Indian Journal of Applied Business and Economi Research
Vol. 5, No. 2, 2024, pp. 173-190

ARF INDIA
Academic Open Access Publishing
www.arfjournals.com

CHALLENGES OF CLIMATE CHANGE AND SDG GOALS IN INDIA: ACHIEVEMENTS, SHORTCOMINGS, CHALLENGES, AND FUTURE ROADMAP

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Received: 09 July 2024; Revised: 10 August 2024; Accepted 18 August 2024; Publication: 15 November 2024

Abstract: This paper presents a detailed analysis of India's progress towards achieving the Sustainable Development Goals (SDGs) from 2017 to 2024, with a particular focus on the impact of climate change on key developmental targets. By evaluating crucial indicators, the study examines the connections between climate change and the SDGs, highlighting how environmental challenges affect the realization of these goals. It also outlines the necessary actions to mitigate the negative effects of climate change, ensuring sustained progress toward the SDGs despite environmental disruptions.

The paper explores how climate-related disruptions, including extreme weather and agricultural challenges, impede SDG progress. It calls for robust climate adaptation and mitigation strategies, with a focus on renewable energy, climate-resilient infrastructure, and equitable access to resources. The findings emphasize the need for continued efforts to build a climate-resilient future and integrate climate action into broader development goals.

Keywords: Climate Change, Sustainable Development Goals (SDGs), International Cooperation, Climate Resilience

1. INTRODUCTION

Climate change is one of the biggest global challenges, with profound implications for sustainable development. India, being one of the most

To cite this paper:
Jaya Bhalla & B.K. Pandey (2024). Challenges of Climate Change and SDG Goals in India: Achievements, Shortcomings, Challenges, and Future Roadmap. *Indian Journal of Applied Business and Economic Research*. 5(2), 173-190.

vulnerable countries to climate change, has recognized the urgency of addressing this issue. The SDGs, particularly those related to climate action (SDG 13), clean energy (SDG 7), sustainable cities (SDG 11), and life on land (SDG 15), are integral to India's climate strategy. India, as a signatory to the Paris Agreement, has committed to achieving the SDGs while addressing climate change. Climate change affects development in various ways, including rising temperatures and changing precipitation patterns that impact agriculture, water resources, and human health. Increased frequency and intensification of extreme weather events cause damage to infrastructure, disrupt economic activities, and endanger life. Sea-level rise and coastal erosion threaten coastal communities and ecosystems.

The objectives of this paper can be categorized as follows

(a) Assessing India's Progress towards SDGs: This paper aims to evaluate India's overall progress from 2017 to 2024 in achieving key Sustainable Development Goals (SDGs), particularly focusing on the interlinkages, impact of climate change on these goals and India's approach to climate change and SDG.

(b) **Analyzing the Impact of Climate Change on SDG Achievement**: The paper seeks to examine the specific challenges posed by climate change to the achievement of SDG targets, including its influence on hunger, poverty, malnutrition, gender disparities, agricultural productivity, and the vulnerability of marginalized communities.

(c) **Identifying Strategies for Climate Resilience and Future Action**: The paper seeks to outline effective climate adaptation and mitigation strategies for India, with a focus on promoting renewable energy, building climate-resilient infrastructure, ensuring equitable access to resources, and integrating climate resilience into broader development initiatives.

The paper seeks to outline effective climate adaptation and mitigation strategies for India, with a focus on promoting renewable energy, building climate-resilient infrastructure, ensuring equitable access to resources, and integrating climate resilience into broader development initiatives. Additionally, it aims to provide a roadmap for enhancing governance and strengthening international cooperation. Additionally, it aims to provide a roadmap for enhancing governance and strengthening international cooperation.

2. METHODOLOGY

The methodology involves a thorough review and analysis of published reports and data from credible sources such as the World Bank, United Nations Development Programme (UNDP), NITI Aayog, and the Ministry of Environment, Forest, and Climate Change (MoEFCC). These reports offer valuable insights into the effects of climate change on specific SDGs—particularly SDGs 7, 13, 2, 11, and 15—and their connections with other goals. The analysis draws upon statistical data, progress indicators, and case studies from both national and international organizations to evaluate India's responses to climate-related challenges. This secondary research is further supported by policy documents and frameworks, including India's Nationally Determined Contributions (NDCs) and the National Action Plan on Climate Change (NAPCC), providing a solid basis for understanding the progress and obstacles in achieving climate-focused SDGs in India.

3. LITERATURE SURVEY ON CLIMATE CHANGE AND SDG GOALS

The literature from the World Bank, UNDP, NITI Aayog, MoSPI, MoEFCC, IMF, Oxfam, and other global and national institutions, have thoroughly examined the impact of climate change on achieving the Sustainable Development Goals (SDGs). These studies highlight how climate change hinders progress toward various SDG targets, posing a major obstacle to advancing multiple goals. They emphasize the complex interplay between climate change and sustainable development, stressing the urgent need for coordinated international and national efforts to address these challenges and refocus on achieving the SDGs.

The literature analyses the multidimensional effects of climate change on critical SDGs such as poverty eradication, health, food security, clean water, and sustainable cities. Additionally, it captures the proposed mitigation and adaptation strategies globally and within India, emphasizing frameworks developed to combat climate change. The review includes insights into climate finance, key policies, and collaborative approaches that are essential for mobilizing resources to implement effective climate adaptation and mitigation efforts.

4. IMPACT OF CLIMATE CHANGE ON SDGS.

The United Nations Development Programme (UNDP, 2017) underscores the critical link between climate change and sustainable development, noting

that climate change undermines progress on numerous SDGs, especially those related to poverty, food security, water, and health. According to UNDP, climate change affects all 17 SDGs, positioning it as one of the most significant challenges to sustainable development.

In 2018, UNDP introduced a comprehensive framework for integrating climate change considerations into the SDGs. The framework emphasizes the need for climate-resilient development pathways, stating that "effective climate action must be incorporated into all development strategies to ensure that progress towards the SDGs is both sustainable and inclusive."

The "Global Sustainable Development Report" also advocates for transformative actions to achieve the SDGs in the context of climate change. It suggests that a "synergistic approach, addressing climate change and development goals together, is crucial for long-term sustainability."

In its 2019 report, "Climate Action for Sustainable Development," UNDP outlined strategies for aligning national climate policies with the SDGs. It recommended that countries adopt a comprehensive approach by integrating climate risk assessments into their national planning and budgeting processes.

The World Bank's 2020 report, "Shock Waves: Managing the Impacts of Climate Change on Poverty," warned that climate change could push over 100 million people into poverty by 2030, with developing nations being disproportionately affected. The report highlighted disruptions in agriculture, water availability, and healthcare as primary drivers of this trend.

The Intergovernmental Panel on Climate Change (IPCC, 2022) warned in its Sixth Assessment Report that climate change is exacerbating inequalities and threatening global progress toward the SDGs. The report cautions that without significant mitigation, climate change will severely impact ecosystems, human health, and economies, with the most vulnerable populations being hardest hit.

Oxfam (2018), in its report "Climate Change and Inequality: A Critique," argued that the SDGs inadequately address the inequalities exacerbated by climate change. It called for more targeted measures to protect vulnerable populations and ensure that climate actions are equitable.

The World Resources Institute (WRI, 2021), in its paper "Climate Action and the SDGs: Synergies and Trade-offs," explored how climate policies can advance several SDGs, particularly those related to energy, water, and urban development, while also highlighting the need to manage potential trade-offs.

4.1. Impact on SDG 1 and 2

Climate change intensifies poverty and hunger by destabilizing agriculture, which serves as the main source of livelihood for millions in India. Recurrent droughts, erratic monsoons, and severe weather conditions have resulted in decreased crop production, negatively affecting food security and income levels in rural communities (World Bank, 2020; IPCC, 2022). The IPCC (2022) further emphasizes that climate-related disruptions in agriculture are key drivers of this trend, directly hindering progress toward SDG 1 (No Poverty) and SDG 2 (Zero Hunger).

4.2. Impact on SDG 3 (Good Health and Well-being)

Climate change leads to health risks such as heatwaves, vector-borne diseases, and malnutrition, all of which undermine public health. In India, rising temperatures and changing precipitation patterns have contributed to the spread of diseases like malaria and dengue, as well as heat-related illnesses (UNDP, 2017; MoEFCC, 2019). According to UNDP (2017), climate change undermines health-related SDGs by increasing the prevalence of vector-borne diseases and malnutrition. MoEFCC (2019) confirms that in India, these impacts are already evident, with heatwaves and disease outbreaks becoming more frequent."

4.3. Impact on SDG 6 (Clean Water and Sanitation)

Water scarcity and quality are directly impacted by climate change, affecting access to clean water and sanitation. In India, shrinking glaciers, altered rainfall patterns, and increased evaporation rates are straining water resources, especially in arid regions (UNDP 2018; NITI Aayog, 2020). UNDP (2018) emphasizes the role of climate change in exacerbating water scarcity and affecting SDG 6. NITI Aayog (2020) highlights that India's water resources are increasingly stressed, with several states facing acute water shortages due to changing climate patterns."

5. INDIA'S APPROACH TO CLIMATE CHANGE AND SDGs

The National Action Plan on Climate Change (NAPCC), launched by the Indian government in 2008, serves as the cornerstone of India's climate policy. It sets forth the country's strategy to combat climate change through eight national missions, focusing on areas such as solar energy, energy efficiency, sustainable agriculture, and water resource management. These initiatives

are intrinsically linked to several Sustainable Development Goals (SDGs), including SDG 7 (Affordable and Clean Energy), SDG 11 (Sustainable Cities and Communities), SDG 12 (Responsible Consumption and Production), SDG 13 (Climate Action), and SDG 15 (Life on Land). By promoting renewable energy, enhancing energy efficiency, fostering sustainable agricultural practices, and conserving ecosystems, the NAPCC advances the broader agenda of sustainable development. In line with the NAPCC, each Indian state has formulated its own State Action Plan on Climate Change (SAPCC), which is periodically updated to address evolving climate challenges and priorities.

5.1. Adaptation Strategies

India has implemented various adaptation measures, such as improving water management, building climate-resilient infrastructure, and promoting disaster risk reduction strategies. Programs like the National Water Mission and the National Mission for Sustaining the Himalayan Ecosystem are critical in addressing the specific vulnerabilities faced by different regions of the country.

5.2. Financial Mechanisms

The establishment of the National Adaptation Fund for Climate Change (NAFCC) aims to support state-level initiatives aimed at climate adaptation. This fund is crucial for including climate resilience in development planning, thereby supporting the achievement of multiple SDGs.

5.3. Technology and Innovation

India has been harnessing technology and innovation to strengthen climate resilience. Initiatives such as the National Electric Mobility Mission Plan (NEMMP) 2020 promote the use of electric vehicles, aiding in the reduction of urban air pollution and cutting greenhouse gas emissions, thereby supporting progress toward SDG 11 (Sustainable Cities) and SDG 13 (Climate Action).

6. ROLES OF KEY MINISTRIES IN CLIMATE CHANGE MITIGATION

Ministries like Environment, Forest, and Climate Change spearhead climate change policy and regulations, whereas the Statistics and Programme Implementation Ministry (MoSPI) monitors progress via the SDG India Index. The Ministry of Panchayati Raj (MoPR) incorporates climate action into local governance, enabling rural communities to embrace sustainable practices.

Collectively, these ministries advance India's climate change mitigation efforts through policy development, data management, and community-based initiatives.

7. INTERNATIONAL COOPERATION AND LEADERSHIP

India is a key player in international climate negotiations, advocating fairness and the principle of common but differentiated responsibilities. The country has bolstered its leadership in global climate action, notably through initiatives such as the International Solar Alliance (ISA). India's contributions have been widely recognized.

7.1. International Commitments under the Paris Agreement

India has pledged to cut the emissions intensity of its GDP by 33-35% by 2030 compared to 2005 levels, Additionally, the country aims to generate 40% of its total installed electric power capacity from non-fossil fuel sources and establish an additional carbon sink of 2.5 to 3 billion tonnes of CO2 equivalent through increased forest and tree cover by 2030. These commitments support SDG 13 (Climate Action) and also have indirect benefits for SDG 15 (Life on Land).

7.2. Renewable Energy Initiatives

India has had significant success in expanding its renewable energy capacity, with particular emphasis on solar and wind energy. The government's goal of reaching 500 GW of renewable energy capacity by 2030 is an important step toward reducing greenhouse gas emissions and advancing SDG 7 (Affordable and Clean Energy).

7.3. Climate Smart Agriculture

Programs like the Pradhan Mantri Fasal Bima Yojana (PMFBY) and the Paramparagat Krishi Vikas Yojana (PKVY) foster sustainable farming practices that improve resilience to climate change. These initiatives contribute to SDG 2 (Zero Hunger) and SDG 13 (Climate Action).

7.4. Green India Mission

Part of the NAPCC, this mission focuses on protecting, restoring, and enhancing India's diminishing forest cover, which is vital for carbon sequestration and biodiversity conservation, aligning with SDG 15 (Life on Land). 2017: Adaptation strategies were primarily focused on agriculture, water, and disaster

management, with ongoing efforts to integrate climate resilience into these sectors.

8. INTERLINKAGES BETWEEN CLIMATE-RELATED SDGS AND OTHER GOALS

The SDGs directly related to climate change are SDG 2 (Zero Hunger), SDG 7 (Affordable and Clean Energy),SDG 11 (Sustainable Cities and Communities), SDG 13 (Climate Action), and SDG 15 (Life on Land). These have wide-reaching impacts on other SDGs due to their interconnected nature. In India, addressing these goals is crucial for the overall progress of the 2030 Agenda, as climate change and sustainability challenges influence various aspects of social, economic, and environmental development.

8.1. SDG 2 (Zero Hunger)

Impact on Other Goals: Climate-induced agricultural disruptions, such as droughts and floods, impact food security (SDG 2), increase poverty (SDG 1), and affect health outcomes (SDG 3). Sustainable agricultural practices can also contribute to reducing greenhouse gas emissions, linking SDG 2 with SDG 13.

Measures in India: India has implemented the *National Food Security Mission* and *Pradhan Mantri Fasal Bima Yojana* (PMFBY) to increase crop productivity and provide insurance to farmers against climate risks. Efforts toward climate-resilient agriculture, including the promotion of drought-resistant crops, have also gained traction.

8.2. SDG 7 (Affordable and Clean Energy):

1. **Impact on Other Goals**: Access to affordable and clean energy is foundational for economic growth (SDG 8), reducing inequalities (SDG 10), and improving healthcare (SDG 3) and education (SDG 4). Energy access also directly influences gender equality (SDG 5) by empowering women, particularly in rural areas, through access to clean cooking fuels and electricity.
2. **Measures in India**: Initiatives like the *Pradhan Mantri Ujjwala Yojana* (PMUY), which provides clean cooking fuel to households, and the push for renewable energy through schemes like the *National Solar Mission* are significant efforts toward expanding clean energy access. India aims to install 500 GW of renewable energy capacity by 2030.
3. **SDG 13 (Climate Action)**: Goal 13 calls for urgent action to combat climate change and its impacts. It is intrinsically linked to all 16 of

the other Goals of the 2030 Agenda for Sustainable India's commitments under the Paris Agreement and its domestic policies directly contribute to this goal by mitigating climate change through emission reductions and enhancing resilience through adaptation strategies.

4. **Impact on Other Goals**: Climate change exacerbates food insecurity (SDG 2), water scarcity (SDG 6), health challenges (SDG 3), and threatens livelihoods, particularly in vulnerable communities. It also impacts poverty reduction efforts (SDG 1) and contributes to migration, affecting peace and stability (SDG 16).
5. **Measures in India**: India has launched several missions focused on enhancing climate resilience, such as the National Solar Mission, the National Mission for Sustainable Agriculture, and the National Water Mission. Furthermore, India has pledged to cut its emissions intensity by 45% from 2005 levels by 2030 as part of its Nationally Determined Contributions (NDCs).

India's *National Action Plan on Climate Change (NAPCC)* outlines eight missions targeting climate resilience, including the *National Solar Mission*, *National Mission for Sustainable Agriculture*, and the *National Water Mission*. Additionally, India has committed to reducing its emissions intensity by 45% from 2005 levels by 2030 under its Nationally Determined Contributions (NDCs).

8.3. SDG 11 (Sustainable Cities and Communities)

Impact on Other Goals: Urban resilience and sustainability affect health (SDG 3), economic growth (SDG 8), infrastructure (SDG 9), and energy consumption (SDG 7). Poorly planned cities are more vulnerable to climate-related disasters, such as floods and heatwaves, worsening inequalities (SDG 10).

Measures in India: The *Smart Cities Mission* aims to develop sustainable urban infrastructure, while the *Atal Mission for Rejuvenation and Urban Transformation (AMRUT)* focuses on water supply, sanitation, and reducing pollution. The *National Disaster Management Plan* also prioritizes urban disaster preparedness and response.

SDG 15 (Life on Land)

Impact on Other Goals: Ecosystem degradation directly impacts livelihoods (SDG 1), water availability (SDG 6), and biodiversity, which is crucial for food security (SDG 2). Deforestation and land degradation worsen climate change

(SDG 13) and undermine efforts to promote sustainable agriculture (SDG 12).

Measures in India

India's Green India Mission aims to advance afforestation and boost carbon sinks. The Compensatory Afforestation Fund Management and Planning Authority (CAMPA) is responsible for supporting afforestation efforts. Additionally, the government has committed to restoring 26 million hectares of degraded land by 2030.

9. MEASURES TAKEN TO ADDRESS CLIMATE-RELATED SDGs IN INDIA

India has taken a multi-pronged approach to address the challenges posed by climate change and achieve climate-related SDGs, as outlined below:

1. **Renewable Energy**: India is a global leader in renewable energy expansion, aiming for 500 GW of renewable energy by 2030, with significant investments in solar, wind, and hydropower through the *National Solar Mission* and *National Wind Mission*.
2. **Climate-Resilient Agriculture**: Under the *National Mission for Sustainable Agriculture (NMSA)*, India is promoting climate-resilient crops, enhancing irrigation efficiency, and investing in research to mitigate the impacts of climate change on agriculture. The PMFBY crop insurance scheme also provides a safety net for farmers against climate-induced losses.
3. **Disaster Risk Reduction**: India has implemented the *National Disaster Management Plan* to reduce vulnerability to climate-induced disasters. The plan focuses on preparedness, response, and mitigation, particularly in disaster-prone areas like coastal regions and flood plains.
4. **Urban Sustainability**: The *Smart Cities Mission* and *AMRUT* aim to develop climate-resilient urban infrastructure, with a focus on water conservation, waste management, and renewable energy use. These programs also promote green buildings and sustainable transportation.
5. **Forest and Biodiversity Conservation**: India has pledged to restore 26 million hectares of degraded land by 2030. Programs like the *Green India Mission* and *CAMPA* focus on afforestation, conservation of biodiversity, and increasing carbon sequestration.

6. **International Commitments**: India has actively participated in global climate initiatives such as the Paris Agreement and the *International Solar Alliance*. The country's NDCs include reducing the emissions intensity of its GDP by 45% by 2030 and achieving 50% of its energy needs from non-fossil fuels by 2030.

10. MONITORING FRAMEWORK FOR TRACKING SDG GOALS PROGRESS ON CLIMATE CHANGE-RELATED INDICATORS: 2015-2024

India's progress on climate change-related Sustainable Development Goals (SDGs) has been tracked through a comprehensive monitoring framework, primarily driven by the NITI Aayog and the Ministry of Statistics and Programme Implementation (MoSPI). This index tracks progress across states and union territories, providing a comprehensive overview of India's performance on various SDG indicators.

10.1. Monitoring Framework

Granularity of Data: The SDG India Index offers data at the state and district levels, enabling targeted policy interventions. Periodic Updates: The index is updated annually, reflecting the dynamic nature of progress and challenges in achieving SDGs. Collaborative Approach: MoSPI and NITI Aayog work with state governments to ensure data accuracy and relevance, fostering a culture of accountability and transparency.

11. SDG INDIA INDEX

"SDG India Index" tracks the country's development on SDGs, including climate-related goals. The SDG India Index, developed using the globally recognized SDSN methodology, assesses progress across 113 indicators aligned with the National Indicator Framework (NIF) provided by MoSPI. The Index calculates scores for 16 SDGs, excluding Goal 14 (Life below Water), which pertains only to coastal states. States and UTs are ranked based on composite scores that average performance across all the SDGs. The Index also integrates feedback from States, Union Ministries, and international organizations like the UN, ensuring a robust framework for tracking and advancing SDG localization.

11.1. The SDG India Index: A Mixed Bag of Progress and Challenges

The latest edition of the SDG India Index 2024, published by NITI Aayog, offers a detailed assessment of India's progress toward the Sustainable Development

Goals (SDGs). Although there have been significant achievements, with the overall score increasing from 66 to 71 out of 100, there are concerns related to measurement issues and a limited focus on quantitative aspects, including deteriorating conditions or lower scores in certain areas. The Index shows notable advancements in critical sectors, such as poverty alleviation (Goal 1), decent work and economic growth (Goal 8), climate action (Goal 13), and life on land (Goal 15). India's overall SDG score has risen to 71 for 2023-24, up from 66 in 2020-21 and 57 in 2018, underscoring the effectiveness of targeted governmental efforts.

Government programs such as Pradhan Mantri Awas Yojana, Ujjwala Yojana, Swachh Bharat Mission, Ayushman Bharat, Saubhagya, and Start-up India have contributed significantly to these achievements. Furthermore, state-specific progress reflects a trend of improvement across the board, with scores ranging from 57 to 79 in 2023-24, up from 42 to 69 in 2018.

Goal 13 (Climate Action) has demonstrated the highest increase, rising from a score of 54 in 2020-21 to 67 in 2023-24, followed by Goal 1 (No Poverty), which climbed from 60 to 72 during the same period. This progress underscores the success of targeted interventions across the Union and State Governments aimed at improving the quality of life.

All 32 States and Union Territories (UTs) are now classified as 'Front Runners,' with 10 new additions, including Arunachal Pradesh, Assam, Chhattisgarh, Madhya Pradesh, Manipur, Odisha, Rajasthan, Uttar Pradesh, West Bengal, and Dadra and Nagar Haveli and Daman and Diu. Among the states showing the most significant improvement is Uttar Pradesh, which increased its score by 25 points, followed by Jammu & Kashmir with a 21-point rise, Uttarakhand with a 19-point increase, and Sikkim with an 18-point gain.

India's advancements are especially notable in areas such as Good Health and Well-being (Goal 3), Clean Water and Sanitation (Goal 6), Affordable and Clean Energy (Goal 7), Industry, Innovation, and Infrastructure (Goal 9), and Sustainable Cities and Communities (Goal 11).

This success is attributed to the government's prioritization of food and nutrition security, health, education, electrification, housing, and renewable energy, alongside rapid advancements in digital infrastructure and financial inclusion**.** Significant progress was noted in the goals "No Poverty," "Decent Work and Economic Growth," and "Life on Land," which experienced the largest point increases across states since 2020-21.

In contrast, goals such as "Gender Equality" and "Peace, Justice, and Strong Institutions" showed only marginal improvements. Notably, "Reduced Inequalities" was the sole goal to experience a decline, dropping from 67 in 2020-21 to 65 in 2023-24. This decrease highlights persistent challenges in wealth distribution, particularly regarding employment opportunities for individuals at the lower end of the socioeconomic spectrum. It also underscores ongoing gender disparities in workforce participation.

"Gender Equality" remains an area of concern, receiving the lowest score among all goals, with only a slight improvement from the previous year. Key issues include skewed sex ratios at birth, low rates of land and asset ownership by women, and their underrepresentation in employment and labor force participation, especially in states with sex ratios below 900.

The goal related to the "Quality of Education" saw a 4-point increase, reaching 61, though several states, particularly in central India, still face significant challenges. While access to education has improved, the primary issue lies in the quality of education, which continues to affect employment opportunities Index also reveals significant challenges and methodological limitations. India has achieved significant progress in reducing poverty (Goal 1) and promoting decent work and economic growth (Goal 8).- The country has also shown significant improvement in climate action (Goal 13), with a score increase from 54 to 67.

However, challenges persist in ensuring zero hunger and gender equality. The Index, reveals varying levels of progress among states and Union Territories, with Uttarakhand, Kerala, and Tamil Nadu emerging as top performers. Uttar Pradesh has made the most rapid progress, with a 25-point increase in its score since 2018.

12. GLOBAL SCORE ON SDG

The recently released 9th edition of the *Sustainable Development Report* in August 2024 by the United Nations Sustainable Development Solutions Network (SDSN) underscores significant global delays in achieving the Sustainable Development Goals (SDGs), The report reveals that only 16% of SDG targets are on track to be met by 2030, with 84% experiencing stagnation or regression. Since 2020, global progress has particularly faltered in SDGs 2 (Zero Hunger), 11 (Sustainable Cities), 14 (Life below Water), 15 (Life on Land), and 16 (Peace, Justice, and Strong Institutions). Notable setbacks have been observed in areas such as rising obesity rates (SDG 2), press freedom

(SDG 16), the red list index (SDG 15), sustainable nitrogen management (SDG 2), and life expectancy at birth (SDG 3), exacerbated by the Covid-19 pandemic and other global challenges. In contrast, slight positive trends were noted in SDG 9 (Industry, Innovation, and Infrastructure).

SDG targets associated with food and land systems remain critically off-track. By 2030, it is projected that 600 million people will continue to suffer from hunger globally, coupled with rising obesity rates. Additionally, greenhouse gas emissions from Agriculture, Forestry, and Other Land Use (AFOLU) constitute nearly a quarter of the world's annual emissions, further complicating SDG progress in this sector.

The report highlights notable regional variations in SDG performance. Nordic countries lead the way, with Finland ranking first (score 86.4), followed by Sweden (85.7), Denmark (85.0), Germany (83.4), and France. Conversely, South Sudan, the Central African Republic, and Chad ranked at the bottom. BRICS and BRICS+ countries, including Egypt, Ethiopia, Iran, Saudi Arabia, and the UAE, have demonstrated faster-than-average SDG progress since 2015. East and South Asia have also shown significant advancements in achieving the SDGs.

13. INDIA'S RANK IN THE SDG INDEX

India ranked 109th with an overall score of 64.0. The country has made substantial progress in about 30% of the SDG targets, while 40% of the targets show limited progress. However, around 30% of the targets reflect a worsening situation.

Challenges

Despite progress, India continues to lag in achieving zero hunger (Goal 2) and gender equality (Goal 5). The Index's methodology relies on incomplete and inaccurate data, raising concerns about the reliability of the scores. The focus on quantitative metrics neglects the qualitative aspects of sustainable development. The Index perpetuates a culture of competition among states and UTs, rather than encouraging collaboration and knowledge-sharing.

14. SHORTCOMINGS AND GAPS

- **Limited Integration across Sectors:** Despite the existence of national and state action plans, there is a lack of integration between climate action and sectoral policies. For instance, industrial policies often do not align with climate resilience goals, leading to conflicting outcomes.

- **Vulnerability of Marginalized Communities:** Climate impacts disproportionately affect vulnerable and marginalized communities. The lack of targeted adaptation measures for these groups remains a significant gap in achieving climate justice. The Index's narrow focus on aggregate scores and rankings obscures the experiences of marginalized communities. NITI Aayog's top-down approach to promoting the SDGs neglects the need for community-led initiatives and participatory governance.
- **Inadequate Climate Financing:** Although efforts like NAFCC and ISA are commendable, there is still a shortfall in climate financing, particularly for adaptation projects at the local level. Many states and local governments struggle to mobilize resources for comprehensive climate action

Future Strategies and Roadmap

Looking ahead, India's future strategies to address climate change and align with SDG goals include:

- **Achieving Net-Zero Emissions by 2070:** India has set an ambitious target to achieve net-zero emissions by 2070. This will involve a gradual transition to a low-carbon economy, with increased investment in renewable energy, energy efficiency, and carbon capture technologies. Enhancing Climate Resilience: Strengthening the resilience of vulnerable communities through improved disaster preparedness, infrastructure development, and adaptive agriculture practices will be a priority. The crucial strategy is to integrate climate resilience into urban planning and rural development.
- **Expanding Green Finance:** Mobilizing finance for climate action through green bonds, public-private partnerships, and international climate funds will be crucial to achieving India's climate goals. The Green Climate Fund and other international mechanisms will play an important role in supporting India's transition to a green economy.
- **Enhanced Policy Coherence and Integration:** Integrating climate action across all sectors, particularly industry, agriculture, and urban planning, is essential. Policies must align with SDG goals to establish a cohesive approach to sustainable development.
- **Strengthening Monitoring and Accountability Mechanisms:** Improving the SDG India Index and other monitoring tools to include more granular data at the district and local levels will enhance accountability and track progress more effectively. MoSPI's role in refining these metrics will be crucial.

- **Targeted Adaptation Strategies:-**Developing and implementing targeted adaptation strategies for vulnerable populations, including women, indigenous peoples, and smallholder farmers, is critical. Localized climate action plans must be prioritized with support from MoPRs and state governments.
- **Mobilizing Climate Finance:-**Expanding climate finance mechanisms, including public-private partnerships, green bonds, and international collaborations, will be essential to scaling up climate action. Ensuring that finance reaches local governments and communities is crucial.
- **Building Institutional Capacities:-** Investing in capacity-building for institutions at all levels is vital. Training programs, knowledge-sharing platforms, and technical assistance should be provided to empower institutions to lead climate action initiatives.
- **Leveraging Technology and Innovation:-** Embracing technological innovations in renewable energy, smart agriculture, and urban planning will be key to enhancing climate resilience. Public-private partnerships should be fostered to drive innovation and sustainable solutions.

15. CONCLUSION

Incorporating climate change thought into the SDG framework is essential for sustainable development, particularly in a diverse and vulnerable nation like India. The interconnections between climate change and various SDGs underscore the need for holistic, multi-sectoral approaches that address both mitigation and adaptation. India's initiatives, as evidenced by national and state-level policies, reflect a strong commitment to aligning climate action with sustainable development objectives. However, significant challenges persist, necessitating continued emphasis on fortifying institutions, improving monitoring systems, and mobilizing resources to meet the SDGs by 2030.

India's progress on climate change-related indicators from 2015 to 2024 reveals both notable achievements and ongoing challenges. While there have been considerable advances in renewable energy, urban resilience, and afforestation, issues remain in areas such as air quality and adaptation for vulnerable communities. The roles of MoSPI, MoPRs, and MoEFCC are pivotal in this progress, and ongoing collaboration at both national and state levels is important for achieving the SDG targets. Moving forward, a concerted effort to integrate climate action across sectors, enhance monitoring frameworks, and

mobilize resources will be crucial for addressing climate change challenges and achieving sustainable development in India.

Integrating climate change considerations into the SDG framework is vital for achieving sustainable development, especially in a diverse and vulnerable country like India. The interconnections between climate change and various SDGs highlight the necessity for comprehensive, multi-sectoral strategies that address both mitigation and adaptation efforts effectively. India's commitment to aligning climate action with sustainable development is evident in its national and state-level policies, which demonstrate a proactive approach to tackling these intertwined challenges. Nonetheless, considerable obstacles remain. It is essential to strengthen institutions that facilitate climate governance, enhance monitoring frameworks to track progress accurately and mobilize the necessary resources to ensure that the SDGs are met by 2030. This focus on building institutional capacity and resource allocation is critical for overcoming the challenges posed by climate change.

Looking to the future, it will be crucial to prioritize the integration of climate action across all sectors, ensuring that climate considerations are embedded in various development strategies. Strengthening monitoring systems will provide the data needed to assess progress and adapt strategies as necessary. Furthermore, securing financial and technical resources will be key to implementing these initiatives effectively. By continually aligning its climate efforts with the SDG agenda, India can foster sustainable development that not only supports its citizens but also protects the planet for future generations. This holistic approach will enable India to address climate challenges while advancing its development goals.

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