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Gulista Ansari
Department of Political Science, Birla Campus, Hemvati Nandan Bahuguna Garhwal University, Srinagar (Garhwal), Uttarakhand, India

Gulshani
Department of Political Science, Birla Campus, Hemvati Nandan Bahuguna Garhwal University, Srinagar (Garhwal), Uttarakhand, India

Naresh Kumar
Department of Political Science, Birla Campus, Hemvati Nandan Bahuguna Garhwal University, Srinagar (Garhwal), Uttarakhand, India

Corresponding Author:
Gulshani
Department of Political Science, Birla Campus, Hemvati Nandan Bahuguna Garhwal University, Srinagar (Garhwal), Uttarakhand, India

Environmental Sustainability in India: Progress, challenges and prospects to climate action (Sustainable Development Goal 13)

Gulista Ansari, Gulshani and Naresh Kumar

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Abstract
The notion of sustainable development has evolved into the definitions of the three pillars of sustainability: social, economic, and environmental. Environmental sustainability is characterized by emphasizing its bio-geophysical dimensions. This entails preserving or enhancing the integrity of the Earth's life-support systems. This paper examines India's achievements in environmental sustainability through Sustainable Development Goal (SDG) 13, which deals with climate action. It further assesses India's progress on four parameters: disaster preparedness, renewable energy, industries complying with environmental standards, and environmental education and awareness. Its findings suggest that India has made progress in achieving the renewable energy target (13.2.1) but must enhance its performance on national indicators in achieving SDG 13, including mortality from extreme weather events, air pollution, and poor disaster management, dependence on fossil fuels, atmospheric pollution, and budgetary limitations. In the end, the paper highlights potential opportunities to achieve these objectives.

Keywords: Environmental sustainability, sustainable development goals, climate action, environmental policies, environmental education and awareness, renewable energy

Introduction
In September 2000, the United Nations adopted the Millennium Development Goals, comprising eight objectives to be accomplished by 2015, which emphasize nations states to address poverty, hunger, disease, illiteracy, environmental degradation, and gender discrimination. These goals were replaced by the Sustainable Development Goals (SDGs) in 2015 for the next 15 years, encompassing 17 goals, 169 targets, and 247 indicators, forming part of the Agenda 2030, designed to direct development initiatives and government policies until 2030. These goals address critical issues such as climate change, innovation, sustainable consumption, poverty alleviation, and the promotion of peace and security (Sachs, 2012; UNEP, 2015; Costanza *et al*., 2016; Sachs *et al*., 2018; Vandemoortele, 2018; UN, 2018) [12].

SDGs are 'integrated and indivisible, balancing the three dimensions of sustainable development: economic, social, and environmental.' It applies to all nations and serves as the primary framework for directing development policies and initiatives from local to global levels, necessitates radical alterations to enhance human welfare and prosperity while tackling environmental conservation and climate change. Each SDG outlines its distinct target; the initial twelve and last two goals are considered Human Development Goals, whereas goals 13, 14, and 15 are designated for environmental preservation. Goal 13 mandates immediate action to combat climate change, targeting a 50% reduction in greenhouse gas emissions by 2030 and aspiring for a carbon-neutral global environment by 2050. It encompasses a multi-faceted approach that incorporates adaptation and mitigation, integrating climate policy, behavioural transformation through education and awareness, and enhancing financial instruments to attain these objectives (Bandyopadhyay, 2021) [5].

Given the alarming nature of climate change, it is a significant challenge in achieving the Sustainable Development Goals (SDGs). As stated by the Executive Secretary of the United Nations Framework Convention on Climate Change (UNFCCC), 'If the average global temperature is allowed to rise above the 2 ˚C threshold, achieving the SDGs will become

nearly impossible'. Climatic change is attributed to anthropogenic activities, such as the combustion of fossil fuels, deforestation, and industrial processes, which collectively result in significant, substantial and enduring alterations in global climatic patterns, including potential threats to food production and security, water supply sustainability, biodiversity, human health and habitation, rising sea levels, alterations in precipitation and temperature, and extreme weather events (Chakravarty & Ghosh, 2023; IPCC, 2022) [10].

Being the second largest country in terms of population, India's performance in implementing and achieving the SDGs becomes pivotal. The Ministry of Environment and Forest, Government of India, has recognized that India is among the most vulnerable countries to the ill effects of climate change (UNEP, 1989; Brenkert & Malone, 2005) [8]. The 7,516.6 km coastline, the complex Himalayan glacier structure, and nearly 70 million hectares of forests- home to most essential mineral reserves escalate India's vulnerability to climate change on multiple fronts. The Energy Research Institution Council on Energy, Environment and Water estimated that 75% of districts in India are susceptible to various hazards, including floods, cyclones, droughts, storm surges, heat and cold waves, forest fires, and unidentified pathogen outbreaks (Dubash & Joseph, 2016; Mandal & Dey, 2022; Charak, 2023; Mitra & Shaw, 2023) [20, 17, 11]. In recent years, extraordinary flooding events in India's major cities, including Delhi, Kolkata, Mumbai, Chennai, Wayanad, Kedarnath, Kullu, Mandi, Shimla, Dhubri, Nagaon, Cachar have highlighted their increasing susceptibility to climate-induced disasters (De *et al*., 2013; Mishra, 2020; The Hindu, 2024; Disaster Management Division, 2024) [3]. Such events further aggravate the existing stress on the country's ecological and socioeconomic systems, which are already struggling with population growth, urbanization, resource use, and economic expansion (Garg *et al*., 2007; Patnaik, 2009; Patnaik, 2009; Bureau of Labour Statistics, 2010). Besides this, India is experiencing an escalating need for power and is anticipated to rise swiftly in the coming years (Kumar *et al*., 2023). It also faces the challenge of being the world's third largest greenhouse gas (GHG) emitter, having tripled its carbon dioxide emissions from fuel combustion between 1990 and 2011, with projections indicating an increase of nearly 2.5 times from 2008 to 2035. Moreover, India possesses a significant concentration of polluted urban areas, with 12 cities ranked among the top 15 most polluted in the world. India has formulated a considerable strategy to tackle these challenges and mitigate emissions (Dubash, 2013) [19].

1.1 Environmental sustainability: Environmental sustainability is a framework for future-oriented thinking that integrates economic, social, and environmental dimensions to preserve a high quality of life (Biberman & Bajpai, 2020) [4]. "Sustainability" means establishing and maintaining conditions that enable humans and nature to coexist in productive harmony (Federal Register, 2009; Heinberg, 2010). It emerged from the environmental movement of the 1960s, which primarily addressed concerns about the rapid consumption of natural resources relative to replenishment rates. The United Nations (UN) initially addressed the environmental costs of growth-oriented or conventional development. However, the World Commission on Environment and Development (WCED) clarified in its report 'Our Common Future' (1987) (commonly referred to as the Brundtland Commission) that development is considered 'sustainable' when it 'meets the needs of the present without compromising the ability of future generations to meet their own needs' (WCED, 1987). The United Nations Conference on the Environment in Stockholm (1972) and the Conference on Environment and Development (UNCED) in Rio de Janeiro (1992) addressed the environmental costs associated with development. The environment comprises a collection of physical and biological entities that facilitate human existence in various forms. It is a component of the development process that prioritizes the sustainable utilization of natural and social resources, focusing on continuity and future implications.

1.2 SDG 13-Objectives and Targets: SDG 13 seeks to implement urgent measures to mitigate climate change and its impacts, establishing five global targets to fulfill this objective. The Ministry of Statistics and Programme Implementation (MoSPI) has established six indicators at the national level to assess India's progress in meeting targets 13.1, 13.2, and 13.3 of Sustainable Development Goal 13.

Table 1: SDG 13 – Targets and Indicators [1]

SDG 13-Climate Action **Goal**- Take urgent action to combat climate change and its impacts	
Targets	**Indian National Indicators**
13.1: Strengthen resilience and adaptive capacity to all countries' climate-related hazards and natural disasters.	13.1.1: Fatality due to extreme weather events 13.1.2: Disaster preparedness
13.2: Integrate climate change measures into national policies, strategies and planning.	13.2.1: Increase the proportion of renewable energy to the total installed generation capacity 13.2.2: Disability-adjusted life year (DALY) rate due to air pollution
13.3: Improve education, awareness-raising, and human and institutional capacity for climate change mitigation, adaptation, impact reduction, and early warning.	13.3.1: Mainstreaming (i) global citizenship education and (ii) education for sustainable development into (a) national education policies, (b) curriculum, (c) teacher education, and (d) student assessment
13. a: Implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change (UNFCCC) to provide financial assistance to developing countries to help them mitigate and adapt to climate change.	The target is not relevant in the national context
13. b: Promote mechanisms for raising capacity for effective climate change-related planning and management in developing countries.	

1.3 Status of Climate Action in India: Climate change

[1] Source- UNEP, 2015; SDG National Indicator Framework Progress Report

became a concern for policymakers in the late 1980s, marked by establishing the IPCC in 1988 (Thaker & Leiserowitz, 2014). The Indian government utilized this report to successfully incorporate the terms “historical emissions” and “common but differentiated responsibilities” (CBDR) into the preamble of the UN Framework Convention on Climate Change. The substantial population of India reinforces the "leave no one behind" principle of the Sustainable Development Goals. Following the adoption of the Sustainable Development Goals, India has prioritised climate action and is actively working to meet the obligations of the Sustainable Development Goals. Niti Aayog's latest SDG India Index (2023-24) indicates consistent progress in achieving the UN Sustainable Development Goals, particularly in health, energy, and infrastructure. The highest scores were recorded in poverty eradication (SDG 1) and climate action (SDG 13). It also implemented various climate-related policies and initiatives to address its impacts, including the National Action Plan on Climate Change (NAPCC) and establishing the Prime Minister's Council in 2008. Additionally, efforts have been made to implement the State Action Plan on Climate Change (SAPCC) at the state level (NAPCC, 2008; Dubash & Ghosh, 2019; Nayak & Nayak, 2023) [19]. Additionally, at the UN Framework Convention on Climate Change Conference of Parties 2015 (COP 21) in Paris, the Government of India committed to a Bonn Challenge pledge to mitigate climate change. The economic survey of India states that the country has taken actions to enhance sustainable development finance in the form of the ‘Framework for Sovereign Green Bonds’ released in 2022, which has enabled the mobilization of resources from diversified investors for green projects, deepening the bond market (Economics Survey of India, 2023).

India’s national policies and programs, including the National Mission on Green India, the National Afforestation Program, compensatory afforestation, and state plantation campaigns, promote and advance afforestation and sustainable forestry practices (Singh, 2024; MoEF&CC, 2019) and aim to enhance resilience to climate-induced hazards and natural disasters while encouraging the development of climate-resilient structures by Targets 13.1 and 13.2 of SDG 13. The projects within the National Action Plan on Climate Change incorporate education-related strategies that focus on climate change knowledge and skill development across various sectors, including forestry, biodiversity, health, water, and waste, facilitated by the Strategic Knowledge Mission. These interventions align directly with Target 13.3 of SDG 13 (Pahuja *et al*., 2020).

The National Disaster Management Plan (2019) delineates its risk management across multiple sectors, including agriculture, and its implications for wildlife management. It also emphasizes the importance of capacity building and outlines the guidelines established by state and central governments regarding climate-related disaster risk reduction. These policy interventions discussed are reinforced by various national policies and strategies, including the Energy Conservation Act 2001, which promotes energy efficiency and conservation; the National Policy for Farmers (2007), which supports sustainable agricultural development; the National Electricity Policy (2005), aimed at ensuring universal access to electricity; the Integrated Energy Policy advocates for the adoption of renewable energy sources (Charak *et al*., 2023; The Gazette of India, 2022) [11].

2. Objectives of the study

This paper attempts to discover the challenges India faces in achieving the Sustainable Development Goals by 2030 and in which areas further progress is needed, emphasizing the following objectives: First, to examine India's progress in achieving environmental sustainability through SDG 13. Second, to identify the key challenges and prospects in achieving SDG 13 in India.

3. Methodology

In this paper, a mixed-method approach is employed to analyze both quantitative data (e.g., energy statistics, mortality rates) and qualitative information (e.g., policy analysis, program evaluation) by utilizing a variety of sources, such as government reports, policy documents, academic literature, statistical databases, and reports from international organizations. By critically examining these sources, it is possible to assess India's progress, challenges, and potential opportunities to achieve SDG 13.

4. Measuring India's progress toward SDG 13-Climate Action

India's progress towards its 2047 development goal, *Viksit Bharat @2047* (Ministry of Education, 2023), hinges on achieving the Sustainable Development Goals (SDGs) by 2030. As per the SDG India Index 2023-24, India's SDG score has risen from 66 in 2020-21 to 71 in 2023-24. Similarly, the UN Sustainable Development Report (2024) shows an increase in India's overall SDG score from 63.4 in 2023 to 64.0 in 2024 (Sustainable Development Report, 2023; Sustainable Development Report, 2024). According to national assessments, the country has progressed from the 'performer' to the 'frontrunner' category, showing significant advancements in climate actions. The score for SDG 13 has markedly improved from 54 in 2020-21 to 67 in 2023-24. The positive trend at the national level contradicts the findings of the United Nations Sustainable Development Goals Progress Report (2024). The report shows that while India has made overall progress in achieving the SDGs, its performance, specifically on SDG 13, has declined in 2024 compared to the previous year. This discrepancy between national and international assessments underscores the complexities in measuring progress towards SDG 13. This study further looks into the factors that have contributed to India's progress in achieving SDG 13 at the national level, as measured by domestic indicators:

4.1 Disaster preparedness: The World Risk Index 2024 evaluates disaster risk across 193 countries, positioning India in third place, following the Philippines and Indonesia. India is classified in the "high" risk category, scoring 40.96. India has implemented various initiatives and strategies to enhance resilience and adaptive capacity to disasters at national, state, and regional levels. Key measures include the Disaster Management Act of 2005, the National Policy on Disaster Management of 2009 (aligned with the Hyogo Framework, 2005-2015), the Disaster Management Plan of 2016 (revised in 2019, based on the Sendai Framework for Disaster Risk Reduction, 2025-2030), and the Prime Minister’s 10-point Agenda for Disaster Risk Reduction established in 2016 (Shaw & Kishore, 2023; Sushma & Aradhna, 2020). World Meteorological Organisation (WMO) report (2023) raised concerns about the extreme heat, severe floods, and a glacial lake outburst flood-like event. It ranked India “14 out of 21 countries’ composite scores which calculate based on risk knowledge,

observation and forecasting, warning, dissemination and preparedness to respond" (Choubey, 2024). Although the government has taken many initiatives despite these, the country needs to improve its disaster preparedness and combating infrastructure to meet the emerging dangers of climate change.

4.2 Renewable Energy: India is enhancing its capacity for renewable energy sources and decreasing its dependence on fossil fuels. India possesses a vast renewable energy resource, and the country was the first globally to establish a ministry dedicated to non-conventional energy sources in the early 1980s (Dey *et al*., 2022) [17]. Renewable energy generation increased from 36.37% to 43.1% between 2021 and 2023 (see Fig.1). Cochin International Airport in Kerala, India, became the first airport globally to be entirely powered by solar energy in 2015. The country has undergone remarkable development in terms of solar energy, hosting some of the largest solar parks, including the Bhadla Solar Park, which is recognized as the world's largest solar park. A 30 GW capacity solar-wind hybrid project, recognized as the world's largest renewable energy park, is currently being installed in Gujarat. India presents significant investment opportunities in the renewable energy sector, with ongoing projects valued at $196.98 billion. Government initiatives, including the National Solar Mission and Wind Energy Mission under the NAPCC, have significantly improved clean energy adoption.

India has established nationally determined contributions (NDCs) to fulfill Sustainable Development Goal 13, which is to achieve carbon neutrality by 2070 while aiming to triple renewable energy capacity (Government of India, 2022). The country has reduced its emissions intensity relative to GDP by 33% and aims to achieve a 45% reduction by 2030 (Singh & Kaur, 2022; Dey *et al*., 2022) [17]. The country derives 43 percent of its installed power capacity from non-fossil fuel sources, expected to increase to 50 percent by 2030 (NITI Aayog, 2023-24; Annual Report 2022-23; DFG Analysis, 2024-25). Further, the country aims to fulfill 62% of its energy requirements by 2030 by utilizing 500 gigawatts from non-fossil fuel sources (Kumar *et al*., 2010; Khare *et al*., 2022; Pal, 2023). Between 2017 and 2023, installed power capacity increased by nearly 100 gigawatts, with non-fossil fuel-based resources comprising approximately 80 percent of this growth. A report by the Reserve Bank of India (2024) indicates that the prevalence of fossil fuels in India's electricity generation will conclude by the end of 2030, with renewable energy anticipated to surpass 50%.

India supported the COP 27 agreement to provide funding for "Lose and Damage" to vulnerable countries most affected by climate disasters and announced its Long-Term Low Emissions Development Strategy (LT-LEDS), a roadmap to achieve net-zero emissions by 2070 (MoEF&CC, 2022; Kumar & Gautam, 2023). According to the country's prime minister India is

"Advancing towards a net zero future, a future powered by renewable energy" (Narendra Modi, 2024)

Government initiatives, including Lead IT 2.0 for industry transformation, the Green Credit Programme to incentivize pro-environmental actions, and the focus on the vulnerability of the Himalayan region, demonstrate India's commitment at COP 28 towards diverse strategies for sustainable development (MoEF&CC, 2023; Rezvi *et al*., 2024). During its G20 presidency, India emphasized the importance of climate action and sustainable development. Its key commitments include promoting renewable energy sources, phasing down unabated coal use, increasing energy efficiency, and encouraging individual and collective action towards a sustainable lifestyle (LiFE). During India's G20 presidency, PM Narendra Modi highlighted that

"India has become the first among G20 nations to meet its climate commitments under the 2015 Paris Agreement and that the feat was achieved ahead of schedule." (Narendra Modi, 2024, p. 2)

Source: Centre Electricity Authority (CEA), 2023

India recently, during COP 29 in Baku, Azerbaijan, expressed opposition to the new Collective Quantitative Target (NCQG), which sets an ambitious goal that requires wealthy nations to provide $300 billion annually by 2035 to help vulnerable countries tackle climate challenges. Standing up for economically disadvantaged nations of the Global South, India argued that unfair trade policies imposed by richer countries make it even harder for these nations to transition to low-emission economies (Business Today, 2024). Emphasizing its commitment to fairness and climate justice, it called for a more equitable approach that genuinely supports those most affected by the climate crisis (THE DIPLOMAT, 2024).

4.3 Industries complying with Environmental Standards: The Ministry of Environment, Forest and Climate Change (MoEF&CC) of India establishes standards for the emission and discharge of environmental pollutants, including air and water pollutants, and regulates noise limits from industrial activities across various industries in the country. This is conducted under the Environment Protection Act (EPA) and the Environment Protection Rules, 1986, aiming to protect, safeguard, and enhance environmental quality against climate change's adverse effects and mitigate pollution. In 2023, the Central Pollution Control Board (CPCB) indicated that 94.86 percent of companies in India adhere to environmental regulations.

4.4 Environmental Education and Awareness: Environmental education and awareness play an important role in environmental conservation; ecologically irrational human activities negatively impact the climate and contribute significantly to climate change. SDG 13 target 13.3 sets a goal for all countries to raise public awareness and education about climate change due to human activities. Recognizing the importance of environmental education, India has mandated its inclusion at all educational levels, including primary schools, colleges, universities, and institutes. It has established 'environmental studies' as a separate curriculum (Bhat *et al*., 2017; Puri *et al*., 2020). India has legal support for the importance of environmental education, a framework that exists only in a limited number of countries globally. The government has implemented several initiatives for environmental education, most notably the National Education Policy of 1986 (revised in 1992) and the National Education Policy of 2020, which promote the integration of environmental education at all educational levels. The government launched a comprehensive environmental awareness campaign, "Swachh Bharat Mission," targeting rural and urban areas from 2014 to 2019, aiming to achieve a "clean and healthy India" by raising environmental awareness (Bhat *et al*., 2017; Puri *et al*., 2020). In 2021, the Indian government launched 'Lifestyle for the Environment (LiFE)' during COP 26, which aims to raise awareness among people about individual behavior and environmental responsibility and

transform them into 'pro-planet people' by adopting eco-friendly lifestyles (Mehta, 2022).

5 Challenges militating against the achievement of Goal 13

Notwithstanding worldwide commitment, the SDG Progress Report 2024 indicates that only 17% of the SDG targets are on course. Progress at 50 percent is inadequate and unsatisfactory. Moreover, 30% of the Sustainable Development Goals have stagnated or regressed. As a growing nation, India encounters some significant challenges in attaining SDG 13:

The primary challenge is India's reliance on fossil fuels to meet its energy requirements. India ranked as the third largest global emitter of CO2, grapples with the pressing challenge of delivering sustainable energy to support its remarkable economic growth. The carbon intensity of its power sector is notably higher than the global average, and India continues to depend on fossil fuel-based energy sources, such as coal, oil, and solid biomass, to fulfil 80 per cent of its energy requirements. **Secondly**, a significant challenge in reaching SDG13 is that India faces the complex task of balancing economic growth and development alongside its carbon reduction objectives. In addition, financing challenges are a significant obstacle facing developing nations in addressing the adverse effects of climate change. India encounters several financing obstacles, including significant funding deficits, restricted access to cost-effective finance, a substantial debt load, and inadequate private sector investment in sustainable development initiatives. Countries like India must boost global investment by US$1.6-3.8 trillion annually to achieve low-carbon economies and improve climate resilience and adaptive capacity (IPCC, 2018). Third, India is highly vulnerable to climate change-induced natural disasters, including droughts, floods, extreme heat, changes in rainfall patterns, depletion of groundwater levels, flash floods and landslides, disproportionately affecting the most vulnerable communities (Charak *et al*., 2024; Chakravarty & Ghosh, 2023) [11, 10]. The Mapping India's Climate Vulnerability Report (2021) shows that more than 80 per cent of the population in India lives in districts that face significant risks from extreme hydrological disasters. However, the level of climate resilience and adaptive capacity remains low in many regions of India. Fourthly, a chronic concern in India is the tenuous connection between the technical capability to provide warnings and the local communities' capacity to respond effectively to official warning systems. Although the Indian government is enhancing access to data, information, knowledge, and skills, this information has not been disseminated promptly to the most vulnerable segments of the population. This results in significant loss of lives and property. Fifthly, Air pollution presents a significant challenge for India in pursuing the Sustainable Development Goals, particularly goals 13 and 11. The Air Quality Life Index (AQLI) 2024, a report by the Energy Policy Institute at the University of Chicago (EPIC), shows that countries like Bangladesh, India, Nepal, and Pakistan continue to be among the world's most polluted. In India, approximately 40% of the population resides in areas where air quality levels surpass the World Health Organization's annual PM2.5 limit of 40 µg/m³ (The AQLI 2024, The Hindu, 2024; MONGABAY, 2024). A recent observational and modeling study published in the BMJ (2023) indicates that outdoor air pollution from various sources results in 2.18 million deaths annually in India, ranking it just behind China (Lelieveld *et al*., 2023). **Sixthly**, a lack of environmental awareness and education is a significant challenge for India. In 2019, India was ranked as the seventh most affected country by climate; however, 65% of the Indian population remained unaware of the issue. The lack of environmental awareness and education and insufficient community involvement in addressing climate change obstructs sustainability efforts and weakens governmental policies contend that incorporating environmental education into the school curriculum in India faces obstacles due to insufficient resources, ineffective educational methods, and the necessity for infrastructure enhancement. The seventh challenge is the uncertainty and lack of effective implementation of climate policies at the grassroots level. Although the Indian government has formulated several climate change-related policies, the uncertainty and lack of implementation undermine efforts to address environmental issues. This often results in fragmented action on climate initiatives due to poor coordination between central, state and local governments (Dubash, 2013; Dubash *et al*., 2016; Dubash & Ghosh, 2019) [18-20].

6. Prospects for attaining SDG 13

India's notable accomplishments and the challenges outlined earlier present opportunities for advancing towards the Sustainable Development Goals, especially concerning SDG 13. These are discussed as follows.

6.1 Climate Policies: The Government of India has developed various strategies and policies for sustainable development concerning environmental protection. The National Action Plan on Climate Change (NAPCC) represents a significant policy initiative in India, having been adopted by the Government of India in 2008 to address one such pressing issue of climate change. India's National Solar Mission aims to enhance solar energy adoption while decreasing carbon emissions. The initiative establishes bold objectives for installing solar power capacity and provides financial incentives for solar projects.

6.2 Resources availability: Forests are crucial in tackling the challenges posed by global climate change as they significantly contribute to the global carbon cycle. The forests of India contribute significantly to the overall carbon sink capacity. Between 1995 and 2005, the carbon stocks in Indian forests rose from 6.24 to 6.62 tons, reflecting an annual increase of 37 tons of carbon (equivalent to 138 tons of CO2). The Food and Agriculture Organization (FAO) reported (2020) that India ranks third among the top 10 countries with increased forest areas during 2010–2020, with an average annual gain of 0.38% or 266,000 hectares in forested areas. FAO (2020) acknowledged the Indian government's Joint Forest Management strategy for the notable rise in community-managed forest areas across Asia. It supported India's dedication to targets 13a and 13b under Sustainable Development Goal 13 (Dandabathula *et al*., 2022) [14]. At the same time, the Indian Himalayan Region (IHR) encompasses nearly 50% of India's total flowering plants, with 30% being endemic to this area (Singh & Hajra, 1996). The IHR presents a favourable environment for the development of hydroelectric power, owing to the consistent availability of water sources in its rivers. This region is estimated to generate over 1.10 lakh MW of electricity.

7. Conclusion

India must achieve the Sustainable Development Goals by 2030 to realize its vision of a 'Developed India @ 2047' and mitigate climate change and its impacts. As a developing nation, India has emerged as a leader by making significant progress towards meeting the climate action goal. The paper assesses India's progress towards national-level climate targets. India has developed various strategies and policies for sustainable development related to environmental protection (Kumar & Shobhana, 2023). In 2008, the National Action Plan on Climate Change (NAPCC), clean energy transition policies promoted a shift towards renewable energy sources such as solar and wind power by providing incentives, subsidies, and favorable regulation. Additionally, the National Clean Air Programme (NCAP) seeks to reduce air pollution in Indian cities by setting targets for air quality enhancement and raising public awareness. Despite this, poor disaster management and climate finance are significant obstacles for India in achieving SDG 13. As a result, people are suffering a massive loss of life and property due to extreme weather events. Challenges include dependence on fossil fuels, economic growth and development, climate sensitivity, lack of green technology skills, air pollution, environmental awareness, and political reluctance to implement climate policies. Another obstacle is inadequate assessment of the progress of Sustainable Development Goals and the lack of sufficient data related to this issue. When compared to other South Asian countries like Bhutan (72.5), Maldives (70.9), China (70.9), Iran (69.0), Sri Lanka (67.4), Nepal (67.1) and Bangladesh (64.3), India's overall performance in achieving the Sustainable Development Goals (SDGs) is lower. This suggests that India needs to intensify its efforts to reduce its reliance on fossil fuels and achieve other SDG targets (Sustainable Development Report, 2024). Monitoring and measuring India's performance is necessary to achieve these goals. Climate adaptation should focus on achieving environmental sustainability by effectively implementing plans and policies that emphasize using clean and green energy sources, sustainable management of natural resources, reduced air pollution, and preparedness for disasters. Reaching the goals can be an essential achievement for developed India.

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