

Investigating the Nexus Between Sustainability and Economic Development in India

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ABSTRACT

This paper uses qualitative analysis through the use of graphs and data from the past 100 years to discuss relevant economic indicators and sustainability metrics. The aim of this research paper is to investigate the nexus between sustainability and economic development in India. Since the Industrial Revolution, carbon emissions have increased dramatically due to industrialization. Aiming for net-zero emissions are about 140 nations, including the US, China, India, and a large portion of the EU. By promoting deforestation, changes in land use, and energy consumption—all of which fuel climate change—urbanization makes sustainability issues worse. Socioeconomic inequality, institutional inefficiencies, and resource limitations present further challenges for India in striking a balance between sustainability and economic growth. Additionally, especially in rural and underserved communities, these problems impede fair access to basic resources like sanitary facilities and clean drinking water. Furthermore, This research shows that globalization, socioeconomic inequality, and institutional impediments make it difficult for India to strike a balance between environmental sustainability and economic growth. Investing in renewable energy, environmentally friendly transportation, and inclusive, region-specific regulations are some solutions. Stakeholder cooperation and targeted rural investments are essential. In order to strengthen sustainability initiatives, the report highlights research shortages in rural, tribal, and informal economies and promotes AI, IoT, and local studies. By examining India's economic growth in light of the SDGs, combining economic and environmental data, bringing attention to regional issues, and stressing the importance of ICT and clean energy, the study enhances the body of knowledge on sustainability. In growing economies like India, its cross-disciplinary methodology and empirical findings provide practical policy recommendations for striking a balance between environmental protection and rapid development.

KEYWORDS

Sustainability, Economic Development, Environmental Sustainability, India

I. INTRODUCTION

Sustainability is the ability to meet current needs while ensuring that future generations can meet theirs, incorporating a delicate balance among environmental, social, and economic systems. Economic development, on the other hand, refers to the improvement of life standards and long-term gain in terms of income, education, and infrastructure. (Moore, J.E., *et al*, 2017) There is a close connection between these two concepts because economic development is generally based on several ways of using resources that may influence the environment or create inequality. Sustainable development intersects these two by making sure that growth doesn't diminish resources, impair ecosystems, or leave some people behind. In fact, investing in renewable energy or resilient infrastructure might stimulate economic growth in a way that preserves the earth. Great examples of how these ideas work together include the UN's Sustainable Development Goals (SDGs), United Nations. (n.d.). which bring together concerns like poverty, clean energy, and equality for a better world in Favor of all. Brundtland Commission. (1987). World Bank. (2024). The development of sustainability indicators, both local and global as shown in figure 1 and 2, has received significant attention in recent years, especially as climate change and global warming escalate at an alarming rate.

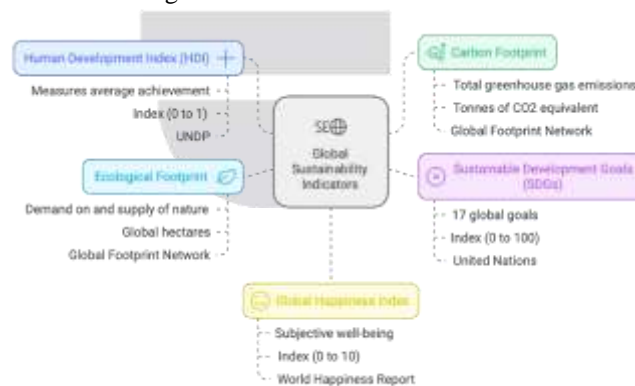


Figure 1. Global Sustainability Indicators

Industrial carbon emissions as shown in figure 3 account for approximately 24% of global emissions and for about 34% when including emissions in electricity and heat generation. High contributors include cement, steel, and chemicals, each of which heavily relies on energy-intensive processes and the use of fossil fuels. Industrial processes, such as waste treatment and material extraction, also release significant Greenhouse Gasses. However, one of the slowest sectors to decrease carbon emissions is the industrial sector, as its production is based on fundamental materials and high-temperature processes. Cement alone accounts for roughly 7% of CO₂ produced globally, resulting from limestone being turned into lime. Steel production also poses a great carbon impact, steel extracted from ore is nearly double the carbon contribution of recycled steel. (Zheng, X., et al. (2023).) (Huang, L., et al. (2018).)

(Environmental Protection Agency (EPA) 2019.). Efforts to reduce emissions includes switching to better energy sources, like hydrogen-based steelmaking; increasing metal and material recycling rates; and using circular economy ideas. Emissions may be brought down significantly by efficient use of materials and the making electric of industrial processes. (Huang, L., et al. 2018.)

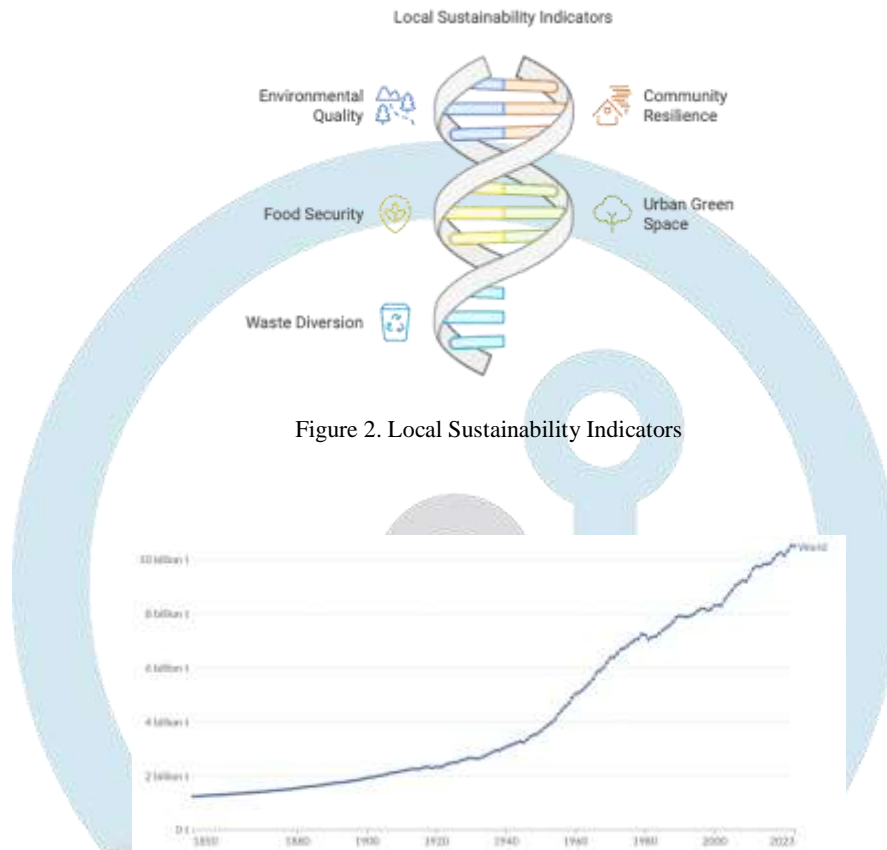


Figure 2. Local Sustainability Indicators

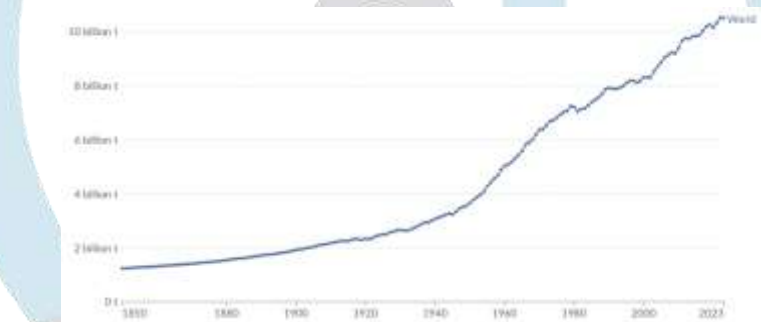


Figure 3: Carbon emissions since 1850. Adopted from: (Hannah Ritchie, et al, 2020)

This paper involves the literature review, research objectives, research framework, future direction for research and the conclusion by highlighting the essential findings and the future scope of this study. **

II. LITERATURE REVIEW

A. Background

Industrialization has contributed massively to carbon emission increase since the Industrial Revolution as the transition of Industries 1.0-5.0 has been mixed in terms of environmental impacts, while the coal-based historical approaches and less-efficient technologies have promoted emissions, the new industrial formats with Industry 5.0 underpin sustainability based on innovation and policy integration (Davis et al., 2018) (dos Santos Gaspar, 2017). Addressing these challenges requires concerted global efforts in adopting green industrial practices and mitigating the socio-environmental consequences of economic development. (NITI Aayog, 2018). The rising levels of CO₂ since the industrial revolution had made sustainability an urgent global call for action to tackle this climate crisis. Since then, rising CO₂ has been one of the hot global issues after the industrialization era. (Davis, et al., 2018). The issue of rising CO₂ has emerged as critical for countries and organizations around the world. It has also become a fundamental part of the United Nations' Sustainable Development Goals and is often featured in international conferences. They included the likes of Apple, Microsoft, and Google promising to maintain carbon-neutral operations while using innovative, sustainable modes of production in an endeavour to meet some of the Sustainable Development Goals, especially those that relate to Affordable and Clean Energy (SDG 7), Responsible Consumption and Production (SDG 12), Climate Action (SDG 13), and Industry, Innovation, and Infrastructure (SDG 9). Likewise, around 140 countries, such as the United States, China, India, and most of the European Union, have committed to achieving net-zero emission goals. These countries, together, represent 88% of the world's emissions, mainly due to the urbanization and high population density in large cities. (United Nations, 2023) (Davis, et al., 2018).

| References | Research Focus | Key Sustainability Indicators | Key Economic Indicators | Advantages | Disadvantages |
|------------|--|---|---|---|--|
| 5- | Analyze the corporate social responsibility (CSR) and sustainability reporting (SR) practices of Indian companies | Economic, Government ethics, Environment | Firm-size has positive correlation with both sustainability reporting quantity and quality, while profitability has insignificant correlation with sustainability reporting. | Does not mention advantages and disadvantages | Does not mention advantages and disadvantages |
| 7- | Investigate the relationship between green innovation (GI), economic growth (GDP), the drama and film (D&F) industry, and environmental sustainability in India | GI, (GDP), drama and film (D&F) industry, and their impacts on environmental sustainability | Green innovation (GI), economic growth (GDP), and the drama and film (D&F) industry | Examines the impact of GI, (GDP), and drama and film industry (D&F) on environmental sustainability in India | The industry's ecological footprint includes waste materials and high energy consumption, leading to greenhouse gas emissions |
| 12- | Electricity consumption was found to have a positive and statistically significant impact on per capita carbon dioxide emissions in the long run. | Per capita CO2 emissions, GDP and Electricity consumption | 1. Per capita CO2 emissions (metric tons per capita) 2. GDP per capita (constant 2010 US\$) 3. Electric power consumption (kWh per capita) | PMG estimator has several advantages over the FMOLS estimator, including the ability to estimate coefficients in the short-run. | 1)Pricing and cost savings aspects of electricity and energy consumption were not considered 2)Efficiency of electricity and energy use not analyzed in depth 3)Doesn't compare the developing countries to developed regions to identify best practices |
| 14- | Evaluate the impacts of environmental regulations and other key macroeconomic aggregates on the ecological footprints in Bangladesh, India, Pakistan, and Sri Lanka. | ecological footprint (EF) and its components. | 1)Fossil fuel dependency for economic growth 2)Low share of renewable electricity in total electricity output 3)Energy shortages and high energy demand 4)Need for regional cooperation and cross-border renewable energy trade 5)High levels of fossil fuel-based CO2 emissions, especially in India, Bangladesh, and Pakistan | 1)Impact of environmental regulations on environmental quality in South Asia 2) Evaluates the Environmental Kuznets Curve hypothesis using ecological footprint data, which provides a more comprehensive measure of environmental quality compared to just using CO2 emissions. | Data availability limited the study to only considering fossil fuel-dependent South Asian nations |
| 17- | Impact of (CSR) environmental and supplier sustainability practices on firm performance within the manufacturing industry in India, and to investigate the moderating effect of plant capability on this relationship. | 1) Environmental sustainability 2) Supplier sustainability | Following performance measures used: percentage change in profitability, percentage change in market share, and percentage change in sales. | 1)Contextualized understanding of CSR and sustainability issues in an emerging market 2)Combining institutional and strategic perspectives3)Importance of cross-national differences in corporate governance and societal expectations for CSR activities. | 1)Small sample size -self-serving bias in the Likert-scale survey instrument 2)Suggestion for future studies to directly question senior managers on their motivations for implementing sustainability practices3)Suggestion for a multi-country study to provide more contextually embedded interpretations |
| 18- | To examine the effects of globalization, financial development, economic growth, and energy consumption on environmental sustainability, specifically carbon dioxide emissions, in India over the period 1980-2015. | Carbon dioxide emissions - Globalization - Financial development (including aggregate financial development index and banking sector development) - Economic growth - Energy consumption - Urbanization | 1. Globalization 2. Financial development 3. Economic growth 4. Energy consumption per capita | 1)Can be applied regardless of whether the variables are I(0), I(1), or a mix of the two 2)Can capture the data generating process well by using appropriate number of lags 3)OLS estimators are consistent 4)Rules out the possibility of endogeneity by ensuring no residual correlation. | 1)Single-country focus 2)Potential bias and misleading findings from using a single indicator for financial development |

| | | | | | |
|------|--|--|--|--|---|
| 3-- | Impact of CO2 emissions, energy utilization, trade liberalization, and urbanization on the economic performance (GDP) of India | GDP | Economic performance | Exploring the connections between economic performance, energy use, emissions, trade openness, and population in India | Time period covered is limited, only from 1975 to 2017, which may not reflect the most current performance of the Indian economy and environment. |
| 4-- | Relationship between financial development, institutional quality, and green economic growth in South Asian countries | Education expenditure, GDP | GDP, education expenditure, monetary value of depleted minerals, monetary value of forest depletion, and monetary value of carbon dioxide emissions | Investigates the role of financial development and institutional quality in green economic growth | NOT GIVEN |
| 13-- | To conduct a systematic review on the nexus between Renewable Energy, Economic Growth, and Economic Development. | does not talk about sustainability indicators | Economic growth, economic development, renewable energy consumption, non-renewable energy consumption, CO2 emissions, GDP, foreign direct investment (FDI), trade openness, financial market development, and macroeconomic factors. | 1) Greater coverage and multidisciplinary content 2) Inclusion of peer-reviewed and open access articles 3) Tools to find authors 4) Wider catalog of scientific and technological journals 5) Automatic generation of h-index 6) More content published in Europe compared to WoS | 1) Effects observed may differ between economies 2) Metrics used to quantify the impact of articles, journals, and authors limited 3) Sample limited to the Scopus database 4) Sampling period was limited to only the first 5 months of 2021 |
| 15-- | To examine the dynamic linkages between energy security, economic growth, environmental sustainability, foreign direct investment (FDI), and trade openness in India. | Energy use, carbon emissions, and economic growth. | Energy use (kg oil equivalent (kgoe)), real GDP (constant 2010, U.S Dollar), carbon emissions (metric tons) per capita, FDI (net inflows, current US dollars), and trade openness (sum of exports and imports). | 1) Can be used with variables that have mixed orders of integration (i.e. some I(0) and some I(1)). 2) Efficient estimator even with small sample sizes or endogenous regressors 3) Allows variables to have different optimal lag lengths. | 1) Limited in scope, as it does not examine the relationship between all the variables in a multivariate framework for India specifically 2) Findings may be limited to the Indian context |
| 16 | The research focus of this paper is to examine the short-run and long-run dynamics between economic growth, financial inclusion initiatives, and ICT infrastructure development in 20 Indian states over the period from 1991 to 2018. | does not talk about sustainability indicators | 1. Percentage change in real per capita state domestic product (PSDP) to measure economic growth 2. ICT infrastructure variables: telephone landlines (TELE), mobile phone penetration (MOBP), and internet users (INTE) 3. Financial inclusion variables: banking branch density (BBDE), banking branch penetration (BBPE), loan account penetration (LAPE), and deposit account penetration (DAPE) | 1) It provides insights into the dynamics between ICT, financial inclusion, and economic growth in a major developing economy (India). 2) The findings can serve as a blueprint for other developing countries to leverage financial inclusion and ICT development to address economic inequality. 3) The study highlights the need for an integrated policy framework that leverages the interrelationships between economic growth, financial inclusion, and ICT infrastructure for sustainable development. | .Limitations of the PCA method used to construct the composite indices - Need for an integrated policy framework to address the endogenous relationships between economic growth, financial inclusion, and ICT infrastructure - Need for partnerships between government and stakeholders to implement co-development policies to promote digital financial systems and economic growth |

The table above shows us the key sustainability and economic indicators in many past research papers, where the research focus is marginally different in each paper. The advantages of each paper indicate what each paper is highlighting, and the disadvantages indicate research gaps seen in each paper.

B. Challenges achieving sustainability

The challenges of achieving sustainability are compounded by the pressure of urbanization, which mainly contributes to climate change by deforestation, land use changes, and energy use. For example, high demand for household appliances like air conditioners and heaters lead to the emission of harmful greenhouse gases that have damaged the ozone layer, thereby aggravating the climate situation. Industrial growth in developing countries, including India, has, to a great extent, depended on outmoded and dirty technologies, which has further hindered sustainable development. (dos Santos Gaspar, J., 2017). The development of sustainability indicators, both local and global as shown in figure 1 and 2, has received significant attention in recent years. However, for most countries these indicators are not the first priority, and are often influenced by political agendas and biases, which do often lead to prioritisation of certain metrics over others that provide comprehensive views on sustainability. For example, Afghanistan, which once worked towards certain SDGs including 'quality education', 'good health and wellbeing', and 'gender equality' however due to the Taliban's return to power it has undermined efforts to achieve goals such as gender equality, education, and economic development. Other countries for example Syria and more recently Ukraine once actively worked towards sustainable development, however, now no longer do so. (developing economies (Wang, Q., et al. (2020).)

However, better environmental policies and technological advancements are driving a shift toward cleaner, more efficient practices. Initiatives like India's Metro and Coastal Road projects reflect the effort to balance economic growth with environmental conservation. Developing renewable energy sources such as solar, wind, hydroelectric power, and biomass is also gaining momentum. Notably, as of 2022, India was the world's third-largest producer of non-fossil fuel energy, with 43.0% of its electricity generated from renewable sources, including 11.2% from hydroelectric power and 16.1% from solar energy (Ministry of Power, Government of India, 2023). (Al-Qudah, et. al (2022).) (Salahuddin, et al. (2019).) Despite these advancements, the lack of a universally accepted definition of sustainable development continues to challenge policymakers and researchers. Sustainable development is often defined as achieving higher economic benefits while improving ecological performance, which includes reduced resource consumption, increased energy efficiency, and decreased environmental pollution (Iyer-Raniga and Treloar, 2000; Barbiroli, 2000).

India is faced with many interlinked challenges in its pursuit to maintain sustainability and economic development due to socio-economic disparities, institutional inefficiencies, and resource constraints. The social economic dimension, institutional barriers, and resource constraints are also limiting factors for India's capability to integrate sustainability and economic growth. Socio-economic issues across rural and marginalized sectors raise a problem in distributing equitable resource access, such as pure drinking water and sanitation (BMC Public Health, 2022). The institutional barriers are uncooperative governance and overlapping responsibilities between national and state governments, which slow down progress. This may probably be due to the country's high population as well as corruption within certain regional government parties pushing forward biased agendas. For example, though schemes like the 'Swachh Bharat' Mission have increased access to sanitation, the maintenance and utility of the infrastructure are often lagging due to poor coordination and a number of issues (Singh, et al. 2022). Corruption and inefficiencies in resource management exacerbate such issues, creating gaps in policy execution (BMC Public Health, 2022). Resource constraints, whether it is financial constraint and water scarcity, pose equally big challenges. Groundwater accounts for a huge percentage in India, which is fast disappearing due to inefficient use leading to decreased agricultural productivity and difficulties in ensuring clean drinking water availability (NITI Aayog, 2018).

C. Solutions to achieve sustainability

1. Triangle Model

The triangle model, in figure 4, assesses the links between economic development, resource-energy use, and environmental impact in an effort to support sustainable strategies. Renewable energy technologies must be invested in, sustainable transportation systems put in place, and natural ecosystems conserved to alter climate change. There is an immediate need to make policies that can reduce the greenhouse effect emissions as well as support economic growth in urban areas. A clean and low-carbon economy transition should be achieved in a way that will benefit both the existing and future generations; this means innovative solutions and coordinated global efforts. (Iyer-Raniga, et al. 2000). (Islam, S. U., et al. (2024).

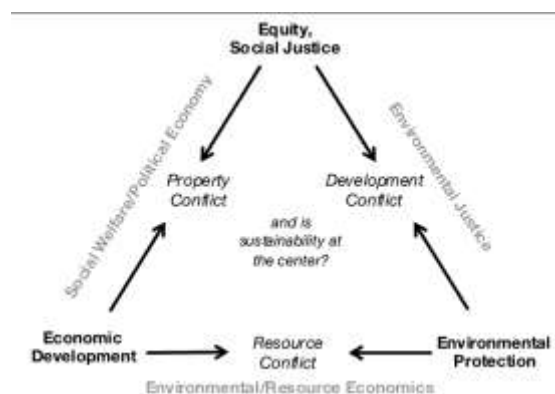


Figure 4: Triangle Model, adopted from (Campbell 1996)

2. Brundtland Report

The concept of sustainable development is defined as the improvement of our world today and for future generations without compromising their ability to meet their own needs. This was first popularized with the Brundtland Report - otherwise known by its official designation, "Our Common Future," published by the United Nations back in 1987. The paper defines sustainable development as "meets the needs of the present without compromising the ability of future generations to meet their own needs". (United Nations, n.d.). It is to be in a balance regarding economic growth, social welfare, and environmental protection to make sure that as one develops and improves the quality of life, he should not drain the resources or harm the environment for the next ones. (Moore, et al. 2017). This has resulted in vast population and economic growth with challenges towards India to implementing sustainable development. India works toward achieving the Sustainable Development Goals put forth by the United Nations in its list pertaining to the reduction of poverty, hunger, health issues, educational gaps, and sustainability of the environment. The recent reports indicate that more than half of the goals set for 2030 are missed in the process for India. Factors that contribute to such failure include environmental degradation, depletion of resources, and social inequality. (Harvard T.H. Chan School of Public Health, 2023). India, on the other hand, is adopting a number of strategies to mitigate the problems. Some of these strategies include; Renewable energy programs, Disaster resilient infrastructure and Eco-Restoration Projects.

- **Renewable Energy Programs:** India is investing in renewable energy sources like solar and wind to minimize its dependence on fossil fuels. This shift will offer clean, affordable, and reliable energy that encourages sustainable development (Kumar & Jha, 2019).
- **Resilient Infrastructure:** Infrastructure should be resilient to disasters. Climate action strategies of India have a focus on building resilient infrastructure that safeguards communities and fosters long-term development. (UN Sustainable Development, n.d.)
- **Eco-Restoration Projects:** Ecosystem restoration and biodiversity projects help in restoring the damaged ecosystems, promote biodiversity, fix environmental damage, and make available natural resources for the benefits of future generations (UN Sustainable Development, n.d.)

Through these, India tries to bring its development in line with sustainability principles so that economic growth is supportive of environmental health as well as social equity.

3. Doughnut Economics framework

There is also another influential framework called the 'Doughnut Economics framework' postulated by economist 'Kate Raworth'. This basically put together two ideas: boundaries of the planet and a foundation for society. It implies that a just economy should operate in the space where human needs are fulfilled without breaching ecological limits. The model makes it evident that economic activity should not be against the social welfare of the society but still keep the ecological constraints. Raworth, (2012)

4. The Five Capitals Model

'The Five Capitals Model' is another extension to the sustainability paradigm that deals with five capitals of natural, human, social, manufactured, and financial. (Raworth, 2012). It states that economic development should be positive for all five types of capital so that growth is not environmentally destructive, socially destructive, or workforce destructive. The 'Five Capitals Model' highlights the need for policies that promote economic growth but also long-term sustainability, maintaining and improving the various types of capital. (Forum for the Future, n.d.). India has expressed its commitment to sustainability by implementing various national and regional policies aimed at addressing climate challenges and promoting sustainable development. There have been policies implemented by the state for sustainability, notably in this respect, the National Action Plan on Climate Change, introduced in 2008 and numerous state-level plans. Eight national missions covering themes such as solar power, energy efficiency, water security, and sustainable agriculture formed part of the NAPCC to help India build its strength to climate change while maintaining the path of sustainable development. Apart from the NAPCC, state governments have designed their own action plans to overcome the climate-related issues at local levels.

For achieving the balance between sustainability and economic development, the policies of India must be inclusive and region-specific. Socio-economic disparities are to be tackled through focused investment in rural and marginalized areas, mainly on clean water and sanitation infrastructure. (BMC Public Health, 2022). Stronger governance mechanisms are also crucial; coordination improvement between central, state, and local governments could enhance the programs like Swachh Bharat Mission. In addition, public-private partnerships for funding and implementation can also provide the needed financial and technical support for success in the long term. Furthermore, the challenges of resources could be overcome with the encouragement of water-efficient technologies in agriculture and industries. (NITI Aayog, 2018). (Singh, 2022). Sustainable development in India also needs the active involvement of all the stakeholders. Government involvement is significant in terms of making policies, regulating, and financing those initiatives where sustainability complements economic growth. Business entities are also vital in embracing environmentally friendly practices and developing new innovative solutions based on specific environmental goals. Civil society organically includes NGOs and community groups that can voice their own concerns, make certain institutions accountable for actions, and even influence policy-making based on grassroots needs. A collaborative approach, where all these stakeholders work together is important to achieve sustainable economic development for India.

III. RESEARCH OBJECTIVES

1. To analyse the historical evolution of sustainability and economic development in India from the First Industrial Revolution to the Fifth, identifying key milestones and transformations.
2. To investigate the role of sustainable practices and innovative technologies in promoting a low-carbon economy in India.
3. To evaluate the impact of economic policies on sustainability outcomes, mainly in the context of India's commitment to the Sustainable Development Goals (SDGs)

Research Questions

1. How do innovative solutions contribute to achieving a low-carbon economy in India?
2. What is the relationship between economic growth and environmental sustainability in India?

Hypotheses

- 1: Innovative technologies and sustainable solutions positively influence the reduction of carbon emissions in India's industrial sectors.
- 2: Economic growth in India has historically been accompanied by environmental degradation, but recent trends show a shift towards more sustainable practices.

IV. RESEARCH FRAMEWORK

This paper discusses the link between sustainability and economic development in India and examines the obstacles it faces regarding socio-economic disparity, institutional barriers, and lack of resources. The framework relies on the principle of the Brundtland Report (Brundtland Commission 1987) which asserts that sustainable development should meet the needs of the present without hindering the ability of future generations to meet their own needs. The United Nations' Sustainable Development Goals and the Five Capitals Model further provide theoretical background, with an integrated approach toward prioritizing economic, social, and environmental priorities.

The study reveals key variables like economic growth indicators such as GDP and employment rate, sustainability metrics such as carbon emissions, adoption of renewable energy, and conservation of resources. These variables will be analysed to extract interdependencies and trade-offs in economic policies versus sustainable practices.

In achieving this, the research study uses a mixed-methods approach that combines data analysis with both quantitative and qualitative insights from policy documents and case studies. The approach ensures an all-rounded understanding of the barriers and opportunities of aligning sustainability with economic development in India. These theoretical and methodological elements form the basis for a robust framework to address the research problem and propose actionable solutions.

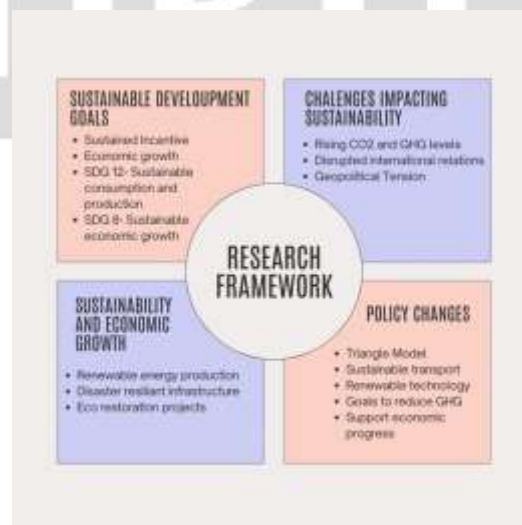


Figure 5: Research Framework

V. RESULTS AND DISCUSSIONS

Research from other related papers show that the papers have focussed their work on environmental regulations, ecological footprint in South Asia, environmental Kuznets curve. Other papers also include the relationship between energy use, economic output, carbon emissions, FDI, and trade openness in India. As well as how Increased globalization and financial development are detrimental to environmental sustainability in India, even though they improve economic performance. Our findings show that socio-economic issues across rural and marginalised sectors raise problems distributing equitable resource access. In addition, institutional barriers can be uncooperative for various reasons.

After extensive research, we developed our own frameworks to fill the research gaps we identified. We feel that countries and companies must invest in renewable energy technologies, implement sustainable transportation systems to mitigate climate change. We also feel that a just economy should operate in the space where human needs are fulfilled without breaching ecological limits. India needs to be inclusive and region specific in policies. Socio-economic disparities must be addressed by focused investments in rural and marginalised areas. Further, using water efficient technologies should be introduced. Lastly, there must be a collaborative approach between all the stakeholders such as the government, businesses, and the civil societies like the NGOs that will help in raising awareness.

This paper could go into more depth to focus on rural and tribal regions, since they have not been studied much. Additionally small scale industries and informal economies, including street vendors and small roadside shops have not been further researched. More local studies are required to bring in more data and solutions with specific socio-economic and environmental conditions. Furthermore, AI and IoT resource management can change the ways by which sustainability goals are achieved.

VI. CONCLUSION

The review portrays an interaction between the concepts of sustainability and economic growth in India-its focus for the removal of socio-economic inequalities and institutional barriers on the one end, and socio-economic resource on the other hand. Even while there have been an enormous number of successes including the 'Swachh Bharat' Mission and the National Action Plan on Climate Change, great deal of challenge still persists, at the rural or underserved regions, and sectors on the other.

The 'Need of the hour' will be an integrated approach toward sustainable economic growth. Policies require a balance of immediate needs of the economy and long-term environmental goals, as well as being inclusive and regionally specific. The joint responsibility of the government, business communities, and civil society is to ensure equitable and responsible resource management. Hence, it is very important that India, in its future growth trajectory, understands this connection and implements solutions that address both sustainability and development for a resilient future. A collaborative approach between all these stakeholders working together is important to achieve sustainable economic development for India.

VII. FUTURE DIRECTIONS FOR RESEARCH

Although there has been much progress in understanding sustainability and economic development in India, there are still many gaps. Most of the studies focus on urban areas, while the rural and tribal regions are not explored much because of their uniqueness in implementing sustainable practices (BMC Public Health, 2022). There is also scarcity of research focusing on specific sectors like small-scale industries and informal economies, which happen to be of great importance to India's development but lack means to implement the sustainable practices that are being urged (Singh, 2022). More local studies are thus required to bring forth solutions applicable to the various regions with specific socio-economic and environmental conditions.

Emerging trends in sustainability point toward growing importance of technology and innovation. AI, IoT, and blockchain applications in resource management and monitoring can change the very ways by which sustainability goals are achieved. The emergence of the concept of the circular economy promises to use and recycle resources worldwide, providing India with the opportunity to marry its economic development with environmental preservation. Therefore, more research exploring ways of integrating these trends into the unique socio-economic context of India could provide valuable insights for future policymaking and practice.

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