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Indian States and UTs Progress Analysis Towards Sustainable Development Goals 2030: SDG 11 Focus

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Abstract

This research analyses India's progress towards SDG 11: "Make cities and human settlements inclusive, safe, resilient, and sustainable," utilizing secondary data from NITI Aayog's SDG India Index and government reports. India demonstrates robust commitment through initiatives like the Smart Cities Mission and Swachh Bharat Mission-Urban, leading to commendable achievements in housing, sanitation access, and waste collection, reflected in a national SDG 11 Index Score of 83. However, significant challenges persist in municipal solid waste processing and, critically, sewage treatment capacity, where many states lag. Pronounced regional disparities, from Chandigarh's perfect score of 100 to Ladakh's 33, highlight uneven development. The study concludes that targeted interventions, strengthened environmental infrastructure, and localized governance are essential to ensure truly inclusive and sustainable urban development across all regions.

Keywords: SDG 11, Sustainable Development Goals, NITI Aayog, Urban Governance

1. Introduction

The 2030 Agenda for Sustainable Development, adopted by the United Nations in 2015, established a universal policy framework to foster a world free from poverty, hunger, disease, and violence, envisioning a planet where all forms of life can thrive in safety and sustainability (Bhanja & Roychowdhury, 2020). Comprising 17 Sustainable Development Goals and 169 targets, this ambitious agenda calls for integrated action to address interconnected global challenges. Despite this global commitment, the pace of progress has been insufficient, with recent reports indicating that only 17 percent of SDG targets are on track, 50 percent show weak progress, and 30 percent have either stalled or reversed (NITI Aayog, 2024). This underscores the critical need for continued, focused efforts at all levels to accelerate the achievement of these vital objectives.

As the world's most populous nation, India plays a pivotal role in the global endeavour to achieve the SDGs by 2030, bearing a significant responsibility given its 17.7% share of the total world population (Chatterjee, 2021). India has actively integrated the 2030 Agenda into its core policy formulations, recognizing that much of its national development agenda aligns with the SDGs. The country operates within a federal structure encompassing 28 states and 8 Union Territories, making the progress at the sub-national level crucial for the overall national achievement of the SDGs. Initiatives by NITI Aayog, a policy think tank of the Government of India, have successfully institutionalized SDGs at both national and sub-national levels, promoting a systematic approach to localization and fostering collaborative competition among

states. Nationally, India has demonstrated commendable progress, with its composite SDG India Index score improving from 60 in 2019-2020 to 66 in 2020-2021, and further to 71 by 2023-2024, indicating a positive trajectory across various goals, including SDG 11 (NITI Aayog, 2021, 2024).

This research specifically focuses on Sustainable Development Goal 11: "Make cities and human settlements inclusive, safe, resilient, and sustainable." This goal is particularly pertinent for India, which is undergoing rapid urbanization, with a significant proportion of its population expected to reside in urban areas by 2030 (Baskaran et al., 2022; Bhatnagar et al., 2018; Mahadevia et al., 2023). SDG 11 addresses crucial dimensions such as access to adequate, safe, and affordable housing and basic services; access to safe, affordable, accessible, and sustainable transport systems; and enhancing inclusive and sustainable urbanization and planning. These targets aim to create urban environments that are not only economically vibrant but also socially equitable and environmentally sound. However, rapid and often unplanned urbanization in India presents significant challenges, including issues of poverty, inadequate housing, sanitation, transport infrastructure deficits, and environmental vulnerabilities (Hatab et al., 2021; Nandi & Gamkhar, 2012). The choices India makes regarding its urban development will profoundly influence the success of global agendas such as the New Urban Agenda and the Paris Agreement (Mahadevia et al., 2023).

Given the federal structure and diverse socio-economic landscapes of India, analyzing progress at the state and UT levels is essential to uncover regional disparities and inform targeted interventions. NITI Aayog has developed a framework with national-level indicators to measure performance on SDG 11 across states and UTs, revealing significant variations in their index scores (NITI Aayog, 2021, 2024). This study aims to provide a comprehensive analysis of the progress made by Indian States and Union Territories towards achieving SDG 11 targets by 2030. By examining the current status, identifying key challenges, and highlighting successful strategies at the sub-national level, this research seeks to offer valuable insights for policymakers, urban planners, and stakeholders. Such an analysis is critical for recalibrating policies, fostering localized approaches, and ensuring that India's urban future aligns with the vision of sustainable and inclusive development as outlined in the 2030 Agenda.

2. Literature Review

This research has tried to critically examine India's progress, persistent challenges, and key policy interventions related to Sustainable Development Goal 11: "Make cities and human settlements inclusive, safe, resilient, and sustainable." Given India's rapid urbanization, analyzing sub-national performance across its states and Union Territories is crucial for understanding the nuances of SDG 11 achievement by 2030.

2.1 India's Commitment and Sub-National Performance on SDG 11

India has demonstrated significant commitment to the 2030 Agenda for Sustainable Development, aligning national strategies with global goals (Bhanja & Roychowdhury, 2020). The NITI Aayog, a government policy think tank, plays a central role in localizing and monitoring SDGs at both national and sub-national levels, thereby fostering cooperative federalism through standardized monitoring frameworks (NITI Aayog, 2021). The SDG India

Index, an annual report by NITI Aayog, is a primary tool for assessing progress on SDG 11 across states and UTs.

2.2 Challenges of Rapid Urbanization

India's trajectory of rapid and often unplanned urbanization poses significant obstacles to achieving SDG 11. The country is expected to experience unprecedented urban growth, with its urban population likely to double by 2050 (Mahadevia et al., 2023). This rapid expansion places immense pressure on existing infrastructure and resources (Narasimhan et al., 2023; Rode, 2020).

Major challenges include:

- **Inadequate Housing and Basic Services**: A segment of urban households still lacks adequate housing. While slums in larger cities may offer better service access than rural areas, underperformance in comparison to non-slum neighborhoods persists (Bettencourt & Sahasranaman, 2019). There is a widening gap between demand and supply for domestic water, and inadequate wastewater treatment capabilities contribute to pollution (Syed et al., 2023). Many urban areas also face challenges with aging and inefficient water supply and sanitation systems (Narasimhan et al., 2023).
- **Sustainable Transport**: Sustainable urban transport is crucial for inclusive urbanization, addressing issues like equity and climate change (Mahadevia et al., 2023). However, high road accident rates remain a concern, and existing urban transport policies have not always achieved their intended success (Verma et al., 2021).
- **Waste Management and Environmental Degradation**: Unregulated urban growth leads to environmental degradation, including increased pollution, loss of green spaces, and amplified climate shocks such as water scarcity and urban flooding (Goswami et al., 2022; Jain, 2017; Rallapalli et al., 2019).
- **Infrastructure Gaps**: Cities face significant infrastructure deficits, and inadequate resilience measures exacerbate disaster risks (Govindarajulu, 2020).

2.3 Policy Interventions and Governance

The Government of India has introduced several initiatives to address SDG 11, including the Smart Cities Mission, launched in 2015. SCM aims for sustainable and inclusive urban development, aligning with SDG 11 targets such as enhancing inclusive urbanization and planning (Bhatnagar et al., 2018; Llorca et al., 2020). The mission focuses on improving services, green buildings, waste management, and renewable energy integration (Akhtar & Kirmani, 2021). Other notable programs like Swachh Bharat Abhiyan and Pradhan Mantri Awas Yojana-Urban contribute to housing and sanitation improvements.

Effective governance is paramount for translating policy into tangible outcomes. Local governments play a critical role in executing global objectives at the local level and directly influencing the quality of life (Praharaj & Chatterji, 2024). Polycentric governance, characterized by multiple decision-making centers, enhances institutional innovation and adaptability to climate change in urban settings (Yadav et al., 2024). However, the benefits of

urban investments have often been unevenly distributed, highlighting the need for more inclusive monitoring and evaluation frameworks (Waghmare & Singhal, 2021). The success of these initiatives relies on strengthening urban planning and management, moving away from traditional master planning towards more participatory and strategic approaches (Maurya & Biswas, 2020).

3. Methodology

This article employs a descriptive and analytical research design to assess India's progress towards Sustainable Development Goal 11: "Make cities and human settlements inclusive, safe, resilient, and sustainable." The study primarily relies on secondary data obtained from official government reports and websites, including publications from NITI Aayog, such as the SDG India Index Report, and other relevant ministries involved in urban development and planning.

Data collection focuses on indicators and performance metrics specific to SDG 11 across Indian States and Union Territories. Qualitative content analysis will be utilized to extract and synthesize information on programmatic interventions, policy frameworks, and reported outcomes. This analysis will critically examine the challenges of rapid urbanization and the effectiveness of policy interventions like the Smart Cities Mission, identifying how governance and urban planning influence the achievement of SDG 11 targets. The aim is to uncover regional disparities and inform targeted strategies for sustainable urban development.

4. Results and Discussion

India has implemented a comprehensive suite of programs and initiatives to address the multi-faceted targets of SDG 11. These schemes are designed to tackle challenges arising from rapid urbanization, ensuring that cities and human settlements are not only economically vibrant but also socially equitable and environmentally sound. The Key Government Programs and Initiatives has been presented in Table 1

Table 1: Key Government Programs and Initiatives

Scheme Name	Primary Focus Area(s)	Linkage to SDG 11 Targets
Smart Cities Mission	Urban Development, Infrastructure, Technology	Aims for sustainable and inclusive urban development, enhancing inclusive urbanization and planning, improving services, green buildings, waste management, and renewable energy integration.
Atal Mission for Rejuvenation of Urban Transformation	Urban infrastructure, Water supply, Sanitation, Green spaces	Focuses on upgrading urban infrastructure, particularly in water supply, sewerage, stormwater drainage, urban transport, and development of green spaces and parks.

Swachh Bharat Mission-Urban	Sanitation, Waste Management	Aims to achieve open defecation-free urban areas and improve municipal solid waste management, directly contribute to reducing the environmental impact of cities.
Pradhan Mantri Awas Yojana-Urban	Affordable Housing, Slum Upgrading	Seeks to ensure access for all to adequate, safe, and affordable housing and basic services, and to upgrade slums.
PM e-bus Seva Scheme	Sustainable Transport	Supports the expansion of public electric transport systems, contributing to safe, affordable, accessible, and sustainable transport systems for all.
MRTS and Metro Projects	Sustainable Transport	Focuses on developing Mass Rapid Transit Systems, including Metro networks, to provide accessible and sustainable public transport, reducing congestion and pollution.
National Heritage City Development and Augmentation Yojana	Heritage Preservation, Urban Planning	Aims to preserve and revitalize the heritage character of cities, contributing to strengthening efforts to protect and safeguard the world's cultural and natural heritage.
Prime Minister's Street Vendors' Atmanirbhar Nidhi	Livelihoods, Inclusive Urbanization	Provides financial support to street vendors, fostering inclusive urbanization by integrating informal economies and supporting vulnerable urban populations.
City Investment to Innovate, Integrate and Sustain 2.0 (CITIIS 2.0)	Urban Innovation, Sustainable Solutions	Supports innovative and integrated urban planning and management, aiming to build more resilient and sustainable urban infrastructure and services.
Source: NITI Aayog SDG Report 2023-24		

These programs collectively demonstrate India's commitment to creating inclusive, safe, resilient, and sustainable cities and human settlements, addressing various dimensions of SDG 11 targets, from housing and basic services to transportation, environmental management, and heritage preservation.

The raw data on performance of states and UTs on indicators for SDG 11 has been shown in table 2.

Table 2: RAW DATA ON PERFORMANCE OF STATES AND UTs ON INDICATORS FOR SDG 11

S. No.	States/UTs	% of urban house-holds living in kachha houses	% of individual household toilets constructed against target	Deaths due to road accidents in urban areas (per 1,00,000 population)	% of wards with 100% door to door waste collection	% of Municipal Solid Waste (MSW) processed to the total MSW generated	% of wards with 100% source segrega-tion	Installed sewage treatment capacity as a % of sewage generated in urban areas
1	Andhra Pradesh	0.2	126.02	10.94	98.68	83.95	96.03	29.60
2	Arunachal Pradesh	10.4	94.69	20.76	97.41	7.43	73.45	0
3	Assam	0.8	104.02	27.72	96.60	46.71	52.17	0
4	Bihar	4.3	105.57	20.36	80.08	25.25	71.08	27.72
5	Chhattisgarh	3	108.81	16.66	100	99.96	100	6.07
6	Goa	0.3	47.39	4.33	100	99.62	100	59.09
7	Gujarat	0.2	137.81	6.79	99.93	94.97	96.40	67.38
8	Haryana	0.2	93.86	17.51	99.82	69.99	77.26	103.52
9	Himachal Pradesh	1.2	59.85	44.13	98.49	99.20	96.47	133.62
10	Jharkhand	1.6	135.24	9.99	87.18	54.23	80.30	42.32
11	Karnataka	1.0	112.37	12.53	97.22	87.11	85.64	60.83
12	Kerala	0	125.79	4.88	100	88.41	99.89	2.82
13	Madhya Pradesh	2	113.13	20.11	99.95	98.82	99.29	52.77
14	Maharashtra	0.2	114.63	9.98	99.97	94.93	99.46	107.82
15	Manipur	0.4	93.26	4.55	99.34	96.07	97.05	0
16	Meghalaya	2.1	31.66	7.29	72.36	21.62	52.85	0

17	Mizoram	0.6	77.82	3.41	100	Null	61.95	9.71
18	Nagaland	2.9	91.65	0.50	49.76	3.97	31.43	0
19	Odisha	3.1	119.18	35.73	100	90.72	100	29.49
20	Punjab	0.5	101.65	15.79	99.44	93.02	98.46	94.28
21	Rajasthan	0.3	101.87	15.73	98.82	43.72	78.16	37.52
22	Sikkim	1	98.11	3.98	100	73.02	100	57.69
23	Tamil Nadu	0.9	123.31	12.54	99.87	65.11	99.87	23.24
24	Telangana	0.2	96.12	15.12	99.81	98.20	99.01	33.87
25	Tripura	4.4	115.37	4.79	100	97.32	100	3.38
26	Uttar Pradesh	1.0	108.66	18.02	95.59	94.09	91.84	40.83
27	Uttarakhand	0.9	100.94	12.06	94.74	90.20	86.93	82.14
28	West Bengal	0.8	54.86	5.09	84.52	9.98	56.82	22.03
29	Andaman and Nicobar Islands	Null	100	2.84	100	88.71	100	0
30	Chandigarh	Null	142.85	6.79	100	100	100	155.85
31	Dadra and Nagar Haveli and Daman and Diu	Null	126.62	2.38	100	100	100	35.82
32	Delhi	0.3	15.50	6.73	100	82.99	73.00	86.97
33	Jammu and Kashmir	0.5	85.98	7.32	99.91	77.86	90.26	33.38
34	Ladakh	Null	108.50	47.25	Null	0	Null	Null

35	Lakshadweep	Null	Null	0	Null	Null	Null	0
36	Puducherry	Null	91.34	3.08	100	7.71	100	36.65
	India	0.9	95.29	12.68	97	78.46	90	51
	Target	0	100	7.05	100	100	100	100
Source: NITI Aayog SDG Report 2023-24								

The detailed raw data offers a granular perspective on India's progress, complementing the SDG 11 Index Scores. This table illuminates specific achievements and persistent challenges across urban development, providing the basis for targeted interventions.

i. Housing and Sanitation Access

Nationally, India shows strong performance in "Percentage of urban households living in kachha houses," averaging 0.9%. This reflects the impact of schemes like Pradhan Mantri Awas Yojana-Urban. Several regions, including Kerala and Chandigarh, report 0% *kachha* houses, while Arunachal Pradesh (10.4%) and Tripura (4.4%) still show a higher prevalence. In sanitation, the "Percentage of individual household toilets constructed against target" is robust nationally at 95.29%, with many states surpassing 100% of their targets, a testament to the Swachh Bharat Mission-Urban. However, some states like Delhi (15.50%) and Goa (47.39%) indicate room for improvement in this indicator.

ii. Waste Management: Collection vs. Processing

Percentage of wards with 100% door to door waste collection" is impressive at a national average of 97%, with widespread achievement across states. Yet, a significant gap exists in actual waste treatment. The "Percentage of Municipal Solid Waste processed to the total MSW generated" drops to 78.46% nationally. While Chhattisgarh and Chandigarh achieve nearly 100% processing, states like Nagaland (3.97%), Arunachal Pradesh (7.43%), and West Bengal (9.98%) process very little of their generated waste. This disparity, along with varied performance in "Percentage of wards with 100% source segregation" (national average 90%), underscores the challenge of moving beyond collection to effective waste management.

iii. Critical Gaps in Sewage Treatment

The most striking challenge lies in "Installed sewage treatment capacity as a percentage of sewage generated in urban areas," with a national average of only 51%. While some states, like Haryana (103.52%) and Himachal Pradesh (133.62%), and Chandigarh (155.85%), show capacities exceeding generated sewage, a concerning number of states (e.g., Arunachal Pradesh, Assam, Manipur, Nagaland report 0%. This severe deficit in urban wastewater management infrastructure poses significant environmental and public health risks.

iv. Urban Mobility and Safety

"Deaths due to road accidents in urban areas (per 1,00,000 population)" averages 12.68 nationally. While Lakshadweep and Nagaland (0.50) record exceptionally low rates, states like Himachal Pradesh (44.13) and Odisha (35.73) face higher numbers, indicating diverse successes and ongoing needs in urban transport safety measures.

In conclusion, the raw data confirms that while India has made commendable progress in basic urban services like housing and waste collection, critical environmental infrastructure, particularly waste processing and sewage treatment, remains a significant hurdle for many states. Addressing these disparities through targeted investments and strengthened urban governance is essential for achieving SDG 11 comprehensively across the nation.

The index score of performance of states and UTs on indicators for SDG 11 has been presented in table 3.

TABLE 3: INDEX SCORE OF PERFORMANCE OF STATES AND UTs ON INDICATORS FOR SDG 11

S.No.	States/UTs	SDG 11 Index Score	S.No.	States/UTs	SDG 11 Index Score
1	Andhra Pradesh	85	19	Odisha	74
2	Arunachal Pradesh	46	20	Punjab	94
3	Assam	59	21	Rajasthan	75
4	Bihar	57	22	Sikkim	88
5	Chhattisgarh	79	23	Tamil Nadu	81
6	Goa	85	24	Telangana	86
7	Gujarat	94	25	Tripura	80
8	Haryana	86	26	Uttar Pradesh	82
9	Himachal Pradesh	77	27	Uttarakhand	89
10	Jharkhand	74	28	West Bengal	54
11	Karnataka	85	29	Andaman and Nicobar Islands	81
12	Kerala	84	30	Chandigarh	100
13	Madhya Pradesh	86	31	Dadra and Nagar Haveli and Daman and Diu	89
14	Maharashtra	98	32	Delhi	75

15	Manipur	83	33	Jammu and Kashmir	82
16	Meghalaya	42	34	Ladakh	33
17	Mizoram	70	35	Lakshadweep	50
18	Nagaland	38	36	Puducherry	72
	India	83			
	Target	100			
Source: NITI Aayog SDG Report 2023-24					

The SDG 11 Index Score data reveals India's national average of 83 against a target of 100, reflecting overall progress. Chandigarh leads with a perfect 100, followed by Maharashtra, Gujarat, and Punjab, showcasing strong urban development. Conversely, Ladakh, Nagaland, Meghalaya, and Arunachal Pradesh are the lowest performers, indicating significant challenges in sustainable urbanization within these regions. This wide disparity underscores the uneven pace of development across Indian states and Union Territories, necessitating targeted interventions and localized strategies to ensure inclusive and sustainable urban futures for all.

5. Conclusion and Limitations

By examining secondary data from government reports and official websites, particularly the NITI Aayog's SDG India Index and raw performance indicators, this research has underscored the dynamic and often varied landscape of urban development across Indian States and Union Territories.

India's commitment to the 2030 Agenda is evident in its robust policy frameworks and extensive programmatic interventions, such as the Smart Cities Mission, AMRUT, Swachh Bharat Mission-Urban, and Pradhan Mantri Awas Yojana-Urban. These initiatives have collectively driven significant improvements, particularly in ensuring access to basic urban services. The national performance data highlights commendable strides in reducing the percentage of urban households living in *kachha* houses and achieving high rates of individual household toilet construction. Similarly, the widespread implementation of door-to-door waste collection underscores the success of sanitation campaigns.

However, the analysis also illuminates critical areas where progress remains uneven or significantly challenged. While waste collection is largely effective, the capacity for Municipal Solid Waste processing lags behind, with several states showing alarmingly low rates. More critically, the installed sewage treatment capacity as a percentage of sewage generated reveals a substantial deficit across many regions, posing significant environmental and public health risks. This disparity between service provision and environmental infrastructure suggests that a holistic approach to sustainable urban development, one that equally prioritizes treatment and processing as much as access, is yet to be fully realized.

The significant variations in performance across states and UTs, from leading performers like Chandigarh and Maharashtra to states grappling with lower scores, underscore that a uniform

approach is insufficient. Effective governance, characterized by transparency, accountability, and the ability to tailor interventions to local contexts, is therefore paramount.

In essence, while India has established a strong foundation for achieving SDG 11, the path forward necessitates a sharper focus on strengthening urban environmental infrastructure, particularly in waste processing and sewage treatment. Targeted policy interventions, coupled with enhanced investment and robust governance mechanisms at the sub-national level, are crucial to mitigate environmental degradation, foster resilience, and ensure that urban growth is genuinely inclusive and sustainable for all citizens.

Limitations

This research, while providing valuable insights into India's progress towards SDG 11, is subject to certain limitations:

i. Reliance on Secondary Data: The study exclusively utilized secondary data from official government reports and websites. While these sources provide comprehensive national and sub-national statistics, they may not always capture the full nuances of ground-level implementation or unforeseen challenges.

ii. Indicator Scope: The analysis is based on a predefined set of indicators provided by the NITI Aayog for SDG 11. While these are critical metrics, they may not encompass every dimension of sustainable urban development, potentially overlooking other relevant socio-economic or environmental factors.

iii. Data Quality and Consistency: Despite efforts by government bodies to standardize data collection, variations in reporting methodologies or potential inconsistencies in data quality across different states and UTs cannot be entirely ruled out. The presence of 'Null' values for some indicators in certain regions also limits a complete comparative analysis.

iv. Temporal Scope: The data reflects a specific reporting period, and while it indicates trends, rapid urbanization means that the situation on the ground can evolve quickly, potentially impacting the timeliness of some observations.

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