Urban planning challenges in India: Achieving Sustainable Development Goal 11.

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Abstract--India's growing urbanization has created several issues, including environmental degradation, resource depletion, and socioeconomic inequities. Sustainable urbanization remains an integral part of the Sustainable Development Goals. Planning has been granted international status by including SDG 11 in the SDG 2030 Agenda for the first time. This paper analyses the challenges faced by Indian cities in achieving SDG 11. Most cities face issues such as affordable housing, air and water pollution, public transportation, solid waste management, energy, climate change mitigation, and the need for large investments.

Index Terms- Sustainable Development, Urbanization, Cities, Goals, Challenges, Climate.

I. INTRODUCTION

Development is inevitably accompanied by urbanization, which frequently acts as a catalyst for economic expansion. Ensuring the best prospects for economic prosperity for all segments of society must be the primary priority as India approaches the tipping point of its transition from a predominantly rural to an urban society. It is concerning that our cities continue to face several sustainability and efficiency-related issues despite significant investment. In numerous international rankings, none of our cities is listed in the top 50. India's urban population is expected to grow by 140 million in the next 15 years, from 470 million in 2021 to 600 million by 2036 (Athar et al., 2022). By 2050, it is anticipated that seven out of ten people will live in cities. India's future lies in urbanization. Although our cities only make up 3% of the country's land area, they account for 60% of its GDP. India is rapidly approaching its goal of being 50% urban in a few decades. This would greatly enhance global competitiveness and economic growth. Cities generate economic growth, accounting for more than 80 percent of global GDP. Cities drive economic growth while also protecting the environment and biodiversity. There are numerous long-term investment prospects in cities. As of 2015, cities consumed almost 70% of all resources. Cities are spreading geographically, absorbing agricultural land for urban development. This is frequently followed by the development of unoccupied areas and the densification of city plots. Faster-growing cities have seen economic expansion and drawn people from rural areas.

The dense and diversified land use patterns that have historically characterized Indian urban areas set them apart from those seen in developed nations. There are concerns about whether high-density, compact, and mixed-use cities decrease car use and promote alternative modes of transportation through a causal relationship between the built environment and travel behaviour, as ideas like Smart Growth, Compact Cities, and New Urbanism gain traction in sustainability discussions (Giancarlos et al., 2017). Traffic issues are made worse by the decrease in the usage of public transit and the heavy reliance on single-occupancy automobiles, which is caused by ineffective public transportation networks.

India will require over $840 billion in investments in urban infrastructure over the next 15 years to adequately fulfil the demands of a rising population, according to a new World Bank assessment. Urban roads, street lighting, storm water drainage, solid waste management, sewage, and water supply are among the vital municipal services that require $450 billion of this total. Systems of mass transit require the remaining $300 billion.

- ***Target 11.2:*** *By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations i.e. women, children, persons with disabilities and older persons*
- ***Target 11.3:*** *By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, Integrated and sustainable human settlement planning and management in all countries.*
- ***Target 11.4:*** *Strengthen efforts to protect and safeguard the world's cultural and natural heritage.*
- ***Target 11.5:*** *By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to the global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor people in vulnerable situations.*
- ***Target 11.6:*** *By 2030, reduce the adverse per capita environmental impact of cities by paying Special attention to air quality and municipal and other waste management.*
- ***Target 11.7:*** *By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities.*
- ***Target 11.a:*** *Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning.*
- ***Target 11.b:*** *By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels.*

Box 1: SDG 2030 Goal 11 Targets Linked to the Environment

Source: UN General Assembly, 2022

Urbanization is a major force behind economic growth and is essential for development. Opportunities for fair economic growth must be established as India shifts from a largely rural to an urban society. Cities around the world are dealing with hitherto unseen issues like resource depletion, social inequity, and climate change as urbanization picks up speed. By 2050, an estimated 7 out of 10 people will likely live in urban areas according to UN estimates, which will increase the need for sustainable solutions. Sustainable urban planning has become a crucial field in response to these issues, intending to create environmentally friendly communities that put social justice, economic vibrancy, and environmental health first. A variety of tactics and methods are included in sustainable urban planning, which aims to build liveable cities that are also robust to upcoming difficulties. The concepts of sustainable urban planning along with many environmentally friendly design techniques can be used to create more sustainable urban settings.

II. SUSTAINABLE DEVELOPMENT GOAL 11

Sustainable Growth The creation of inclusive, secure, resilient, and sustainable cities is the focus of Goal 11.

Population and Levels of Urbanisation of India and Other Countries in 2018

S. No.	Country	Total population (in millions)	Urban* population (in millions)	Percentage urban
	1	2	3	4
1	World	7,632.81	4,219.81	55.28
	Advanced economies			
2	United States	326.77	268.78	82.26
3	Germany	82.29	63.62	77.31
4	Japan	127.19	116.52	91.61
5	United Kingdom	66.57	55.52	83.39
	Emerging market and developing economies			
6	China	1,415.05	837.02	59.15
7	India	1,354.05	**460.78**	34.03
	Continents/regions			
8	North America	363.84	298.99	82.17
9	South America	428.24	360.35	84.14
10	Western Europe	194.07	154.99	79.86

Note:

The names of countries in column 1 are examples of 'Advanced economies' and 'Emerging and developing economies' are from International Monetary Fund, *World Economic Outlook. July 2021.* p.6 https://www.imf.org/en/Publications/WEO/Issues/2021/07/27/world-economic-outlook-update-july-2021

To accomplish Goal 11, participatory planning may be essential. According to the UN General Assembly (2015), sustainable urbanization is dependent on cities producing enough revenue and good-paying jobs, supplying the necessary infrastructure for energy, water and sanitation, transportation, and communication, guaranteeing equitable access to housing and services, lowering the slum population, and preserving a healthy environment both inside and outside of the city. Designing cities to foster intergenerational justice while avoiding negative effects on the economy, ecology, and society is known as sustainable urban planning.

The SDG 2030 Agenda, which was adopted in India, calls on UN member states to make cities inclusive, safe, resilient, and sustainable by 2030. This goal includes goals for gauging success, such as increasing access to affordable housing, developing public transportation systems, enhancing disaster resilience, and reducing air and water pollution from waste disposal and unsustainable energy practices (Nirupam Bajpai and John Biberman, 2021).

The role of cities as crucial elements of development needs to be strengthened. The nation's global position in SDG preparation has declined due to the significant obstacles it still faces in accomplishing SDG 11 of the 17 SDGs. According to a study conducted by the Asian Development Bank (ADB) in 2021 on funding under the Smart Cities Mission, 90 percent of the grants and loans were allocated for mobility and connectivity. The remaining 10 percent was designated for health, education, housing, water supply-related facilities, and other areas. Achieving Sustainable Development Goal 11 (SDG 11) requires a comprehensive approach, with particular emphasis on water supply and sanitation.

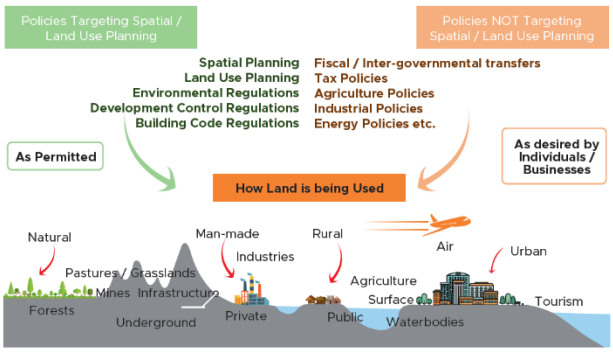
III. KEY ISSUES AND CHALLENGES FOR URBAN PLANNING

To protect our cities from the snares of unplanned urbanization and uncontrolled construction activities, efforts must be directed toward ensuring that the country is equipped to handle such a significant urban change. The demands of global technical breakthroughs and urbanization have outpaced the growth of our urban planning machinery. In addition to budgetary difficulties, urban local governments have a severe lack of qualified and experienced human resources. Furthermore, one of the biggest obstacles to achieving the full economic potential of urbanization is inadequate planning. One of the most important objectives for addressing the pressures of urbanization is sustainable urban planning. The National Commission on Urbanization in India acknowledged the significance of encouraging adaptability in land use, sufficient land availability, and equality and efficiency in land supply in 1988. Nearly 70% of the world's population is predicted to live in cities by 2050. This significant change calls for proactive measures to support expansion while guaranteeing an improvement in the standard of urban life. Incorporating sustainable development principles into the nation's policies and programs and ensuring their rigorous and appropriate implementation are long overdue. The key

issues and challenges facing India's urban planning in achieving Sustainable Development Goal 11 are as follows.

Figure 2

Spatial and Non-Spatial Factors Affecting Land Use



Note.

Graphics from Agarwal A. (2018). *A Compendium on International Practices and Experiences*. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, New Delhi.

Affordable Housing

In 2020, almost one in every four urban inhabitants lived in slums or informal settlements around the world. According to empirical data, a 1% rise in urban population growth will raise the incidence of slums by 2.3% in Africa and 5.3% in Asia. The urban housing shortfall in India was around 19 million units in 2012, and it is predicted to increase at a CAGR of 6.6% over the next ten years, until 2022 (Press Trust of India, 2015). According to a KPMG estimate, nearly 95.6% of the shortage is likely to come from EWS and LIG households who are unable to purchase residences costing more than Rs. 15 Lacs. PMAY-U in India is one of the world's largest housing initiatives. To fulfil the objective of 'Housing for All', all eligible families in the country's urban areas will be provided with all-weather pucca houses and basic civic amenities. Till date, PMAY-U has approved more than 12.2 million dwellings. More than 10 million residences have been laid out for building, with more than 6 million finished and given to beneficiaries (MOHUA, GOI, 2022).

Air and Water Pollution

One of India's most pressing environmental challenges is air pollution. Air pollution is a major danger to human health worldwide. According to the 2021 World Air Quality Report, India has 63 of the top 100 most polluted cities, with New Delhi being declared the capital with the worst air quality in the world. The survey also discovered that PM 2.5 concentrations in 48% of the country's cities are more than ten times higher than the WHO air quality guideline threshold. In 2019, 4.2 million people died as a result of ambient air pollution caused by transportation, industry, electricity generation, garbage burning, and domestic fuel combustion. Current scientific research demonstrates that air pollution affects the immune system's ability to fight infections. According to evidence, more than 80% of city dwellers globally experience air pollution levels that are up to 2.5 times higher than the World Health Organization's safety standards (World Health Organization, 2021).

India's National Strategy intends to cut PM emissions by up to 30% by 2024. However, according to research from the Centre for Research on Energy and Clean Air, 132 cities now have pollution levels below national requirements, up from 102 since the National Clean Air Program's launch in 2019. Water pollution in India accounts for up to half of the loss of GDP growth, according to a recent World Bank report. Water pollution costs the Indian government between USD$6.7 and $ 7.7 billion per year and is associated with a 9% drop in agricultural revenues and a 16% decrease in downstream agricultural yields. Despite many initiatives, fluoride and arsenic-contaminated water reaches 1.96 million urban residences in India (UNICEF India).

Public Transport

According to 2020 data from 1,510 cities worldwide, public transportation serves only around 37% of urban areas. Due to variations in population density within cities, this translates to 52% of the urban population having convenient access to public transportation. City governments still struggle to improve the availability and use of accessible, inclusive, safe, dependable, and efficient public transportation networks. The country boasts the world's second-largest road network. In India, around 36.5 million people, or 18% of the population, use public transportation daily (IDEF,2022). According to the NITI Aayog's latest report on changing mobility, India has 1.2 buses per 1,000 inhabitants, which is lower than developing nation benchmarks, with a significant variance between states (4.7 in Chandigarh against 0.02 in Bihar). In comparison to Thailand (8.6 per 1,000) and South Africa (6.1 per 1,000).

Solid Waste Management

In 2022, an average of 82 percent of municipal solid waste was collected globally, with 55% managed in controlled facilities. It is estimated that urban India creates between 1.30 lakh and 1.50 lakh metric tons (MT) of municipal solid garbage each day, with an average per capita waste generation of 0.330-0.550 kg. This adds up to approximately 50 million MT per year. At the current rate, this will increase to around 125 million MT

each year by 2031. Currently, approximately 5% of all collected waste is recycled, 18% is composted, and the rest is sent to landfill sites.

Energy

The transportation sector accounts for 18% of overall energy consumption. It is rather frightening that the road transport sector accounts for 87 percent of emissions (approximately 123 million tons). According to figures from a report by the Central Electricity Authority, fossil fuels generate around 60.2% of India's energy, with coal power plants accounting for 51.9%. The Indian government aims to cut the economy's carbon intensity by 45% by 2030 and reach net-zero emissions by 2070. It is only achievable with widespread adoption of EVs, particularly in the public transit system. Out of the 5,60,493 EVs sold in India (from January 2022 to August 2022), two- and three-wheelers accounted for 94%, four-wheelers 5%, and e-buses 0.2%. Because e-buses represent a small proportion of EVs sold in the country, a monthly growth in the vehicle fleet is required to meet the net-zero emissions objective by 2070.

Climate Change

Overall, climate change poses a hazard to cities and their infrastructure. Environmental disasters are more likely to be severe, causing buildings, roadways, and facilities to be damaged or destroyed. According to the Intergovernmental Panel on Climate Change (IPCC), India is anticipated to pay the largest price for the effects of the climate crisis. Aside from catastrophic weather occurrences like flash floods and massive wildfires, the country frequently faces extended heat waves and droughts that deplete its water resources and threaten agriculture.

Investment

To accomplish Sustainable Development Goal 11 of making cities inclusive, safe, resilient, and sustainable, India will need Rs. 131 lakh crore (USD 2067 billion). This comprises housing for all city growth and planning, efficient transportation systems, public spaces, and other costs associated with urban infrastructure. Of the Rs. 131 lakh crores required for such urban development, India now has a funding imbalance of Rs. 76 lakh crores (USD 1202 billion). This estimate currently does not include disaster management expenditures. The Indian government has previously announced ambitious goals for sustainable urban development (Goal 11). The AMRUT (first 500 cities) and 100 smart cities initiatives have a five-year central allocation of Rs. 98,000 crore (USD 15.6 billion), while Housing for All (urban) has a central allocation of Rs. 5625 crore (USD 893 million) by 2022.

GOVERNMENT OF INDIA'S INITIATIVES TOWARDS ACHIEVING SDG 11

- The United Nations Framework Convention on Climate Change (UNFCCC) saw India announce its voluntary goal to reduce the emission intensity of its GDP by 20-25 percent by 2020 compared to the 2005 level.
- The National Action Plan on Climate Change (NAPCC) is an initiative of the Government aimed at addressing, combating, and adapting to climate change.
- The National Clean Air Program (NCAP) is a national-level strategy to reduce air pollution levels across the country.
- The Ministry of Housing and Urban Affairs (MoHUA) encourages Indian cities through various initiatives and programs. The National Urban Transport Policy of India, 2006, outlines the role of NMT as a last-mile connector for urban transport systems and as an independent mode for short distances (NUTP, 2006). It also recognizes a significant deficit in urban transport services and infrastructure in both quality and quantity. The use of desirable modes of transport, such as walking, bicycles, and public transport, is declining, while the use of undesirable modes, such as cars and two-wheelers, is increasing. Consequently, congestion is rising, while urban mobility, road safety, pollution, fossil fuel consumption, and accidents are deteriorating daily.
- The National Mission for Sustainable Habitat, under the Prime Minister's National Action Plan on Climate Change, has formed sub-committees specifically focused on urban transport. These committees have established eight primary principles to promote a sustainable approach to urban transport planning, with the first two being 'Walk' and 'Cycle' (NMSH, 2011).
- A working group on urban transport under the 12th Five-Year Plan proposed creating dedicated funds to improve, maintain, and upgrade existing walking and cycling infrastructure (Planning Commission, 2011).
- The Smart Cities Mission initiatives emphasize promoting mixed land use in area-based development and creating walkable neighbourhoods. They have also launched another national green recovery initiative called Streets for People to make Indian cities pedestrian-friendly, lively, and safe. The Atal Mission for Rejuvenation and Urban Transformation (AMRUT) has identified 500 cities, focusing on enhancing pedestrian, nonmotorized, and public transport facilities (MoUD, 2015).
- NITI Aayog has developed an SDG index for urban centres in India, measuring their performance and achievements across various sectors.

CONCLUSIONS

Effective, perceptive planning is urgently needed since without it, neither investments nor activities would be able to produce long-term results. Unplanned urbanization may have detrimental effects. The Government of India has made numerous attempts to effectively implement SDG 11. However, these initiatives have not yet spread to the city level, particularly in middle and small towns. According to OECD (2022), two-thirds of the Sustainable Development Goals can only be met through local and regional action. Furthermore, urban infrastructure and services are linked to many other SDG goals and objectives. The majority of urban infrastructure and services are energy-intensive industries, which will have a direct influence on Goal 6 - water sources; Goal 7 - energy; Goal 12 - sustainable consumption and production, as well as the impact on ecosystems, biodiversity, and climate change (Goals 13, 14, 15). Unfortunately, urban design in India now prioritizes motorized transport networks over non-motorized modes of transportation. Mumbai continues to have the lowest car ownership rate among India's Tier 1 cities. Walkability is thus a good urban planning method for drastically reducing energy usage.

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