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# Circular Economy and Resilience to Climate Change and Natural Disaster

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# Initiatives of Circular Economy

- The circular economy is a system where materials never become waste and nature is regenerated. In a circular economy, products and materials are kept in circulation through processes like maintenance, reuse, refurbishment, remanufacture, recycling, and composting.



# Principles of the Circular Economy

- A circular economy cuts greenhouse gas emissions by adopting the three principles of the circular economy. These principles are based on and driven by design:

(i) eliminate waste and pollution,

(ii) circulate products and materials (at their highest value), and

(iii) regenerate nature.

- Circular economy helps climate change by eliminating waste and pollution by reducing greenhouse gas emissions across the value chain; by circulating products and materials and retaining their embodied energy; and by regenerating nature and sequestering carbon in soil and products.

# Three Circular Economy Principles

- Eliminate waste and Pollution: when we eliminate waste and pollution, we can reduce and avoid emissions across the value chain;
- Circulate Products and Materials: when we circulate products and materials, we can enable embodied emissions to be retained within the economy;
- Regenerate nature: when we regenerate nature and natural systems, we can improve carbon sequestration.

# A circular economy helps climate change

- A circular economy helps climate change
  - By eliminating waste and pollution, we reduce greenhouse gas emissions across the value chain.
  - By circulating products and materials, we retain their embodied energy.
  - By regenerating nature, we sequester carbon in soil and products.

# A circular economy can provide a sustainable global society

- Circular economy plays a key role in achieving sustainability by reaching maximum input efficiency using minimal resources, as well as reducing waste production.
- [Three Ways the Circular Economy can aid Climate Action:](#) .
  - ❖ Circular economy strategies could **slow down nature degradation by reducing the demand for virgin materials and decreasing** pressure on ecosystems;
  - ❖ By restoring and safeguarding ecosystems on land and in the ocean, we help plants and animals to build climate resilience. Nature, in turn, can help us regulate the climate, give us clean, safe water, control pests and diseases and pollinate our crops.

# Circular Economy: a Powerful Mitigation Strategy

- **Mitigation activities refer to:**
  - ❖ Actions designed to cut greenhouse gas emissions with the aim to keep climate change within a 1.5 degrees temperature rise.
  - ❖ Key mitigation targets include halving emissions by 2030 and achieving net zero by 2050.
  - ❖ The United Nations Environment Programme's [Emissions Gap Report 2022](#) state that Nationally Determined Contributions (NDCs) to emissions reduction point to a 2.6 degree increase in temperatures by 2100.
  - ❖ Mitigation strategies and activities are therefore essential for the long-term survival of humanity and [stability of the planetary system](#).
  - ❖ Efforts must increase: Mitigation and adaptation should no longer be considered in isolation, but hand-in-hand, so that root causes and locked-in consequences are addressed together.

# Circular economy: a support for adaptation activities

- The relationship between a circular economy and climate adaptation till date is less well mapped:
- However, a holistic view of the complex systems on which our economies are built and in which they operate can identify systemic solutions that suggest that a circular economy approach could support climate adaptation action.
- In some sectors, the link is already more present. For example, the food system and conventional agriculture is a sector whose high-emissions profile and reliance on the stability of natural systems marks it as both climate-culpable and climate-vulnerable. **Switching to regenerative agriculture is a key tenet of a circular economy for the food system.** Employing agricultural practices that have regenerative outcomes has tended to be presented mainly as a mitigation strategy, by reducing carbon and methane emissions as well as waste and pollution. However, regenerative practices can also support adaptation and build resilience.



# Role of Resilience in Disaster Management

- Disaster resilience is the ability of individuals, communities, organisations and states to adapt to and recover from hazards, shocks or stresses without compromising long-term prospects for development.
- A circular economy approach is especially important for preparing for (and recovering from) disasters. When essential supplies are needed on short notice, a circular economy can help people source what they need from local partners, in ways that often reduce carbon emissions and eliminate waste.
- **CE plays a critical role in preventing the post-disaster recession. Helps in recovery and recycling of building demolition waste**

# The ASEAN Framework for Circular Economy

1. Circular economy plays a key role in achieving sustainability by reaching maximum input efficiency using minimal resources, as well as reducing waste production.
2. Circular economy can provide a sustainable global society. China has had circular economy in its policy since the early 2000s. It was part of the eleventh five-year plan. To begin with it was primarily an industrial ecology agenda, looking at how the waste of one company can become resources for another
3. [Association of Southeast Asian Nations \(ASEAN\)](#) adopted the Framework for Circular Economy for the ASEAN Economic Community (AEC) at the 20th AEC Council Meeting held on 18 October 2021. The Framework aims to guide ASEAN in achieving its long-term goals of a resilient economy, resource efficiency, and sustainable and inclusive growth.

## **Circular Economy Areas of India: as suggested by NITI Aayog**

1. Municipal Solid Waste and Liquid Waste
2. Scrap Metal (ferrous and non-ferrous),
3. Lithium Ion (Li-ion) Batteries,
4. Tyre and Rubber Recycling,
5. Gypsum waste,
6. End-of-life Vehicles (ELVs),
7. Electronic Waste,
8. Toxic and Hazardous Industrial Waste,
9. Used Oil Waste (generated from tools and machines)
10. Agriculture Waste, and
11. Solar Panels

# Priority Circular Economy Areas during India's G-20 Presidency

1. India embraced four priority areas for the circular economy during G-20 presidency in 2022-23: circularity in the steel sector; Extended Producer Responsibility (EPR); circular bioeconomy and establishing an industry-led resource efficiency and circular economy industry coalition.
2. Resource efficiency and circular economy powerful strategies that can effectively minimize dependence on natural resources, curtail waste and encourage sustainable design practices.
3. There is now heightened recognition of resource efficiency and circular economy strategies within the G-20 community.



# Importance of Circularity in the Steel Sector

## Steel a Crucial Material for Infrastructure and Industrial Growth:

- Steel is a **fundamental building material** for various sectors, including construction, manufacturing, and transportation.
- As economies grow, the **demand for steel increases**, putting additional pressure on natural resources.

## Energy Sector Emissions:

- Globally, **approximately 7% of energy sector emissions** can be attributed to iron and steel production.
- The traditional linear production model leads to higher resource consumption and emissions, **contributing to [climate change](#)** and environmental degradation.

# Circularity in the Steel Sector

## Reducing Waste Generation:

- Circular practices aim to minimize waste generation and promote responsible waste management throughout the steel industry.
- By adopting a circular economy approach, the steel sector can significantly reduce the environmental impact associated with waste disposal and landfilling.

## Promoting Sustainable Development Goals:

- Circular steel practices align with several United Nations Sustainable Development Goals (SDGs), including responsible consumption and production, climate action, and partnerships for sustainable development.

# Extended Producers' Responsibility (EPR)

- EPR as a concept holds producers accountable for the environmental consequences of their products from cradle to grave.
- It aims to improve waste management and ease the pressure on local authorities.
- It reflects environmental costs in product prices and motivates the creation of eco-friendly products.
- EPR applies to various waste streams, such as plastic waste, e-waste, and battery waste.
- EPR was introduced for the first time in India in 2011 for the [E-Waste \(Management and Handling\) Rules](#)

# How does EPR Promote Circularity?

## Encouraging Eco-Design and Sustainable Materials:

- To fulfil their extended responsibilities, producers are incentivized to design products that are more durable, repairable, and recyclable.
- Eco-design principles are integrated to ensure that products have a longer lifespan and create less waste.

## Resource Conservation and Waste Reduction:

- EPR drives producers to reduce resource consumption, as they bear the costs associated with waste management and end-of-life treatment of their products.
- As a result, they are encouraged to use recycled materials and explore more sustainable production processes, reducing the demand for virgin resources.

## Promoting Recycling Infrastructure:

- Producers, as part of their responsibility, often establish and support recycling infrastructure to ensure that their products are effectively collected, sorted, and recycled at the end of their useful life.
- This contributes to a closed-loop system and promotes circularity by keeping materials in circulation.



# EPR Promoting Circularity?

## Incentivizing Take-Back and Recovery Programs:

- EPR schemes often require producers to set up take-back and recovery programs, where consumers can return their used products.
- This practice ensures that products are properly managed after use, either through recycling, refurbishment, or safe disposal.

## Creating Market for Recycled Materials:

- As producers are responsible for managing their products' end-of-life, they are encouraged to incorporate recycled materials back into their production processes.
- This, in turn, stimulates the demand for recycled materials, supporting a circular supply chain.

## Government and Industry Collaboration:

- EPR relies on close collaboration between governments, industries, and other stakeholders.
- By working together, they can develop more effective and comprehensive EPR policies, enabling a smoother transition towards a circular economy.

# Benefits of a Circular Bioeconomy

## Reduced Dependence on Fossil Fuels:

- A circular bioeconomy relies on renewable biological resources, such as plants, algae, and agricultural waste, to produce bio-based products and bioenergy.
- By using these resources instead of fossil fuels, it helps reduce greenhouse gas emissions and mitigates climate change.

## Resource Efficiency and Conservation:

- The circular bioeconomy follows the principles of a closed-loop system, where waste and by-products from one process become valuable resources for another.
- This efficient use of resources minimizes waste generation and reduces pressure on natural resources, leading to more sustainable resource management.

## Sustainable Agriculture and Forestry:

- Circular bioeconomy practices encourage sustainable agricultural and forestry practices.
- For example, using crop residues for bioenergy or bioproducts helps retain organic matter in the soil, improving soil health and fertility.

# Circular Bioeconomy

## Green Job Creation:

- Transitioning to a circular bioeconomy creates new job opportunities across various sectors, including **agriculture, forestry, bio-based industries, research, and waste management**.
  - It boosts rural economies and contributes to social development.

## Innovation and Technological Advancements:

- The circular bioeconomy drives innovation and encourages research and development in sustainable technologies and bioprocessing methods.
  - This fosters **technological advancements that can benefit various industries**.

## Climate Change Mitigation:

- Sustainable bioenergy from biomass **can help replace fossil fuels** in various applications, thereby **reducing carbon emissions and combating climate change**.
- The Government of India has been working towards the adoption of biofuels, biogas, and bio-compost through various schemes

## Enhanced Food Security:

- The circular bioeconomy can **contribute to improved food security by using agricultural residues and waste as feedstock for bio-based products** instead of diverting them from food production.

# Challenges of the Circular Economy?

## Infrastructure and Technology:

- Developing and **upgrading recycling and waste management infrastructure**, as well as adopting advanced technologies for resource recovery, can be a major challenge.

## Behavioural Change:

- Encouraging a shift in **consumer behaviour towards responsible consumption, product reuse, and recycling** requires effective communication and behavioural change campaigns.

## Regulatory Framework:

- Ensuring effective and harmonized **policies, regulations, and incentives to support circular economy** practices across different sectors is challenging.

## Financial Investment:

- Circular economy projects often **require significant upfront investments**. Attracting private and public investment to fund these initiatives can be challenging.

# Circular Economy the Way Forward: 4 Recommendations

## Incorporate Data and Case Studies:

- To provide concrete **evidence and examples**, consider incorporating data and case studies showcasing specific circular economy projects and their outcomes in India.

## Include Challenges and Solutions:

- Address challenges faced during the implementation of circular economy practices in India.
- Include **potential solutions and strategies** that the country is adopting to overcome these challenges.

## Involve Stakeholders' Perspectives:

- Consider including statements or perspectives from **government officials**, industry leaders, environmental experts, and other stakeholders involved in promoting circularity in India.
- This will add depth and authenticity to the article.

## Concise Policy Framework:

- Provide a **concise overview of the policy framework and regulatory measures** that India has put in place to promote resource efficiency and circular economy.



Thank You