frontiers | Frontiers in Sustainable Cities

TYPE Editorial
PUBLISHED 02 September 2024
DOI 10.3389/frsc.2024.1466952

OPEN ACCESS

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RECEIVED 18 July 2024
ACCEPTED 19 August 2024
PUBLISHED 02 September 2024

CITATION
Saxena P, Sonwani S, Juhola S and Louis F (2024) Editorial: Towards 2030: a sustainable cities perspective on achieving sustainable development goal 13 – climate action. *Front. Sustain. Cities* 6:1466952. doi: 10.3389/frsc.2024.1466952

Editorial: Towards 2030: a sustainable cities perspective on achieving sustainable development goal 13 – climate action

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KEYWORDS

climate change, extreme weather, Biodiversity Loss and Ecosystem Services, disaster risk reduction, adaptation, co-benefits, Sustainable Development Goals

Editorial on the Research Topic
Towards 2030: a sustainable cities perspective on achieving sustainable development goal 13 – climate action

Climate change is one of the significant global environmental issues, a threat to sustainable development and its widespread, unprecedented impacts disproportionately burden the poorest and the most vulnerable populations. Today, greenhouse gas emissions (GHG) are 50% higher than the levels in the 1990s (Sonwani and Saxena, 2022). Increasing earth's surface temperature, changes in precipitation pattern, frequent tropical storms, drought, flood, forest fire, sea level rise and melting of glaciers are important markers of changing climate observed across the world (Saxena et al., 2022). To reduce the impact of such climate driven extreme events, the United Nations have recognized the role of developed and developing countries in climate change mitigation and adaptation under Sustainable Development Goals (SDGs) and to take urgent action to combat climate change and its impacts. The United Nations funds developing countries under SDG-13 to adapt to climate change and prepare low-carbon development plans (Filho et al., 2023). The aim of the goal is to keep the global temperature change below 1.5°C with the work to be carried out within the framework of this purpose. In addition, the carbon dioxide emission rate in 2030 should be reduced by 45% compared to 2010, and net-zero is targeted for 2050 (Filho et al., 2023).

Cities are responsible for around 60% of greenhouse gas emissions, and with an ever-growing level of urbanization, this proportion is only expected to rise. It is therefore essential that efforts to mitigate climate change are centered on urban environments. Furthermore, with the United Nations predicting that 68% of the world's population will live in urban areas by 2050, adapting cities to withstand the impacts of climate change is vital for the health and survival of urban populations. This Research Topic addresses SDG-13 from a Sustainable Cities perspective, focusing on the progress toward the goal

in urban environments. The papers in this Research Topic recognize the Sustainable Development Goal 13 (Climate Action) from an urban perspective, where, we have invited the multidisciplinary and diverse studies that explore themes including Climate Change and Extreme Weather Events, Net Zero Emissions: a Solution to Climate Change, Climate Change, Biodiversity Loss and Ecosystem Services, Climate Change and Health Issues, Climate change, adaptation, and resilience in cities, Climate finance flows in cities, Implementation and impact of climate action plans in cities, Climate justice and equity in cities and Participation of stakeholders, citizens, private sector, in climate action in cities. Under this Research Topic we received several articles and a total of six articles have been published after the peer review process.

Contributing studies in this Research Topic have provided several facts and figures that illustrate the changing climatic conditions that are having global to local impacts causing environmental damage, loss of life/disease, property damage and economic loss. Changes in the current climate are also a responsible factor for the transformation in environmental, socio-economic, and urban landscapes. Over the recent years, a significant increase in the number and frequency of extreme weather events are observed, causing vulnerable communities. Countries like India have also experienced severe air pollution problems in several metropolitan cities and Delhi was highlighted in the list of the world's most polluted cities. Due to its wide impact across the globe in terms of environment, society, finance and health, it also linked all 16 of the other Goals of the 2030 Agenda for Sustainable Development.

The urban environment, with its built infrastructure, green spaces, and diverse human activities, offers various ecosystem services that enhance the wellbeing and resilience of urban dwellers. Urban ecosystems offer regulatory services like temperature control, air quality, and storm-water management, plus provisioning like food and water (Sonwani et al., 2022). They also provide cultural benefits, promoting recreation and community unity. However, climate change poses significant challenges to urban ecosystem services. Climate change can disrupt biodiversity and ecological processes, affecting the overall resilience and sustainability of urban ecosystems (Edwards et al., 2024). To address these challenges, cities are adopting various adaptation strategies that recognize the interdependence between urban ecosystems and climate change. Green infrastructure interventions, such as the creation of urban parks, green roofs, and community gardens, aim to mitigate the impacts of climate change by enhancing the regulation of temperature, improving air quality, and reducing storm-water runoff. Additionally, urban planning and design approaches prioritize compact and walkable neighborhoods, promoting public transportation and reducing reliance on fossil fuels. Furthermore, engaging communities in the management of urban ecosystems and climate change adaptation measures is crucial for ensuring equitable distribution of ecosystem services and building social resilience. Therefore, the Research Topic highlights a comprehensive understanding of the dynamic interrelationship between urban ecosystem services and climate change and their implications. It also focuses on how urban cities especially developing countries are facing problems arises due to changing climate, particularly due to extreme weather events, change in lifestyle, anthropogenic activities and demographic factors. It also features the role of community people and policy makers to work together to address such climatic extreme issues and protect the environment by resilient planning of cities to move toward sustainable transformation. Moreover, it also highlighted the possible suggestive recommendations about how to reduce climate change impacts in urban cities/areas by adopting sustainable methods, community participation and policy reforms in the form of climate action as SDG13 and reduction of CO_2 emissions upto the year 2030 and net zero for 2050. Moreover, this Research Topic contributes and aware the society about problems of climate change in different countries and recommended cost effective measures can be used by policymakers to build action plans for developing and developed countries to reduce the impacts of climate change.

For more understanding about specific published articles, brief descriptions are below.

The first original research article titled "*Two decades of nighttime surface urban heat island intensity analysis over nine major populated cities of India and implications for heat stress*" targeted nine highest populated cities of India to analyze the nighttime surface urban heat island. The key role of increasing urbanization (pre- and post-2010) in nighttime surface urban heat island (SUHI) expansion and intensification is highlighted in the present study. Two seasons, March, April & May (MAM) and December, January and February (DJF) show the strongest prevalence of nighttime SUHII in Indian cities, a period coinciding with an increasing number of severe heat waves in India. The study also highlights that the incipient megacities of India showed a substantially greater mean annual growth rate of nighttime SUHII than the megacities where this rate remained below 0.007°C/year. Studies also suggest that urban greening strategies such as vertical gardens, rooftop and terrace gardens, community forests, urban agriculture are aesthetically pleasant and also provide thermal comfort in heat-stressed urban environments (Anjos et al., 2020). It is recommended that all the major populated cities of India should formulate city-specific action plans incorporating the mitigation of UHIs (or SUHIs) and extreme heat events under a warmer future climate (Jain).

A perspective paper on "*The polyethylene terephthalate water bottles problem in Dubai hotels—Would an initiative solve this problem or does it need a law?*" highlight about the environmental effects of single used polyethylene terephthalate (PET) water bottles used by tourists in Dubai. The government of Dubai launched an initiative to reduce the usage of PET bottles, and this paper mentioned whether this initiative is adequate to change hotels' dependence on PET water bottles. Several 5-star hotels in Dubai responded to the initiative by discontinuing PET bottles. The factors that influence hotels' decisions to stop using PET bottles were also examined. The factors were initially determined using the Delphi method. These elements included cost, peer pressure, superior pressure, marketing, and tourist pressure. Decision-makers are satisfied with the number of hotels that banned PET bottles after a year after the initiative. Nonetheless, decision-makers must monitor the situation and intervene if the rate of change is insufficient (Al-Shihabi).

A review on "*Urban ecosystem services and climate change: a dynamic interplay*" highlights the reciprocal relationships, impacts, and adaptation strategies associated with these phenomena. Urban ecosystems offer regulatory services like temperature control, air quality upkeep, and stormwater management, plus provisioning like food and water. Ultimately this review highlights that by recognizing and integrating the contributions of urban ecosystems, cities can develop sustainable and resilient strategies to mitigate and adapt to climate change, ensuring the wellbeing and habitability of urban environments for present and future generations (Pandey and Ghosh).

"*Diagnosing the voids of knowledge in the transformation process in managing and standardizing smart city development: the case of the government of Indonesia*" investigates smart city development projects implemented by the Government of Indonesia (GoI) from 2017 at the regional and municipal levels. It provides a critical perspective on the lack of knowledge of the transformation process, substantive knowledge, and the wide-regime-shifting balance of knowledge required to accomplish smart city development. The authors find four unique theme formulations: the GoI's behaviors in equivalencing with regular procurement, the voids of knowledge in the transformation process, substantive knowledge boundaries, and letting these projects progress without accompanying committed knowledge boundaries and working for a future without a signifier. Finally, this study suggests that the government should prioritize mastery of knowledge of the transformation processes in smart city development and implement agile strategies to ensure these projects' success and future benefits (Panjaitan et al.).

A comprehensive review on "*Navigating the impact of climate change in India: a perspective on climate action (SDG13) and sustainable cities and communities (SDG11)*" identifies the vulnerability of developing nations in the area of climate change. The transformations in land use resulting from rapid urbanization, altered river courses, shifting cultivation practices, erosion, and desertification, as outlined by experts (Chakraborty, 2009; Sreenivasulu and Bhaskar, 2010) profoundly shifts ecosystems. India, as a rapidly developing nation, has witnessed an alarming warming trend over the decades, leading to unprecedented weather extremes and heightened demand for cooling in the sweltering summers due to both climate change and population growth. Furthermore, this review also mentioned that, marginalized urban communities, including the impoverished, elderly, children, and those dependent on climatic conditions like fisher folk, will be subjected to impacts of climate change. It further highlighted that the adoption of nature-based solutions (NbS) emerges as a promising strategy, leveraging nature's innate capacities to counterbalance the impacts of urbanization and climate change. By integrating natural elements into urban landscapes, NbS not only bolster resilience but also promote wellbeing, offering a ray of hope amidst the encroaching climate crisis (Hussain et al.).

"*Expectations of i-Tree Eco as a tool for urban tree management in Nordic cities*" focused on the application and significance of i-Tree Eco v.6 in 13 Nordic cities which were engaged in aresearch project with ambitions to use i-Tree Eco for the purpose of retrieving numeric and monetary data of the biophysical structures and ecosystem services of the urban forest. It also highlighted the use of this model in urban forest management and providing numeric information on ecosystem services that further adds a deeper understanding toward the criteria used in the valuation process and the potential risks of numeric approaches which may provide more context-specific applications (Sjöman et al.).

Thus, the articles in this Research Topic draws attention toward ground-based knowledge about the linking of climate change impacts on ecosystem services and related disaster risks in urban area. It also highlighted the possible tools, strategies and policy measures important to achieve transformational resilience in urban settings. The research papers also highlights that how smart and sustainable cities are playing significant role in global climate change adaptation which focuses toward the objectives of SDG13 and 11 and their aim to achieve sustainability toward 2030.

Author contributions

PS: Conceptualization, Supervision, Writing – review & editing. SS: Investigation, Project administration, Writing – original draft. SJ: Investigation, Visualization, Writing – review & editing. FL: Visualization, Writing – review & editing.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

The author(s) declared that they were an editorial board member of Frontiers, at the time of submission. This had no impact on the peer review process and the final decision.

Publisher's note

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