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Kishor Kumar Hira
Senior Graphic Instructor,
Department of Journalism and
Mass Communication,
Swami Vivekananda
University, West Bengal, India

Integrating green economy principles for sustainable growth

Kishor Kumar Hira

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Abstract

The transition to a green economy, combined with the circular economy and the bioeconomy, has gained entry into policy debates, scientific research, and business discourse as parallel ways to respond to sustainable development. The narratives provide complementary means of addressing economic, social, and ecological objectives, but none on its own provides the complete solution. We examine, through the Framework for Strategic Sustainable Development, the integrated potential of such narratives to address a sustainable future. For India, the challenges are daunting. In particular, a rise in temperatures threatens to unseat economic stability and ecological balance. Given that cities account for about 60 percent of global greenhouse gas emissions, they tend to be one of the leading causes of climate change. It is in this backdrop that the latest commitment by the government to achieve a \$5 trillion economy makes strategic policy intervention important to foster climate-proofed and resilient development. Finally, integrating green growth strategies will help further in managing disaster risks, enabling sustainable urbanization, and building climate resilience. Besides, innovative methods such as blue-green infrastructure have the added advantage of responding to the consequences of rapid urbanization in a manner that makes certain towns plan sustainably. Public and private investment in green infrastructure, low-carbon technology, and resource-efficient approaches is required for meeting the SDGs for India. The chapter has underlined the need for holistic, system-wide approaches to sustainability, thus giving prominence to the role of integrated green economy principles in shaping the contours of resilient and inclusive development within which lies the future of India. The green economy narrative synthesized here forms a valuable frame against which policymakers, businesses, and scholars develop sustainable development efforts in the post-COVID-19 period as India seeks to balance economic ambition with environmental imperatives.

Keywords: Climate resilience, bioeconomy, green economy, biodiversity, environmental sustainability

Introduction

Integrating Green Economy Principles for Sustainable Growth. The transition toward a green economy is a shift in the integration between growth of the economy and environmental stewardship. It is set to promote development for sustainable development to enhance economic growth at the same time reducing adverse environmental impacts through sustainable distribution of its benefits. Resource efficiency, low-carbon technologies, and sustainable practices try to combine advancement for economics with preservation for ecology. Integrate the green economy with the circular economy and the bioeconomy to resolve complex questions of global sustainability. Each of these paradigms might offer unique solutions to the various issues of sustainability:

Circular economy

This model depends on the continuum reuse of resources through such practices as recycling, reuse, and reduction in waste. The new model is a direct antithesis of the traditional 'take-make-dispose' mindset of the linear economy. By means of closed loops in product lifecycles, this model reduces waste, thus mitigating its impact on the environment, whereas transforming wastes into resources and designing products for extended life forms the basis of the circular economy model that supports more sustainable consumption and production.

Bioeconomy

This is production from renewable biological resources of food, energy, and materials. The issue has a focus that reduces dependence on fossil fuel through the use of biological processes and resources and which promotes environmental sustainability. Sustainable agriculture, bioenergy, and bio products because it favors economic growth and environmental protection.

Corresponding Author:
Kishor Kumar Hira
Senior Graphic Instructor,
Department of Journalism and
Mass Communication,
Swami Vivekananda
University, West Bengal, India

It integrates these economic models towards a holistic approach to sustainable growth, synergies from the principles of the green economy, practices of the circular economy, and innovations in the bioeconomy all of which not only answer several aspects of sustainability in terms of resource efficiency, waste management, and renewable resource use but also reduce environmental impacts while promoting resilient and inclusive economic growth. As the world begins to steadily rise to the challenge of promoting economic growth and responding to the issues of the environment, it is considering taking on a holistic framework containing the two approaches. Such integration would give a solid basis for attaining long-term sustainability as well as be indifferent and resilient about the future.

Challenges to India's Sustainable Development

India is unique in its socio-economic and environmental scenario, which poses a challenge to attaining sustainable development. This scenario is going to face increased challenges with a rapid pace of economic growth, significant urbanization, and increasing temperatures.

Climatic Impact: Increased Temperatures

The greatest challenge for India arises from increased temperatures caused by climate change. This diversified climate has led India to face more enhanced heat waves, and rain patterns are changing in the country. The associated weather conditions put a threat to the farm productivity, increases water shortages, and affects health issues. The most vulnerable groups affected by the temperature increase scenarios, according to estimates, include those staying in the rural and slum cities of the country.

Climate change poses quite serious implications for agriculture in terms of the fluctuation of monsoon patterns, which may have serious impacts on crop yields and food security. Again, this has serious implications for economic stability and livelihoods, particularly where agriculture remains the major sector for regional and local economies. Urbanization and Economic Growth Ambitions Urbanization is yet another factor that impacts disaster risk reduction by increasing urban economic growth ambitions. At a time when cities are considered to be the engines of economic growth, high levels of urbanization require critical attention to disaster risk reduction efforts. Rapid urbanization is another significant challenge that India is facing. More than 60% of the world's population would be urbanized by 2050. In such a scenario, the cities in India are growing at a very high rate. Such growth always requires more and more water, energy, and land resources. Again, urban areas are significant pollution generators, and cities alone account for nearly 60% of global greenhouse gas emissions. As big industrial and pollution sources in their cities, it also means sources of untearable air and water pollution. Infrastructure and services under strain often result in inadequate waste management, housing shortages, and transportation problems.

Added to the tremendous leapfrogging economic development that India seeks for itself is the challenge of urbanization. It seeks to become a \$5 trillion economy, which calls for speedy industrialization, infrastructure development, and fuel intake. Among them, it is the challenge of how to reconcile growth aspirations with environmental sustainability. Reducing carbon emissions,

energizing their use, and green infrastructure are aligned with prospects in push for economic development.

Cities in Climate Strategy

Cities form the core of India's climate strategy, accounting for a large percentage of the greenhouse gas emissions. Urban areas are therefore integral in efforts to mitigate and adapt to climate change. A sustainable urbanization strategy must be about reducing emissions, improving energy efficiency, and making the city resilient to the impacts of climate change. Overcoming these groups of challenges will call for India to embrace an integrated approach—conceptualized through principles of green economy, adoption of circular economy, and bioeconomy innovations. More fundamentally, this means sustainable urban planning; the development of green infrastructure; and resource-efficient technologies. In addition, it improves public transportation systems, carries out waste management programs, and enforces the creation of green spaces for improved sustainable urban conditions.

Commitment to a \$5-trillion economy requires strategic policy intervention in the direction of sustainable growth and must pay heed to both economic and environmental objectives. Sustainable development should ensure resilience in terms of impacts of climate elements, and at the same time, accelerate growth towards long-term sustainability. Increasing temperature, rapid urbanization, and aggressive targets for economic growth form challenges in India's sustainability journey. Therefore, these issues require a holistic approach wherein sustainability is woven into some of the economic planning, urban development, and climate strategies. Alignment between growth ambitions and environmental stewardship could become the foundation upon which to build a much more resilient and sustainable future for India.

Green Growth Strategies and Urbanization

India is experiencing rapid urbanization coupled with an increase in climate-related disaster risks. Therefore, there is a need to have the ability to integrate green growth strategies into that mission so that their endeavors related to disaster risk reduction may help foster sustainable urban development. In fact, green growth strategies, where environmental sustainability can be as equally significant as economic growth, can become very useful tools to address disaster risks and to encourage more resilient urbanization.

Green Growth Strategies to Address Disaster Risks

This includes resilience enhancement in the environmental system while at the same time improving resource efficiency, and these are essential for managing disaster risks. In India, where extreme weather occurrences are growing in frequency and intensity, amongst others, green growth strategies assume an important role in disaster risk reduction and adaptation. Ecosystem-Based Approaches: Natural Ecosystems for Buffers against Environmental Hazards: One of the foundational bits of green growth is using natural ecosystems as buffers to environmental hazards. For instance, maintaining and restoring wetlands, mangroves, and forests can actually allow for natural flooding while also helping cushion the impact of storm surges. Such ecosystems are natural barriers that reduce flood magnification with attendant erosion along the coasts and yield room for biodiversity.

This primarily involves developing climate-resilient infrastructure, which means that buildings, facilities, and any kind of construction have a resilience to withstand such situations—they would not easily collapse due to extreme heat, heavy rainfall, or high wind speeds. Sustainable building materials and energy-efficient designs reduce the susceptibility of urban infrastructure to climate effects. **Integrated Disaster Management:** This aspect of disaster management needs a holistic approach incorporating the principles of green growth. It should have mainstreaming risk assessment and mitigation strategies in the urban planning processes, developing early warning systems, and enhancing community preparedness since people are well prepared to face future events. Therefore, connecting the efforts of disaster management with the sustainability objectives creates enabling conditions for cities to deal better with risks as well as be equipped with enhanced resilience capabilities to develop preparedness against bigger future events.

Facilitating Sustainable Urbanization

Green growth strategies also facilitate sustainable urbanization, they promote resource efficiency and reduction of environmental impacts while enhancing quality of life in an urban area. In a country like India, where cities are quickly experiencing the effects of urbanization, such a green growth strategy has to be automatically incorporated to establish livable, resilient, and environmentally friendly urban spaces. **Energy Efficiency and Renewable Energy** Green urbanization promotes energy-efficient buildings and investments in renewable energy sources. This works when cities cut down on carbon footprint levels and save on the cost by conserving energy as measures of energy-saving efforts that lead to cutting reliance on renewable sources of energy. This is further augmented by green building standards through certification, such as the LEED.

Leadership in Energy and Environmental Design

Transportation Building sustainable transportation systems is one of the indispensable measures that can better help reduce emissions and alleviate congestion in cities. Investment in public transport, cycling, and pedestrian-friendly pathways reduces reliance on private vehicles to encourage more sustainable modes of transport. Introducing electric vehicles and alternative fuels into transportation infrastructures will support cleaner and more efficient urban mobility.

Waste Management and Circular Economy

Effective waste management is necessary for sustainable urbanization. Strategies for green growth recommend strong integrated systems for comprehensive waste management that favors more recycling and composting while reducing the production of waste. Circular economy practices in urban planning incorporate a more efficient use of resources and reduce waste, thereby making an environment urban area more livable.

Innovative Approaches: Blue-Green Infrastructure

Blue-green infrastructure addresses the urbanisation challenge in a sustainable manner by linking both the natural and built environments. It integrates green spaces, such as parks and green roofs with water management systems and wetlands, which makes it possible to create

ecological and social benefits. Blue-green infrastructure Flood Management and Water Conservation Blue-green infrastructure helps address the challenge of urban flooding by incorporating permeable surfaces, green roofs, and rain gardens that absorb storm water and further manage it as it travels upstream. These reduce the runoff rates, mitigate instances of floods, and enhance the quality of water. Incorporating of water conservation measures in designing urbanities strengthens sound water utilization and reduces stress on municipal water supplies.

Improving Urban Livability

Blue-green infrastructure enhances the livability of a city by developing "green spaces" that encourage physical and social recreational activities, clean air, and natural cooling. They hence enhance the personal well-being of residents and support biodiversity within urban ecosystems.

Climate adaptation

Blue-green infrastructure within the planning of cities acts to adapt better to climate change. Green spaces and natural systems protect the city against extreme weather events of heat waves and heavy rainfall, while supporting long-term adaptation to climate conditions.

The effective solution in green growth strategies helps the management of disaster risks and permits sustainable urbanization in India. By incorporating ecosystem approaches, climate-resilient infrastructure, and innovative blue-green infrastructure, this endeavor allows cities to face challenges related to rapid urbanization in an environmentally sustainable and resilient manner. Thus, urban planning and urban development solutions shall integrate these strategies.

The Role of Green Economy in the Post-COVID Era

The COVID-19 pandemic has underscored the need for a resilient and sustainable economic model that balances economic ambition with environmental imperatives. In the post-COVID era, the green economy narrative emerges as a critical framework for guiding sustainable development and addressing the multifaceted challenges that India faces. This framework not only responds to the immediate impacts of the pandemic but also sets the stage for long-term economic and environmental resilience.

Green Economy as a Framework for Post-COVID Sustainable Development

The green economy concept, which prioritizes reducing environmental impacts while fostering economic growth and social inclusion, aligns well with the lessons learned from the COVID-19 crisis. The pandemic has highlighted the interconnectedness of global health, economic stability, and environmental sustainability. In this context, the green economy offers a comprehensive approach to rebuilding economies in a way that promotes long-term resilience and sustainability.

Stimulating Green Recovery

As India navigates its economic recovery from the pandemic, the green economy provides a pathway to stimulate growth while addressing environmental concerns. Investments in green infrastructure, renewable energy, and sustainable industries can create jobs, drive economic growth, and reduce greenhouse gas emissions. This

approach not only supports immediate recovery efforts but also lays the groundwork for a more sustainable and resilient economy.

Enhancing Public Health and Resilience

The green economy emphasizes the importance of environmental health in supporting public well-being. By promoting cleaner air, water, and green spaces, green growth strategies contribute to improved public health outcomes. Additionally, enhancing the resilience of infrastructure and communities through green practices helps mitigate the impacts of future crises, including pandemics and climate-related disasters.

Encouraging Sustainable Consumption and Production

The pandemic has accelerated shifts towards digitalization and changes in consumer behavior. The green economy encourages sustainable consumption and production patterns that align with these shifts. By promoting circular economy principles, resource efficiency, and sustainable supply chains, India can support a transition to more sustainable economic practices that reduce waste and environmental impact.

Balancing Economic Ambition and Environmental Imperatives

India's ambitious economic goals, including its target to become a \$5 trillion economy, must be balanced with environmental considerations to ensure sustainable development. The green economy narrative offers a framework for achieving this balance, guiding policy and investment decisions in a way that aligns economic growth with environmental stewardship.

Integrating Green Growth into Economic Planning

To achieve economic ambition while addressing environmental imperatives, India needs to integrate green growth principles into national and regional economic planning. This involves setting clear sustainability targets, implementing policies that support green innovation, and promoting investments in low-carbon technologies and green infrastructure. By aligning economic policies with environmental goals, India can ensure that growth is achieved in a sustainable manner.

Promoting Sustainable Urbanization

As urbanization accelerates, integrating green growth strategies into urban planning is crucial for managing environmental impacts and enhancing livability. Investments in sustainable transportation, green buildings, and waste management systems can reduce the environmental footprint of urban areas while improving quality of life for residents. Additionally, adopting blue-green infrastructure approaches can address urban flooding, enhance resilience, and provide multifunctional benefits.

Fostering Innovation and Inclusivity

The transition to a green economy requires fostering innovation and inclusivity. Supporting research and development in green technologies, promoting entrepreneurship in sustainable industries, and ensuring equitable access to green jobs and resources are essential for achieving both economic and environmental goals. By prioritizing innovation and inclusivity, India can drive

economic growth while ensuring that benefits are widely shared and environmental impacts are minimized.

The green economy narrative provides a vital framework for shaping India's post-COVID sustainable development. By integrating green growth principles into economic planning, urbanization, and innovation, India can achieve a balance between economic ambition and environmental imperatives. This approach not only supports recovery from the pandemic but also lays the foundation for a resilient, inclusive, and sustainable future. Embracing the green economy offers a path to rebuilding economies in a way that addresses the urgent environmental challenges of our time while promoting long-term prosperity and well-being.

Conclusion

It is, therefore, of prime importance that India formulates convergent green growth strategies so as to ensure a resilient and more inclusive future. The COVID-19 pandemic has really made evident the essential convergence of the pursuit of economic ambitions with environmental imperatives. In the path of recovery and growth, green growth strategies can thus give direction to the country as it grapples with some even greater challenges posed by issues such as climate change, urbanization, and economic development. It involves what is termed green growth strategies in adopting sustainable practices within sectors of energy, infrastructure, and urban planning. Prioritization on the part of investments in green infrastructure, renewable energy, and circular economy principles would likely send India down a route to rapid economic growth without inflated environmental impact. Not only does this approach stand for immediate recovery but it also bears with long term resilience from future crises. Increasingly, urbanization contributes to the effects of environmental degradation and, therefore, requires a shift toward sustainable practices. Green growth strategies in urban planning through investment in sustainable transportation, green buildings, and blue-green infrastructure will reduce the environmental footprint of cities, enhance livability, and build resilience to climate impacts. Crucially, innovative and inclusive strategies in green technologies and practices are necessary for equitably framed development. Supporting research, green entrepreneurship and access to sustainable resources and employment will ensure that growth brings such benefits in the context of removing social inequalities. That is to say, India needs to green its development strategy to balance ambitions for growth and environmental stewardship: outlay a new future that will be more sustainable, more resilient, and more inclusive-growth that is environmentally sound and broadly beneficial. This holistic approach will not only enhance India's recovery from the pandemic but also assure long-term prosperity and well-being to all its citizens.

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