THE NEXUS BETWEEN ECONOMIC GROWTH AND SUSTAINABILITY

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Why in News: There is debates sparking amidst the concern of climate change in the world forums regarding “The nexus and the balance between the sustainability and economic growth ”

Introduction to nexus between sustainability and growth

With only 5 years left to achieve the Sustainable Development Goals 2030, India must balance complex trade-offs, such as food security versus water and biodiversity. Traditional approaches that separate forests, agriculture, and water are insufficient for current challenges. An integrated "nexus approach" linking biodiversity, agriculture, and water while emphasising equity, sustainability, and community involvement is essential.

India’s present status on sustainability

1. Renewable Energy & Non-Fossil Capacity Growth

- India added a record ~**25 GW** of renewable energy capacity in FY 2024-25, up from ~18.6 GW the previous year.
- Solar led the growth: ~23.83 GW solar added in FY25 vs ~15.03 GW in FY24.
- Total installed renewable energy capacity (including various sources like solar, wind, small hydro, biomass) reached ~220.10 GW by end FY25.
- India has a target of **500 GW** non-fossil fuel?based power capacity by **2030** and also India has developed its capacity to achieve it.

2. Policy, Investment & Institutional Measures

- Strong push under **Production-Linked Incentive (PLI) scheme** to build domestic solar module / PV cell manufacturing.
- Investments and financial support: e.g., Indian Renewable Energy Development Agency (IREDA) significantly increased loans, disbursements for RE projects.
- Incentives / regulatory steps: states like Tamil Nadaim to add 10,000 MW solar + 2,000 MW wind over next 5 years.

3. Circular Economy and Waste Management: India is advancing towards a circular economy through the adoption of comprehensive waste management policies, particularly targeting single-use plastics.

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This regulatory momentum is further supported by an increased emphasis on waste-to-energy initiatives and notable growth in the recycling and utilization of hazardous waste.

Currently, India is developing the Bandhwadi facility in Gurugram, which, upon completion, will be the nation's largest

- Green Finance and Innovation:India has established itself as an attractive destination for green finance and is actively promoting innovation in sustainable technologies

oThe government has liberalized its foreign direct investment (FDI) policy, allowing100% FDI under the automatic route for the renewable energy sector,attracting billions in investments

oNearly$12.67 billionhas been received as foreign direct investment (FDI) in the renewable energy sector (as of March, 2025),

This financial and policy support has also catalysed the development of cutting-edge technologies like green hydrogen, with theNational Green Hydrogen Missionsetting a target of5 million tonnesof production by 2030.

oIndia is also expected tooperationalise the India Carbon Market by 2026under which13 major sectorswill be given mandatory emission-intensity targets

4. Other Sustainable Practices & Initiatives

- Water conservation: Bidar district won “Jal Sanchay Jan Bhagidari Award” under the “Jal Shakti Abhiyan: Catch the Rain” campaign for community-based water conservation (check dams, gabion, rejuvenation of traditional systems etc.).
- Mangrove conservation: In Tamil Nadu, with support from World Bank, project to restore degraded mangrove areas (700 ha) + plant new saplings in 300 ha, establishing Village Mangrove Councils for local community participation.

Challenges for India’s Green Growth

1. High Dependence on Coal

- Coal still contributes over **70% of electricity generation**, despite renewables’ rising share in installed capacity.
- New coal plants are still being approved to meet short-term energy demand, creating a lock-in effect.
- Example: India’s power demand hit record highs in 2024–25 due to heatwaves, pushing coal plants to run at peak levels.

2. Energy Storage & Grid Integration Issues

- Solar and wind are intermittent; without adequate **Battery Energy Storage Systems (BESS)** or pumped hydro, grid stability is at risk.
- India’s transmission infrastructure lags behind RE growth ? delays in evacuating power.
- Example: In FY25, despite adding record 25 GW renewable capacity, many projects faced curtailment due to lack of evacuation lines.

3. Financing Gaps

- Transition to green economy needs **hundreds of billions of dollars annually** till 2030.
- India faces challenges in securing low-cost climate finance, green bonds, and foreign investment due to risk perception.
- Example: Climate Policy Initiative (CPI) 2024 estimated India needs ~$170 billion annually to meet its climate goals, but actual flows are <25% of this.

4. Land Acquisition & Social Conflicts

- Large solar/wind projects require vast tracts of land, often in ecologically sensitive or agricultural areas.
- This leads to local protests, displacement issues, and litigation.
- Example: Farmers in Rajasthan and Gujarat have resisted land acquisition for solar parks, citing grazing land loss.

5. Industrial Transition Difficulties

- Hard-to-abate sectors (steel, cement, fertilizers, petrochemicals) are slow to adopt green hydrogen or carbon capture.
- Costs are high and infrastructure (pipelines, storage, refueling) is missing.
- Example: National Green Hydrogen Mission (2023) is ambitious, but adoption is limited to pilot projects.

6. Transport & Urban Emissions

- EV adoption is rising but still under **2% of total vehicle stock**.
- Charging infrastructure is uneven, and battery recycling ecosystem is weak.
- Rapid urbanization adds to emissions through construction, congestion, and air pollution.

7. Agriculture & Water Stress

- Agriculture contributes ~18% of India's GHG emissions, mainly from methane (livestock, rice paddies) and nitrous oxide (fertilizers).
- Over-extraction of groundwater and unsustainable irrigation practices worsen the climate–water nexus.
- Example: Punjab and Haryana's stubble burning crisis continues to cause severe winter pollution in Delhi NCR.

8. Waste Management & Circular Economy Deficit

- India generates **~62 million tonnes of municipal solid waste annually**, but only ~30% is treated scientifically.
- Plastic and e-waste recycling rates remain low; informal sector dominates without safety/environment safeguards.

9. Institutional & Policy Gaps

- Policies are ambitious but fragmented across ministries ? coordination challenges.
- Implementation at the state/local level is weak due to capacity and funding issues.
- Example: Many state-level climate action plans are outdated and lack proper monitoring frameworks.

10. Climate Vulnerability & Adaptation Burden

- India faces extreme weather: heatwaves, floods, cyclones, droughts ? divert resources to disaster relief instead of long-term green growth.
- Example: 2024 saw record heatwaves across north India, pushing energy demand and worsening water stress.

Strategies for Advancing Green Growth & Sustainability

1. Accelerating Renewable Energy Transition

- Prioritize solar, wind, and offshore wind projects with stronger transmission infrastructure.
- Example: In 2025, Tamil Nadannounced plans to expand solar and wind capacity significantly to meet local demand sustainably.

2. Strengthening Energy Storage & Grid Modernization

- Scale up Battery Energy Storage Systems (BESS) and pumped hydro to balance intermittent supply.
- Example: Pilot solar-BESS projects in Gujarat and Rajasthan are being expanded to ensure round-the-clock clean power.

3. Mobilizing Green Finance

- Attract low-cost global climate funds, strengthen sovereign green bonds, and incentivize private investment.
- Example: India's 2024 issuance of sovereign green bonds was oversubscribed, showing rising investor confidence.

4. Promoting Green Hydrogen & Industrial Decarbonization

- Push adoption in steel, cement, and fertilizer sectors under the **National Green Hydrogen Mission**.
- Example: Public-sector steel plants in Odisha and Jharkhand began pilot green hydrogen blending in 2025.

5. Sustainable Urbanization & Mobility

- Expand EV adoption, strengthen charging infrastructure, and promote mass rapid transit.
- Example: Delhi Metro added solar-powered stations and EV-charging hubs in 2025 to cut urban transport emissions.

6. Circular Economy & Waste Management

- Scale up formal recycling systems, plastic alternatives, and bio-CNG plants.
- Example: The **Swachh Shehar Jodi programme (2025)** linked 200 cities in mentorship partnerships to improve solid waste management.

7. Water Security & Climate-Smart Agriculture

- Encourage micro-irrigation, crop diversification, and precision farming to conserve resources.
- Example: Bidar district, Karnataka, won a national award in 2025 for community-driven water conservation under *Jal Shakti Abhiyan*.

8. Nature-Based Solutions & Biodiversity Conservation

- Restore degraded ecosystems, protect mangroves, and integrate local communities in conservation.
- Example: Tamil Nadu, with World Bank support in 2025, launched a large-scale mangrove restoration project with village councils.

9. Institutional Coherence & Governance Reforms

- Create stronger inter-ministerial coordination on climate policy, link national missions with updated state action plans.
- Example: The government in 2025 initiated an integrated "National Green Transition Council" to monitor cross-sectoral policies.

10. Building Climate Resilience

- Mainstream disaster risk reduction, heatwave action plans, and resilient infrastructure.
- Example: After severe 2024 heatwaves, states like Maharashtra and Rajasthan rolled out expanded heat-action plans with early-warning systems.

Conclusion:

India’s pursuit of green growth is not just an environmental imperative but also an economic opportunity to ensure energy security, job creation, and resilience against climate shocks. By embedding sustainability in energy, industry, agriculture, and urban planning, and by fostering innovation, finance, and community participation, India can transform its development trajectory into one that is inclusive, resilient, and globally responsible. The coming decade will be decisive in determining whether India becomes a model of sustainable growth for the Global South.