APPLICATION OF GREEN BUILDING CONCEPTS TO A BUIDING

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ABSTRACT

At present, we all are aware of how Green House Effect, resource depletion, environmental degradation is increasing day by day in our planet. Earth is badly in need of sustainable development by reducing pollution, reducing dependence on natural resources, reducing Global Warming etc. Else, after almost 200 years, there will be no life on Earth as predicted by Professor Stephen Hawking. Buildings accounted for 30% of final energy use and 28% of energy-related CO2 emissions globally in 2017 (IEA and UNEP 2018). Significant untapped potential exists for India's buildings to be made more energy efficient and resilient through implementation of green building policies and programme. The objective is to evolve a strategy to reduce energy use in buildings so as to reduce energy costs and greenhouse gas emission into the earth's atmosphere. A green building is designed, constructed and operated to minimize the total environmental impacts while enhancing user comfort and productivity. Globally cities are enacting ambitious policies to significantly curtail energy use in buildings through energy efficiency measures and introducing integration of renewable energy generation to decarbonize operational energy use in buildings. The most powerful of these policy measures include mandatory building energy codes and green building certification and rating systems. In India, the Energy Conservation Building Code (ECBC) for both commercial and residential buildings was introduced by the Bureau of Energy Efficiency (BEE) to realize energy savings from new construction by better design and materials. Voluntary rating systems like those from not for-profit bodies like Green Rating for Integrated Habitat Assessment (GRIHA) council, Indian Green Building Council (IGBC) and Leadership in Energy and Environment Design (LEED) have been adopted by all types of buildings leading to a green building footprint that's amongst the highest in the world.

1. FIELD STUDIES

Gotluru is a Village in Dharmavaram Mandal in Anantapur District of Andhra Pradesh State, India. It belongs to Rayalaseema region. It is located 34 KM towards South from District headquarters Anantapur. 5 KM from Dharmavaram. 392 KM from State capital Hyderabad. Gotluru Pin code is 515672 and postal head office is Dharmavaram R.S. Thummala (4 KM) , Thogata Street (5 KM) , P.r.t Street (5 KM) , Dharmavaram (6 KM) , Pothukunta (6 KM) are the nearby Villages to Gotluru. Gotluru is surrounded by Bathalapalle Mandal towards East, Raptadu Mandal towards west, Chennekothapalle Mandal towards South, and Tadimarri Mandal towards North. Dharmavaram, Anantapur, Kediri , Pavagada are the nearby Cities to Gotluru.

Location Details:

Survey No. 45, Gotluru , Dharmavaram Taluk, Anantapur Dist, Andhra Pradesh.

Area: 1 acre
GPS Location: 14° 28' 54" 77° 43'27"

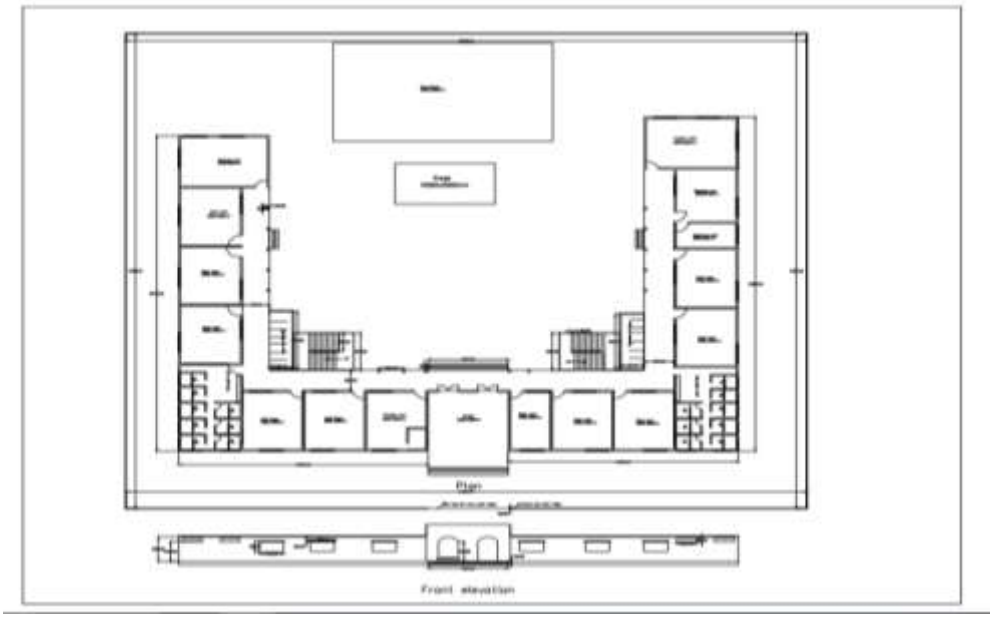
Physical Features:

Elevation: 371 meters above sea level
Wind: 18.5 kmph
Soil:
PH level: 7.0(±0.22)
Organic carbon (%): 0.48(±0.02)
Calcium (ppm): 1612(±152.0)
Average annual rainfall: 544 mm
Temperature:
Maximum Average Temperature: 41°c
Average Temperature: 37°c
Average Min Temperature: 27°c

Fig-1: Malakapuram

Fig-2: Plot no.45

2. DESIGN ASPECT



*The plan is made with 1:100 scale all dimension in mm. Direction: NE (North East). Room height is 3mt, Size of Door: 1.2m*2.4m and size of window: 2.4m*1.2m. It consists of 7 class rooms(6m*7m), 2 staff rooms(6m*7m), 1 principal room(6m*7m), 1 Computer Lab, 1 Museum Room, 1 Biological lab, two separate wash rooms for boys and girls & 2 wardrobe. The entrance with portico is 1.5m high from ceiling level. Two staircase is provided for access to terrace. The plan is also include stage (10m*5m) and playground (22m*12m).*

Fig-3: 3D model

Fig-4: Front View

3. DISCUSSION

 Water Conservation: *IGBC Green New Buildings rating system encourages use of water in a self-sustainable manner through reduce, recycle and reuse strategies (RWH). By adopting this rating program, green new buildings can save potable water to an extent of 30 - 50%.*

 Energy Efficiency: *The building sector is a large consumer of electrical energy. Through IGBC Green New Buildings rating system, buildings can reduce energy consumption through energy efficient - building envelope, lighting, air conditioning systems, etc., the energy savings that can be realized by adopting this rating programme can be to the tune of 20 - 30%.*

 Health and Well-being of Occupants: *The rating system ensures adequate ventilation, daylight and occupant well-being facilities which are essential in a building. The rating system also recognizes measures to minimize indoor air pollutants.*

 According to National Building Code (NBC),green buildings save material to about 25- 40% compared to conventional buildings.

 Heighten aesthetic qualities.

 Increase in user productivity.

 Enhanced image and marketability.

 Optimize life-cycle economic performance.

 Limited waste generation due to recycling and reuse.

4. CONCLUSION

If trees are cut off to clear up the plot for building construction, the same number of trees are to be planted elsewhere. Only this mentality of mankind can save the Earth from destruction. The condition of our planet at present is alarming. The researchers state that building construction is one of the main causes of environmental degradation. They are responsible for a huge amount of harmful emissions, accounting for about 30 percent of greenhouse gases, due to their operation. In cities, buildings occupy 50 percent or more of land area. Buildings

are responsible for not just a large percentage of the world's water use, but a large percentage of wasted water as well. In order to mitigate the effect of buildings along their life cycle, Green Building (GB) has become a new building philosophy, which uses more environmentally friendly materials, implements strategies to save resources and energy, lowers waste generation, improves indoor environmental quality, reduces harmful gas emissions etc. This might lead to environmental, financial, economic, and social benefits. For instance, savings in operation and maintenance costs in GBs can be realized through the installation of high-efficiency illumination and insulation systems or through a suitable material.

5. REFERENCES

[1] A Review paper on Green Building Research by Mr.Apoorva V.Kotkar, prof. Hemant Salunkhe

[2] http://www.indiaenvironmentportal.org.in/files/LEED2 011forIndia-NC.pdf

[3] A Review on Sustainable Building (Green Building) by Behnam Neyestani Department of Civil Engineering, De La Salle University, Manila, Philippines

[4] A Conceptual Review of Green Buildings in Energy Saving by Kambam Gireeshma, K.Leleedhar Rao

[5] Sustainable Building Material for Green Building Construction, Conservation and Refurbishing by Usman Aminu Umar, M. F. Khamidi and Hassan Tukur

[6] Selection of Materials for Green Construction: A Review by Geeta Mehta, Amit Mehta, Bidhan Sharma