

# Architecture of the Future-Local, Sustainable processes and product

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Realizing the need to adapt to local resources as the key for futuristic design

As we think about what would be the architecture of the new era, pictures of high-tech material, scaling unbelievable heights with state of the art technology may come to our minds but a little more thought on it would make us wander on the

available resources at the time and its prudent use. Architecture of the future would have to be based on the sustainable and practical use of the natural resources available to us. As architects and designers we would have to constantly work at satisfying human needs



for growth and prosperity while making our future sustainable with the limited natural resources that we possess.

The green economic report initiative by the UNEP gives convincing evidence for policy makers, designers and leaders from all arenas of society to invest in and design with clean technologies, renewable energy, natural materials and infrastructure.[1] There is a constant need for architects and planners to implement these measures for the future for architecture to be sustainable environmentally and economically. The sustainable approach to development and architecture of the future could have a varied

scope and scale of interventions. Some examples of architecture in the present are illustrations of sustainability in relation to the environment and a minimum environmental footprint in a single unit, neighbourhood and town. This approach towards sustainability would mean lesser carbon emission and greater use of renewable processes and energy.

The architecture in the future would have to blend with the modern urban fabric, woven with the traditional cultural and sociological needs of the community using environmentally sustainable processes and materials. The discussion in this article is with respect

to private residential buildings as examples as they are some of the smallest, important units of habitable spaces where a single family has full control on the design decisions without any government, bureaucratic or other influences. The use of environmentally sustainable design, processes and material, especially mud and fly-ash to make the architecture of the future not just technologically advanced but environmentally and culturally also sustainable.

### USE OF SUSTAINABLE AND LOCAL BUILDING MATERIALS

As more and more buildings use glass facades, stone imported from far off



Natural Light flooding the house also filler slab with hourdi block roof



Openings Inside - Use of Natural Lighting to the maximum, Kanavi residence designed by Ar Deepak Godhi

land and imported high energy consuming materials makes us move one step backwards in the context of sustainability and become more obsolete than ever. A material which is brought from hundreds or in some cases thousands of kilometers away and processed with high consumption of energy would have an enormous footprint and in no way could be sustainable. The trick would be to find construction material around us which could be easily available, rich in strength, texture and feel. India, with its enormous manpower could shape these produces into magical

form and architecture. It requires ingenuity and intense knowledge of the material and its strength and not materials with which they are processed for higher material strength than required. The use of Bamboo, mud, fly-ash and many such materials in recent architecture are the ones which could provide us with a sustainable architecture. It has always been assumed that mud is used only for poor homes and small structures while there have been examples of airports, embassies, hospitals and factories also done with mud. Another assumption associated with envi-

ronmentally friendly materials like mud is that it is fragile and ephemeral material, while in reality mud buildings are the oldest in history and it has been used and experimented with centuries ago. Even today mud is used in many ecologically sensitive construction sites. Syria used mud beehive houses, the Great Mosque of Djenne in Mali, Africa, Considered by many architects to be the pinnacle of Sudano-Sahelian architectural style, this mosque is one of the most famous landmarks in Africa and was built in 1907 [2], The Taos Pueblo is a historical adobe village in Taos, New



Clay tile flooring, Kanavi residence designed by Ar Deepak Godhi

Mexico – multi-storied buildings that have been continuously inhabited for over 1,000 years. It was probably built between 1000 and 1450 A.D., and as of 2006, it had 150 inhabitants. [2]. The contemporary examples of the use of mud and adobe is the Hotel Tierra Atacama by Rodrigo Searle. The hotel is built entirely with adobe and rammed earth in Chile. Other examples which can be attributed for the use of mud and its components on a larger scale in India, for the present day are, The Oland resort in Conoor, Tamil nadu, the resort, Bangalore, multistorey (4 floors)apartment type

which shows the beauty, sensitivity and the modesty of this material

Mud has always been a symbol of the rural face. In context with the urban scenario, the use of mud blocks, minimum plastering and extensive used ecological construction material has been exhibited in the Kanavi residence at HSR Layout in Bangalore designed by Architect Deepak Godhi. The walls of the house have been made with stabilized mud blocks which are sun-dried. The structure is made using stabilized mud mortar. This makes the ecological footprint of the wall material minimum as there is no transporta-

tion costs involved. The finishing of the mud blocks have been kept minimalistic with no plaster on the walls and the use mud plaster on some of the walls to create a different texture which exhibits the inherent colour of mud. This avoids the processed paints which contains lead in them. Also the texture and colour created is unique as the mud in a region may vary in colour to a large extent. The roof uses the in-situ jack arch panels made with WPC tiles with minimum concrete. Also there is a use of terracota tiles for the flooring and natural locally available stones for the building of walls.



Wood and steel staircase



Arch Panel Roofing

### CONSERVE, REUSE, RECYCLE

Limited natural resources need to be conserved and hence one should reuse and recycle materials and resources such as water. This house also conserves the water that falls on its 1450 sqft roof for all its domestic purposes and drinking needs. The grey water (from the



Kitchen garden and composting on site



Mud Blocks, Less Plaster

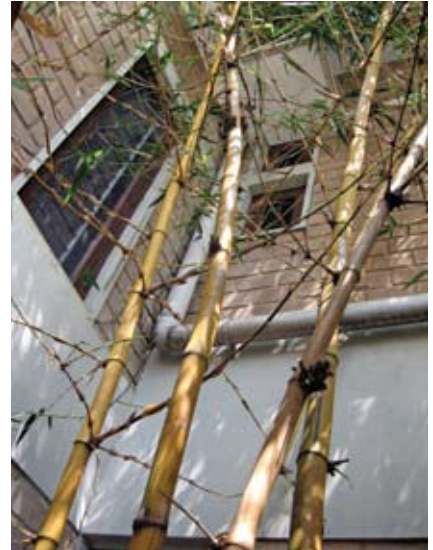


Space for art work on mud plaster

washing machine) is recycled for use in toilets of the ground floor. 60% of the yearly total water consumption at the rate of 500 liters per day is met by rainwater harvesting, with a holding capacity of 10,000 ltrs underground storage tank and 1,000 ltrs overhead tank. The kitchen water is collected and



Mud plaster



Bamboo growing with the building

made use for the kitchen garden, thus overall reducing the foot-print of water used by this building to a minimum. The roof is painted white, to reflect the heat during summers, thereby reducing the heating of the roof, which in turn reduces the usage of fans, thereby conserving electricity. The use of solar water heater and solar lanterns also help in reduction in the use of the conventional electricity source.

### SUSTAINABLE CONSTRUCTION PROCESSES

A building would be sustainable in every sense when not only the material but also the processes involved in the construction are sustainable environmentally and socially. In a country like India where the natural resources need to be optimized because of the high demand and scarcity on one end and on the other end availability of a huge

manpower base. Labour intensive construction techniques could be used with little mechanical use. This could create more green jobs and livelihood for many more while reduction in carbon emissions. Also the waste on site and off site needs to be managed wisely. At a residence designed by Biome solutions in Bangalore, old keyboards and other electronic waste material have been used as filler material for

Sky, Earth and Green





Mud plaster



Mud Blocks and Stone-Local Materials

ceiling where concrete is not required. The other wastes such as damaged tiles and extra tiles could also be used to add uniqueness and an enhanced aesthetic value to each dwelling place. The construction waste that occurs should also be managed with care while reusing whatever possible. If every architect insists on basic shelter, basic facilities like temporary toilets on site, safety gear for the workers and create opportunities for physically challenged if would make construction more socially equitable.

## POLICY CHANGES FOR SUSTAINABILITY

Strong policy recommendations which may have to be formulated for specific issues of Energy efficiency in old and new buildings, renewable energy technologies, such as wind, solar, geothermal and biomass technologies. Building owners with sustainable material and processes should be given some tax holidays or other concessions to encourage greener technology and renewable energy resources. There is an urgent need for architects and designers to acknowledge the benefits of sustainable processes, design, materials if we want

a better, high efficiency and evolved architecture in the future. Also having a better and scheduled wage system for the labour and other site workers may be an effort towards making the Indian construction industry from highly unorganized to a more reliable, structured and efficient sector.

## CONCLUSION

The architecture of the future would be gauged not only on the hi tech technology it uses, the heights it scales, the comfort it provides but also how efficient it is, how green it is and how much does it conserve, reuse and on how it reduces its carbon emission. The architecture and design of the future would not aim at standing out from everything around but blend with earth and its surroundings like it was an integral part of its own environment. In the past architecture in minds of some was to do with the scale and height it achieves or the uniqueness, glitter it presents. On the contrary, a good design in the future would be judged by its sustainability and oneness with nature. Architects of tomorrow would have to adapt the knowledge of the biome around it from all disciplines

and work as a team to create shelters for mankind.

## REFERENCES

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