UNEP Report on Construction Emissions

Why in news?

The new UNEP report "*Building Materials and The Climate: Constructing a New Future*" outlines how developing, developed countries can reduce emissions from constructions.

What is the report about?

> *The buildings and construction sector is by far the largest emitter of greenhouse gases, accounting for a staggering 37% of global emissions.*

- **Launch**- The report is launched by *UN Environment Program (UNEP) and Yale Centre for ecosystems and architecture.*
- It highlighted the pressing need to establish innovative cooperation models to decarbonize building materials.
- These models are critical to achieve the world's ambitious target of net zero emissions from the built environment sector by mid-century.
- The report highlights the overarching strategies which need to be implemented together to decarbonize building materials.
    - **Avoid** unnecessary extraction and production
    - **Shift** to regenerative materials
    - **Improve** decarbonization of conventional materials

Categories of emission
• **Embodied emissions** - Emissions associated with the construction and demolishing of a building. • It include emissions from extraction, manufacturing, transport and on-site construction of building materials and "end-of-life" demolition or reuse. • **Operational emissions-** Emissions generated while maintaining the building's indoor "comfort levels" • It includes emission from heating, cooling, lighting and electrical appliances.

What are the key highlights of the report?

- **Embodied vs Operational Emissions** - Indirect operational emissions from residential buildings make up a majority of emissions (11%), while embodied emissions from the use of concrete, steel, etc. account for at least 6%.
- The UNEP warns that embodied carbon is projected to surge from 25% to nearly 49% by 2050.
- The share of operational carbon emissions will shrink due to increased adoption of renewable energy and improvement of energy-efficient buildings.

- **Renovated building**- The report highlighted that a renovated building generates 50-75% fewer emissions than new construction.
- **Cement** - Processing of cement, the binding agent in concrete, contributes to 7% of global carbon emissions.

How to reduce the emissions?

- **Circular design -** The experts call for incorporating circular design strategies to reduce GHG emission by 10-50%.
    - Circular design process enables the recovery of products, parts and materials when a building is disassembled or renovated.
- **Recycled materials**- Avoiding raw material extraction by promoting steel reuse and producing steel from scrap (discarded steel or steel product) can save around 60-80% of the energy.
    - If G7 countries and China use recycled materials, they could reduce emission in the material cycle of residential buildings by 80-100% by 2050.
- **Lifetime of buildings**- Increasing the lifetime of buildings creates significant opportunities to reduce aggregate embodied carbon.
- **Bio-based materials-** To reach net zero emissions in the built environment sector, the building materials of the future has to be procured from renewable or reusable sustainable sources.
    - ***Mass timber*** has emerged as an attractive alternative to concrete and steel due to scalability, sustainability, strength and flexibility in mid-rise urban buildings.
    - ***Bamboo*** can be processed and manufactured into *engineered bamboo* whose structural performance similar to that of cross-laminated timber and steel.
- **Decarbonise energy**- UNEP recommended electrifying and decarbonising the energy that is supplied to the production and maintenance of materials, buildings and urban infrastructure across their life cycle.
- **Sustainable alternatives**- Solutions such as reducing the clinker (produced from limestone and chalk)-to-cement ratio and increasing the share of cement alternatives, etc. could help in decarbonising the sector.
- **Carbon capture and utilisation (CCU)** - It is a process of removing carbon from the atmosphere and storing it within the building material itself over time.
    - It is estimated that CCU concrete can remove 0.1 to 1.4 gigatonnes of CO_2 by 2050.

References

1. Down To Earth- UN report on reducing emissions
2. UNEP- Global ABC Report

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