which provides LEED (Leadership in Energy and Environment Design) certification has 254 certified green projects to its credit and has registered more than a billion square feet. While the new national green rating system of India, GRIHA (Green Rating for Integrated Habitat Assessment) conceived by the Energy Resources Institute (TERI) and developed by the Ministry of New and Renewable Energy Sources in 2006, has over 300 registered projects accounting for more than 100 million square feet of green building footprint. The Indian Govt. provides economic incentives for architects and developers for efficient design and use of renewable energy sources through the rating system.

In 2005, the US Asia Environmental Partnership (USAEP) initiated Eco-housing guideline for residential buildings in India along the lines of the LEED model but adapted to Indian conditions. A team comprising Rachana Sansad's Institute of Environmental Architecture, The Energy Resources Institute (TERI), the Indian Institute of Architects (IIA), Builders Association of India (BAI) and several others, began work on an indigenous green building guideline with the International Institution of Energy Conservation (IIEC) & the University of Pune's Science and Technology Park as implementing agencies. The 'Eco-housing' guideline which was developed as an outcome of this partnership for residential dwellings was adopted by the Pune municipality. In August 2009, Eco-housing under the IIEC released its second version of guidelines for five climatic zones of India.

More recently, the Energy Conservation Building Code (ECBC), formally launched by the Bureau of Energy Efficiency (BEE), a part of the Ministry of Power, Government of India, in collaboration with the United States Agency for International Development (USAID) in May 2007, is policy measure to reduce the adverse impact of buildings on environment with specific reference to energy use to meet the goals of India's Eleventh Five Year Plan.

These rating systems, although voluntary at present, are constantly increasing their thresholds for better and more holistic approach toward the environment. For example, the newer versions of LEED extending it beyond the scope of commercial buildings into homes, factories and townships, even neighbourhoods (still to be introduced in India) have led to a holistic approach to the movement.

However, with continuing environmental degradation, and escalating concerns about Global Warming and CO2 levels in the environment, it is becoming clear that efforts to make buildings efficient needs to be at a war footing. Green buildings still constitute a miniscule percentage of the total building stock in Indian cities.

Green buildings must also be viewed in the standpoint of the country's vernacular architecture. Built to context they present local solutions to global issues. From the Chettinad houses of South India to Wadas of Western India, Bungas and Havelis of Rajasthan, they present an array of structures whose design has evolved over millennia, which are bio-climatically responsive and culturally sensitive. In comparison, currently rated green buildings may appear to be huge energy guzzlers and emitter of greenhouse gas emissions.

Future of green design:

Habitat or buildings is next only in its impact on the earth's ecosystems than agriculture. At a global level, the converging problems of climate change, energy security, and ecosystem destruction largely result from the increased conversion of natural resources into waste that occurred after the industrial revolution nearly 300 years ago. It provided more people with greater affluence, but it also had a heavy environmental impact.

Impact is widely accepted as a function of PLT ie. Population, Lifestyle, and Technology. It is important for designers and engineers to have a holistic mindset – to think integratively about design. In order for it to be more effective and sustainable, Green buildings must adopt the following:

Passive Design:

This means that buildings must be designed as per local climate and site conditions so as to rely less on mechanical means and fossil fuel resources to provide thermal comfort. Modern simulation tools can aid in designing shading devices, appropriate orientation and envelope design as well as help compute the heat gain or loss by the use of different materials. This is critical to reducing energy consumption and carbon emissions.

Carbon Neutral Design:

Holistic carbon neutral design is to reduce carbon emissions associated with all aspects of a project. This would include the operating energy as well as the construction and materials, and additionally the carbon associated with the commercial, institutional or residential use of the building by the occupants. This

incorporates the nature of the work or activity that is carried on within a building. Locating the building to reduce transportation costs will factor into this equation, and thereby includes neighbourhood and local or regional planning issues.

Eco friendly building materials:

Green ratings have created a new market for materials such as thermally superior glass, insulation and HVAC systems. An understanding of life cycle of a material is critical to the choice of a sustainable building material. How is the material processed? Where is it mined from and what are the raw materials used? How much fossil fuel energy it has consumed and how much carbon has been emitted from transportation of raw materials to manufacturing site and there on? Has the material during manufacture polluted soil, air and water? Is it bio-degradable, reusable or recyclable? Or is it made from waste? These questions will determine the choice of an eco-friendly building material.

Indoor Environment Quality:

Commercial buildings are often sealed glass envelopes which are incapable of breathing. The environment inside is often devoid of vital oxygen, natural light and ventilation, and still worse, laden with harmful gases such as Nitrogen di-oxide, Volatile Organic Compounds (VOCs), Ozone, and disease-causing micro-organisms that are released and contained within the building's envelope. The result in such buildings is a notable increase in employee illness and lack of productivity.

Architects can prevent their designs from becoming health hazards to occupants by taking specific measures such as providing adequate ventilation or air changes, avoid fabric carpets with large surface areas in hot humid environs as they harbour micro-organisms, reduce humidity levels and allow sunlight, avoid furniture made of particle board, excessive resins or formaldehyde, and such other techniques.

Emerging green technologies:

The most potent tool of the designer in the PLOT equation is technology – innovation for sustainability. Among the several sustainable technologies that have emerged, structural cooling to reduce indoor air temperature, can provide solutions to thermal comfort in hot climates with no fossil energy. Decentralized waste water treatment systems with phytorid and DEWATS is another innovation that has great future. Use of geothermal or earth energy for heating and cooling as well as solar hydrogen, are many others which can contribute to a sustainable civilization.

Challenges and the way forward:

At an urban scale, eco-sensitive architecture must address the issues of hydrology building along the natural drainage and slope of land and protecting surface and ground water flows, conserving vegetation and existing biodiversity including mangroves and wetlands by preventing encroachments and pollution and allowing for their natural life cycle. Issues such as urban heat island effect must also be addressed reducing hard surfaces and using materials with high solar reflectance index.

Ultimately, it is the lifestyle we choose to live – a personal decision – that would make a difference. In Denmark, Netherlands and many other countries in Europe, walking and cycling have become the norm. There is a move towards 'slowing down the pace of the city'. In the city of Freiburg in Germany, residents can own a car - but they have to pay €18,000 a year to park it in one of the multi-storey 'Solar Garages' on the outskirts of the quarter. On the main thoroughfare there is a speed limit of 30km per hour - and in the narrow residential streets, cars can travel no faster than walking speed. Further, nearly 20 per cent of the housing is social housing funded by private investors - a deliberate formula intended to create a healthy social and economic mix.

While construction Industry in India is growing at the rate of 12.9% the Eleventh Five Year Plan document of India estimates housing shortage during the plan period (2007-12) to be around 26.53 million. Thus, on the one hand, a huge shortfall of housing exists while on the other, we have a booming construction industry which not catering to this need, is still growing at a phenomenal rate. Sustainable architecture is the ability to meet the demand of housing while minimizing the footprint of built structures and cities.

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By Roshni Udyavar Yehuda

Environmental Architecture

Some key principles:

- Buildings should be climate sensitive; their orientation, window size and shading and materials used should be appropriate.
- Materials used for construction must have low embodied energy, must be as far as possible from renewable sources, must be recycled or recyclable, must use waste rather than virgin materials and must be non-toxic, both during manufacture and use
- Should provide good indoor environmental quality
- Must provide thermal comfort with minimal energy consumption
- Must use renewable energy
- Must recycle and reuse water and solid waste
- Must be self sufficient

Enviroarch, a partnership firm based in Mumbai, will provide consultancy on environmental architecture free for those genuinely interested in incorporating these measures in the design of old age homes.

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