ASSESSING PROGRESS TOWARDS SUSTAINABLE DEVELOPMENT GOALS: A REGIONAL DISPARITY ANALYSIS

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How to cite this paper: Debnath, P., Ganguly, I., Sharma, T., Upadhyay, P. K., Tripathi, P. K., Vadikar, P., & Debi, H. (2025). Assessing progress towards Sustainable Development Goals: A regional disparity analysis. *Corporate Governance and Sustainability Review, 9*(2), 18–28. https://doi.org/10.22495/cgsrv9i2p2

ISSN Online: 2519-898X
ISSN Print: 2519-8971

Received: 02.10.2024
Revised: 13.01.2025; 25.02.2025; 18.03.2025
Accepted: 11.04.2025

JEL Classification: H51, R1, R3, Q2
DOI: 10.22495/cgsrv9i2p2

Abstract

The Sustainable Development Goals (SDGs), established by the United Nations (UN) in 2015, represent a universal call to action for advancing a more prosperous future for all. The present study examines the advancements and disparities in achieving the SDGs across various states and union territories (UTs) in India since 2015. The study considers secondary data derived from the National Institution for Transforming India (NITI) Aayog's SDG Index. To fulfill the outlined objectives, the study utilizes statistical analyses, including the T-test, ANOVA, and Spearman correlation analysis. The findings reveal substantial progress in SDG achievements across the states and UTs. However, progress towards individual goals remains inconsistent over the study period. The ANOVA results confirm disparities in SDG progress across regions. Additionally, the t-test results demonstrate a significant gap between financial and general SDGs. The SDG interaction analysis confirms that the maximum number of goals synergizes with other goals. This study enriches current literature by providing empirical insights into SDG progress and disparities across states and UTs for the first time in the Indian context. However, the study is constrained in its ability to describe the progress and disparities of SDGs across states and UTs. Future research endeavours may delve into the underlying factors contributing to uneven progress.

Keywords: Sustainable Development Goals, SDGs, India, Regional Disparity, NITI Aayog, Financial SDGs, General SDGs

Authors' individual contribution: Conceptualization — P.D. and H.D.; Methodology — P.D. and I.G.; Investigation — P.D., T.S., and P.K.U.; Funding Acquisition — P.D. and H.D.; Resources — P.D. and H.D.; Writing — Original Draft — P.D. and H.D.; Writing — Review & Editing — P.K.T. and P.V.

Declaration of conflicting interests: The Authors declare that there is no conflict of interest.

1. INTRODUCTION

India and 193 member states of the United Nations (UN) adopted the Sustainable Development Goals (SDGs) at the UN Summit in 2015. This new global development agenda, also known as the Global Goals, comprising 17 goals and 169 targets, replaces the Millennium Development Goals (MDGs) adopted in 2000 and has a target to be achieved by 2030 (Breuer et al., 2019; Mitra & Chatterjee, 2020). With its vast population of over 1.3 billion people, rapid economic growth, and diverse social landscape, India

is pivotal in achieving the SDGs globally. India's progress towards the SDGs will significantly influence the global outcome, given its substantial share of the world's population and economic output. According to the UN SDG report, India ranks 109th out of 193 UN member countries, with an overall achievement score of 63.99 (Sachs et al., 2024). As per the spillover score, India ranks 27 out of 193 countries, which measures the positive impact of a country's actions on other countries' abilities to achieve the SDGs (Sachs et al., 2024). India's National Development Agenda aligns with the SDGs, and the country has made significant progress in various areas. Biswas et al. (2024) reported that India had made significant progress in SDG 6 on water and sanitation for all and found regional disparities across the different states. However, the spillover effect among the target goals hinders equal growth (Nilsson, Griggs, & Visback, 2016; Kroll et al., 2019) and interactions differ significantly among countries and depend on the specific goals (Scherer et al., 2018). For example, Pradhan et al. (2017) stated that Goal 1 (No Poverty) has synergy (positive) with other goals, and Goal 13 (Climate Action) has a maximum tradeoff (adverse) effect with different goals. The Government of India has established the National Institution for Transforming India (NITI) Aayog to oversee SDGs implementation and monitor progress (Schweiger, 2016; Ghosh & Chakravarty, 2023). The SDG India Index, developed by NITI Aayog, tracks progress across states and union territories (UTs). Despite overall progress, disparities persist across states, sectors, and communities. Despite notable strides in various development indicators, India still faces formidable challenges, including poverty, inequality, environmental degradation, and healthcare disparities. The country's diverse states exhibit varying levels of socioeconomic development, underscoring the need for nuanced, state-level assessments to inform targeted policy interventions. India's development journey is marked by stark regional disparities, hindering the realization of the SDGs. The country's 28 states and 8 UTs exhibit distinct trajectories, influenced by governance, resource allocation, historical legacies, and cultural contexts. These regional disparities underscore the need for nuanced assessments to inform targeted interventions. Therefore, sustainable development is the need of the hour for better and inclusive growth (Saha et al., 2023).

In India, reaching the SDGs means tackling various issues in a way that fits the country's needs. First, India should strengthen social safety nets to help people out of poverty and improve food security by supporting farming and rural development. Expanding access to good education and healthcare is also crucial. Gender equality must be promoted, and investment in clean energy and sustainable industries is important. Additionally, India needs to focus on managing water resources wisely, taking strong climate actions, and protecting the environment. The government, businesses, and communities need to work together and contribute to these goals to make progress.

Financial inclusion, ensuring access to financial services like bank accounts, loans, and insurance for everyone, especially the poor and disadvantaged, is integral to achieving multiple SDGs. Goal 1 (No Poverty) benefits by enabling savings, credit access, and asset-building opportunities. Goal 2 (Zero Hunger) sees improved agricultural productivity through financial support for farmers. Goal 3 (Good Health and Well-being) is enhanced by affordable healthcare access facilitated by financial services. Goal 5 (Gender Equality) is promoted as women gain economic empowerment and decision-making capabilities. Goal 8 (Decent Work and Economic Growth) thrives with increased opportunities for small businesses and job creation. Goal 9 (Industry, Innovation, and Infrastructure) advances through financing for start-ups and technological developments. Goal 10 (Reduced Inequalities) is supported by inclusive financial systems benefiting marginalized groups. By advancing financial inclusion, nations can significantly progress towards these SDGs, fostering global equity and sustainability.

The study on the progress of Indian states and UTs in achieving SDGs holds significant importance as it provides a comprehensive evaluation of the performance of different regions, identifies disparities in SDGs achievements, measures progress related to financial inclusion, employs robust analytical frameworks using statistical tools, informs policymakers about successful practices and resource allocation, and aligns with India's national goal of achieving the SDGs by 2030, contributing to the broader discourse on sustainable development in the country's diverse socioeconomic landscape. For several reasons, studying the SDGs in India is extremely important (Pongiglione, 2015). This research helps understand and address different states' unique challenges, promoting national progress and equitable development. Pradhan et al. (2017) found the contradictory spillover effect (synergy and trade-off) of one goal against another. India has a vast geographical and socioeconomic diversity, leading to significant differences in development indicators across states. By analyzing each state's performance against the SDGs, researchers can pinpoint areas of disparity. Some states might excel in education and healthcare, while others lag.

This research significantly contributes to national progress and equitable development by addressing different states' unique challenges. Policymakers, researchers, and stakeholders can work together through comprehensive SDGs performance analysis to create a more inclusive, sustainable and prosperous future for all citizens of India.

This study aims to comprehensively evaluate India's progress towards achieving the SDGs across its 28 states and 8 UTs. More specifically, this study aims to:

- assess the status and progress of SDGs achievement in India;
- measure the regional disparities in SDGs achievement;
- identify the difference between financial SDGs and general SDGs achievement;
- identify the interlinkages among the SDG targets.

The present paper is structured as follows. Section 1 briefly outlines the background of the study. Section 2 reviews the relevant literature on SDG performance and progress, the formulation of hypotheses, and a summary of the objectives. Section 3 discusses data sources and research methods. Section 4 goes into the analysis and discussion of the results. Section 5 presents the study's findings and recommendations to achieve the national SDGs by 2030.

2. LITERATURE REVIEW

This study aims to thoroughly examine SDG implementation in India, focusing on socioeconomic diversity across states. It will analyze progress variations, explore financial inclusion's impact on SDGs, and identify best practices from successful states. The research will also examine the competitive dynamics among states and assess the role of transparency and accountability in governance. Special emphasis will be placed on addressing regional challenges and opportunities. This study offers actionable insights for promoting equitable and sustainable development, contributing to a more inclusive and practical approach to achieving the SDGs by 2030.

Since 2015, the countries of the UN have been working to address 17 of the most difficult challenges facing humanity, intending to achieve a more peaceful and prosperous world by 2030. In India, the Agenda 2030, featuring 17 SDGs, has become a guiding framework endorsed by all the states and UTs. Unlike earlier development agendas that mainly prioritized economic growth, the SDGs provide a comprehensive blueprint that includes a wide range of policy goals spanning economic, social, and environmental sectors. These goals are designed to work together to support sustainable development, with many of them complementing each other. This holistic approach aims to foster economic prosperity and promote social and financial inclusion and environmental sustainability across the country. Breuer et al. (2019) provide evidence of interlinkages and interdependencies among the goals. The existing literature has indicated notable advancements in sustainability practices among corporate enterprises in developing economies (Debnath, Das, Bhuyan, et al., 2024; Debnath, Das, Goel, et al., 2024; Debnath, Bhuyan, et al., 2024).

The literature review highlights various aspects of implementing SDGs and their challenges. Saini et al. (2022) noted that India's efforts towards Goal 4 are essential for improving education quality, utilizing data analysis methods such as exploratory data analysis and association rule mining. Roy and Pramanick (2019) emphasize the importance of monitoring water needs to achieve Goal 6 and address water and sanitation issues exacerbated by population growth and inequality. Dhar (2018) highlighted the advancement of Goal 5 on women's empowerment. Mishra (2020) discusses India's corporate social responsibility (CSR) requirement, which mandates companies to spend 2% of profits on activities aligned with SDGs. Poddar et al. (2019) reveal sectoral and geographic disparities in SDG CSR spending, highlighting varying industry priorities. Banerjee (2023) examined India's progress in poverty eradication, acknowledging achievements while identifying ongoing challenges. Khalid et al. (2020) express concerns about the effectiveness of SDGs in addressing real-world problems, particularly in less developed regions. Pandey (2018) evaluates India's educational initiatives, such as Sarva Siksha Abhiyan (SSA) and Right to Education (RTE), and the challenges in ensuring quality education, focusing on integrating Goal 4 through the New Education Policy. David (2018) discusses India's significant challenges in achieving SDGs, including economic imbalance and environmental degradation, and suggests strategies for overcoming these obstacles. Allen et al. (2019) proposed an integrated assessment framework for prioritizing SDG targets, stressing the need for various analytical approaches. Bennich et al. (2020) reviewed SDG interaction studies, highlighting research gaps and the need for better policy integration and system-wide approaches. Doni et al. (2020) emphasized the urgent need for climate action under SDG 13, advocating for accelerated adoption of renewable energy. Fukuda-Parr and McNeill (2019) analyzed the politics and knowledge shaping SDGs, noting challenges in target selection and the influence of big data. Sadoff et al. (2020) called for updated water policies to address contemporary challenges, aligning with broader literature on the need for innovative approaches. Horan (2019) critiques current partnership models for SDG transformations and proposes frameworks for strengthening collaborations. Nilsson, Griggs, Visbeck, et al. (2016) introduced a framework for managing SDG interactions, stressing the need for integrated approaches to tackle economic, social, and environmental challenges. United Nations Children's Fund (UNICEF, 2018) underscores the connection between SDGs and child well-being, highlighting the importance of integrating child-centric measures into development frameworks. Erin et al. (2022) identified shortcomings in SDG reporting among Nigerian companies, emphasizing the need for better compliance and regulatory enforcement. Tjoa and Tjoa (2016) highlighted a dual role of information and communications technology (ICT) in advancing and challenging SDGs, advocating for holistic ICT strategies. Erin et al. (2022) investigated the SDG reporting practices in African firms, noting low disclosure levels and the need for improved corporate commitment to sustainability reporting. Biswas et al. (2022) reported that Indian households had enough drinking water throughout the year, while 79.8% had access to toilet facilities in 2018. However, Kroll et al. (2019) reported the contradiction among SDGs because achieving one goal sometimes prevents other goals. Kumar et al. (2023) reported that the North-Eastern region of India has topped the country in Goal 1 (reducing the poverty level).

Table 1 presents a concise summary of the SDGs and their key objectives.

Table 1. Summary of the SDGs and their key objectives

Goals	*Objectives*
1. No Poverty	Eradicate poverty and halve its global rate by ensuring access to social protection and opportunities.
2. Zero Hunger	End hunger and malnutrition by ensuring access to nutritious food and supporting sustainable agriculture.
3. Good Health and Well-Being	Improve health by reducing mortality rates, combating diseases, and ensuring affordable healthcare.
4. Quality Education	Provide quality education for all, ensuring primary and secondary completion and access to early and higher education.
5. Gender Equality	Achieve gender equality by ending violence and harmful practices and ensuring equal opportunities for women.
6. Clean Water and Sanitation	Ensure access to clean water and sanitation facilities and improve water quality and management.
7. Affordable and Clean Energy	Increase access to clean, affordable energy through renewable sources and improved energy efficiency.
8. Decent Work and Economic Growth	Promote inclusive economic growth and decent work, and eradicate forced labour and human trafficking.
9. Industry, Innovation and Infrastructure	Build sustainable infrastructure, foster innovation, and support inclusive industrialization.
10. Reduce Inequalities	Reduce inequalities and promote equitable economic growth by targeting the bottom 40% of the population.
11. Sustainable Cities and Communities	Create inclusive, safe, and sustainable cities and ensure access to housing and essential services.
12. Responsible Consumption and Production	Encourage sustainable consumption and production practices to reduce waste and environmental impact.
13. Climate Action	Combat climate change by enhancing resilience and integrating climate considerations into policies.
14. Life Below Water	Conserve marine ecosystems by reducing pollution and protecting marine habitats.
15. Life on Land	Protect terrestrial ecosystems by halting deforestation and promoting sustainable land management.
16. Peace, Justice and Strong Institutions	Promote peace, justice, and strong institutions by reducing violence and corruption.
17. Partnership for the Goals	Foster global cooperation and partnerships to achieve the SDGs through finance, technology, and knowledge sharing.

Source: United Nations (2016).

Several studies have been undertaken worldwide on SDGs, but very few studies have taken place in the context of India. There is an extensive research gap regarding the data availability. An extensive study on the SDGs in India will help foster the government to formulate policies. Furthermore, give policymakers a detailed idea of the ways and means to achieve those SDGs. Furthermore, there is an opportunity for studies that compare different ways of helping countries meet several SDGs at once. These studies could examine how well different plans or ways of running things work in places like India. By doing this, researchers can give useful insights to policymakers and others working on the SDGs.

3. RESEARCH METHODOLOGY

This study assesses the overall progress of Indian states and UTs in achieving the UN SDGs 2030. It employs a combination of descriptive and analytical approaches, utilizing SDG data from all states and UTs. The study relies on secondary data from the SDG Index, computed by NITI Aayog, covering 2018, 2019, 2020, and 2023. The SDG Index calculates scores for each state and UT based on their performance on the 16 SDGs. These scores are then used to generate an overall score, known as the composite score, which measures the combined performance of the state or UTs across all 16 SDGs. The overall score measures the total progress towards achieving all 17 SDGs. The score can be interpreted as a percentage of SDG achievement. A score of 100 indicates that all SDGs have been achieved. The scores range from 0 to 100, with a score of 100 indicating that the state or UT has achieved all the targets. A higher score indicates that the state or UT has made greater progress toward the targets. However, Goal 14 (Life Below Water) has not been included in the calculation of the composite score for the Index as it solely pertains to the nine coastal states.

The data analysis involves the use of statistical tools such as arithmetic mean, standard deviation (SD), and coefficient of variation (CV) in Microsoft Excel. Additionally, a one-way ANOVA test is employed to assess the extent of differences in SDG goal achievement among the six categorized regions. Growth rates in SDG achievements across states and UTs are depicted, and statistical significance is evaluated using a t-test. According to the United Nations Capital Development Fund (UNCDF, n.d.), seven SDGs (SDG 1: Eradicate Poverty; SDG 2: Eliminate Hunger; SDG 3: Promote Health and Wellness; SDG 5: Achieve Gender Equity; SDG 8: Foster Equitable Employment and Economic Advancement; SDG 9: Foster Innovation and Develop Sustainable Infrastructure; and SDG 10: Eliminate Disparities) are linked to financial inclusion and categorized as financial SDGs. The performance differences between financial SDGs (FSDGs) and general SDGs (GSDGs) are also illustrated with the help of a t-test.

The study emphasizes the importance of examining regional disparities in SDG achievements in India. The country's diverse socioeconomic landscape leads to varying levels of development across regions, resulting in inconsistent progress toward the SDGs. Identifying these disparities enables better resource allocation, more effective policy implementation, and the identification of successful practices that can be shared among states. As an exception for the ease of study, Sikkim has been considered under the Eastern Region because, in many government research and policy planning efforts, Sikkim is classified within

the Eastern Region. The analysis focuses on six geographical regions: Central Region (CR), Eastern Region (ER), North-Eastern Region (NER), Northern Region (NR), Southern Region (SR), and Western Region (WR).

A t-test is employed to determine the statistical significance of differences in SDG growth among the states and to differentiate the achievement of FSDGs and GSDGs. At the same time, one-way ANOVA is used to find the difference in SDG achievement across the 16 SDGs.

The methodology emphasizes evaluating significant differences in SDG achievement among states within the same region and across different regions. The calculations of SD and CV provide insights into the level of dispersion and variability within each state in a given region, with higher values indicating greater variation among the states.

Further, to examine the interlinkage among SDGs, we systematize the identification of synergies and trade-offs using the NITI Aayog's SDG indicator for 28 states and 8 UTs over four years under consideration. A significant positive correlation between the SDG indicators is classified as a synergy while a significant negative correlation is classified as a trade-off (Pradhan et al., 2017). Here, synergies indicate that progress in one goal favours progress in another. On the other hand, trade-offs advocate progress in one goal hinders progress in another. We examine synergies and trade-offs to the results of a Spearman correlation analysis across all the SDG indicators, accounting for all states and the entire time frame between 2018 and 2023–2024 (Kroll et al., 2019).

4. RESULTS AND DISCUSSION

The SDGs have been a cornerstone of global efforts to achieve a more equitable, sustainable, and prosperous future. As a signatory to the 2030 Agenda, India has committed to achieving the 17 SDGs, encompassing a broad range of social, economic, and environmental objectives. This chapter presents our research findings on the status of SDG achievements in India, highlighting progress and disparities across various goals and regions. The following discussion interprets the results in the context of India's development landscape, identifying areas of success for accelerated progress toward achieving the SDGs. By examining the current SDG achievements in India, this chapter aims to inform policy decisions, guide future research, and contribute to the global discourse on sustainable development.

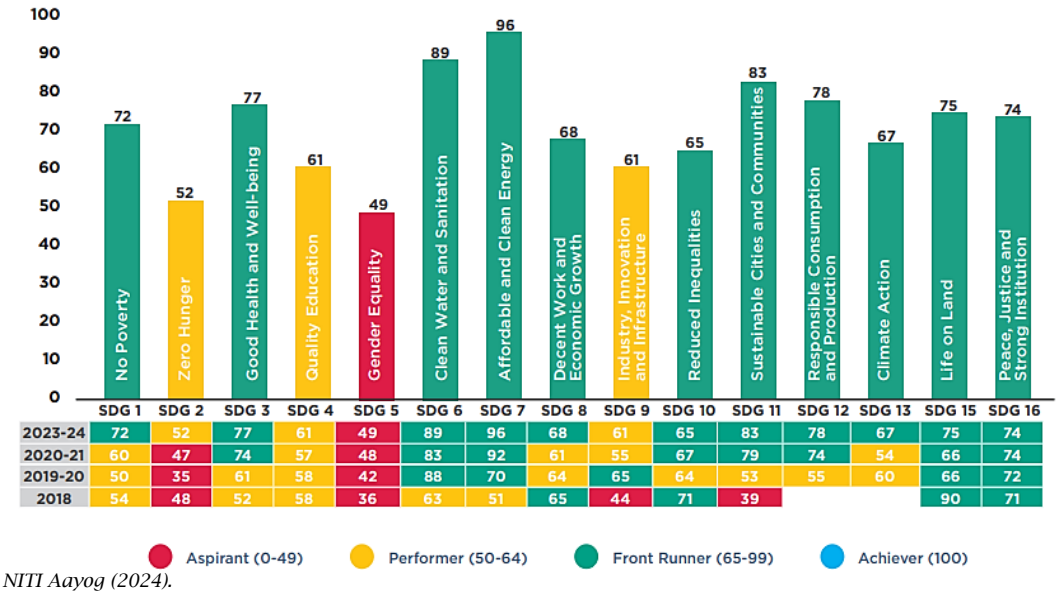
Figure 1. National SDG performance for 2018–2023

Source: NITI Aayog (2024).

Figure 1 presents India's progress in SDG performance from 2018 to 2023. The composite score improved from 57 in 2018 to 66 in 2020–2021 and 71 in 2023–2024.

Figure 2 presents the goal-wise performance during the study period. Figure 2 shows that India has taken significant strides in accelerating progress on the SDGs between the 2020–2021 and 2023–2024 editions of the Index. Noteworthy advancements have been observed in Goals 1 (No Poverty), Goal 8 (Decent Work and Economic Growth), and Goal 13 (Climate Action). These are now in the Front Runner category (a score between 65 to 99). Among these, Goal 13 has shown the most substantial improvement, with its score increasing from 54 to 67. Goal 1 follows closely, with its score rising significantly from 60 to 72.

Figure 2. SDG goal-wise performance in India



Source: NITI Aayog (2024).

The progress underscores the effects of the focused programmatic interventions and schemes of the Union and State Governments in improving the lives of citizens. Since 2018, India has witnessed substantial progress in several key SDGs. Significant progress has been made in Goal 1 (No Poverty), Goal 3 (Good Health and Well-being), Goal 6 (Clean Water and Sanitation), Goal 7 (Affordable and Clean Energy), Goal 9 (Industry, Innovation and Infrastructure) and Goal 11 (Sustainable Cities and Communities).

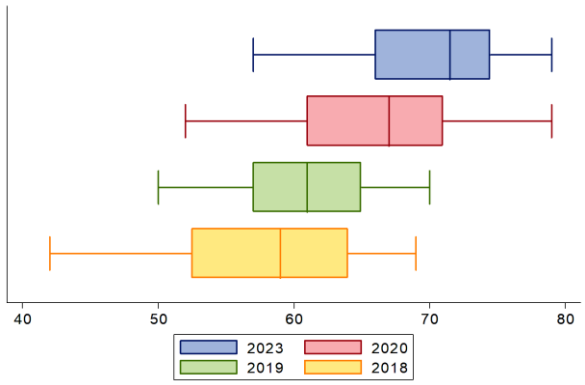
Table 2. ANOVA output among SDGs

Source of variation	*SS*	*df*	*MS*	*F*	*p-value*
Between groups	223835.78	15	14922.39	57.23004	6.3399E-144
Within groups	542868.82	2082	260.7439		
Total	766704.6	2097			

Source: Authors' elaboration.

Table 2 presents the output of the ANOVA test carried out among 16 Goals to compare their means and identify statistically significant differences between them. From Table 2, it is seen that the F-statistic of 57.23004 is quite large, and the *p*-value of 6.3399E-144 is extremely small, indicating significant differences between the group means. This means there is a significant difference among the targeted goals during the study period.

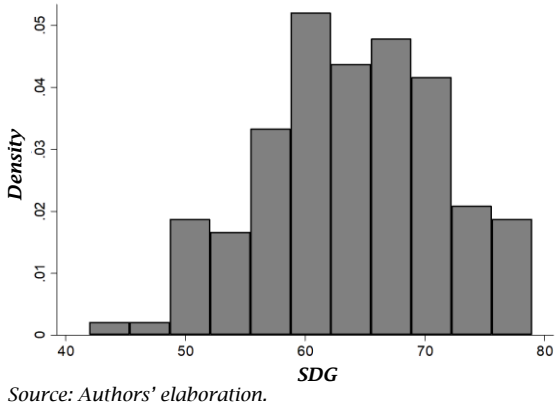
Figure 3. Boxplot of SDGs for 2018–2023



Source: Authors' elaboration.

To better understand the distribution of overall SDG performance across states and UTs, we utilized boxplots for each year from 2018 to 2023 (see Figure 3). In the context of aggregate SDG performance, Figure 3 illustrates that the size of the boxplot varies over the study period, indicating that the spread of SDG performance is inconsistent. However, there are no outliers during this period. Nonetheless, there is a noticeable difference in SDG performance across the study period. The lower quartile of SDG performance for 2023 corresponds to the upper quartile of 2020 and is significantly higher than in the earlier years, 2018 and 2019. This demonstrates a consistent increase in SDG performance across the states and UTs over the study period. The median positioning within the box suggests that the distribution is symmetric for 2018 and 2019 but asymmetric in the last two years, 2020 and 2023. Therefore, it is evident that despite the increase in overall SDG performance, disparities exist across the states and UTs.

Figure 4. Histogram of SDG performance for 2018–2023

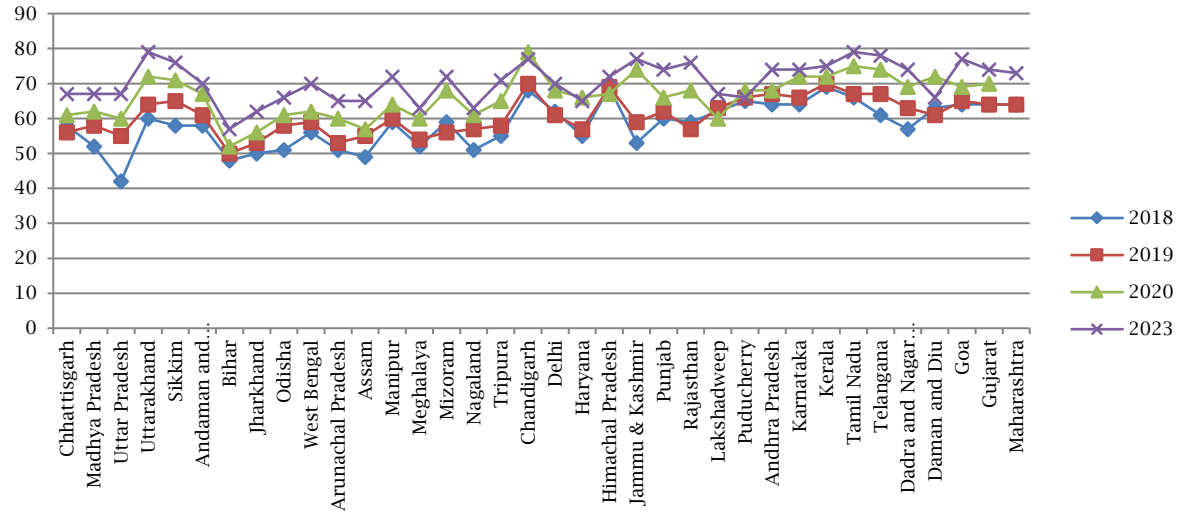


Source: Authors' elaboration.

Figure 4 illustrates the distribution pattern of SDG performance across the states and UTs during the study period. Figure 4 indicates that SDG performance follows a normal distribution.

Figure 5 shows the SDGs growth across different states and UTs from 2018 to 2023–2024. Figure 5 indicates a general upward trend in SDG growth rates across most states and UTs, suggesting progress in achieving sustainable development objectives. The Index records a significant increase in the number of states and UTs achieving Front Runner status (score between 65 to 99). In 2023–2024, 32 states/UTs scored between 65 and 99, up from 22 in the 2020–2021 edition. Notably, 10 new states and UTs are in the Front Runner category. These include Arunachal Pradesh, Assam, Chhattisgarh, Madhya Pradesh, Manipur, Odisha, Rajasthan, Uttar Pradesh, West Bengal, Dadra and Nagar Haveli, and Daman and Diu. Sikkim and Chhattisgarh are leading in SDG growth, showing significant improvements over the five-year period, which suggests effective policies and initiatives in these regions. States like Uttar Pradesh and Bihar show lower growth rates, indicating challenges in meeting SDG targets, which may reflect socioeconomic factors that hinder progress. There is considerable variability among states, with some like Kerala and Telangana also showing strong growth.

Figure 5. SDGs growth across different states and UTs



Source: Authors' elaboration.

In contrast, others lag behind, highlighting the need for tailored strategies to address specific regional challenges. The performance of UTs, such as Lakshadweep and Daman and Diu, also varies, with some showing promising growth rates. Figure 5 effectively highlights disparities in SDG growth across states and UTs, emphasizing the need for targeted interventions to support underperforming regions while continuing to bolster the progress of leading states. From Figure 5, it is clear that there is overall growth in SDG achievement across the states and UTs, whereas, it is also seen that there is a noticeable difference in SDG growth rates. The difference is statistically tested in Table 3.

Table 3. T-test output of SDG growth across India

Year diff.	*Obs.*	*Mean 1*	*Mean 2*	*Dif.*	*St. Err.*	*t-value*	*p-value*
2019–2018	36	60.834	58.278	2.556	0.538	4.75	0.0000*
2020–2019	35	66.171	60.743	5.429	0.628	8.65	0.0000*
2023–2020	35	70.486	66.171	4.314	0.546	7.9	0.0000*
2023–2018	36	70.555	58.278	12.278	0.879	13.95	0.0000*

*Note: * Significant at a 1% level.*
Source: Authors' elaboration.

T-test is a statistical test used to compare the means of two groups to determine if they are significantly different from each other. Table 3 displays the results of the t-test on SDG performance between two years. Table 3 illustrates notable changes in the mean values across the year, and the changes are consistent throughout the study period. All comparisons yield highly significant p-values (0.0000), signifying the statistical significance of the observed differences.

Table 4. Descriptive analysis of SDGs across regions

Region	*SDG score*	*Sample size*	*SD*	*CV*
Central Region (CR)	61.25	16	8.50	0.1387
Eastern Region (ER)	59.87	24	7.48	0.1249
North-Eastern Region (NER)	59.82	28	6.39	0.1068
Northern Region (NR)	66.23	30	6.99	0.1055
Southern Region (SR)	69.11	28	4.85	0.0701
Western Region (WR)	66.47	17	5.22	0.0785

Source: Authors' elaboration.

Table 4 clearly shows different regions' SDG scores, sample sizes, how much the scores vary, and how consistent they are. The SDG score is an important performance measure, while the sample size tells us how many data points were collected. The standard deviation (SD) shows how much the scores differ from the average, and the coefficient of variation (CV) helps compare this difference to the average score.

The Southern Region (SR) has the highest SDG score of 69.11 and the lowest variation at 4.85, which means it performs well and has consistent results. The Northern Region (NR) comes next with a score of 66.23 and moderate variation, while the Western Region (WR) scores 66.47 but has a bit more variation. The North-Eastern Region (NER) and Eastern Region (ER) have scores of 59.82 and 59.87, respectively, with the NER showing the least variation. The Central Region (CR) scores 61.25 and moderate variation.

In brief, the Southern Region is the best performer with consistent results. The Northern and North-Eastern Regions reported the lowest score. The Central and Eastern Regions have average performance, and the Western Region has a high score but more variation. Overall, the regions show different levels of performance and consistency.

Table 5. ANOVA output for regional disparities in SDG achievement

Goals	*Source*	*SS*	*df*	*MS*	*F*	*Prob. > F*
SDGs	Between groups	2001.53977	5	400.307954	9.19	0.0000*
	Within groups	5968.01268	137	43.5621363		
Goal 1	Between groups	3982.08544	5	796.417089	4.10	0.0017*
	Within groups	26596.9076	137	194.138011		
Goal 2	Between groups	9538.2256	5	1907.64512	8.91	0.0000*
	Within groups	29332.8933	137	214.10871		
Goal 3	Between groups	5749.81142	5	1149.96228	6.89	0.0000*
	Within groups	5749.81142	137	166.848602		
Goal 4	Between groups	8421.51536	5	1684.30307	15.32	0.0000*
	Within groups	15063.8413	137	109.955046		
Goal 5	Between groups	552.498834	5	110.499767	1.03	0.4032
	Within groups	14714.1585	137	107.402617		
Goal 6	Between groups	4161.54184	5	832.308367	3.71	0.0035*
	Within groups	30705.9127	137	224.13075		
Goal 7	Between groups	9560.87992	5	1912.17598	4.48	0.0008*
	Within groups	58516.0571	137	427.124505		
Goal 8	Between groups	4794.4989	5	958.89978	8.12	0.0000*
	Within groups	16181.7109	137	118.114678		
Goal 9	Between groups	13428.598	5	2685.7196	6.57	0.0000*
	Within groups	56026.339	137	408.95138		
Goal 10	Between groups	2670.40665	5	534.081329	2.61	0.0276**
	Within groups	28076.5724	137	204.938484		
Goal 11	Between groups	7433.52619	5	1486.70524	3.68	0.0037*
	Within groups	54497.4667	137	403.684939		
Goal 12	Between groups	3260.31754	5	652.063509	2.60	0.0295**
	Within groups	25302.5983	137	250.520776		
Goal 13	Between groups	1966.51429	5	393.302858	1.56	0.1778
	Within groups	25442.3642	137	251.904596		
Goal 14	Between groups	2310.71296	5	1155.35648	2.71	0.0867
	Within groups	10224.9167	137	426.038194		
Goal 15	Between groups	5014.96617	5	1002.99323	4.06	0.0018*
	Within groups	33807.1877	137	246.767793		
Goal 16	Between groups	2579.20138	5	515.840276	7.00	0.0000*
	Within groups	10096.3371	137	73.6958911		

*Note: * Significant at a 1 % level; ** significant at a 5 % level.*
Source: Authors' elaboration.

Table 5 shows the results of one-way ANOVA, which depicts significant differences between groups for the overall SDGs (F = 9.19, $p < 0.0000$), indicating that at least one SDG performs differently than the others. The results also reveal significant differences among groups for Goal 1 (F = 4.10, $p = 0.0017$), suggesting varying levels of achievement in eradicating poverty, and highly significant differences for Goal 2 (F = 8.91, $p < 0.0000$), indicating substantial variation in efforts to end hunger. Goal 4 shows the most significant difference (F = 15.32, $p < 0.0000$), highlighting notable disparities in education access and quality. In contrast, Goal 5 does not show significant differences (F = 1.03, $p = 0.4032$), suggesting more uniform efforts in gender equality. There are also significant differences in water and sanitation efforts for Goal 6 (F = 3.71, $p = 0.0035$). Most goals from 7 to 16 exhibit significant differences, particularly Goal 8 (F = 8.12, $p < 0.0000$), Goal 9 (F = 6.57, $p < 0.0000$), and Goal 11 (F = 3.68, $p = 0.0037$), indicating varied progress in sustainable economic growth, innovation, and urban development. In summary, while many SDGs show significant differences in performance between groups, some, like Goal 5, are more consistent across the board, helping identify areas that may require more focused efforts to achieve the SDGs effectively.

Figure 6. The mean score of FSDGs and GSDGs

Source: Authors' elaboration.

Figure 6 presents the mean difference between FSDGs and GSDGs and reveals that GSDGs have a higher mean value of 68.66 compared to FSDGs, which have a mean value of 58.43. This 10.23-point

difference highlights that GSDGs are performing better on average. This disparity suggests that GSDGs, which focus on social equity, environmental sustainability, and institutional effectiveness, are currently more effective or advanced than FSDGs. The lower performance of FSDGs indicates a need for increased attention to financial mechanisms and practices. Addressing this gap could involve enhancing financial strategies, investments, and accountability, thereby improving overall sustainability efforts and achieving a more balanced approach to development.

Table 6. Two-sample t-test with equal variances between GSDGs and FSDGs

Variable	*Obs.*	*Mean*	*Std. Err.*	*SD*
FSDGs	143	58.43357	0.6886996	8.23565
GSDGs	143	68.66027	0.6889617	8.238784
Combined	286	63.54692	0.5728464	9.687712
Diff.		10.2267	0.9741537	
Diff. = mean (GSDGs) – mean (FSDGs) H_0: diff. = 0			t = 10.4980 Degrees of freedom = 284	
Ha: diff. < 0 Pr(T < t) = 0.0000*	*Ha*: diff. ! = 0 Pr(|T| > |t|) = 0.0000*		*Ha*: diff. > 0 Pr(T > t) = 1.0000*	

*Source: Authors' elaboration. * Significant at a 1% level.*

Table 6 presents the results of a two-sample t-test comparing two groups, FSDGs and GSDGs, each with 143 observations. The means for FSDGs and GSDGs are 58.43 and 68.66, respectively, indicating that GSDGs have a significantly higher mean, with a difference of -10.23. The standard errors for FSDGs and GSDGs are 0.67 and 0.69, respectively. The t-value is -10.50, suggesting a strong statistical significance. In conclusion, the GSDG group significantly outperforms the FSDG group based on the mean scores.

Table 7 presents the correlation among the target goals. From Table 7, it is visible that the goals under consideration are correlated to each other. The maximum number of goals depicts the synergy effect on other indicators. This indicates that advancement in one target helps to achieve other goals as well. Goals 1, 2, 3, 4, and 5 showed maximum synergic effects on other indicators during the study period. However, Goal 15 (Life on Land) depicted a maximum trade-off effect over other indicators. That indicates progress in Goal 15 hinders progress in other indicators like Goals 1, 2, 3, 5, 7, and 9. The findings are similar to previous findings (Nilsson et al., 2018).

Table 7. Correlation among SDGs

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*
1	1															
2	0.428*	1														
3	0.539*	0.263*	1													
4	0.286*	0.486*	0.351*	1												
5	0.432*	0.331*	0.420*	0.248*	1											
6	0.092	0.007	0.272*	0.133	0.497*	1										
7	0.424*	0.317*	0.573*	0.308*	0.440*	0.551*	1									
8	0.212*	0.023	0.221*	0.345*	0.228*	0.295*	0.234*	1								
9	0.089	0.094	0.352*	0.289*	0.0577	0.1417	0.319*	0.243*	1							
10	0.094	0.028	0.085	0.1349	-0.112	-0.129	-0.152	0.0638	-0.088	1						
11	0.439*	0.169*	0.536*	0.222*	0.484*	0.434*	0.615*	0.249*	0.283*	-0.1405	1					
12	0.321	0.207*	0.111	-0.07	0.1249	-0.006	0.221*	-0.161	-0.371*	0.0193	0.1479	1				
13	0.383*	0.275*	0.321*	0.1686	0.282*	0.0812	0.1572	0.222*	-0.048	0.223*	0.261*	0.195*	1			
14	0.025	-0.008	-0.149	-0.247	-0.051	-0.039	0.1724	-0.164	-0.459*	0.0184	-0.0482	0.516*	0.0963	1		
15	-0.222*	-0.177*	-0.241*	0.0491	-0.187*	-0.034	-0.383*	0.0211	-0.184*	0.178*	-0.177*	-0.058	-0.021	0.0369	1	
16	0.221*	0.246*	0.211*	0.352*	0.1575	0.236*	0.259*	0.281*	0.228*	-0.0431	0.1248	0.0564	0.1463	-0.173	-0.171*	1

*Note: * Significant at a 1% level.*
Source: Authors' elaboration.

All states have shown an improvement in the overall score. The overall SDG score for the country is 71 for 2023–2024, a significant improvement from 66 in 2020–2021 and 57 in 2018 (NITI Aayog & United Nations, 2018). Scores for states range from 57 to 79 in 2023–2024, marking a substantial improvement from the year 2018 range of 42 to 69. Significant progress in Goal 1 (No Poverty), Goal 8 (Decent Work and Economic Growth), Goal 13 (Climate Action), and Goal 15 (Life on Land). Goal 13 records the highest increase in score from 54 in 2020–2021 to 67 in 2023–2024, followed by Goal 1 from 60 to 72. Thirty-two states and UTs in the Front Runner category with 10 new entrants —Arunachal Pradesh, Assam, Chhattisgarh, Madhya Pradesh, Manipur, Odisha, Rajasthan, Uttar Pradesh, West Bengal, Dadra and Nagar Haveli, and Daman and Diu. Between 2018 and 2023–2024, the fastest moving states are Uttar Pradesh (increase in score by 25), followed by Jammu & Kashmir (21), Uttarakhand (19), Sikkim (18), Haryana (17), Assam, Tripura and Punjab (16 each), Madhya Pradesh and Odisha (15 each). The maximum number of indicators has shown a synergic effect over other indicators during the study period.

Significant regional disparities mark India's progress towards achieving the SDGs. Despite overall progress, certain states and regions lag behind in achieving specific SDG targets, such as poverty reduction, clean water, and sanitation. Economic, social, and institutional factors contribute to these disparities. To address these challenges, policymakers should design targeted interventions, promote regional planning and coordination, and invest in capacity-building initiatives for local institutions. By acknowledging and addressing these regional disparities, India can accelerate its progress towards achieving the SDGs and ensure a more equitable and sustainable development trajectory.

5. CONCLUSION

The study emphasizes the SDGs in guiding India toward a more equitable and sustainable future. The analysis reveals significant disparities in the progress of different states, highlighting the need for tailored strategies that address specific regional challenges. As India strives to meet the 2030 deadline for achieving the SDGs, policymakers need to leverage sustainable practices from states that have excelled in certain areas, such as education and healthcare, while focusing on those that lag in necessities like clean water and food security.

Moreover, the study underscores the integral role of financial inclusion in advancing multiple SDGs, particularly in enhancing the livelihoods of marginalized populations. By ensuring access to financial services, India can foster economic growth, improve health outcomes, and empower women, thereby contributing to a holistic approach to sustainable development. The findings also stress the importance of collaboration among various stakeholders, including government, businesses, and civil society, to create a unified effort toward achieving these goals. Transparency and accountability in governance are crucial, as they enable citizens to engage actively in the development process and hold their leaders accountable.

In conclusion, this research illuminates the current status of SDG attainment across states and UTs and provides actionable insights for future strategies. By addressing the unique socioeconomic challenges faced by different states, India can make significant strides toward creating a more inclusive, sustainable, and prosperous society for all its citizens.

The study has limitations, leaving scope for further research in this field. First, it shows that SDG progress varies significantly between states, but it may not fully explain the reasons behind these differences. A deeper look at each region's specific social and economic factors could provide more insight. Second, while the study highlights the importance of financial inclusion, it may not cover all the ways financial services impact SDGs. Additional research is needed to understand how different financial products affect various SDGs.

Thirdly, the findings are specific to India and might not apply to other countries with different conditions and challenges. Comparing these results with studies from other countries could offer more perspective on SDG implementation in diverse contexts. Fourthly, the study's timeframe (2023–2024) may not fully capture the long-term impacts of SDG implementation. Lastly, the study may not have access to granular data at the state or district level, which limits the analysis of sub-national variations.

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