

SUSTAINABLE HABITAT

A **sustainable habitat** is an ecosystem that produces food and shelter for people and other organisms, without resource depletion i.e., no external waste is produced. A sustainable habitat involves several key principles, including:

1. **Energy efficiency:** Sustainable habitats are designed to be energy-efficient, minimizing the use of non-renewable energy sources and reducing greenhouse gas emissions.
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5. **Water conservation:** Sustainable habitats conserve water through measures such as low-flow fixtures, rainwater harvesting, and water-efficient landscaping.
6. **Waste reduction:** Sustainable habitats reduce waste through measures such as recycling, composting, and the use of sustainable materials.
7. **Sustainable materials:** Sustainable habitats use environmentally friendly materials such as locally sourced, non-toxic, and recyclable materials.
8. **Social equity:** Sustainable habitats promote social equity by providing access to affordable housing, healthcare, education, and other basic needs.
9. **Biodiversity:** Sustainable habitats promote biodiversity by preserving natural habitats, providing green spaces, and encouraging the use of native plants.
10. **Green transportation:** Using green fuel like biodiesel

GREEN BUILDINGS

Green building is the practice of creating structures and using processes that are environmentally responsible and resource-efficient throughout a building's life-cycle from siting to design, construction, operation, maintenance, renovation and deconstruction.

Impacts of the built environment:

Aspects of Built Environment:	Consumption:	Environmental Effects:	Ultimate Effects :
Siting	Energy	Waste	Harm to Human
Design	Water	Air pollution	Health
Construction	Materials	Water pollution	Environment
Operation	Natural	Indoor pollution	Degradation
Maintenance	Resources	Heat islands	Loss of Resources
Renovation		Storm water runoff	
Deconstruction		Noise	

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Green buildings are designed to reduce the overall impact of the built environment on human health and the natural environment by:

- Efficiently using energy, water, and other resources
- Protecting occupant health and improving employee productivity
- Reducing waste, pollution and environmental degradation

Benefits:

- Protect and enhance the biodiversity and ecological system.
- Reduces the wastage of water and energy.
- Lower construction cost and higher property value.

- Improves occupants' health and overall productivity.
- Saves utility and other household bills by efficient use of water and energy.

Criteria for Green Building:

- Buildings are encouraged to build on previously developed land rather than developing new land.
- Building site should be smaller because there is less environmental footprint.
- Consumption of water should be reduced by built-in design by using low-flow toilets, grey water systems.
- Buildings should be constructed using clean energy like geothermal, solar, wind energies.
- Building should be constructed by using natural materials and should reduce material usage.

Features of Green Building:

1. **Energy efficiency:** Green buildings are designed to be energy-efficient, reducing the amount of energy needed to heat, cool, and light the building. This can be achieved through the use of high-performance insulation, energy-efficient lighting and appliances, and renewable energy sources such as solar or wind power.
2. **Water conservation:** Green buildings are designed to conserve water, reducing the amount of water used for landscaping, washing, and other activities. This can be achieved through the use of low-flow fixtures, water-efficient landscaping, and rainwater harvesting.
3. **Sustainable materials:** Green buildings are constructed using sustainable, environmentally friendly materials such as recycled content, rapidly renewable materials, and locally sourced materials. This reduces the amount of waste generated during construction and reduces the building's impact on the environment.
4. **Indoor environmental quality:** Green buildings promote healthy indoor environments by using materials and products that are low in volatile organic compounds (VOCs) and by providing adequate ventilation and daylight. This can improve the health and well-being of occupants and increase their productivity.
5. **Site selection and planning:** Green buildings are located in areas that minimize the impact on the environment and promote sustainable transportation options, such as public transit, biking,

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and walking. This can reduce the building's carbon footprint and improve the health of the surrounding community.

6. **Waste reduction:** Green buildings reduce waste through the use of recycling and composting programs, and through the design of buildings that are easy to deconstruct and recycle at the end of their useful life.
7. **Optimization of operation and maintenance:** Operation and maintenance of building should be performed by trained professionals, to reduce the environmental impact.

Thus any building can be a green building whether it is a home, an office, a school, a hospital, a community center provided it includes features listed above.

GREEN MATERIALS

Green materials are materials that are environmentally friendly and have a lower impact on the environment than traditional building materials. Due to the properties of non-toxic, organic and recycling, green materials (like wood, ceramics, clay, sand, stone) are widely used.

Criteria for green materials:

Following criteria can be used to identify the green materials

- i. Local availability of materials
- ii. % of recycled (or) waste materials used.
- iii. Rapidly renewable materials
- iv. Contribution in energy efficiency of building
- v. Recyclability of materials
- vi. Durability
- vii. Environmental impact.

Characteristics of Green materials:

- a. Green materials are energy efficient products
- b. It lowers the energy cost and lessen pollution
- c. Renewable and can be regenerated again and again
- d. Green materials are recyclable or made from recycled material. So, they save energy and reduce waste.
- e. Green materials are non-toxic
- f. They are durable and no need to upgrade or repair
- g. Green materials are cost effective
- h. Materials can be locally sourced, so transport cost can be reduced.

Green materials example:

1. Stone: Living in a stone structure is low maintenance and eco-friendly, and any extra stone leftover from the build can be used for home finishing such as countertops or tile. Benefits of stone: **Low maintenance, Durable**

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2. **Cob:** It is a mud mixture made of multiple natural ingredients such as soil, sand, straw and sometimes even lime. Benefits of cob: **Cheap & Energy-efficient:** Cob homes slow down the rate of heat transfer.

3. **Bamboo:** The strength and look of bamboo can help you achieve a distinctive style to make your home stand out. It's also one of the fastest-growing plants on the planet, so it's more sustainable than most! Benefits of bamboo: **Durable & Lightweight.**

4. **Cork:** It is one of the lightest solid substances, cork comes from cork oak trees, which are mainly harvested in Europe. This sustainable material has been used in construction in Europe for many years. Because 50 percent of cork cell volume consists of air. Benefits of cork: **Thermal insulation & Mold-resistant.**

5. **Adobe brick:** adobe bricks are made of clay and straw. Adobe insulation helps keep home temperatures consistent. Benefits of adobe brick: **Low sound transmission & Unique design.**

6. **Straw bale: Straw-bale construction** is a building method that uses bales of straw (commonly wheat, rice, rye and oats straw) as structural elements, building insulation, or both. This unique natural build is affordable and sustainable, but be wary of pests and potential allergens. Benefits of straw bale: **Easily renewable & Cheap.**

7. **Earth bags:** Also known as sandbags, this natural material is made of (mostly) earth that is then filled into bags and piled on top of each other in a method similar to bricklaying. Benefits of earth bags: Insulation and locally sourced.