

Sustainable Construction Practice in India – It's Impact on Economical, Environmental and Social Elements

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Abstract— Building sector consume a significant amount of natural resources and have a wide range of environmental, economical and social impacts. These concerns are key drivers behind the sustainable design movement in construction sector. Various estimates indicate that buildings sector use more than 40 % of the raw materials and generate 35% of Green House Gas (GHG) emissions annually. Considering what buildings are made of steel, concrete, glass and other energy intensive materials. Buildings have a high level of embodied energy. Applying sustainable designing can significantly reduce these impacts. The main objective of this paper is how the sustainable design is benefit to Economical, Environmental and Social factors.

Key words: Sustainable development, Objectives, Fundamental Principals, benefits

I. INTRODUCTION

We live in largely urban world consuming more energy and natural sources than we can replenish. Globally, the urban population is increasing by about of 70 million per year. Increasing urbanization, increase in population, rising income level and the resultant increase in consumption has resulted unprecedented damage to environment. It is estimated that buildings globally consume 40% of planet's material sources and 30% of its energy and 25% of water, .The construction of buildings consume 3 billion tons of raw materials and generate 40% solid waste and generate 35% of Green House Gas (GHG) emissions annually. In India economy has growing with an average of 6.6% over 5 years and expected to grow further. The real estate sector in India is expected to 180 billion dollars in 2020 and is growing at the rate (CAGR) of 11.2%. Sustainable building construction aims to embody the principals of sustainable development i.e. environmental protection, economic development, and social development. Sustainable buildings are designed and constructed to high environmental standards and thereby; minimize energy requirements, reduce water consumption, use low environmental impact materials , low embodied energy and resource efficient, reduce wastage, conserve the natural environment and safeguard human wellbeing. The main objective of this paper is how the sustainable design in construction sector is benefit to Economical, Environmental and Social factors.

II. IMPORTANCE OF SUSTAINABILITY IN CONSTRUCTION INDUSTRY

Sustainable construction main aims is to meet present day needs for housing, working environments and infrastructure without compromising the ability of future generations to meet their needs. It incorporates elements of economic efficiency, environmental performance and social responsibility – and contributes to the greatest extent when

architectural quality, technical innovation and transferability are included.

While India is preparing to achieve these growth plans with enthusiasm, it is essential that we should analyses and take into account the price that the future populations of the world and India will have to pay in return if this growth takes place without adequate thought to sustainability. Should we consume all our energy, materials, and water resources without considering for the needs of next generation? The future of ours is at stake due to obvious GHG emissions, climate change and sustainability. It is estimated that GHG emissions would increase from 2 billion tons to 6-7 billion tons of CO₂ in 2030.

III. OBJECTIVES OF SUSTAINABLE DEVELOPMENT

Sustainable construction development can be considered that have the following four main objectives.

- 1) Social progress, recognizing the needs of everyone.
- 2) Effective protection of the environment.
- 3) Prudent use of natural resources.
- 4) Maintenance of high and stable levels of economic growth and employment.

IV. FUNDAMENTAL PRINCIPLES OF GREEN BUILDING AND SUSTAINABLE SITE DESIGN

In considering sustainable practices that construction industry of India must adopt, an analysis is required for each stage of construction. And for this we need to have a grade based certification system or a comprehensive plan for sustainable construction of every structure in country. This can be done by considering sustainability at aspects as:

- Sustainability and building design
- Efficient water management and waste water treatment
- Solid waste management
- Passive solar design
- Building materials
- Building technologies
- Energy systems and environment
- Indoor environmental quality
- Innovation
- Use of Construction Demolition and recycled Material

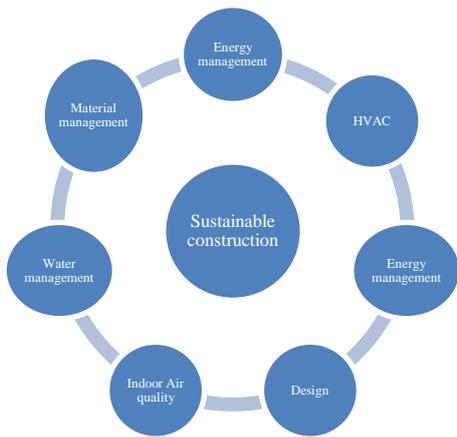


Fig. 1: Fundamental principles

V. BENEFITS OF SUSTAINABLE CONSTRUCTION

Green building is not a simple development trend; it is an approach to building suited to the demands of its time, whose relevance and importance will only continue to increase. The benefits to green building are manifold, and may be categorized along three fronts: environmental, economic, and social. Apart from that owner, tenant and contractor are also benefitted in many ways. 2%-20% initial cost is higher, but 25%-39% saving in energy consumption, 20-30% saving in water consumption, 50% less wastage generating, 35% reduce co² emissions, increase 2% rental premium, 30% less operating expences,40% excess space utilization are the major benefits from Green Buildings

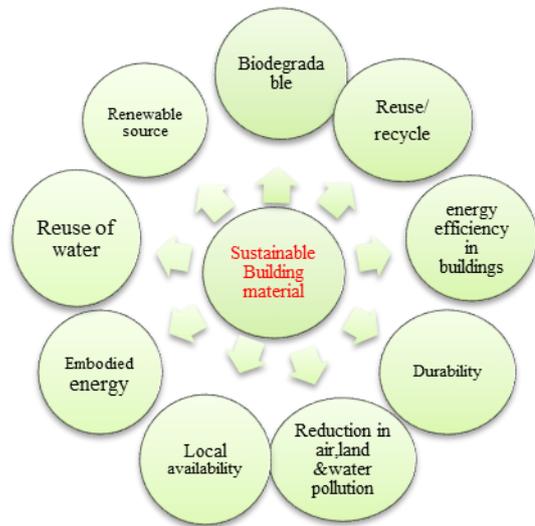


Fig. 2: Property circle of sustainable material

- Decrease use of natural resources and lower ecosystem impacts
- Reduce green house gas emissions
- Improve Air and Water Quality
- Conserve Water, Reduce Waste Streams
- Conserve and Restore Natural Resources
- Waste Reduction
- Storm water Management
- Temperature Moderation

Developing sustainable buildings minimizes the use of water, raw materials, energy and land. It also reduces emissions, waste and pollution in the environment and protects employees' health. Sustainable construction has significant long-term effects, allowing businesses to play their part in protecting the environment on a daily basis. Creating such workplaces also makes further sustainability efforts much easier, which can benefit both local communities and society as a whole.

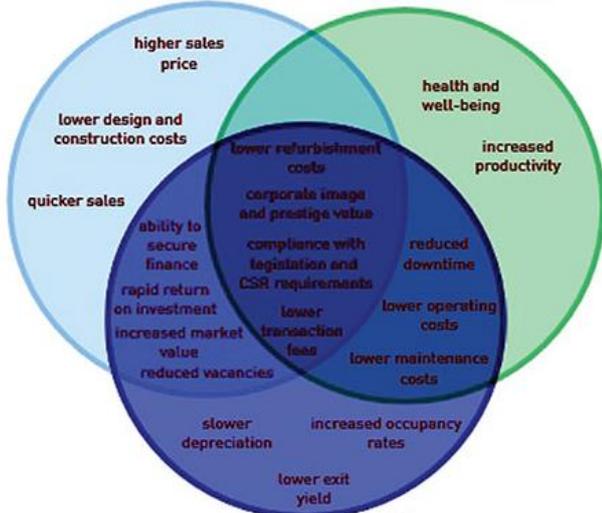


Fig. 3: Benefits of sustainable designing

A. Environmental Benefits of Sustainable Design:

Buildings consume a significant amount of our natural resources and have a wide range of environmental impacts. These environmental concerns are a key driver behind the sustainable design movement. Buildings have a high embodied energy materials, produce these materials depletes nonrenewable resources and has environmental effects. Building operations contribute significantly to environmental pollution levels. The whole purpose behind sustainable building is to preserve our environment and avoid the depletion of the earth's natural resources. Applying sustainable design principals can significantly reduce these impacts.

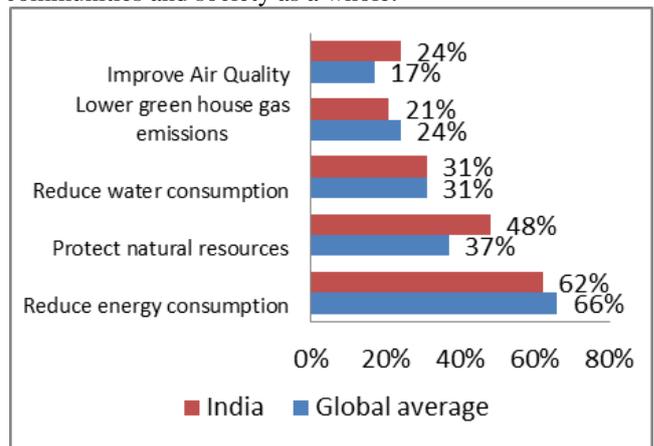


Fig. 4: Environmental reason, global average and by country

B. Economic Benefits of Sustainable Design:

Sustainable building not only improves the quality of environment but it also has many economic and social benefits as well. By using sustainable materials, reducing energy consumption, and improving water efficiency it will enable you to: like Energy and Water Savings, reduce operating costs, Increased Property Value, Decreased Infrastructure Strain, Optimizes the Life Cycle of the Building ,Improved Employee Attendance, Improve

Occupants Attendance and Productivity, Helps Aid in the Expansion of the Green Market, Development of Local Talent Pool **Green buildings use on average 26% less energy, emit 33% less carbon dioxide, use 30% less indoor waste and send 50% - 70% less solid waste to landfills, according to the US Green Building Council (USGBC).**

Green building benefits	
26%	Less energy
30%	Less Indore waste
50%	Less solid waste
33%	Less CO ² emission
30%	Less water usage

Table 1: Cost benefit analysis for green buildings

- Lower first costs
- Annual energy cost savings
- Annual water cost savings
- Lower costs of facility maintenance and repair
- Lower maintenance and repair
- Lower absenteeism and improved productivity
- Benefits to the building owner

1) *Tax incentives in India:*

Tax benefits for Green building construction and green materials (Government of Indian fast environmental clearance, Ministry of New Renewable Energy (MNRE) provide 90% reimbursement of the registration fees, State governments encourage with some benefits like additional floor area (FAR), discount in permission charges and property tax benefit and financial institutions like ICICI, IDBI, SBI and YES bank are providing some additional benefits to green rated buildings.

C. *Social Benefits of sustainable design:*

Although the environmental and economic benefits of green buildings are well known, the social benefits of green buildings are often ignored. By improving indoor environmental quality you can: like

- Improve Occupants Comfort and Health
- Healthier Lifestyles and Recreation
- Create an Aesthetically Pleasing Environment
- Improve Worker Productivity
- Better health of building occupants
- Improved comfort, satisfaction, and well-being of building occupants
- Occupant safety and security
- Community and social benefits

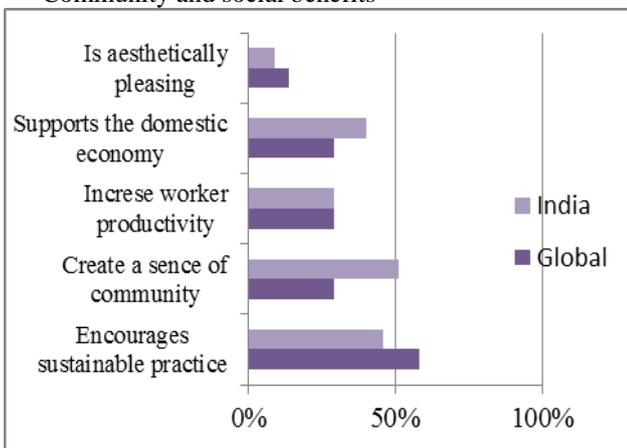


Fig. 5: Social reasons, global average and by country

VI. CONCLUSION

India is a rapidly growing economy and population growth; hence the pressure on the use of natural resources is very height. We are endangering the future of coming generations by leaving depleted resources. An active and some mandatory effort is extremely essential by construction sector along with participation of all the financial institutions, professional bodies, educational institutions, industry as well as central, state governments for sustainable development and hence leaves resources for the Future generations to fulfill their needs.

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