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Building climate resilient cities in the global South: assessing city adaptation plans in India

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ABSTRACT

Planning discourse deeply influences urban responses to climate change, particularly within the context of the global south. This article examines urban climate action plans developed by 13 Indian cities to understand the different scenarios that shape policies and visions of urban governance, using discourse analysis. We find that the urban climate action agenda in India needs greater definitional clarity. Most plans require better contextual engagement with specific vulnerabilities in each city. City plans need to be better networked with state and national planning mechanisms, recognising that climate change requires multi-level governance responses. Finally, most plans consider Nature-Based Solutions only in the form of tree planting and waterbody management, lacking sufficient consideration of urban ecosystem function and process, and ecosystem-based restoration. These aspects require incorporation to help Indian cities become more effective at addressing urban climate challenges.

KEYWORDS

Climate action plans; India; discourse analysis; climate urbanism

Introduction

Throughout the world, but particularly at low latitudes, cities of all sizes are growing but also facing increasing environmental hazards, particularly those associated with climate change. Several cities in India are already experiencing more frequent heatwaves. The current emissions trajectory for the country suggests these hot spells will increase 10-fold by 2050 (Mukherjee & Mishra, 2018). Between 2036 and 2060, 33 out of 57 Indian sample cities will experience a greater risk of floods, while 24 cities will show an increased risk of drought (Ali et al., 2014). Such changes also increase the likelihood of climate-related deaths, and influence the spread of vector-borne diseases, while further reducing urban quality of life (Dholakia et al., 2020; Singh et al., 2021).

Cities are not just hotspots for climate impacts, but also opportunities for transformation and adaptation (Angelo & Wachsmuth, 2020). Urban climate adaptation requires systemic solutions (Castán Broto, 2020; Castán Broto & Robin, 2020). The highly political interventions required involve more than adjustments to urban built spaces, mandating the transformation of urban ecosystems, and of urban socio-cultural lives. Accordingly,

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since the 1990s, city governments across the world have increasingly brought in climate-related concerns into urban development agendas (Heinrichs et al., 2013). Urban responses to climate change across the world have occurred over two phases: 1) development of climate action plans by city governments in the global North, largely aimed at mitigation, via reducing emissions and energy use and 2) since 2000, a focus on wider climate adaptation challenges, including risk and vulnerability, which also involves cities from the global South (Bulkeley, 2010).

Cities are important players in global responses to climate change (UN Habitat, 2011), alongside national governments, international bodies such as the UN Habitat, Action Aid, Rockefeller Foundation, the World Bank, and HSBC (Bulkeley & Castán Broto, 2013). Discourses and narratives emerging from international negotiations often deeply influence national and regional actions, particularly in emerging economies of the global south.

In India, responses to climate change at the policy level have been influenced by international reports, policies and agreements, including those of the Intergovernmental Panel on Climate Change (IPCC), the United Nations Framework Convention on Climate Change (UNFCCC), and the Kyoto Protocol (Atteridge et al., 2012). The National Action Plan for Climate Change (NAPCC) establishes eight national missions on climate change. The prominent discourses influencing the NAPCC recognise that India sees its climate action as embedded within narratives of national development, with a focus on increasing economic growth, reducing poverty, protecting livelihoods, sustainable development, efficient utilisation of its resources as well as high impact technological innovations in the climate sector (Atteridge et al., 2012).

In addition to the NAPCC, many State Action Plans on Climate Change (SAPCCs) focus on addressing more proximate drivers and consequences of climate change (Oliveira, 2009). While ambitious in their scope, these SAPCCs, however, have proven to be limited in their impact owing to a centrally driven agenda that offers limited scope for regional experimentation (Jogesh & Dubash, 2015). In addition to the NAPCC and SAPCCs, a growing number of Indian cities have evolved action plans to deal with climate risks such as flash floods and heatwaves. Overall, most plans are developed by, or in collaboration with local municipal bodies.

This article evaluates climate change city action plans across 13 Indian cities, identifying prominent discourses that have influenced Indian responses to climate risk within urban scenarios using a discourse analysis approach. Such an approach helps us understand how climate action is framed and presented within the urban development agendas of the global south, of which India is a prominent example.

Methods

We identified city action plans on climate change by analysing policy documents available on urban nodal agency websites, as well as external websites such as those of the National Disaster Management Authority (NDMA), ICLEI – Local Governments for Sustainability, and the Rockefeller Resilient Cities project. Plans were downloaded through the website of the local municipality, or from external repositories (such as the India Environment Portal). We focused on policy documents drafted in English. This meant excluding a couple of disaster management plans for two cities within the state of Maharashtra [Figure 1](#).



Figure 1. Cities for which urban climate plans were studied. **Source:** Map prepared by Enakshi Bhar for the authors using QGIS.

We mapped city plans into six categories – heat action plans, resilience strategies, carbon-neutral cities, environmental status reports, city development plans, and disaster management plans. These plans take different forms. Some plans, such as those of Nagpur, form part of larger comprehensive development plans; others such as the heat action plans of Surat and Ahmedabad were initiated by local municipalities to prepare for risk events. Six were evolved in response to external initiatives such as the Rockefeller Foundation’s 100 resilient cities programme (Karanth & Archer, 2014).

Based on previous studies of city and state-level climate plans, we focused on two important parameters influencing urban climate action discourse: 1) the technological, economic, ecological, equity, and sustainability ‘imaginaries’, or ideas and perceptions

expressed in these documents and 2) visions of urban governance contained in the climate action plans, including urban agendas, state–centre relationships, international relationships and systems and resilience thinking (Box 1).

We analysed each of the policy documents through a discourse analysis approach, identifying and coded these ideas and concepts in the document, along with the ways they were set within the urban planning agenda. We also paid attention to those narratives that were not found in the planning document so that their implications for urban planning in the context of climate change in Indian cities could be discussed.

Box 1. Themes analysed within the discourse analysis process.

Imaginaries (social representations or ways of thinking) surrounding climate action plans

- **Technological imaginary:** Parts of the policy document which prioritise technological interventions (for example, early disaster warning systems, expansion of solar power)
 - **Economic imaginary:** Mentions of economic aspects such as budgets, allotments, and financial incentives
 - **Ecological imaginary:** Statements relating to ecological concerns such as pollution, ecosystem processes and function and biodiversity
 - **Justice:** Statements within the policy document which related to issues of gender, inclusivity, equity and justice
 - **Interpretation of sustainability:** Statements within the policy document that help assess how issues of sustainability are identified and framed
- Visions of urban governance:** Mentions of institutional arrangements at local, regional, or national levels along with the associated policy instructions that aimed at managing issues relating to climate change. These include
- **Urban agenda:** Descriptions that help understand whether urban climate action strategies were connected to or separate from larger urban planning agendas
 - **State centre relationships:** Whether city plans synergise with or differ from state and national urban planning agendas, and the institutional relationships described
 - **International Relationships:** Mentions of climate actions influenced or driven by international agreements and international treaties, or funded by international agencies such as the World Bank
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As seen in Table 1, each of the six different types of policy documents identified deal with some form of climate-related risk in urban areas. The city resilience plans are the commonest, having been drafted mainly for the Rockefeller Foundation’s 100 resilient cities programme. City development plans (such as those of Nagpur) and Resilient City plans refer to multiple diverse aspects of climate change including, but not limited to, solid waste management, renewable energy use, energy efficiency, disasters, and green spaces. Heat Action Plans, Disaster Management Plans, and Carbon Neutral Plans are more limited in scope, only addressing specific issues such as mitigating heat-related disasters, or simply serving as a roadmap for action in the event of a disaster. Each type of plan was conceptualised through prior engagement with state or national-level policies such as the Disaster Management Act of 2005, the NAPCC, the SAPCC, and the Prime Minister’s Council on Climate Change.

Irrespective of the nature of a plan or its scope, certain technological, ecological and economic imaginaries (points-of-view – see Box 1) seem widely represented. Technological imaginaries dominated action plans that set out a clear agenda for tackling risks identified as important considerations. Large engineered techno-fixes such as improved disaster management infrastructure; increasing the capacity for solar power or building large water reservoirs were the preferred strategies to deal with climate risk. For example, the Ahmedabad Heat Action Plan aims to mandatorily enforce cool roofing through various materials. The Resilient Chennai Strategy aims to prioritise ‘capacity building through water-centric design’ and ‘creating a web-based platform for urban water design’. Priority was also given to the research and development of technologically advanced solutions to problems such as heatwaves and flash flooding. For example,

Table 1. Results of discourse analysis.

Type of plan	Cities	Drivers of plan development	Problem areas	Imaginarities present	Imaginarities absent	Notes on action strategy
Carbon neutral city plans	Pune	NAPCC	Renewables, Carbon sequestration	Technology Economic Ecological Justice	Interpretation of sustainability	Technological focus (energy and carbon sequestration); gender issues absent
City	Development Plans	Nagpur	Prime Minister's Council on Climate Change	Pollution (including air pollution) Water Gardens Open spaces Disasters Climate change	Sustainable Development	Technology Economic Ecological Justice
Interpretation of Resilient city plans	Gorakhpur Indore Chennai Kolkata Surat Visakhapatnam	Status report, no actionable agenda, gender issues absent Rockefeller Resilient Cities; Asian Cities Climate Resilience Network; Asian Development Bank; NAPCC and SAPCC	Water Health Disasters Solid wastes Energy Transport Low carbon Green cover Resource stress Non renewables India Disaster Management Act, 2005	Technology Economic Ecological	Ecological Justice (except Visakhapatnam) Interpretation of sustainability	Gorakhpur: research and knowledge building (climate resilience, and climate histories) Indore, Chennai, Kolkata, Surat, Visakhapatnam: Lack of clarifying definitions. Technological focus sometimes motivated by funding agency agendas (Visakhapatnam)
Disaster	Management Plans	Koraput	Floods Fire Drought Heat	Technological Ecological	Economic Justice Interpretation of sustainability	

(Continued)



Table 1. (Continued).

Type of plan	Cities	Drivers of plan development	Problem areas	Imaginarities present	Imaginarities absent	Notes on action strategy
Clear	institutional structure; identifies specific responsibilities of individuals. Planting trees only a disaster management response, not climate related					
Environment Status reports	Chandrapur Nanded	Directives from the Indian Ministry of Environment, Forests and Climate Change; and the Maharashtra Pollution Control Board	Pollution (including air pollution) Solid wastes Mining Health	Technology Economic Ecological	Justice Interpretation of sustainability	Mentions of slums and vulnerable populations only in figures No actionable agenda Gender issues absent
Heat Action Plans	Ahmedabad Hazaribagh	India Disaster Management Act, 2005	Heat	Technology Economic Ecological	Justice Interpretation of sustainability	Ahmedabad: Focus on heat. Information dissemination targeted at girls and mothers. Hazaribagh: Treats heatwaves as disaster, no connection to urban heat islands or other social ecological factors. Roadmap provides strategies to alert, monitor and treat effects of heatwaves. However, lacks systematic engagement with urban design to mitigate heatwaves

Resilient Chennai calls for creating ‘an urban data observatory for better governance’ without qualifying what qualifies as ‘better governance’ especially within the context of that city. The city of Gorakhpur calls for a systemic response that includes ‘systems, uses, providers, and governing rules and policies’ with explicit focus on water, sanitation, housing, and health, and natural systems”. With these cities focussing on techno-centric solutions (conserving public spaces, low-cost design for preventing water logging, improving water and sanitary networks), the public seem to be seen simply as recipients of urban infrastructural services and to be governed by a set of universal rules and policies.

Urban responses to climate change were largely embedded within narratives of increasing economic efficiency within the city through more efficient production and labour practices. For example, the city of Indore explicitly identifies urban migration into the city as an area of concern, causing a drain on the city’s infrastructural support systems. Climate change is seen as an accessory that is ‘likely to add to’ the problems faced by the city in this context. Further adapting and mitigating climate change was mostly discussed within the context of balancing urban development with ecosystem-related concerns. There is explicit recognition that climate action (included aspects such as disaster management) occurs at multiple levels. All plans describe the state and national nodal agencies, funding arrangements, and institutional arrangements likely to be associated with climate risk planning. Governance strategies that emerged from these documents reflected distinct engagement with centralised command and control mechanisms. Ideas of local self-governance or collective community-led mechanisms were largely missing.

The ecological imaginaries in the various action plans either quoted established literature on climate change, adaptation, resilience, and vulnerabilities; or provided a status report on ecological conditions within the city paying attention to issues such as noise, solid waste management, and conditions of local water bodies. Another feature common to most of the plans studied was the poor definitional clarity of terms such as sustainability, sustainable development, resilience, climate or climate change, despite frequent mention of these notions within the texts. For example, the resilience strategy devised by the city of Indore, despite mentioning the word ‘Resilience’ several times within the document, does not provide a working definition of this concept as it applies to that city.

The resilient Chennai strategy defines resilience as being about ‘making a city better in good times and bad, for the benefit of all its citizens, especially the poor and vulnerable’. In keeping with this understanding of resilience, the strategy goes on to propose that the collective vision for the city is that of being ‘an enlightened, just, and integrated’ space, however without going into specific contextual peculiarities of Chennai that make this vision locally actionable. While these plans were drafted with the intention of highlighting and responding to local challenges, they provide a general narrative of environmental problems, with little mention of city-specific challenges. Disaster management plans, environmental status reports, and heat action plans on the other hand, deal with city-specific experiences, and outlining strategies building on those experiences (Figure 2).

Certain critical key concepts, ideas and concerns were missing in most documents. These include discussions of gender, inclusivity, equity, justice, and international relations (the last seen in some cases funded by international funding bodies such as

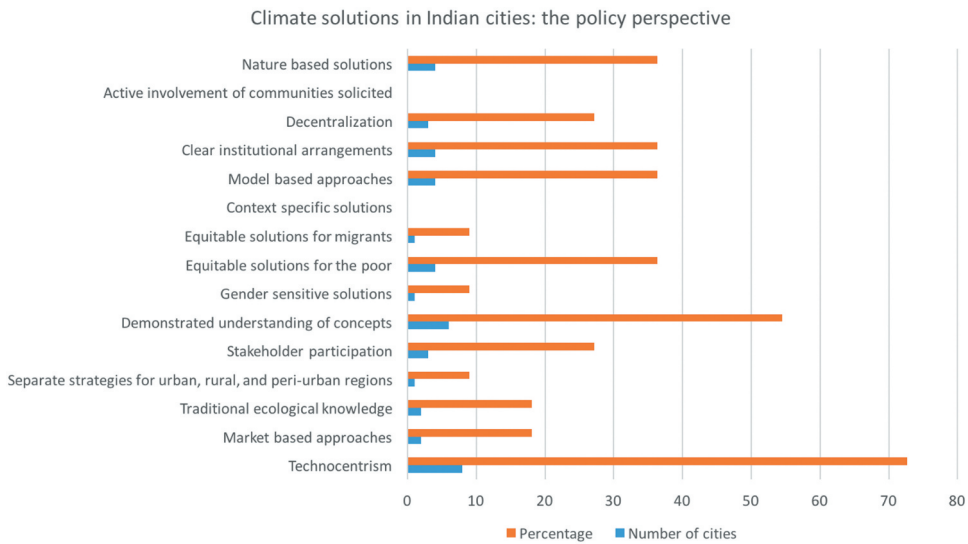


Figure 2. Climate solutions as envisaged by Indian urban climate policies. Source: Figures prepared by the authors.

the Asian Development Bank). Discussions of urban ecosystem restoration, acknowledgement of indigenous and local knowledge systems, of community engagement strategies, and the need for context-specific planning were also missing. Public health concerns are largely addressed from the perspective of strengthening existing health-care infrastructure. An integrated perspective, that takes into account the interconnections between heatwaves, vector-borne diseases, solid waste disposal and air pollution is largely absent.

Most plans seem to demonstrate an understanding of the science behind climate change and resilience. Plans were also competent in identifying their own vulnerabilities through modelling and historical studies. For example, the resilience plans of Chennai, Kolkata, and Surat all described the state of their cities based on historically situated narratives of changes in ecosystem form and functions as also changing people's perceptions and governance regimes over time. Each of them relied upon stakeholder engagement, survey instruments, and meteorological data to understand the vulnerabilities of the city both from an infrastructural perspective as well as from the point of view of the climate-related risks they were facing such as heatwaves and floods.

Despite these advances, the proposed solutions seem to be guided by technocratic panaceas that are not context dependent in most cases. Neither does the state actively solicit community engagement, seeking instead to impose choices upon them. For example, every one of the plans we analysed spoke of solutions such as improving centralised water and sanitation networks, making green roofs mandatory, or providing better solid waste management solutions in the form of landfills or segregation centres. Emphasis was placed on centralised early warning systems for disaster, and mitigating the effects of disasters through relocating informal settlements, or GIS-based public health monitoring. Nature-Based Solutions, while present, were restricted to tree planting and water body management in all 13 plans.

Visions of urban governance

Visions of urban development outlined in city plans were influenced by the state action plans and the national action plan on climate change. All plans analysed operated through a centralised agenda, with urban development seen as a service to be rendered to populations by designated nodal agencies. The role of citizens within these plans was restricted to activities such as public consultations, stakeholder participation, and survey instruments. Each plan had a designated urban agenda, almost always providing infrastructure to help the city adapt or mitigate the identified challenges (for example, water, sanitation, and slum clearance) through the nodal agencies responsible for these activities. Given that these nodal agencies draw funds, as well as interact closely with their counterparts at the level of the state, most plans (except the Environmental Status Reports) made explicit mention of how these nodal agencies would draw on support financial, technological, and infrastructural from the state. However, none of the plans set out details of the interactions existing between the state and the centre (either through funds or coordination across governance levels) or explained how national agendas (which influence state and city planning) may be impacted or supported by international agreements relevant to the region.

Discussion

While several Indian cities have progressed towards developing local climate action strategies, they remain embedded within centralised command and control mechanisms, prioritising technological solutions, and operating within economic narratives of efficiency and urban development. At the same time, critical issues of gender, inclusivity, equity, and justice remain missing from these action plans. These are important omissions, as urbanisation in India as well as urban lived experiences in Indian cities reflects each of these concerns in diverse ways.

From our analyses, we suggest that urban climate strategies need to take four aspects into consideration in order to move towards the goal of climate resilient cities. First, there is a need for terms such as sustainability, resilience, and climate change to be clearly defined, particularly in terms of the specific urban contexts from which they emerge. Urban climate solutions need to be context specific and tailored to vulnerabilities faced by cities. For example, what are the specific vulnerabilities to climate change that a small riverside town like Nanded may face in contrast to a large coastal city like Chennai? A land-locked city exposed to heat stresses should provide tailored solutions to mitigate these issues, beyond engaging with sea-level rise and glacier ice melting. The geographic setting is the context for identifying local risks and vulnerabilities for which specific targeted adaptation strategies can be developed.

Second, city plans must go beyond technological, ecological and financial considerations to situate climate action within the social and cultural urban context of each city. As such, they must consider issues of gender, inclusivity, justice, and equity. Climate impacts are often differentially perceived by different groups of people, for instance, women often bear the brunt of climate vulnerabilities due to gendered roles within society that may require long-distance travel to obtain

essentials such as water. Similarly, climate change has driven water scarcity and excessive heat impacts on resource-dependent livelihoods such as livestock rearing and farming. Such increased vulnerability produces further inequities and marginalisation and, needs to be explicitly incorporated in climate policies.

Third, there needs to be explicit recognition that urban policies on climate action do not operate in silos but both influence and are influenced across geographical locations and scales. Climate change policies are rarely created in any single location, but rather are products brought about by the diffusion of social, technological, and institutional advancements across local, regional, national, and global scales, mutating and adapting to different contexts (Castán Broto, 2020). In these contexts, urban climate action agendas need to explicitly highlight how their interface across ecological, economic, political and technological discourses operate at the level of the state and the country, and further how these agendas feed into international negotiations and agreements.

Finally, urban climate policies need to explicitly recognise the role of Nature-Based Solutions, including green and blue spaces, and ecosystem restoration in urban climate risk mitigation. Policies should go beyond proposing tree planting and urban greening to understand the role of ecosystem process and function. Plans need to identify degraded ecosystems in the city which can be restored to act as natural carbon sinks, provide ecosystem services, and act as microclimate and biodiversity regulators. Policies need to be tailored to include strategies leveraging these spaces and making provisions to sustain them equitably and ecologically over time. Related to this, existing city plans have minimal engagement with local knowledge systems. Community engagement in current policies remains restricted to soliciting information about the problems faced and situating them within current infrastructural deficits. In a sense, communities are seen only as recipients of infrastructural benefits, as opposed to being an active part of contextually derived solutions.

Cities represent a new world of climate action and intervention, in which a multitude of actors mould and reshape urban infrastructure in ways that completely redefine everyday lives and lifestyles. Cities, particularly in countries of the global south, such as those in India, thus remain crucial sites where climate change needs to be addressed in addition to already existing vulnerabilities (C40 and Arup, 2015). Local governments thus play a particularly important role in these contexts because they can shape low-carbon and resilient urban futures, while interfacing across existing contextual vulnerabilities, and across multiple actor groups in the region (Castán Broto, 2020). Understanding the dynamics of climate action discourses not only dictates urban governance, but also produces new ways of understanding and responding to urban climate change (Castán Broto & Robin, 2020). It is unfortunate that these plans, while focusing predominantly on avoiding risks do not sufficiently stress the spillover benefits to citizens from adopting effective climate mitigation strategies in various dimensions of urban life, including economic, health, and wellbeing. If plans can focus on wider societal benefits over the long term, this could help stimulate greater interest in participation from civic groups and citizenry, corporate groups and industry, and other critical urban actors.

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No potential conflict of interest was reported by the author(s).

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