

SMART CITIES AND URBAN DEVELOPMENT: EVOLVING SUSTAINABLE URBAN GOVERNANCE IN THE AGE OF CLIMATE CHANGE



Dr. Prem Chand*

Abstract

Indubitably, the future lies in Urban Cities. In this regard, Smart cities are best suited to allow the intersection of 'Urban Governance'. However, integrating environmental sustainability with climate justice is a real challenge, as protecting the fundamental rights of vulnerable communities and marginalised persons is still an uphill task for the State. More than three hundred persons died in the extreme heat of summer season in 2024 in Delhi caused by climate change and most pertinently, all these people belonged to vulnerable communities. This poses a question, whether smart cities are inclusive cities or are meant only for the rich and elite class. The present research paper will examine how sustainable urban governance would be able to integrate 'Smart cities' with technological advancement to safeguard the human rights of the vulnerable and marginalised groups of society within the constitutional framework. The research will further explore as to how smart cities would be able to tackle the challenges posed by climate change and how they will mitigate its adverse effects and how smart cities would be able to provide a dignified life, equally to all, by following the constitutional right to provide clean and healthy environment under Article 21 of the Constitution of India. Smart cities must integrate both sustainable technological solutions and sustainable development goals to do climate justice. Smart cities are envisioned to adhere to constitutional values and sustainable development goals. The paper also asserts that smart cities, while applying technology to enhance sustainable urban infrastructure, should ensure the addressal of the vulnerabilities of both the vulnerable and marginalised communities. This will undoubtedly address issues of social justice and fulfill other responsibilities. To conclude, the research proposes as the

*Dr. Prem Chand, Associate Professor and Executive Director @ Centre for Law & Urban Development, National Law University Delhi



outcome, the need to have ‘sustainable urban governance’, especially in the age of climate change, to engage with the designing of the ‘sustainable smart cities’, towards ‘sustainable development’ in order to integrate within its foretold, the human rights and the climate resilience. This also means that there is a strong need to have a robust constitutional framework to ensure that ‘Smart cities’ should be aligned with international commitments also in order to foster the principle of ‘sustainability’. This also means that these new smart cities would also be able to address the issues born out of climate change and will protect the vulnerable and marginalised from its adverse effects.

Keywords: *Sustainable Development Goals 2030, Climate Change, Smart Cities, Urban development, Marginalised Groups. Sustainable Urban Governance.*

1. Introduction

The future of human settlements lies in urban cities, especially in ‘Smart Cities’.¹ Interestingly, on one hand, these ‘Smart cities’ are the main reason of climate change while on the other hand, they are themselves vulnerable to its impacts.² Urban development lies in the sustainable growth of urban cities, especially smart cities, which integrate modern cutting-edge technologies, including (i) Artificial Intelligence (AI) and (ii) the Internet of Things (IoT) along with (iii) the Big Data and (iv) Automation, so as to improve the urban living conditions and to make it more dignified. Smart cities promote sustainability through ‘Sustainable Urban Governance’ (SUG) by focussing on the (i) optimisation of the city services and also on the (ii) enhancement of the quality of life with the assistance of intelligent systems for promoting (i) sustainable transportation (ii) focussing on renewable sources of energy (iii) working on waste management and (iv) by engaging the citizens.³ In short, smart cities

¹By 2030, half of the Indian population would be in urban cities. UN-HABITAT, *Urbanization in India: Building Inclusive & Sustainable Cities*, available at : <https://unhabitat.org/india>, (last visited on 26.11.2024).

²Felix Creutzig et al., “Towards a Public Policy of Cities and Human Settlements in the 21st Century,” *Urban Sustainability* 29 2024, available at: <https://doi.org/10.1038/s42949-024-00168-7> (last visited on 26.11.2024).

³Brett M. Frischmann, Michael J. Madison, and Madelyn Rose Sanfilippo, *Governing Smart Cities as Knowledge Commons* 2 (Cambridge University Press, Cambridge, 1st edn., 2024).



comprise a “system of systems”, where principally the (i) technology (ii) governance and (iii) the community interact with each other by being interconnected with each other.⁴ SUG assists in evolving contemporary urban governance, where, on the one hand, are the challenges born out of change in the climatic conditions and on the other hand, is development.⁵ Both the aspects require equal attention. Consequently, a holistic contemporary policy of SUG is warranted to tackle the complex global issues that are in fact, threats to mankind, such as the adverse effects of climate change, which is also now established as a fundamental right within Article 21 (right to life) of the Constitution of India.⁶ The right against adverse effects of climate change (RAAECC) is at the inception state only, and therefore, it requires much judicial vigour to define it and later, to create its essentials so that it can be implemented appropriately and the marginalised and the vulnerable also be a part of climate justice, who presently are facing the major brunt of climate change, by facing the extreme natural calamities. However, these essentials can be determined only over time, as and when the urban cities will face the brunt of climate change. This right is extremely crucial and will evolve with every passing climate change-related event⁷ and will prove to be a critical right for protecting the marginalised and vulnerable strata of urban cities. The question here first is to define urban and smart cities and then to examine how Smart Cities and urban development are working hand in hand to evolve sustainable urban governance in the present times, where climate change is causing havoc. Consequently, every State is designing indigenous policies to tackle the adverse effects of climate change. Building smart and sustainable cities is one such step in that direction. Therefore, it is necessary first to define the terms ‘urban cities’ and other related nomenclatures and only then, explain the smart cities.

1.1 Urban Cities

Defining ‘urban cities’ is an uphill task, as so many parallels of smart cities are already present in the global landscape. For example, at various places,

⁴*Ibid.* at 288.

⁵International Electrotechnical Commission (IEC) Editorial Team, “Smart Urban Planning for Cities of the Future,” *available at*: <https://www.iec.ch/blog/smart-urban-planning-cities-future> (last visited on 26.11.2024).

⁶Rights against the Adverse Effects of Climate Change was instilled by the Supreme Court of India in *MK Ranjitsinh v. Union of India*, 2024 INSC 280.

⁷The extreme weather conditions, such as (i) the extreme heat of the Delhi summer in 2024 and (ii) the Wayanad landslides of 2024, proved to be major disasters.



they are also known by the term ‘Megacities’⁸ and due to their dense populations and messy conditions, are also at times known as the ‘Mess Cities’⁹. In the present times, at various places, they are also addressed as ‘Sustainable cities’¹⁰ or ‘Green facades’¹¹ as these cities are environmentally sensitive in their approach. There are places where they are defined as ‘Resilient Cities’¹² also, as they show resilience towards the contemporary problems of the urban cities, such as addressing the adverse effects of climatic changes in the atmosphere and due to their day-to-day reactions to contemporary issues, they are also at places termed as ‘Reactive Cities’¹³. Anna argues that due to reactive planning, the big urban cities only end up, informally, absorbing the population inflow.¹⁴ Due to execution of environmental projects

⁸Abu Dhabi, Berlin, Shanghai, London, etc., are termed as mega-cities because of the number of people living there. Shanghai has a population of 25.5 million. Danielle Spiegel-Feld, Katrina Miriam Wyman, et al. (eds.), *Global Sustainable Cities: City Governments and Our Environmental Future* 24 (New York University Press, 1st edn., 2023).

⁹Somdeep Sen, “Why are Indian cities a mess? Because they’re not about people: Urban projects are treated as political symbols, rather than vehicles to make the lives of citizens better,” *Al Jazeera*, May 10, 2023, available at: <https://www.aljazeera.com/opinions/2023/5/10/indian-cities-mess-not-about-people#:~:text=cities%20a%20mess?,Because%20they're%20not%20about%20people,the%20lives%20of%20citizens%20better.&text=Glance%20over%20the%20Economist%20Intelligence,an%20ever%20more%20unliveable%20environment> (last visited on 26.11.2024).

¹⁰Sustainable Cities (*Goal 11 of the Sustainable Development Goals, 2030*) are the need of the hour, as they integrate development with environmental protection.

¹¹Green facades help reduce stormwater runoff and heat flux, which in turn helps to decrease the speed of climate change. See Theingi Aung, Sui Reng Liana, Arkar Htet, and Amiya Bhaumik, “Implementing Green Facades: A Step Towards Sustainable Smart Buildings” 2 *Journal of Smart Cities and Society* 41-51 (2023).

¹²Resilient Cities are capable of addressing the issues related to climate change.

¹³Reactive urban cities primarily challenge contemporary issues affecting them, such as (i) rapid urbanization, (ii) climate change, and (iii) related infrastructural demands, without any proactive planning to mitigate such issues. For example, Mumbai, one of the urban cities of India, faces monsoon floods that affect a huge number of people every year. The Government, as a reactionary measure, works on immediate disaster management instead of having an integrated flood management strategy. See Smruti Koppikar, “Muddling Through Monsoon is Mumbai’s De Facto Response”, *The Hindustan Times*, July 04, 2019, available at: <https://www.hindustantimes.com/mumbai-news/muddling-through-monsoon-is-mumbai-s-de-facto-response/story-5X7X45UcGOCRRZkZp2tWBI.html> (last visited on 27.11.2024).

¹⁴Anna Wellenstein, “The Biggest Mistake of Cities is Their Reactive Planning”, *Habitat for Humanity*, available at: <https://www.habitat.org/emea/stories/biggest-mistake-cities-their-reactive-planning> (last visited on 28.11.2024).



and working on aesthetics, they have also been defined as ‘Eco-Cities’¹⁵ whose design is more sustainable towards the environment or because of composition of elite population comprising of ultra-high net wealth persons, there are cities known as ‘Elite Cities’¹⁶. There are also a set of cities that are termed as ‘Digital Cities’¹⁷ and in a similar fashion, there are certain other urban cities that are termed as ‘Tech-Driven’¹⁸ cities. Many cities are also known as ‘Knowledge Cities’¹⁹ or ‘Ivory Towers’²⁰ cities. These urban cities can also be termed as ‘Global Cities’²¹ or the ‘Unequal Cities’²². Essentially, all these urban cities, in one way or another, have some urban development policy executing ‘Sustainable Urban Governance’ as a model to address the modern complex problems such as climate change, while accommodating all, including the concerns of the marginalised and vulnerable groups of society.

¹⁵Simon Elias Bibri, “The Eco-City and Its Core Environmental Dimension of Sustainability: Green Energy Technologies and Their Integration with Data-Driven Smart Solutions” *3(4) Energy Informatics* 2 (2020). Eco-cities work on integrated urban planning to ensure the well-being of citizens to harness the ecological systems by protecting and nurturing the environmental assets for future generations.

¹⁶Max Koch, Kajsa Emilsson, Jayeon Lee, and Håkan Johansson, “Structural Barriers to Sufficiency: The Contribution of Research on Elites” *5(1) Buildings and Cities* 268–282 (2024).

¹⁷Digital Cities comprise urban areas that use digital technology to collect data and accordingly, deliver services. The State uses digital technology in ‘Urban City’ planning and transportation simulations.

¹⁸Tech cities are global urban cities where technology ecosystems are groomed such as the San Francisco Bay Area of the USA, which is the hub of Silicon Valley.

¹⁹These urban cities prioritise their planning around ‘knowledge-based development and innovation’, and because of this, they invest more in ‘education’ and ‘research’. These cities are also known as information-driven Cities. One can easily find good universities and research institutions in such cities. In India, Bangalore and in the US, Boston cities are classic examples of knowledge cities.

²⁰These cities heavily planned themselves around higher education and other intellectual pursuits and therefore, prominent universities were often found there. However, they emphasised theoretical knowledge more than the practical aspects of real-world applications such as in Oxford, UK.

²¹Saskia Sassen first used the term global cities to refer to cities with key locations for finance and specialised service firms, such as London and Tokyo. Saskia Sassen, *The Global City: New York, London, Tokyo* 126 (Princeton University Press, New York, 2nd edn., 2001).

²²Unequal growth leads to the making of unequal cities.



1.2 Challenges in Designing Smart Cities

There is a valid concern prevalent in the Indian context, that is of designing ‘Smart cities’, which is a new buzzword, to address contemporary problems such as the security of the State, climate change and other types of health hazards born out of, an environment which is going beyond control, faced by the Smart cities. Smart cities broadly necessitate a sustainable urban policy to amalgamate both information and communication technology (ICT) and internet technologies. These are essential components to reshape the structure of smart cities, including other vital areas, such as advanced infrastructure and transportation as well as the environment and healthcare. It also includes governance, particularly for developing a sustainable ecosystem aimed at minimising the threats to the urban and smart life of the smart cities. And this novel framework of smart cities is expected to have the convergence of (i) ICT technologies (ii) sustainability and (iii) performance, which are the prime indicators in various sectors, including social and economic, along with technical.²³ However, there are various challenges to Smart cities, such as tackling both air and water pollution, which is affecting the cities’ lives the most and is at its peak.

1.3 Handling Air and Water Pollution in Urban Cities

Air and water pollution are challenges that almost every urban city is facing in India. For example, Delhi, which is one of the leading urban cities in India, which is witnessing the challenge of deteriorating air quality due to severe air pollution²⁴, which has even forced the schools to go online²⁵ during winters so that the children can be saved from the toxic air prevalent in the atmosphere and which has larger health hazards such as, increase in lungs’ related ailments, chronic asthma, etc. Different people have different level of exposure to atmosphere and accordingly, air pollution has different effects on every

²³Danuta Szpilko, Antonio de la Torre Gallegos, Felix Jimenez Naharro and Agnieszka Rzepka, “Waste Management in the Smart City: Current Practices and Future Directions” 12 *Resources* 115 (2023).

²⁴Delhi’s Air Quality Index (AQI) dropped to 999 by the weekend, 22.11.2024, making Delhi one of the most polluted urban cities and capitals in the world. The World Health Organisation (WHO) has set 25 as the limit and anything above 500 is a severe public health emergency. “*Delhi’s Air Quality Index (AQI) Drops to 999, Declared Severe Public Health Emergency*”, NDTV, November 22, 2024, available at: <https://www.ndtv.com/air-pollution-quality-index> (last visited on 29.11.2024)..

²⁵Sophiya Mathew, “Delhi Air ‘Severe Plus’: More Curbs Kick In, Schools Go Online Barring Classes 10, 12” *The Indian Express*, November 18, 2024, p.1



person, which makes them more vulnerable than others, for example, traffic police officers, who are constantly being exposed to the outside environment are affected badly, as they have to regulate the traffic in the urban cities.²⁶ It is not only air pollution but also water pollution that gives headaches to the people of these smart urban cities. It has become problematic in the past many years to provide clean drinking water to urban cities, both due to its scarcity and also due to its contamination.²⁷ There are various reasons for water contamination and one such reason is the waste management problem. But, it has to be borne in mind that access to clean air and clean water is one of the foremost necessities of life and without which, sustenance is itself a doubtful question.

1.4 Persisting Problem of Waste Management and Smart Cities

Urban cities, especially Smart cities, constantly face the problem of tackling waste as these metropolitan centres become more environmentally sensitive. Due to increasing population, this problem is escalating day by day. Presently, landfills are the only solution they have. However, these landfill sites are being neglected, causing health hazards and which needs urgent and immediate attention.

1.4.1 ‘Legacy Waste’ in the Landfills: Environmental Disaster in Making

Due to the mishandling of waste management, landfills on the outskirts of these urban cities also cause water pollution. The Bandhwari landfill in Gurugram, Haryana, is a classic example of mismanagement, as it has become a toxic wasteland.²⁸ These landfills were planned to hold the processed waste only, but places like Bandhwari landfills are sitting as the ticking time bombs, as due to negligence, they are now the hub of both water and air pollution. Any garbage unattended or left for over three months is termed as ‘legacy

²⁶ Upasika Singhal, "We've to Stand in the Open All Day, Breathe This Air ... Lekin Pet Ka Sawal Hai: Working Class Bears the Brunt" *The Indian Express*, November 24, 2024, Delhi, p.4.

²⁷ Rajarshi Bhattacharjee, "Decoding Delhi's Water Crisis: Causes, Impact, and Sustainable Solutions", *Business Standard*, May 31, 2024, available at: https://www.business-standard.com/india-news/decoding-delhi-s-water-crisis-causes-impact-and-sustainable-solutions-124053100784_1.html (last visited on 29.11.2024).

²⁸ Deepanshu Mohan and Shubhangi Derhgawen, "Turning the Sacred into Trash" 41(22) *Frontline*, November 2-15, 2024, pp. 76-81.



waste'. Swachh Bharat Mission 2.0, in 2021, promised to remove the mountains of garbage and, by removing legacy waste, make urban city centres garbage-free. But such policy measures are not implemented in their true letter and spirit, leading to such landfills, which are environmental disasters. Swachh Bharat Mission-Urban (SBM-U) has identified 2,424 sites of over one thousand tonnes of legacy waste. On May 15, 2024, the Haryana Pollution Control Board revealed the alarming state of groundwater contamination near the Bandhwari hills before the National Green Tribunal.²⁹ Similarly, the threat is also to the 30 unique tree species for whom Aravalli Hills is a home. To protect them, the Wildlife Institute of India has declared the area ecologically sensitive.³⁰ Since both flora and fauna have equal rights over the mother earth therefore, appropriate and adequate measures ought to be taken to address these critical issues.

2. Rare Metals and its Impact on Smart Cities and Sustainable Urban Governance

Rare Metals played a paradoxical role in the evolution of smart cities. On the one hand, they are enabling various environmental revolutions, such as the green revolution and the digital revolution and on the other hand, their extraction cost is very high. It has both environmental and economic costs associated with it. It also has geopolitical costs as it directly impacts the evolution and development of (i) smart cities (ii) urban growth and (iii) SUG in the context of adverse effects of climatic changes.

2.1 Over relying on the Rare Metals and Its Impact on Smart Cities

The infrastructure of Smart cities is completely technology-driven and relies heavily on rare metals for its sustenance. These rare metals are essential for building state-of-the-art smart cities, as they are utilised in all the important things and services there such as (i) various types of sensors (ii) different types of renewable energy systems such as solar and wind energy (iii) all types of electric vehicles and (iv) Internet of Things (IoT) infrastructure, etc.³¹ Smart city innovations revolve around rare materials such as neodymium, which is used in the manufacturing of magnets (used in wind turbines) and lithium which is used in the manufacturing of batteries, are central to smart city innovation³². The challenge here is the environmental cost attached to

²⁹*Ibid* at p. 79

³⁰*Ibid* at p. 78.

³¹Guillaume Pitron, *The Rare Metals Wars* 13 (Scribe, 1st edn., 2020)

³²*Ibid.* at 166.



the mining of these rare metals, which has extensive energy consumption and also leads to pollution. For instance, in many cases, extracting one kilogram of rare metals leaves behind a massive stock of toxic waste. And, while these smart cities promise SUG, which relies on the principles of sustainability, reliance on rare metals actually undermines the environmental goals of the State by using unsustainable mining practices as the foundation of the smart cities. This means that urban development in Smart cities depends on those resources that will increase the demand for rare metals in the international markets for building state-of-the-art smart urban infrastructures. As a result, this will intensify the geopolitical dependencies³³, mainly on those countries such as, China, which presently dominates the rare metal production in the world. This type of economic dependency for building Smart cities, which is completely smart technology driven and dependent, will make the State both economically and politically vulnerable to artificial supply disruption. There is also a social impact of mining operations of rare metals, as it often leads to human rights violations and mass scale development-induced displacement of the local communities, which certainly will raise questions of equity in sustainable urban governance. There is a paradox. On the one hand is dirty metals, which are essential for the smart technologies and on the other hand, is the greener ecological world. The objective of smart cities is to combat climate change through the usage of renewable sources of energy along with efficient systems. But, the production processes for the use of these technologies significantly contribute to the greenhouse gas emissions, which is one of the major reasons of climate change and environmental degradation. The trouble is further aggravated by the fact that, in most cases, the creation of solar panel infrastructure is affecting the marginalised and vulnerable communities³⁴ and also disturbing the ecological balance by being the cause of the extinction of various other living species, such as, the Great Indian Bustard³⁵. Therefore, it is proposed to have a lifecycle assessment

³³*Ibid.* at 4.

³⁴Pragathi Ravi and Mitul Kajaria, “Fishing in Photovoltaic Waters” 41(21) *Frontline*, Oct. 19–Nov. 1, 2024. The installation of the Solar Plant in the Nathsagar reservoir directly affects the livelihoods of traditional fisheries, hence affecting the delicate ecosystem of the place.

³⁵In *M K Ranjitsinh v. Union of India*, 2024 INSC 280, the problem of extinction of the Great Indian Bustard (GIB) due to the installation of significant infrastructure related to renewable sources of energy, solar panels and wind mills, was an issue. The Court initially in 2021 ordered stay on the installation of such structures. But, in 2024, the Court vacated the stay on the installation of big infrastructure for the solar panels and instead, instructed for the formation of a big committee to reconsider the issue.



at a policy level to have a holistic view of the environmental impact of the technological components. It is necessary to consider the entire lifecycle i.e. from extraction to disposal. The Court, while promoting the recycling of rare metals, can also mitigate the environmental impact and this will help (ii) reduce dependency on virgin mining operations. Consequently, one of the essentials of urban governance frameworks here is transparency, which directs them to enforce transparency in sourcing rare metals by ensuring ethical and other sustainable supply chains. Rare metals are critical for the success of green technologies, such as solar panels and wind turbines and their extraction often generates more pollution than traditional fossil fuels. This contradiction principally complicates the very narrative of smart cities as solutions for climate change³⁶.

3. Integrating Technology with Smart Cities: Evolving Sustainable Urban Governance

Despite understanding the fact that most of the modern technologies are relying on rare metals, it is difficult to be away from it, especially in the present times, as it is difficult to sustain these modern infrastructures in the absence of these technologies. The present urban cities, are facing the demographic boom alongside the dynamic urbanisation, which is reinforced by the forces of globalisation processes and also due to unprecedented flow of (i) enormous population (ii) the capital and (iii) information. And, cumulatively, all this is causing unprecedented challenges to the Smart Cities, which must adopt altogether, the new development strategies.³⁷ Therefore, the contemporary smart cities have evolved with the integration of technology with the infrastructure of smart cities. Undoubtedly, technology has its drawbacks and it is necessary to know the limits of its usage. The overuse of technology has its problems and therefore, its use in smart cities needs regulation so that these urban cities cannot be converted into ‘Surveillance cities.’ This problem is going from big to bigger, as the size of these urban cities is expanding like never before in the history of these cities. For example, in Delhi, the capital of India, almost 7,00,000 people are added every day in search of better livelihoods.³⁸ Hence, holistically addressing the present

³⁶ Guillaume Pitron, *The Rare Metals Wars* 25 (Scribe, 1st edn., 2020).

³⁷ P. Lombardi, S. Giordano, H. Farouh, and W. Yousef, “Modelling the smart city performance” 25 *The European Journal of Social Science Research* 137 (2012).

³⁸ Jill Ward, “Will future megacities be a marvel or a mess? Look at Delhi” *The Economic Times*, November 3, 2018, available at: <https://economictimes.indiatimes.com/news/politics-and-nation/will-future-megacities-be-a-marvel-or-a-mess-look-at-new-delhi/articleshow/66486600.cms?from=mdr> (last visited on 26.11.2024).



challenges, especially the smart cities, is a formidable task in itself. Without the help of technology, it would be difficult to address all the issues. However, the first major impediment towards the growth of urban development is climate change, as it is changing the nature and character of urban cities to a great extent. And smart cities, in this regard, are designed in a way to have the best of all types of urban cities discussed above, to not only tackle the brunt of climate change but also to evolve the principles and philosophy of sustainable urban governance.

3.1 Fulfilling Electricity Demands of Smart Cities and Marginalised and Vulnerable Communities

Electricity consumption in smart cities is expected to go up in order to maintain the smart infrastructure. Therefore, relying more on renewable energy sources is necessary, but this also comes at a cost. More importantly, the digital grids that provide electricity to the smart cities depend upon rare metals, whose extraction is an environmental hazard.³⁹ And, the installation of these big solar panels and wind turbines directly affects the ecology and also affects the local communities to a large extent.

3.2 Experiencing ‘Jouissance’ in Integrating ‘Smart Cities’ with ‘Technology’

The citizens of smart cities are experiencing *jouissance* and often derive paradoxical pleasure from technological innovations and their outcomes, efficiency in the context of improved urban living standards, coupled with many challenges attached to it and the complexities introduced by it. For example, they are enjoying the seamless integration of technology in their day-to-day lives, as it enhances their abilities and production capacities, by providing various types of smart mobility systems, along with the renewable energy solutions and also by introducing data-driven public services. Now, people can access the public transport through mobile applications also and can track them accordingly for better results. However, this pleasure comes with various contradictions also, as the very system which provide a comfort zone with convenience to lead a dignified life, comes with the concerns related to both the (i) surveillance and (ii) data privacy and it also comes with socio-economic disparities. For example, a citizen of a smart city of Singapore, might enjoy the efficiency of Artificial Intelligence (AI) driven traffic management

³⁹See chapter two of Guillaume Pitron, *The Rare Metals Wars* 26 (Scribe, 1st edn., 2020), which discusses the dark side of green and digital technologies.



systems, as it has reduced its commuting time to a great extent and this will exemplify his *jouissance* in harmony between the integration of technology and the urban life of the Smart Cities. Yet, it is the same individual, who might be feeling discomfort and may be grappling with, the very idea of living under the big eyes of the State, while being under the constant digital scrutiny, which in a way, reveals the dual nature of his experience while interacting with technology. Hence, while discussing urban development in the context of Smart Cities, there is a complex interplay between the happiness attached to the usage of technological advancements and the issues related to the existential dilemmas in the pursuit of building sustainable and inclusive smart cities for future. The introduction of technology in urban development has assisted cities in converting to smart cities, adding ease and comfort to human life, though it has its challenges. Therefore, whether the addition of technology has proved to be a boom or a bane for human beings living in Smart cities, is yet to be seen and analysed. Hence, the question of whether technology has actually assisted in human comfort or reduced the quantum of freedom, becomes very important. It is necessary, therefore, to have a policy of *SUG*, to integrate 'Smart cities' with the 'technological advancement' to protect and preserve the human rights of the vulnerable and marginalised groups of society within the constitutional framework.

4. Are Smart Cities Addressing the Adverse Effects of Climate Change?

Smart cities are designed to tackle the challenges posed by climate change and mitigate its adverse effects, providing a dignified life to all. They are being built with the constitutional framework to give a clean and healthy environment under Article 21 of the Constitution of India. To achieve the objective of 'climate justice,' Smart cities are designed to integrate sustainable technological solutions with sustainable development goals. Smart cities are envisioned to adhere to constitutional values prevalent in Parts III and IV of the Indian Constitution.

5. Social Justice and the Smart Cities and Climate Change: Addressing Issues of Marginalised and Vulnerable Persons

Smart cities have to plan themselves to address the new issues of Social Justice brought about by climate change, as the vulnerable and marginalised will face the brunt of climate change. As we have already witnessed in the summer of 2024, in Delhi alone, more than 300 persons died due to heat.⁴⁰

⁴⁰Refer Divya Gandhi, "India Scorching", *Frontline*, August 9, 2024, p. 9.



In most cases, the body temperature soars so high, which first leads to the delirium stage and which further leads to untimely death. In all these cases, the victims were the vulnerable and the marginalised class of the society, who are unable to adapt and adjust to the rapidly changing environment and fail to realise that the climate of these Cities has become worse in the last few years, more due to anthropocene activities. Smart Cities undoubtedly have to address climate justice in the light of the already existent social justice jurisprudence⁴¹.

5.1 Political Jouissance⁴² and the Smart Cities: Contradictions

The political jouissance in India always fuels the very enthusiasm towards the building of smart city initiatives, though it has also perpetuated a complete disconnect between the symbolic progress on the one hand and the lived realities of the vulnerable and marginalised communities, on the other. For example, vulnerable groups experience exclusion from these types of Smart city initiatives, which for them is in clear violation of the constitutional promises of equity and the building of sustainable urban governance. The political leaders promote these projects with high visibility and they undermine the climate resilience policies of sustainable development. They also, at times, exclude inclusive planning when it comes to designing Smart Cities. This is why this leads to making superficial progress instead of substantive growth. And, during these difficult times, when climate change is causing extreme natural calamities and also when the climate challenges have already escalated, the political jouissance emerges as a rhetoric for the formation of smart cities, which is also portrayed as a solution for the ‘global environmental crisis’. Political leaders also derive gratification by projecting these smart cities as the models of sustainability, despite the fact that the implementations of the above have failed to address the systemic vulnerabilities prevalent in the city. The urban flooding that had occurred in Tamil Nadu or Gujarat are the classic examples, when the vulnerable and the marginalised groups were more adversely affected than others. The smart city initiatives, had failed to address the prevalent systemic vulnerabilities such as (i) urban flooding and (ii) resource scarcity. In fact, social inequalities are also not being plugged by the smart

⁴¹Nickhil Kumar Sharma, Tom Hargreaves and Helen Pallett, “Social justice implications of smart urban technologies: an intersectional approach” 4(1)

Buildings and Cities 315 (2023)

⁴²Nicol A. Barria-Asenjo, *Political Jouissance* 10 (Bloomsbury, Great Britain, 1st edn., 2024).



cities, which then makes them elite and then in all certainty, the marginalised and vulnerable would face the adverse effects of climate change more. This is the reason why in the 2024 summers of Delhi, due to excessive heat caused by the climate change, more than 300 persons died and all of them were belonging to the vulnerable class. In the evolving narrative of SUG, the political journey reflects, both the motivational power to promote Smart Cities on the one hand and on the other, the existing limitations on the political investments in the smart cities. The present state of affairs can be described in this way that, here a political leader inaugurates, a state-of-the-art infrastructure in the smart park in a smart city, while categorically ignoring the unresolved issues of the informal settlements, slums, etc., who are living most of the time at the outskirts of these smart cities, which also reflects that there is an existing tension inherent in the political journey. Principally, the critical features of SUG in the context of smart cities are, *firstly*, the ‘Technological Integration’ by following the principles of Sustainability and implementing and executing ‘green infrastructure’ and ‘renewable energy solutions’. *Secondly*, the smart cities have resource-efficient systems at disposal, to combat the environmental challenges. *Thirdly*, the smart cities also provide for the ‘Citizen-Centric Services’, focussing on the improvement of quality of life by enabling (a) digital governance (ii) e-health and (iii) smart transportation. *Fourthly*, it provides for the ‘data-driven decision’ making. Thus, smart cities are clearly, mixed bags of technology and hassle.

5.2 International Best Practices: Smart Cities in Poland

In Poland, smart cities are developed by following certain sustainable principles of sustainable urban governance. Their focus is both on building infrastructure based on smart technology and also focuses on the enhancement of the urban efficiency across the sectors, including, (i) mobility, which is inclusive of making efficient use of the public transport, and also in providing an alternative to the petrol and diesel vehicles, by promoting cycles and other related means, (ii) effective sustainable urban governance, (iii) sources of energy, by promoting solar energy, (iv) protecting and preserving the environment, and (v) engaging citizens in forming policies related to sustainable urban governance, while also addressing multivarious challenges posed by the rapid urbanisation of the city and the adverse effects of the climate change.⁴³ For energy efficiency

⁴³Izabela Jonek-Kowalska and Radosław Wolniak, *Smart Cities in Poland: Towards Sustainability and a Better Quality of Life?* 1 (Routledge, New York, US, 1st edn., 2023).



and also for using renewable sources of energy, Poland uses smart grids and solar and wind power infrastructure and tries reducing the reliance on fossil fuel-based sources of energy, such as petrol and diesel. For example, Amsterdam uses contemporary decentralised automatic trash compactors, which run on solar energy, to optimise their city's waste management, which also assists in reducing carbon emissions.⁴⁴ Similarly, for sustainable mobility, Copenhagen has an integrated pedestrian and cycling system, which considerably reduces the carbon emissions from fossil fuel-based vehicles, and this also helps in enhancing mobility.⁴⁵ Vienna's Smart City carries various projects incorporating contemporary renewable energy systems that are citizen-driven and assist in building a zero-carbon economy.⁴⁶ And, to collect the data sustainably, Amsterdam uses 'Smart benches', which collect the environmental data from the atmosphere and immediately, utilise the solar energy, in doing real-time climate monitoring in Poland.⁴⁷ And, for enhancing the climate adaptation, various Smart City platforms were created like Madrid's MiNT to optimise all the urban services.⁴⁸

6. Conclusion

Smart Cities are indubitably, the future of Indian Urban Governance.⁴⁹ A comprehensive 'Sustainable Urban Governance' (SUG) policy is pivotal in addressing contemporary and complex issues, such as tackling the adverse effects and impacts of climate change. SUG will be significant, particularly in the context of smart cities, which are also going to be the future insulated cities⁵⁰ in addressing the problems of planning and governance. SUG will be significant in building an inclusive and transparent smart city, which will also be accountable to them. There is a strong need for participatory decision-making processes at the helm of affairs to integrate 'Smart city' planning to include within it the environmental, social and other economic considerations of the urban cities and also to create a conducive social and political environment, which will be resilient to contemporary issues, such as climate change, both

⁴⁴*Ibid.* at p. 15.

⁴⁵*Ibid.* at p. 59.

⁴⁶*Ibid.* at p. 8.

⁴⁷*Ibid.* at p. 15.

⁴⁸*Ibid.* at p. 11.

⁴⁹Feroze Varun Gandhi, *The Indian Metropolis 27* (Rupa Publications, India, 1st edn., 2023).

⁵⁰Insulated from the adverse effects of climate changes.



in terms of addressing its adverse effects and social challenges of inclusiveness. There are certain key aspects of SUG that need further deliberation.

6.1 Inclusive Decision-Making

Engaging diverse stakeholders, including citizens and government agencies, non-governmental bodies, private entities and marginalised and vulnerable segments of society, in Smart City planning will ensure that urban policies address the larger needs of residents and foster equitable and effective governance.⁵¹

6.2 Transparency and Accountability

Similarly, by developing open governance practices, a gap between the citizens and the government would be bridged, which is necessary for developing mutual trust amongst citizens and encouraging citizens' active participation in executing compliances in light of the government's sustainability initiatives.

6.3 Smart Cities and Sustainable Urban Governance: Ignoring Social Inequalities

The State, despite being aware of the undesirable situations in the context of the smart cities, chooses to tolerate it, which shows the stakeholders' tendency to be complacent in addressing the challenges within the SUG. In various smart city initiatives started by the State, urban planners randomly allow unsustainable practices to persist in the name of the nation's or society's progress.⁵² For example, despite knowing the cost associated with mining rare materials, which are a must for promoting smart technologies, urban planners are proceeding without exploring any of the other alternatives or promoting some policies based on recycling. In a way, this is a clear sign of accepting the environmental harm, which clearly reflects tolerance towards completely unsustainable practices. This will also promote social inequality in drafting policies related to smart cities, which will then disproportionately benefit the city's elite and affluent populations and exclude the vulnerable and marginalised communities from its ambit. Despite knowing these brutal

⁵¹Tzuhao Chen, J. Ramon Gil-Garcia and Mila Gasco-Hernandez, "Understanding social sustainability for smart cities: The importance of inclusion, equity, and citizen participation as both inputs and long-term outcomes" 1 *Journal of Smart Cities and Society* 135 (2022).

⁵²Islam Bouzguenda and Nadia Fava, "Towards smart sustainable cities: A review of the role digital citizen participation could play in advancing social sustainability" 50 *Sustainable Cities and Society* 101627 (2019).



facts related to exclusion, the State fails to take corrective action and rather chooses to celebrate the surface-level achievements of smart cities. This erodes the public trust in the State, as the governance model that tolerates inequality or environmental harm, undermines its credibility and public support. Smart cities should be used as an opportunity for genuine sustainable progress by addressing systemic issues instead of relying on short-term solutions, which cannot sustain urban resilience, especially in light of the adverse effects of climate change.⁵³

6.4 Integration of Climate Resilience

Sustainable Urban Governance has to incorporate both (i) the climate adaptation and (ii) mitigation strategies into urban planning⁵⁴, so as to enhance the Smart city's capacity and ability to take the challenges posed by the climatic changes and also to be able to positively implement the right against adverse effects of climate change. To address the contemporary issues related to climate change, especially when we are ready for the 'Smart Cities', there is an extreme need to re-engineer the concept of development to make it more (i) inclusive (ii) sustainable and (iii) affordable, so that this new model of development, must also have a space for the marginalised and the vulnerable persons of the society. There is a need for new imagination in designing new development schemes,⁵⁵ and also in addressing the visions of economic growth so as to address the issues related to (i) smoother energy transition and (ii) climate mitigation.⁵⁶

6.5 Policy Integration of 'Environmental Sustainability' with 'Climate Justice'

Integrating the principles of environmental sustainability and climate justice is necessary for the sustainability of smart cities and to make them inclusive⁵⁷. And this goal can only be achieved by balancing the advancements in technology with the prevalent equities of the society, by designing sustainable urban

⁵³Mengmeng Wang and Tao Zhou, "Understanding the dynamic relationship between smart city implementation and urban sustainability" 70 *Technology in Society* 102018 (2022).

⁵⁴Joshua Hallwright and John Handmer, "Progressing the integration of climate change adaptation and disaster risk management in Vanuatu and beyond" 31 *Climate Risk Management* 100269 (2021).

⁵⁵Sunita Narain, "Old Agenda with New Imagination" *Down to Earth*, 1-15 June 2024, p.7.

⁵⁶Trishant Dev, Tamanna Sengupta and Avantika Goswami, "Vision 2030" *Down to Earth*, 1-15 June 2024, pp. 8-10.



governance policy by prioritising (i) the renewable energy sources (ii) developing an efficient waste management system and building green infrastructure. Because these technological developments come at the cost of vulnerable stage of society, therefore, achieving climate justice requires that the benefits of achieving sustainability be distributed equitably and similarly, the marginalised community should be adequately protected from the brunt of adverse effects of climate change. All should enjoy these advanced green solutions and the same must not be restricted to the affluent class of the cities. The resource extraction which is degrading the environment, especially in developing countries, creates a paradox where all the efforts to achieve environmental sustainability in creating infrastructures for the smart cities indirectly perpetuate the ecological or environmental injustice somewhere else, which highlights the problems in aligning the local sustainability policies of sustainable urban governance with that of the global climate justice⁵⁸. There is a clear policy gap in implementing environmentally sustainable policies, which cater to addressing both environmental sustainability and climate justice. For Smart cities, the requirement is to have a governance framework, which should be both (i) inclusive as well as (ii) adaptive. Because of the wholly fragmented and scattered decision-making processes, along with the insufficient representation of the vulnerable and the marginalised voices and also because of the conflicting governmental priorities between the (i) economic growth and the (ii) environmental sustainability, has created huge barriers in achieving the integration of the smart cities and the objectives of sustainable urban governance. These problems can be addressed by adopting a holistic approach⁵⁹, by prioritising inclusivity as the first goal, followed by ethical sourcing of the rare metals used in creating the web of technological innovations in building smart city infrastructures and by the equitable distribution of the resources in urban development by evolving sustainable urban governance⁶⁰ to mitigate the adverse effects of climate change in the smart cities.

⁵⁷Katrine Skagena and Elin Lerum Boasson, “Climate policy integration as a process: from shallow to embedded integration” 26(3) *Journal of Environmental Policy & Planning* 279 (2024).

⁵⁸Deirdre De Burca, Jyotsna Mohan and Ajay Jha, “Climate Justice And Policy Coherence For Sustainable Development: Lessons from the Asia-Pacific Region”, *FORUS, Asia Development Alliance*, 2023, p. 8, available at: <https://www.forus-international.org/pt/pdf-detail/97879-climate-justice-and-policy-coherence-for-sustainable-development-lessons-from-the-asia-pacific-region> (last visited on 30.11.2024).

⁵⁹Naim Kapucu, Yue Ge, Emilie Rott and Hasan Isgandar, “Urban resilience: Multidimensional perspectives, challenges and prospects for future research” 4(3) *Urban Governance* 163 (2024).

⁶⁰Iva Mrak, Denis Ambruš and Ivan Maroviæ, “A Holistic Approach to Strategic Sustainable Development of Urban Voids as Historic Urban Landscapes from the Perspective of Urban Resilience” 12(11) *Buildings* 1852 (2024).