

URBAN TRANSITIONS

CONFERENCE
PROCEEDINGS **2025**





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Urban Transitions

The ninth edition of Urban ARC, IIHS' Annual Research Conference, was held from 16–18 January 2025, virtually and in person, at the IIHS Bengaluru City Campus. The theme for this edition was 'Urban Transitions'.

In the current discourse, 'transition' as a concept is increasingly pivotal in responding to questions around sustainability, social equity and climate justice. A key framework to emerge from this discourse is "just transition", calling for equitable processes in the shift towards sustainability. This approach acknowledges that transitions—whether in energy, economic systems, or social structures—must seek to address driving and consequential inequalities by integrating social justice with environmental goals, ensuring that the transition pathways have positive outcomes for social, economic and natural systems. While transitions present opportunities for development, they need to be understood for their far-reaching implications, especially for the poorest and most vulnerable.

Building on this, this year's theme focused on urban transitions. Globally, more than 55 per cent of the population resides in urban areas, along with a heavy concentration of economic and political resources, making cities and their actors highly influential in meeting global sustainable development goals (United Nations, 2018). Cities are sites of transitions that are constantly shaping global realities beyond their geographical boundaries, making it crucial to study their unique transition pathways and intersections (Mahendra et al., 2021; Roy, 2009).

Cities of the Global South are transitioning at a faster pace than before (UN, 2018). Changing weather patterns, rise of the digital economy, the evolving role of the state and public institutions, expanding built environment, technological innovations, emerging health emergencies, growing regional disparities, and a ballooning population highlight some of the key changes taking place in the cities of the global South (Pieterse, 2019). We now know that the historical development pathways taken by the Global North are not replicable or relevant in the Global South, owing to structural differences, divergent starting points driven by colonisation and modernisation, resource constraints, and other economic factors (Harvey, 2005; Sachs, 2005; Kowalski, 2020; Roy, 2009). Much of this growth will take place in non-metropolitan settlements as well as those that are on the cusp of urbanisation (PEAK Urban, 2023). These are often off the radar of research and deep understanding (Hutchings et al., 2022). We are especially interested in work that examines southern urban transitions, especially in non-metropolitan urban centers that often operate with a high degree of informality, data-scarcity and limited formal local institutional capacity.

Transitions Underway

Globally, we are seeing a series of interlinked structural transitions at play in existing and emerging urban settlements, across multiple dimensions: demographic, economic, health, energy, information, education, lifestyles and consumption, ecosystems, and environment. The pathways adopted by each of these transitions vary across contexts, geographies, and scales, and are influenced by several factors. The linkages between these transitions, too, vary depending on the larger environmental, socio-economic, and political context. The role of public and private actors in understanding, anticipating, and responding to these transitions is essential. The ability to manage these in the context of rapid urbanisation and harness synergies across these will determine the outcome of sustainable development

globally (Mahendra et al., 2021). This highlights the need for more research on the ongoing transitions at play within existing and emerging urban regions.

Shifts in populations and their characteristics that constitute the demographic transitions underway globally, are perhaps among the most visible shifts taking place and have implications for how all other related transitions play out. While global population is expected to peak this century, demographic pathways differ across nations (UNDESA, 2024). Countries such as China have already witnessed a population peak and are expected to see a population decline this century. Much of the rest of the global South continues to experience population growth, with some regions witnessing an incremental increase. Some parts of Africa are projected to double their populations by 2050. While this presents an opportunity for a potential demographic dividend, it could also add additional pressure on resources, urban and economic infrastructure, and further exacerbate socio-economic disparities and environmental challenges, in the absence of sound policies (Chauhan & Arokiaswamy, 2018; Kundu, 2011).

These shifts are accompanied by economic transitions. In the Global South, urban unemployment is closely linked to agrarian productivity and residual unemployment. The manufacturing sector at large has been undergoing a shift in priorities and geographies, with scope for reimagination of the sector (Rajan & Lamba, 2023). Technological innovations such as digitisation and artificial intelligence are reshaping the nature of work in the services sector and have the potential to further catalyse economic growth as they backward integrate into the secondary and primary sectors. The burgeoning 'gig economy' and its fleet of informal migrant workers is one example of a digitally induced economic transition. In the absence of regulation and safety nets, economic vulnerability, too, is seeing shifts, fueled by climate-induced migration (Surie & Sharma, 2019). While cities of the Global South compete for big capital, especially from the information technology and related sectors, emerging urban centres are also trying to attract capital. These shifts are reflected in governance, master planning, and city-making processes (Mitra, 2013; Kandpal et al., 2019).

Changing healthcare needs of the Global South is closely linked to the demographic transition. While our public health systems have for long focused on communicable diseases, demographic shifts imply an additional burden of non-communicable and chronic diseases (Yadav & Arokiasamy, 2014). Environmental factors and climate crises further add to public health exigencies. While the transition presents an opportunity for structural reforms, innovations, and rethinking provision of healthcare, it has a disproportionate impact on the vulnerable, especially those living with poor health services in dense urban informal settlements.

A key transition occurring globally is the clean energy transition. The ongoing discourse around the need for a just and equitable energy transition indicates the importance of a larger social, economic, and political inquiry, along with infrastructural and technological shifts (Halder et al., 2023). This is particularly important in the context of the Global South, where the shift to clean energy is more complex due to socio-economic factors (Kumar et al., 2021).

Questions of equity and capabilities also arise while studying the infrastructural transitions in the urban. The built environment and affiliated services play a crucial role in shaping the nature and scale of urban centres. Physical and social infrastructural needs are intricately linked to all other ongoing transitions, and if unmet, could significantly alter pathways to achieving sustainable development goals.

Technological innovations have also had far reaching impacts on several other sectors such as finance, commerce, education, health, and communication. Transitions in the field of information and communication through robust telecom and internet infrastructures have made more extensive

connectivity and deeper financial access possible. Use of technology in commerce has enabled creation of new markets and deepened existing ones. Urban economy and trade have benefitted from developments in modes of payment and management. The transition to digital forms of governance and service delivery aims to bring technology to everyday governance. Recent developments in the field of artificial intelligence will further catalyse innovations in these fields. These advancements raise questions around the digital divide, equitable access, risks, and building capacities, which remain crucial to enabling inclusion in the face of a rush to scale solutions (Bansal et al., 2023; Jaiswal et al., 2021; Ismagilova et al., 2022).

In the socio-cultural context, cities are sites for new opportunities but also growing disparities, shaped by forms of identities such as caste, religion, ethnicity, race, and gender. This transition is often reflected through visual and audio representation, where the 'gaze' of the planner, regulator, or even researcher plays an important role in how the city is perceived and communicated.

A Call to Explore and Reflect

Urban ARC 2025 aimed to explore urban transitions from various perspectives, methodologies, and disciplines by creating a space for dialogue and exchange of knowledge on urban issues. It does this to further understand the dynamics of the cities of the Global South, especially smaller towns and peri-urban regions, through a study of ongoing transitions and their intersections with each other. This inquiry would also require newer ways of seeing and analysing, by including spatial, literary, visual, and many more tools and formats. The conference seeks to foster collaboration, discussion, and exchange among researchers and practitioners working on these urban processes. It invited researchers and practitioners into a space that allows for reflection on their practice(s) against the background of economic, environmental, socio-cultural, technological, political, and historical urban transitions, using diverse modes of engagement in ideation, method, history, investigation, and implementation.

The conference encouraged the bringing together of an assortment of methods, questions asked, geographies covered, disciplines explored, and outcomes reached. It welcomed panel as well as paper submissions covering several sectors (e.g. environment and sustainability, planning and policy, among others), disciplines (e.g. social sciences, climate sciences, humanities, economics, architecture, planning), and methods (quantitative, qualitative, mixed methods), using the lens of research, academia, policy, and practice. The conference invited work that looks at both contemporary and historical ways of studying urban transitions.

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Schedule

Day 1 16 January 2025	
9:30 am – 10:00 am	Opening Remarks by Aromar Revi, Director, IIHS
10:00 am – 11:30 am	Panel 1 Urban Ecosystems and Biodiversity
	A More-than-Human Chronopolitics of Coimbatore's Urban Forests Charllotte Adelina, Free University of Berlin
	Contested Nature in Transitioning Cities: A Study of Bengaluru's Lakes and How Power Shapes Them Sanjana Acharya, Independent Researcher
	Growing Urban-Wildlife Habitats: Interpreting Spatio-Temporal Dynamics of Tiger Habitats in Bhopal's Urban Fabric Shramana Ghosh, School of Planning and Architecture - Bhopal
	Re- Calibrating Heritage Infrastructure in Cities through Hybrid Ecological Programmes: Promoting Cultural, Digital and Biological Diversity. A Characteristic Case of Botanical Gardens of Kaiserbagh Amongst with the Salempur House, Lucknow, India. Gazal Nanwani and Parth Jamadar, Independent Researchers
	The Vanishing Interzone: Bhoj Wetlands and the Urban-Ecological Transition Imperative Shaurya Singh, CEPT University and Urban Design Research Institute
11:30 am – 12:00 pm	Break
12:00 pm – 1:30 pm	Panel 2 Urban Strategies for Sustainable Futures
	Exploring the Potential of Nature-Based Evaporative Cooling Solutions for Enhancing Thermal Comfort in Urban Open Spaces Pranjal Maheshwari and Apurva Upadhye, Ant Studio
	Investigating Biomimicry-based Architectural Design Strategies to Combat Extreme Heat in Hot and Dry Regions: the Case of Ahmedabad Ninad Parag Shroff, Indian Institute for Human Settlements
	Marginalised Futures of Sustainable Cooling in Pune Namrata Dhamankar, Dr.B.N. College of Architecture
	From Chips to Cities: the Unseen Semi-Conductor Revolution Driving South Asia's Urban Transformation Ellora Ghosh, Sushant University
1:30 pm – 2:30 pm	Break
2:30 pm – 3:45 pm	Panel 3 Resilient Urban Services
	Transportation Justice in the Face of Just Transition: Mobility and Livelihood Access in Bengaluru Slums Aneesh Mugulur, University of California, Berkeley

	Organic, Not Anomaly: How Slums Build Resilience to Fire in a Changing City Satorupa Karmakar, University of Queensland-Indian Institute of Technology Delhi (UQIITD)
	Transitioning to Plastic-Free Water Bodies: a Case Study of Plastic Pollution in Cox's Bazar's Urban Ecosystems and Marine Environment Using a 3R Approach Noor-E-Jannat Nitu and Rukhsar Sultana, BRAC Bangladesh
	Urban Environmentalism and the Changing Geographies of Waste in Patna Rahul Raj, University of Sheffield
3:45 pm – 4:15 pm	Break
4:15 pm – 5:45 pm	Panel 4 Evolving Urbanscapes
	Lessons for Urban Transformation: a Conversation with Hyderabad's Past Aman Rameshwar Krishna, Indian Institute of Human Settlements
	Revitalising Urban Ecosystems: The Restoration of Barren Land into Urban Mini Forest, a Home for Biodiverse Taxa to Thrive at Harit Upvan, Amarapur, India Sugandha and Varsha Tevetia, HCL Foundation
	A Political Industrial Ecology of Water in Bodh Gaya, India Pre- and Post-World Heritage Designation Ritika Rajput, United Nations University- Institute for the Advanced Studies of Sustainability
	Urban Futures, Traditional Roots: Examining Social Attitudes in India Poorvi Kumar Iyer, London School of Economics and Political Science
	The Political Imagination of the Postapartheid Township in South Africa, 1990 -1994. Baxolele Zono, University of Cape Town
5:45 pm – 6:00 pm	Break
6:00 pm – 7:30 pm	Panel 5 Urban Transitions in Practice: Reflections from a Large-Scale Sanitation Programme Kavita Wankhade, Indian Institute for Human Settlements Adriana Allen, University College London Edgar Pieterse, University of Cape Town Geetika Anand, Indian Institute for Human Settlements Colin Marx, University College London
Day 2 17 January 2025	
9:30 am – 11:00 am	Panel 6 Urban Governance and Participation
	From Engineers to Sustainability Advisors: Exploring the Expertise, Operation and Influence of Consultants in Municipal Governance Jennifer Spencer, Tata Institute of Social Sciences – Mumbai
	Analysis of Urban Transitions Through Digital Narratives: Cybersemiotic and Grounded Theory Analysis of City Infrastructure Services in Smartcity Pune Chetna Rathee, National Institute of Construction Management and Research (NICMAR) University

	Governance, Growth, and Sustainability: Navigating Urban Transitions and Challenges in Post-Bifurcated Andhra Pradesh Sandeep Inampudi, Central University of Karnataka
	Mapping Power and Participation in Greenfield City Development: the Case of Amaravati's Land Assembly Mechanisms Anusha Bellapu, University of California, Berkeley
	Postcolonial Property Technics: Reconceptualising Socio-Technical Transitions at Delhi's Agrarian Urban Frontier Sahil Sasidharan, University of Wisconsin-Madison
11:00 am – 11:30 am	Break
11:30 am – 1:00 pm	Panel 7 Labour and Employment Transitions
	Are the Peasants Reporting for 'Dipty' (Duty)?: Everyday Lives of Depeasantisation in Urbanising Coal Fields in India Srishti Mishra, Indian Institute of Management - Ahmedabad
	Navigating Just Transitions in Exhausted Extractive Industries: Insights from the Kolar Gold Fields Aditi Subramanian, Delhi School of Economics; Niranjana Krishna Kumar, Ambedkar University
	Transitioning Collective Labour Agency: Multiple Geographies of Constrained Labour Agency in Kerala's Software Industry Shonima Nelliath, Centre for Development Studies
	Waiting for the City: Auto-Rickshaw Drivers and Urban Change in a Smaller Indian City Ian M. Cook, Allegra Lab
	Waste Work(ers) in Contemporary Bangalore: Changing Labour Dynamics and Implications for a Just Transition Geetanjali and Chinmayi, Hasiru Dala
1:00 pm – 2:00 pm	Break
2:00 pm – 3:15 pm	Panel 8 Vulnerabilities and Resilience
	Counter Hegemonic Stories of Community Resilience and Gender Just Transitions: The Governmentality of Climate Justice Discourses among the Coastal Communities in Kerala Manjula Bharathy, Tata Institute of Social Sciences, Mumbai
	Observations on Drought in Ceará, Brazil: its historical existence, its Current Worsening Due to Climate Transition and the System's Priorities Marina Guerra Diógenes, Federal University of Rio de Janeiro
	Rendering Floods Technical: Exploring the Politics of Disaster Management from a South African town Nicola Frances Rule, African Centre for Cities, University of Cape Town
	Urban Flooding in Kochi: Navigating Transitions in a Vulnerable Landscape Gayathri Pramod and Jayprakash Chadchan, CHRIST (Deemed to be University)
3:15 pm – 3:45 pm	Break

3:45 pm – 5:15 pm	Panel 9 Migration under climate change: Envisioning rural-urban transitions in the context of mobility Chandni Singh, Indian Institute for Human Settlements Anuraag Srinivasan, Work Fair and Free Sheetal Patil, Indian Institute for Human Settlements Aysha Jennath, Indian Institute for Human Settlements Nihal Ranjit, Indian Institute for Human Settlements Arjan de Haan, International Development Research Centre Manuela de Mauro, Foreign, Commonwealth and Development Office
5:15 pm – 5:45 pm	Break
5:45 - 7:15 pm	SPECIAL PLENARY Cities Rethought: a New Urban Disposition Gautam Bhan, Indian Institute for Human Settlements Michael Keith, University of Oxford Susan Parnell, University of Bristol
7:30 pm onwards	Conference Dinner
Day 3 18 January 2025	
9:30 am – 11:00 am	Panel 11 Urban Spaces and Positionalities Negotiating Equitable Transitions in 21st century Shillong: Hawkers and the Hill-City Rahul Saikia, Delhi School of Economics Sports as an Arena for Understanding Urbanisation in Mumbai Region During late 20th and early 21st century Balbir Singh Aulakh, Tata Institute of Social Sciences - Mumbai Sustaining Sites of Learning Beyond the University: Pedagogical Reflections from IIHS' Inclusive Housing Programme Rashee Mehra and Ruchika Lall, Indian institute for Human Settlements Urban Transitioners: The Emergence of the (Extra)Ordinary Modern Woman in India's Social Media Landscape Abhiruchi Ranjan, CHRIST (Deemed to be University) Undoing the Town and Gown Edges-in-Conflict: Planning Beyond Heterocisnormative Campus Territoriality in Delhi and Toronto Chan Arun-Pina, York University
11:00 am – 11:30 am	Break
11:30 am – 1:00 pm	Panel 12 Health and Urban Transitions From Fast Food to Fresh Choices: a Nutrition-Based Intervention for Maternal Health in Kolkata's Slums Purbita Sanyal, Sreeparna Ghosh Mukherjee and Simi Chatterjee, Child in Need Institute How has Climate Migration Influenced Health in Urban South Asia? A Literature Review Niyati Shah, Azim Premji University

	Monitoring and Prevention of NCD using AI Powered Health in Urban India: Status and Challenges Vijayalakshmi S, RV University
	Transitioning Healthcare: Locating Health in India's Emergent Urban Processes Deeksha and Sneha Palit, Collective Good Foundation
	Urbanisation and Health Transitions in Kerala: Analyzing the Impact of Rapid Urban Growth on Public Health Systems and Non-Communicable Diseases Sneha M R, and Sandeep Inampudi, Central University of Karnataka
1:00 pm – 2:00 pm	Break
2 :00 pm – 3:30 pm	Panel 13 Shifting Urban Realities “We Don’t Know, We Don’t Care”: The Production of Castelessness in Bengaluru’s Gated Communities Stuti Mehta, Indian Institute for Human Settlements Conflict-Induced Urban Transitions: Pemba, Cabo Delgado, Mozambique Silvia Amaral, Centre for Studies on Africa and Development and University of Lisbon Disability, Poverty, and Urban Transition: Experiences from India Pankaj Kumar Soni, Banaras Hindu University Invisible Agents: Mumbai’s Transformation Through the Lens of Waghri Community Nishka Kumar, Centre for Urban and Regional Excellence Koliwadas between Land and Sea: Transitioning Lives of Coastal Urban Village in Mumbai Neha Sunil Rane, Harshali Ghule and Priyanka Akkar, University of Exeter
3:30 pm – 4:00 pm	Break
4:00 pm – 5:30 pm	Panel 14 Communities, Mobility and Migration Creation of the ‘Other’ in Urban Discourse: a Case Study of Kochi City, Kerala Sankar Varma and Rajib Sutradhar, CHRIST (Deemed to be University) Engagement with Land: a Renewed Reading of Agrarian Change in India, Through a Study of the Wedding-Real Estate Nexus in Gujarat. Raghuveer Kathpalia and Isha Riza Khan, Independent Researchers Pedalling for a Clean Environment: Mapping the Impact of Transition to E-rickshaws on Cycle Rickshaw Communities Sidhant Kumar, People’s Resource Centre The Right to a City: Rethinking Welfare Capitalism through Urban Rights Ranjani Srinivasan, Columbia University Rethinking Cross-Border Migration: a Decolonial Approach to South-South Mobility along Open Borders Chitra Rawat, Indus Action
5:30 pm – 6:00 pm	Break

6:00 pm – 7:15 pm	Panel 15 Navigating Urbanisation: Transforming Health Systems in Transition Upendra Bhojani, Institute of Public Health Bengaluru Prashant N S, Institute of Public Health Bengaluru Vaibhav Agavane, Institute of Public Health Bengaluru Sudha Ramani, Independent Researcher Kabir Sheikh, University College London Aruna Bhattacharya, Indian Institute for Human Settlements
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PANEL 1
**Urban Ecosystems and
Biodiversity**

A More-than-Human Chronopolitics of Coimbatore's Urban Forests

Charlotte Adelina, Freie Universität Berlin

I study the politics of naturing Coimbatore city in India, to delineate a lively urban political ecology of urban forests in India. My work traces current afforestation projects envisioned to 'save cities' in the long durée of planetary crisis, and the ways in which it reorders relationships between humans and trees, in a space activated by modalities of entrepreneurial urbanisation, sustainability fixes, and more-than-human agencies. I aim to bring together stories of human and more-than-human aspirations in uneven landscapes and their contested politics of place, bringing disparate bodies of work from urban studies and political ecologies into conversation.

In the proposed presentation, I would focus on excavating the temporalities of close-range afforestation that are presently adopted by non-governmental actors (NGOs) for urban greening projects in Coimbatore. The financing mechanisms and project timelines of philanthropic and policy organisations play a key role in shaping these experimental ecologies. The Miyawaki method of afforestation relies on accelerating vegetal growth through ecological engineering processes tapping on the ecological concept of inter-species competition. These projects of experimental urbanism not only ally with the project management timeframes of NGOs, but also with the rhythms and policy sprints of 'fast urbanism'. While they bode well for human actors, speeding up the life cycle of tree growth negatively affects the resultant experiment ecologies and offsets the labour of maintenance.

The temporality and teleology of development have been a long-standing focus of social sciences. Sociology of time has largely focussed on issues of acceleration and speed brought about through modernity and capitalism (Gokmenoglu, 2022). Urban ecological transitions are studied as scalable policy fixes and best practices, under the realm of 'urban sustainability transitions' (Bai, Roberts, & Chen, 2010; Bulkeley, 2013; Bulkeley & Betsill, 2005; Bulkeley et al., 2016; Colding, Colding, & Barthel, 2018). The literature on policy transfer illustrates how policies mutate and transport themselves as readily transportable models and best practices (Ong, 2011; Peck & Theodore, 2015). Relatedly, Datta (2016) notes how speed is a central figure in 'fast policy' (Peck & Theodore, 2015) and similar paradigms of urbanisation in the global South. She argues processes of "leapfrogging" into green urbanism is brought about through the construction of temporal binaries such as fast policy versus slow governance, thus resulting in the prioritisation of fast lives over democracy (Datta, 2016).

Non-governmental organisations and community clubs are significant players in the arena of development. The tools of project timeframes and log frames lend rationality and coherence to disparate set of activities and outcomes by NGOs. Coherence is crucial for it shapes the project to achieve its outcome, with its beginning and ending, and the allocated budget. Project rationalities align with the policy sprints of urban greening that are permeated by and shaped through 'audit cultures' which pull in labour towards assessment and monitoring (Strathern, 2000). In the realm of forest conservation, Jokinen (2006) aptly notes how even as forests shift from mono-cultured economic entities to bio-diverse 'conservation entities', the practices of classification and inventory maintenance get ironically more stringent. Thus, organisational practices of national-level benchmarking, project reporting, and programme monitoring simultaneously hide and reveal; what counts and what does not count reveals the pitfalls of an enumerative politics of forest making. In such studies, time remains a leitmotif.

It is further instructive to think of the temporal discordances afforded to other-than-human beings in the context of urban forests as living and agential entities. Recent work in more-than-human geographies

and multispecies anthropology affords and shares time with other-than-humans. Tsing (2015) points to the polyphonous rhythms of socio-natures through the phenomena of masting. Rather than locating time through unhelpful binaries such as slow/fast, urban / rural, natural/cultural, and structure/agency (Adam, 2013; Bakker & Bridge, 2006; Crang, 2003), the paper presents materials from archival and fieldwork to illustrate how all orders of temporalities are entangled. A chronopolitics of the urban forest reveals not only the myths of urban restoration but also the lopsidedness of more-than-human relations. The presentation will thus unpack the convergences and divergences between the time of the forest, of human actors, and of the ambitions of “green transitions” in an urbanised planet.

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Contested Nature in Transitioning Cities: a Study of Bengaluru's Lakes and how Power Shapes them

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In the context of the climate crisis, nature in cities has become an area of renewed focus. As the world becomes increasingly urbanised, policymakers are grappling with the necessity to urbanise "with nature" rather than deplete it. Environmentalists, urban policymakers, and civil society increasingly emphasise preservation of nature spaces—for their carbon mitigation potential, as 'nature-based solutions' to foster climate resilience, to 'flood-proof' and 'heat-proof' cities, and as communal 'public commons'. Urban nature is now a key actor in climate resilience and 'global city' narratives, viewed as a key climate solution.

Objective

Drawing from urban anthropology, political ecology and critical geography, I wish to embed the renewed focus on nature conservation in a rapidly urbanising world into historical, political and geographic context, drawing lessons from fieldwork from two lakes in the Indian city of Bengaluru (Hebbal and Kaikondrahalli). Using assemblage thinking and Raymond Williams' 'Ideas of Nature,' I examine nature as a construction shaped by human and non-human actors through time and space. I aim to showcase the embeddedness of ecology; how rejuvenation politics is intimately connected to the social and spatial politics of the city and to advocate that it not be viewed in silos. Through tracing the way power operates, the key question I explore is: who gets to shape nature in the city, and which groups are made invisible, displaced, or are tokenised and villainised in this process?

Setting

Bengaluru, one of the world's fastest-growing cities (Oxford Economics, 2023), is known globally for its IT industry. It was also once touted as 'land of a thousand lakes' (India Today, 2024), currently understood to have been degraded. Bengaluru's significant civil society presence has called for action to save Bengaluru's lakes, prompting various responses from the government. Thus, Bengaluru becomes a relevant case to explore nature in a transitioning city. As Bengaluru began finding itself in the liberalised-globalised new world map, in 2002, the state government set up the 'Lake Development Authority' (LDA) a parastatal body tasked with 'development' of the city's lakes, primarily through public-private partnerships (PPP). Hebbal lake was among the first lakes to be leased out under this scheme to a luxury hotel management company. As 'civil society' protested this privatisation (Environment Support Group, 2011), the LDA model fell into disfavour, with most lakes now falling under the authority of the municipal government, BBMP, with associations, NGOs, and civil society groups managing some, touted as 'community-led initiatives'. Kaikondrahalli Lake was among the first of Bengaluru's water bodies to be managed in this model.

Key Findings

Raymond Williams tells us that "the idea of nature contains, though often unnoticed, an extraordinary amount of human history" (Williams, 1980, p.67). Bengaluru's water bodies are no different, originally 'keres' or tanks constructed and maintained through the labour of various groups for purposes including irrigation, drinking water, and spiritual functions. They have shaped and been shaped by the topography of the land, hydrological cycles as well as the beliefs, labour, and skills of the various groups that have historically settled here. Over time, through colonisation, modernity, and liberalisation, these lakes have been recast as 'public property' to be centrally controlled, conserved, and more recently, managed as public commons for recreation and climate buffering—all with a shifting motley of actors involved in its day-to-day life. Keres, outside city limits, are associated with diverse land tenure types (gadde jameen,

gomala/grazing land, kharab land). Depending on the size of the lake, it tends to be governed by the gram/zilla panchayat, or irrigation department with fisheries, agricultural departments also being involved (D'Souza, 2017, p.75-78). As Bengaluru's urbanisation expands, these keres become sites of contestation, with competing interests shaping their materiality.

Fortress Conservation

An understanding of nature as 'pristine unpeopled wilderness' led to conservation models like those of Holmes Rolston III and Garret Hardin. Influenced by Malthusian population growth models, today dubbed 'fortress conservation', such models advocated "creating and maintaining landscapes devoid of humans... to safeguard wilderness... against the threat posed by encroaching local populations" (Siurua, 2006). Such a model pits local communities that lived in or around these natural spaces as "enemies of nature". Solutions Hardin proposed to safeguard 'commons' were to sell them off as private property, else impose strict restrictions to entry based, which while he acknowledged were not just, was preferable "to total ruin" (Hardin, 1968). The LDA model with Hebbal lake, which sought to privatise the lake to combat pressures of the property market, was framed out of this model of conservation.

New Politics of Civil Society: Bourgeois Environmentalism?

Hebbal was one of the original lakes to have artificial 'bird islands', now seen in many of Bengaluru's developed lakes, including Kaikondrahalli. It was built by the Forest Department in collaboration with a local civil society group, to have pockets of 'pristine nature' untouched by human intervention. It is particularly popular with the bird watchers of the lake. However, the local livelihood users of the lake, (Bestha community of Hebbal), stated that these islands damaged the lakebed and fish ecosystem in a way that has never fully recovered. The presence of excess birds now hampers their own fishing catch as well. The creation of human-made islands to protect 'the pristine-ness of nature' rings true Williams' words "There is more similarity than we usually recognise between the industrial entrepreneur and the landscape gardener, each altering nature to a consumable form" (Williams, 1980, p.81). These 'civil society' groups, like consisting largely of upper-middle class and caste residents of the city, represents a trend in associational politics that John Harris dubs 'new politics' (Harris, 2007, p.2719), and Partha Chatterjee categorises as 'civil society', in opposition to 'political society'—the domain of politics that much of India's poor and lower income groups employ to access the state (Chatterjee, 2006).

Such elite 'civil society' has played a key role in Bengaluru's lake story over the past few decades, from groups protesting the privatisation of Hebbal lake, to some groups forming a 'citizens collective' in Kaikondrahalli to jointly revive and manage the lake. What becomes clear through my research is that this new associational form of politics fails to seriously address the needs, voice and agency of the urban poor and marginalised. This 'civil society' remains "restricted to a small section of culturally equipped citizens" (Chatterjee, 2006), hijacking what constitutes "public interest" (Baviskar, 2020). In this mode of politics, the urban poor are viewed as 'denizens'—inhabitants "who may be 'done unto' (Harris, 2007, p.2719) —rather than as active agents, even when groups often claim to be working on their behalf. "Problem-solving" and efficiency characterises these groups, rather than democracy. The livelihood users of Hebbal lake remain invisible in narratives of the lake utilised by governments and civil society. Their use of the lake remains entirely contingent on the goodwill of the lake managers—whether private management, government departments or civil society. During COVID, the lake management closed access to the lake for a year, depriving livelihood users, with no assistance offered. When the lake opened, the community had to use their own expenses to de-weed the lake and invest in fresh fish stock. This example speaks to what Amita Baviskar terms 'bourgeoisie environmentalism' where the urban elite define what is an environmental issue, and are more concerned with "ordering of nature", where aesthetics, hygiene, beauty, biodiversity (like the bird islands) assume central importance, pervading over issues of life and livelihood that are central to the poorest sections (Baviskar, 2020). In

the section below, I foreground considerations of real estate value and land tenure types as well, in these elite anxieties over 'order' and 'transparency'.

Kaikondrahalli lake was, however, developed from thinking that diverts from Hardinian 'fortress conservation', influenced by the work of Elinor Ostrom who advocates for sustainable management of commons through the active participation of locals (Ostrom, 2010). A documentary (Ramasubban, 2013) and written articles showcase prominently livelihood users and consultations with the village community during lake restoration efforts. However, at the time of my fieldwork (2021), it had been over a year since any livelihood/traditional use of the lake was done. Different reasons (polluted rain, sewage seepage) were cited due to which the fish stock of the lake had died out and had not been revived. Instances of expedited calls for eviction of 'encroacher' construction workers that had set up on the lake, and ire that a working-class migrant colony by the side of the lake were and are subjected to by both lake management and recreational visitors, point to disdain for those aesthetics that clashed with elite sensibilities. This is even as several surrounding apartments have been built on encroached land and discharge sewage into the lake, and yet, do not face similar public disdain. It becomes clear that this new model still fails to transfer real decision-making power to the livelihood users and views urban poor as 'denizens' rather than active agents.

Contesting the Commons

In this section, I explore how the narrative of the commons, whether through Hardinian or Ostrom's framings fails to capture the complexity at play in these nature sites. The kere is a fluid site maintained by various communities, influenced by the land tenure practices of the traditional inam system (D'Souza, 2017, p.74). A kere (wetland) covers diverse land tenure types and serves different functions, but under the conception of a 'lake' becomes a bounded portion of land that gets demarcated as 'public commons', "converting the fluid kere into a fixed 'lake'" (D'Souza, 2017, p.77-78). This allows for lands around it, and oftentimes, the kere itself, to be brought into the fold of the city's growing real-estate market. From fieldwork, it became clear how Hebbal lake extended wide, to where today flyovers, building layouts and even the forest department nurseries stand. The kere area under what today is a flyover used to be a marshy area where paddy was grown during certain seasons. Thus, the demarcation of Hebbal into a 'lake' for conservation 'fixed' the fluidity of the kere, and much of it was bounded out for commercial value.

Rohan D'Souza (2017) and Solomon Benjamin (2011, 2015) study extensively the cases of several keres across Bengaluru and how different actors, including local residents, real estate groups, government agencies mobilise to stake claims to the land in and around the kere. Logics of 'public commons' mobilised by 'bourgeois environmentalists' and the government agencies they tend to ally with (high courts, Forest Dept/senior bureaucrats, parastatals) attempt to flatten the existing diversity of land tenure and negotiations under the language of 'encroachment', 'corruption' and 'vote-bank politics'—all deemed as illegitimate (Benjamin, 2015, p 98-100). In their quest to 'protect' lakes, these groups use the language of transparency, land titling, and 'rights-based' governance, often ignoring and delegitimising the networks and practices through which low-income communities access and use these spaces (Benjamin & Raman, 2011, p.46-50). Benjamin cautions that such "transplanting categories and concepts from the 'North'" (Benjamin, 2019) tends to favour larger real estate groups, centralised government agencies and elite commercial/residential groups over local coalitions that claim land. The 'commons' become flattened into exclusive spaces with tacit acceptance of singular forms of property, reinforcing elite control—not allowing for the "day-to-day actions" of 'popular society' (low income groups and lower levels of government) who rely on more dynamic, opaque forms of land use (Benjamin, 2011).

It is also not a coincidence that 'lake development' arose in the late 90s and 2000s in Bengaluru, as the city liberalised and began to attract global capital. The governance of 'commons' in the city of

Bengaluru, through creating manicured parks, lakes with jogging tracks and lawns coincide with the 'urban reforms agenda' of the 1990s and 2000s that sought (and seeks) to make the city attractive to global capital, that is, part of the "efforts to make Bengaluru a Singapore" (Benjamin, 2011). Such 'commoning' practices, as outlined above, end up reinforcing and materialising urban nature that complies with elite sensibilities and interests.

Conclusion

As cities transition to become more 'climate-proof' through nature-based solutions, it is essential to develop more materially grounded understandings of urban ecology. My research highlights how the interests of the urban elite continue to shape urban nature, while new forms of associational politics fail to meaningfully incorporate the claims of the urban poor. Drawing from Onur Ulas Ince (2013), the 'commons' discourse remains rooted in capitalist and colonialist logics of extracting value from land—whether economic or ecological. This approach detaches land from the historical and cultural practices that have evolved around it. Common 'development' then becomes a process of appropriation, where certain groups benefit, while others are dispossessed and displaced. How can our cities adopt more expansive and inclusive framings of the urban commons? I echo Benjamin's call for the 'Global South' to evolve understandings of urban nature from the ground up, rather than relying on positivist frameworks imported from the Global North. Can our framings of urban commons accommodate multiple logics of territorial formation without rendering the modes accessed by the urban poor as 'illegitimate'? My hope is that this research contributes, in a small way, toward this evolution of more materially grounded framings of urban nature, as cities like Bengaluru race to become 'world-class' and 'climate-resilient.'

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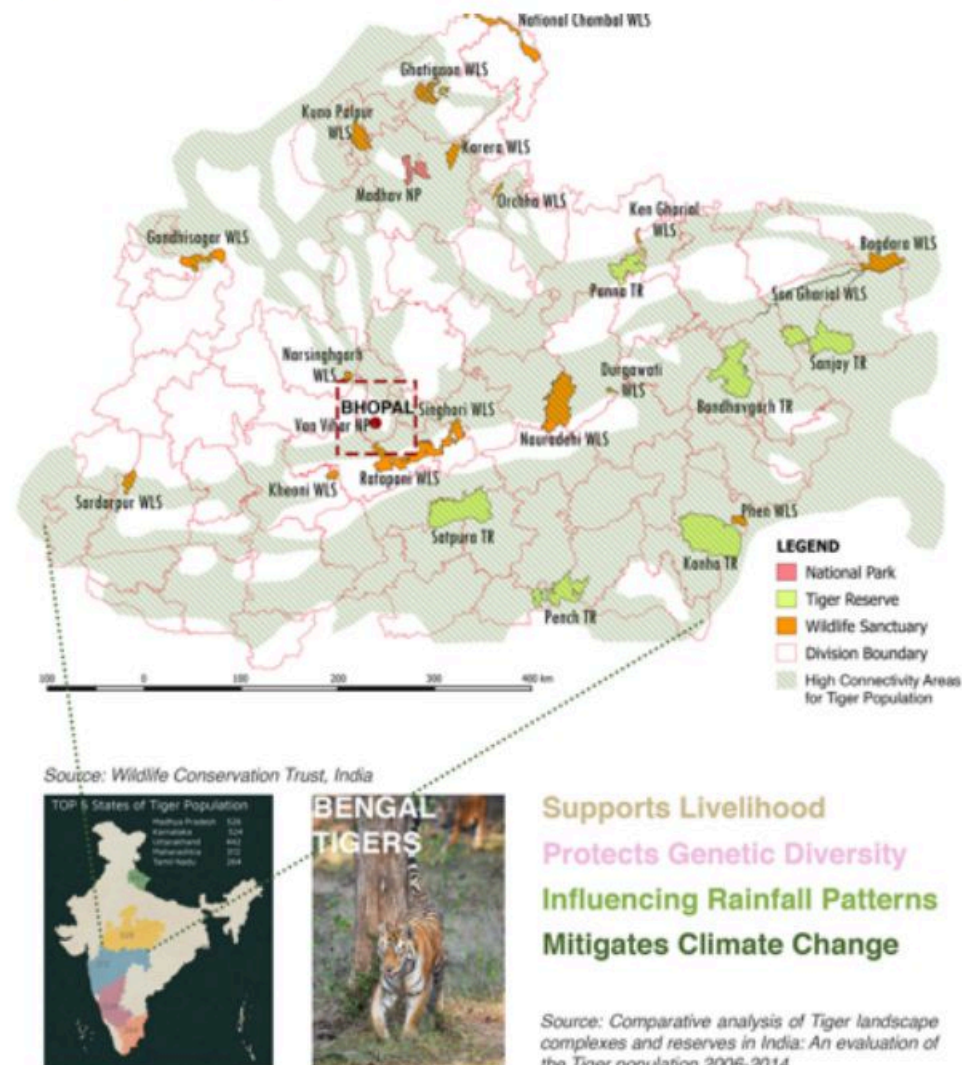
Growing Urban-Wildlife Habitats: Interpreting Spatio-Temporal Dynamics of Tiger Habitats in Bhopal's Urban Fabric

Shramana Ghosh, School of Planning and Architecture Bhopal

Fragmentation of Wildlife Habitats in Urbanising Landscapes

Habitat fragmentation has become a critical challenge as urban areas expand, altering the balance between natural ecosystems and human settlements (Haddad et al., 2015). Rapid urban growth has led to the fragmentation of once-continuous wildlife habitats, creating isolated patches of vegetation and wildlife that face pressure from surrounding urbanisation (Rathore et al., 2012). This phenomenon is particularly significant in countries like India, which, as a mega-biodiversity nation, harbours rich ecosystems that support a variety of species, including large predators like tigers (Zoological Survey of India, 2023). As the urban sprawl extends into the hinterlands, cities like Bhopal in Madhya Pradesh face the challenge of maintaining a delicate balance between urban growth and the preservation of natural habitats. This study focuses on Bhopal's unique case of man-animal coexistence, exploring how its urban fabric accommodates the movement patterns of tigers, even as habitat fragmentation intensifies.

Figure 1: Tiger + Terrestrial Ecosystem = India is home to 75% of the tiger population in the world. There are 6 designated tiger reserves in Madhya Pradesh.



Source: India Tiger Census, 2023

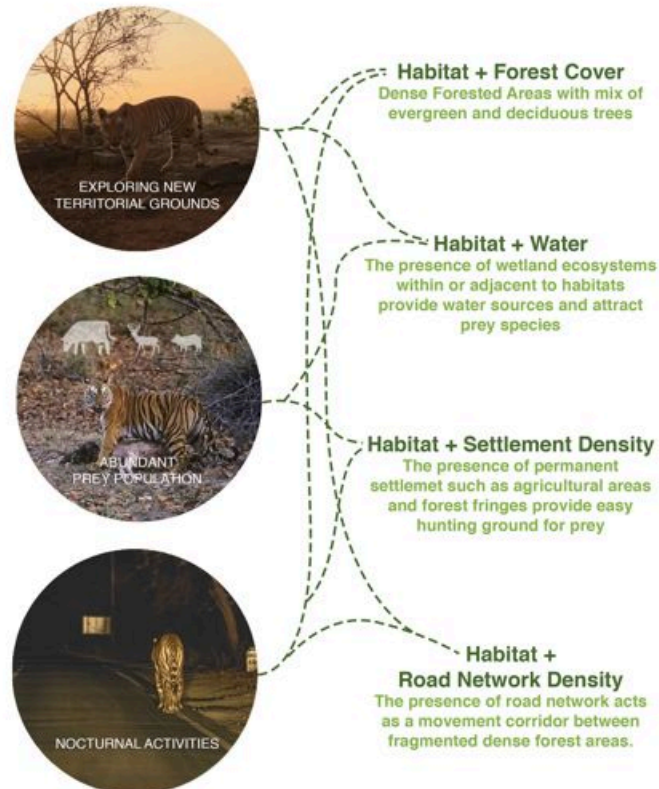
The Status of Tigers in India and Madhya Pradesh

India is home to approximately 75 per cent of the global tiger population, according to the 2023 India Tiger Census (PIBIndia, 2023). This conservation success story is particularly evident in Madhya Pradesh, which hosts six designated tiger reserves and has been declared the "Tiger State" with a population of 785 tigers (Singh, 2024). However, as urban centers like Bhopal continue to grow, there is a need to understand how tigers adapt to these changing landscapes. While tigers are typically solitary and elusive, new evidence suggests that they are increasingly capable of navigating urbanised environments, using isolated habitat patches and semi-urban areas as corridors for movement (Srivastava & Tyagi, 2016). This adaptation raises important questions about the cities' potential to support wildlife populations and the role of urban planning in facilitating coexistence between human and animal populations.

Urbanisation, Habitat Fragmentation, and Wildlife Ecology

Often a slow, time-driven process, habitat fragmentation is initiated by human habitation or land-use changes, which eventually results in the complete isolation of once-contiguous habitats (Dwivedia, Rathore, & Dubey, 2008). This study adopts an ecological perspective to examine how such fragmentation impacts the spatial and temporal movement of tigers in Bhopal. The research employs concepts from landscape ecology, including the idea of "habitat islands"—isolated natural patches surrounded by an urban matrix—to analyse how these fragmented habitats function as refuges or corridors for tigers (Srivastava & Tyagi, 2016). Additionally, we consider theories of urban ecology that emphasise the dynamic relationship between urban form and natural ecosystems, looking at how urban development, land-use planning, and infrastructure shape the distribution and movement of wildlife within city boundaries (Imama, Kushwaha, & Singh, 2009).

Figure 2: Tiger Behaviour + Urban Habitat Preferences



Source: Adapted from data collected from Wildlife Conservation Trust, 2017

Bhopal's Unique Case: Spatial Dynamics of Bhopal's Urban Tigers

Exploring the spatial dynamics of tiger movement in Bhopal

This research investigates the movement patterns of tigers in and around the urban areas of Bhopal, which serves as a key zone for tiger sightings. Through a combination of spatial analysis, satellite imagery, and secondary data from the field, the research aims to map tiger movement across different land use zones, landforms, water streams, and urban densities, identifying the factors that enable tigers to navigate Bhopal's urban landscape. Key spatial features such as hilly terrains, perennial streams, water bodies, dense forest cover, and road networks are analysed to determine how they facilitate or hinder tiger movements. Furthermore, the study examines the impact of urban expansion on these natural features, assessing how recent changes in land use, particularly since 2005, have reshaped the ecological landscape of Bhopal (Bhopal Development Plan 2031).

Figure 3: The tiger census report released in 2023 crowned Madhya Pradesh, with 785 tigers, as the tiger state of India.



Aerial view of Bhopal showing an array of rich biodiversity - fragmented and peripheral.



One of the urban tigers strolling in the night using the higher terrains of the city.

Source: Author

Land Use Change in Bhopal: Patterns of Green Cover Loss and Urban Sprawl

Bhopal's urbanisation trajectory has significantly altered its natural landscapes over the past two decades (Saba & Yadav, 2021). The city's green cover has decreased considerably, especially in the south-west and south-east parts, while the central urban core has become increasingly built-up. This has left isolated patches of green spaces that serve as critical habitats for wildlife. The conversion of nearly 1,000 hectares of green belt, botanical gardens, and agricultural land into residential and Public-Semi Public (PSP) zones marks a significant shift in the city's land use pattern. The Bhopal Development Plan 2031, which emphasises mixed-use development around eco-sensitive zones, poses a potential threat to the city's peripheral biodiversity. Such development risks disrupt wildlife corridors, increasing the likelihood of human-wildlife encounters as tigers and other animals seek to move between isolated patches of habitat.

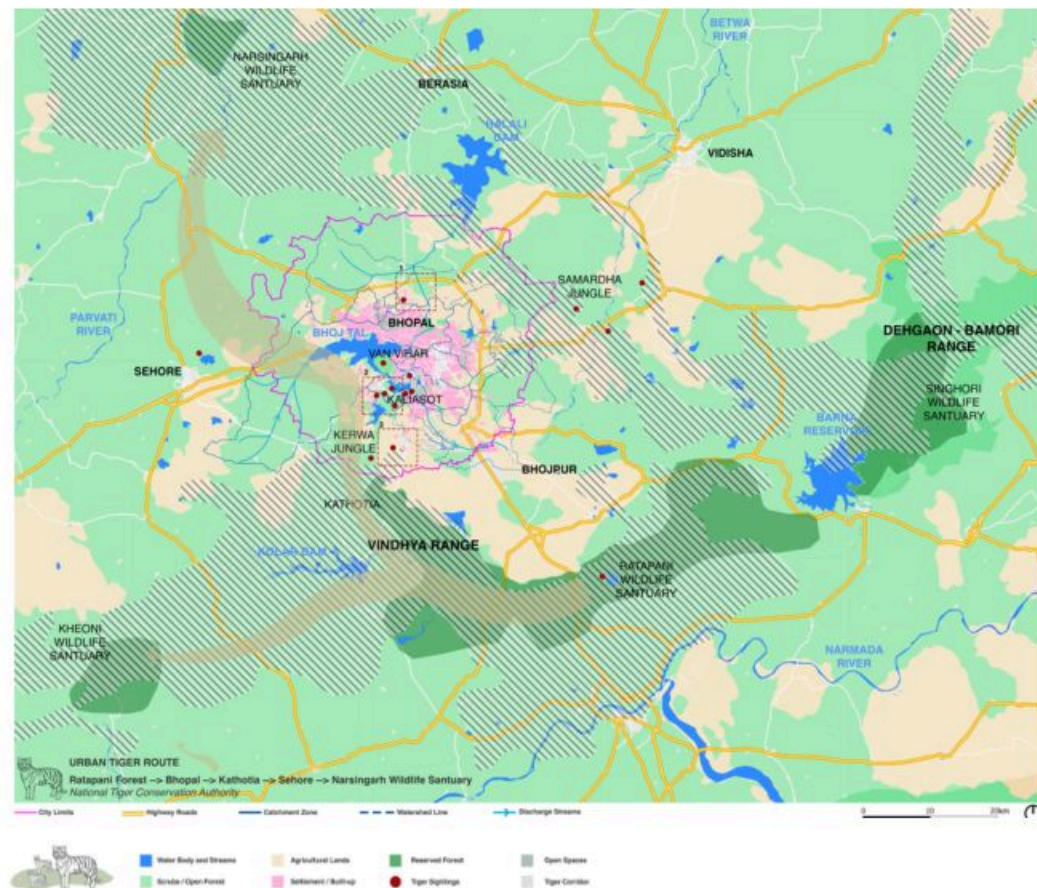
Spatio-Temporal Analysis of Tiger Movement Patterns + Urban Habitat Use

Three sites were identified, located on the outskirts of Bhopal, that serve as a critical habitat corridor for tigers, with several reports of tiger sightings in the area (Srivastava D. P., 2018). The region is characterised by a mix of land holdings, including agricultural fields, schools, private plots, and forest areas under the jurisdiction of the forest department and revenue department. Despite the diverse ownership, the ecological integrity of this zone remains relatively intact, supporting a variety of wildlife species, including tigers. This study examines the potential of this area to function as a small sanctuary, analysing the spatial configuration of green patches, water sources, and human settlements. By mapping the movement of tigresses and their offspring in this region, we identify how tigers utilise the landscape to establish territories and find hunting grounds, offering insights into the spatial needs of large predators in semi-urban settings.

Using a combination of data sources, including wildlife monitoring platforms, local news reports, and community observations, this study maps the movement patterns of tigers within Bhopal's municipal

boundary (Srivastava, 2018). The analysis focuses on identifying patterns in tiger sightings, particularly nocturnal movements, which allow tigers to navigate urban areas without being detected (Naveen, 2023). Spatial analysis tools such as Geographic Information Systems (GIS) are used to visualise these movement patterns and to correlate them with key ecological features like perennial streams, forest patches, and low-density road networks. By understanding these spatial dynamics, the study seeks to shed light on how tigers adapt to fragmented habitats and the role of specific landscape features in supporting their survival.

Figure 4: Spatio-temporal analysis map of tiger movement patterns in Bhopal's urban landscape



Source: Author

Discussion

Challenges and opportunities: balancing urbanization and wildlife conservation

The coexistence of tigers and urban communities in Bhopal highlights both the challenges and opportunities of managing urban-wildlife interactions. While the presence of tigers in urbanised areas indicates the resilience and adaptability of these animals, it also underscores the vulnerabilities of fragmented habitats. As urban expansion continues, the risks of unplanned development, encroachment into forested areas, and the conversion of agricultural land into residential zones pose serious threats to the city's ecological balance. This study emphasises the need for a more integrated approach to urban planning, one that considers the ecological functions of natural landscapes and prioritises the creation of green corridors to facilitate wildlife movement. Such an approach would require a coordinated effort between urban planners, the forest department, local communities, and conservation organisations to ensure that the needs of both human and animal populations are met.

Policy implications: integrating wildlife conservation into urban planning

The findings of this study have significant implications for urban planning and policy in Bhopal and other rapidly urbanising cities in the global South. The M.P. Environmental Policy (Environmental Planning and Coordination Organization, 1999) emphasises the importance of conserving pasture lands and creating protected area networks, yet urban development plans often overlook these ecological priorities (Madhya Pradesh State Environment Policy, 1999). This study calls for a re-evaluation of urban development frameworks to include considerations for wildlife corridors and habitat preservation. Policy recommendations include establishing buffer zones around eco-sensitive areas, regulating land use changes near forested regions, and incentivising green infrastructure development that supports both urban and natural ecosystems. By aligning urban planning with conservation goals, Bhopal can serve as a model for other cities looking to balance growth with ecological integrity.

Conclusion

Bhopal's experience with urban tigers offers valuable insights into the possibilities of sustainable urban-wildlife coexistence. The study highlights the importance of spatial analysis in understanding the dynamics of habitat use and the need for an interdisciplinary approach to addressing the challenges of urban growth and ecological conservation. As cities across the Global South continue to grapple with the dual pressures of urbanisation and biodiversity conservation, this research underscores the need for new models of urban planning that are sensitive to the needs of both people and wildlife. By fostering a more nuanced understanding of the interactions between urban form, natural landscapes, and wildlife, Bhopal can pave the way for more resilient and ecologically balanced urban futures.

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Re- Calibrating Heritage Infrastructure in Cities through Hybrid Ecological Programmes: Promoting Cultural, Digital and Biological Diversity. A Characteristic Case of Botanical Gardens of Kaiserbagh amongst with the Salempur House, Lucknow, India.

Gazal Nanwani, Independent Researcher

Parth Jamadar, Independent Researcher

Humans since more than millennia, in order to sustain themselves have been fluctuating natural ecosystems whether knowingly or unknowingly. But recent global development being a vital aspect of anthropocene, has been building a precarious evolution in the dynamics of humans and natural systems. In contemporary times development of settlements around the globe has presented a relative discontinuity in terms of scale as well as intensity of human derived ecological transformation and eventually has defied us to reconsider the city fabric in the milieu of global changes. Urbanisation is radically motivating a systemic change in ecological as well as cultural systems thereby swaying the earth's overall ecosystems by generating a new upsurge of space-time compression (Alberti, 2023), henceforth accelerating the interaction rates of human activities with the earth's ecosystems. These rapid urban transitions are directly echoed with escalated resource extractions, escalated levels of greenhouse gases, and land conversions. These incessant activities are adversely affecting the existent climatic system and diminishing biodiversity, hence altering the interfaces amongst environmental and evolutionary procedures that sustain life. It is a well known fact that rampant development of cities is the major reason for alteration of genetic as well as cultural character of several living beings, including plants, microorganisms as well as fungi, and animals, that have a substantial role to play in relevant ecosystems like pollination, air as well as water purification, nutrient cycling etc. (Alberti, 2023).

Cities in terms of human settlements have always been places of cultural and social production. The inter-relation of a city and its inhabitants is so idiosyncratic that in order to acknowledge the pursuits and exertions of people, we need to study the evolution of cities in terms of its structure (tangible and intangible) and form (Shankar, 2012). Cities have always been instituted through a dense linkage of intertwined socio- ecological processes that are concurrently humane, discursive, cultural, and material. Circulatory conduits of water, food, energy etc. produce urban as a continuously morphing landscape within the diverse set of conditions in our newly defined Anthropocene age. These substantial dependencies are prominently perceived in the historical multi-functional urban centres of major cities (like Delhi, Varanasi, Madurai, Pataliputra, Vadnagar, Lucknow etc.) or local precincts that have witnessed hybridised urbanisation and lifestyle changes, making them examples of heteronormative economic transitions.

Figure 5: View of Old Lucknow city



Source: Krishna, 2022

Vital considerations for survival of these 'loci' are their productivity predispositions which are grounded on consumption-oriented components like demand-based supply. Cities, with their magnitudes of diversifications, are culturally and socially distinct entities, susceptible to vulnerabilities of climate contingencies given to their immobility. Furthermore, they operate with strong material dependencies on these urban centres or precincts which observe in numerous mutations due to issues of inhabitation, abandonment, governance and maintenance. Resulting in the production of infrastructural defects and ecological distortions, furthermore these contingencies fabricate irreversible social inequities influencing the order of the environment and impacting the 'agency' to access resources.

Sites of 'heritage' infrastructure that lie within the spatial subdivisions of multi-functional urban precincts have been an interesting point of introspection for the emergence of a new 'political institutionalism'¹ that functions to generate interconnected, subjective and sited evidence for contribution to bio-technological share—condemning sustainable development. While fostering an understanding of collaboration between local entities of the environment and functional practices of survival (agricultural, technological, & experiential) beholds the key to discursive digital information for consumers at the micro scale. It also follows for an opportunity to assemble a rational and systematic approach towards 'expert systems' (Mithal, 2024) shaping urban regeneration.

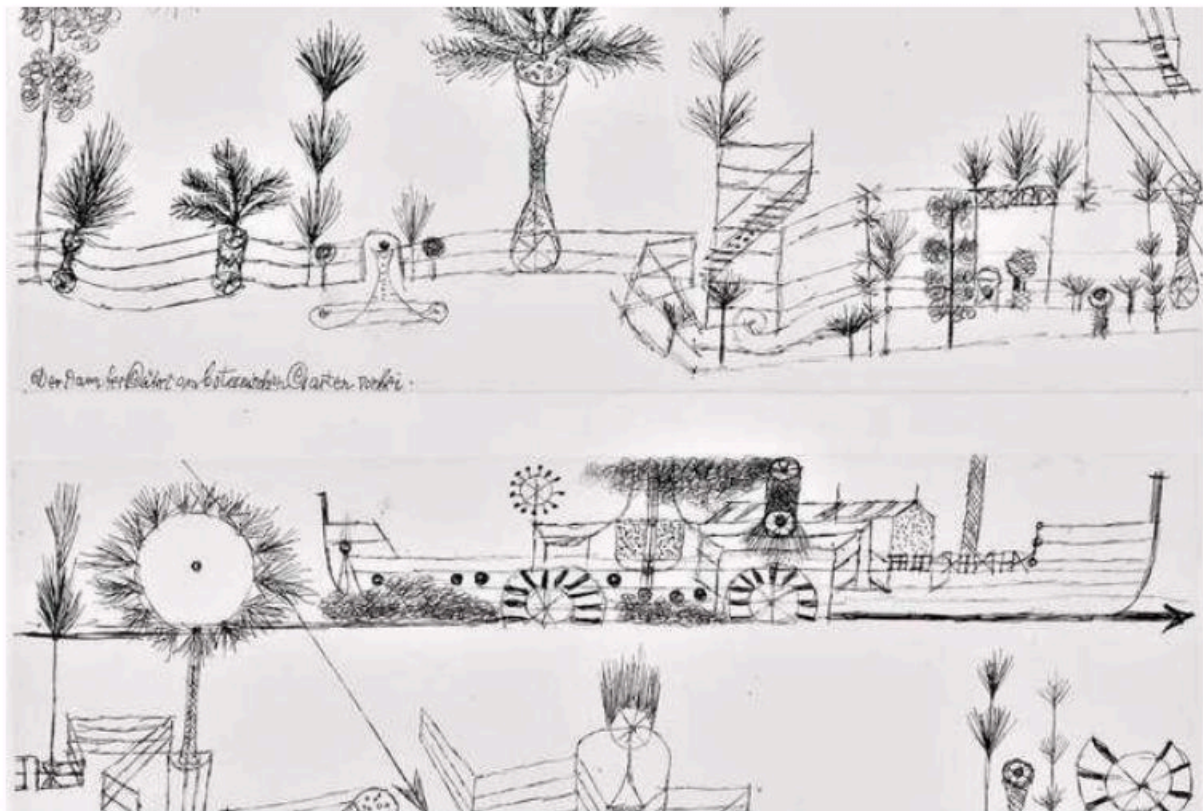
Amidst recent increment in worldwide challenges in expansion of environment and heritage management strategies, a non-conservationist thought process has motivated authors like Helen Frichot (Frichot & Gabrielsson, 2017) as well as Donna Haraway (Haraway, 2016) to propose a pervasive

¹ Donna Haraway discusses this term in 'A Cyborg Manifesto' in association with new materialism- suggesting that political perspectives can sometimes be incompatible, even though they may seem rational. She also argues that identity is political and that current notions of identity can lead to poor politics.

computation of ecological governance, where every singular part of urban parcel outpours substantial communicable data about inherited layers of structured systems.

Accordingly, in order to establish 'relationality' and repair the identity of 'ruptured and non-accommodating systems'—biological and social, new hybrids between entities of natural systems and their co-evolutionary dynamics need to be foregrounded. Hence, 'urban regeneration' as a concept permits us to reinstate as well as repair some of the damage to these precincts at the same time as augmenting public interactions and urban resilience. It is a method of city planning to mend the economic and social issues, eventually transforming superseded or ruined areas into economically useful areas of community. In order to establish robust ecosystem resilience whilst generating adaptive capability for managing the effects due to these planetary changes, a connection and re-establishment of existing and new enhanced ecosystems is pivotal at both stages, within urban and rural environs. Additionally, an inclusive deliberation which is integrating human, plantationocene as well as technology within an urban borough to visualise ontological and ethical continuum, is the need of the era.

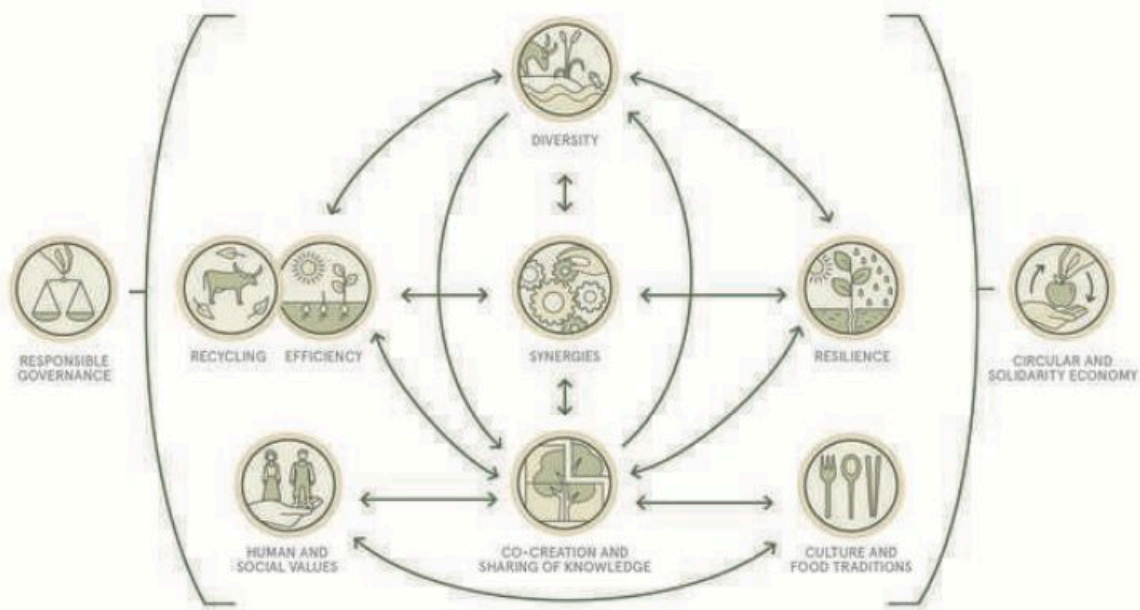
Figure 6: The Steamboat Passes by the Botanical Garden, 1921, 199, By Paul Klee



Source: Gandy, 2023

Conceding the fact that practices of urbanisation are vibrant and ambitious by area specific lifestyles, they are equally value oriented as well. This is leading to generations of constant suburbanisation, land inclusions to urban fabric, agrarian dislocation and loss of local food familiarity. Thus, agricultural ecology (or agroecology) can be applied as an alternative strategy in combination with other sustainable activities while entailing urban regeneration, as it indulges several methodologies to resolve tangible defies of farming. Although it was principally dealing with crop protection and production facets, in contemporary times innovative aspects like social, economic, ethical, as well as environmental advance are becoming more pertinent to it. Henceforth, creating it as an important solution for times when urban nutrients, semi-urban land use, community nutrition pedagogies, and farming infrastructure are gaining enunciations as major transformation agendas.

Figure 7: 10 principles of agroecology from the FAO



Source: Shefali Sharma, 2019

This phenomenon, often explored with allied disciplines like preservation, conservation, and urban development, is also a central paradigm of forensic architecture involving material science, humanist, and post-humanist studies. While tracing instances of varied urban transitions in 'heritage infrastructures', across the physical landscape of the globe, the Indian context becomes unequivocally relevant owing to its culturally rich affiliation amid society and its agro-ecologically originating settlements. Attestation of foundational chastisements of colonial rule and domination of informatics after the green revolution, made 'India' constitutive of social complexities arising between redundant entities of human ecology. Furthermore, Lucknow being a protracted hereditary seat of Nawabs during the 18th century, has incessantly been identified as multi-ethnic and proliferated as an ingenious capital of north India with an allegorical city master plan.

Kaiser Bagh, being one of the jewels of 'heritage' that presents Lucknow's ecological symbiosis as well as providing evidence of colonial incisions, demonstrates the deterred dialectic between human-natural systems. Kaiser Bagh or 'Qaiserbagh', was initially intellectualised as a heterogeneous and notably 'Queer' (Mithal, 2024) fabric of various recreational structures and parks by Wajid Ali Shah, which were ransacked eventually during the mutiny of 1857. An imperative alteration that transpired during the colonisation of Lucknow was the dissemination of all the traditional systems with modern central ones. Kaiser Bagh's infrastructure and spatial configuration was disrupted and mutated, on account of diverse ownership conflicts and involvement of multiple stakeholders, eventually converting the gardens and palace complex into a socio-cultural nexus or unidentifiable urban precinct, challenging its identity. When new laws of cohabitation and sustainable usage of resources are altering the paradigms, Lucknow, with its historical dependencies combined with intricate botanical associations to the cyclic food processes of production, supply, distribution and consumption presents a tremendous opportunity for generation of thresholds for survival, human collaboration, and occupation.

Figure 8: Cloth Painting of Kaiserbagh, Lucknow. Painting depicts the aura of the pace before being shattered in 1857-1858 by Britishers



Source: Hay

The paper explores briefly the modes of intersectionality of the synchronic practices in architecture that are framed by investigations on material ecology and culture of Kaiser Bagh during Wajid Ali Shah's times in Lucknow. It offers a cumulative analysis of contingencies of the botanical heritage of Kaiser Bagh impacting synchronised collaboration of human relational identities of past and future. The paper presents a series of chronological mappings that emanate principally from technological, experiential and agricultural reverence of Nawabi water systems that composed the ecosystem of the Bagh, contriving transportation, collection, retention, and distribution of water as largely the motifs of speculation into the ecology of water at that time and stand as 'hybridised ecological heritage' today. These overlaps of these systems in time, present evidence for building a hybrid system that uses defunct infrastructure that is not cohort but synchronised and collaborative, proliferating experiences of inclusivity and accessibility if integrated with spatial infrastructural forms. Henceforth, this paper, by employing an inductive based methodology, where all the characteristics and parameters which have been a permutation of continuous adaptation in these areas will analyse via thorough theoretical information accompanied with pragmatic investigation. And as a result, the need-based conditions will present 'Agrotek'², an agroecological scientific market as a typical model of restorative urbanism which serves as an infrastructural entity that fuses machine-logic with communal living.

By foregrounding infrastructuralised architecture, the proposal of hybrid ecological programmes would introduce an integration of indigenous practices of creative doing (farming, research, selling, eating, celebrating) by re-calibrating an existing private Kothi - Salempur House into a diverse meta-political urban centre in Kaiser Bagh for various collaborators (farmers, botanists, vendors etc). Furthermore, it discusses the creation of network ecologies by integration of this public market with energy infrastructure—futuristic installations and public toilets that facilitate the calibration of broken bio-

² 'Agrotek' - Is a term coined as a concept for a design experimentation by authors at Spring_2022 Studio titled- 'Staging Ecologies- Politics of Gender and Memory in recovery of Kaiserbagh Lucknow- AD4016, at the Masters programme conducted at CEPT University

technological orders and disrupted components of the Bagh's ecology. Retrofit, circulation, and surplus become central to serving these ecological agendas. The paper introduces de-colonial feminist materialist discourse relevant to technology, ecology, and architecture, opening up avenues of combining materials and media for design to create emergent urban environments—hybridised and shared. It outlines the contingencies and heteronormative conditions that generate new patterns of land-use and presents an opportunity for continuation of the marginalised farming traditions in the privatised gardens of Kaiser Bagh where historical land politics between multiple stakeholders has played a pivotal role. It further argues that feminist ecologies of cohabitation, urban equitability, and accessibility are a way to empower local communities by offering a radical approach to ecological education via introduction of food cells, collab cells, automated retail, tissue culture laboratory, and hydroponic systems of urban farming. The paper concludes with a discussion on cybernetic social reality of a newly defined Indian City, where the relationship between society and its settlements and with those of sustainable development goals become the pillars of growth and morphological contribution amidst the bio-technological contingencies of a post humanist world.

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The Vanishing Interzone: Bhoj Wetlands and the Urban-Ecological Transition Imperative

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South Asia, home to over one-fifth of the global population, is increasingly facing a severe water crisis, marked by alternating cycles of floods and droughts (Sobti, 1993). This necessitates a comprehensive, long-term strategy for water resource management. Throughout history, reliable water supplies, including lakes and reservoirs, supported the development of major cities in the region. However, rapid urbanisation, industrialisation, population growth, and chemical-intensive agriculture have led to significant environmental degradation, particularly of urban water bodies (Sathre et al., 2022). Lakes and reservoirs have been heavily polluted by sewage, industrial effluents, and toxic chemicals, leading to issues such as eutrophication, loss of water area, biodiversity decline, and degradation of water quality (Edmondson, 1991).

Urban transitions in the Global South are reshaping cities at an unprecedented pace, presenting complex challenges for sustainable development and ecological preservation (Wadwekar & Wadwekar, 2018). This study examines the Bhoj Wetlands of Bhopal, India, offering a compelling lens through which to understand these transitions, particularly in the context of water resource management and environmental conservation in rapidly growing non-metropolitan centres.

The Bhoj Wetlands, comprising the Upper and Lower Lakes, have been central to Bhopal's development since the 11th century and the rapid urbanisation following Bhopal's designation as the capital of Madhya Pradesh in 1956 has intensified pressures on this vital ecosystem (MS. Kodarkar, 2007). Through a comprehensive analysis of 14 distinct edge conditions, this research illuminates the multifaceted challenges facing this critical urban-ecological interface.

Structured in three parts, the study first explores Bhopal's historical development and conservation efforts, then provides a detailed examination of contemporary edge conditions, and finally discusses the implications for urban transitions and water resource management. By juxtaposing historical conservation practices with current realities, the research reveals the dynamic nature of urban-ecological interfaces and the limitations of static urban design solutions in addressing the needs of evolving wetland ecosystems.

Table 1: Overview of the three research sections: historical context, current state of the wetlands, and implications. Source: Shaurya Singh

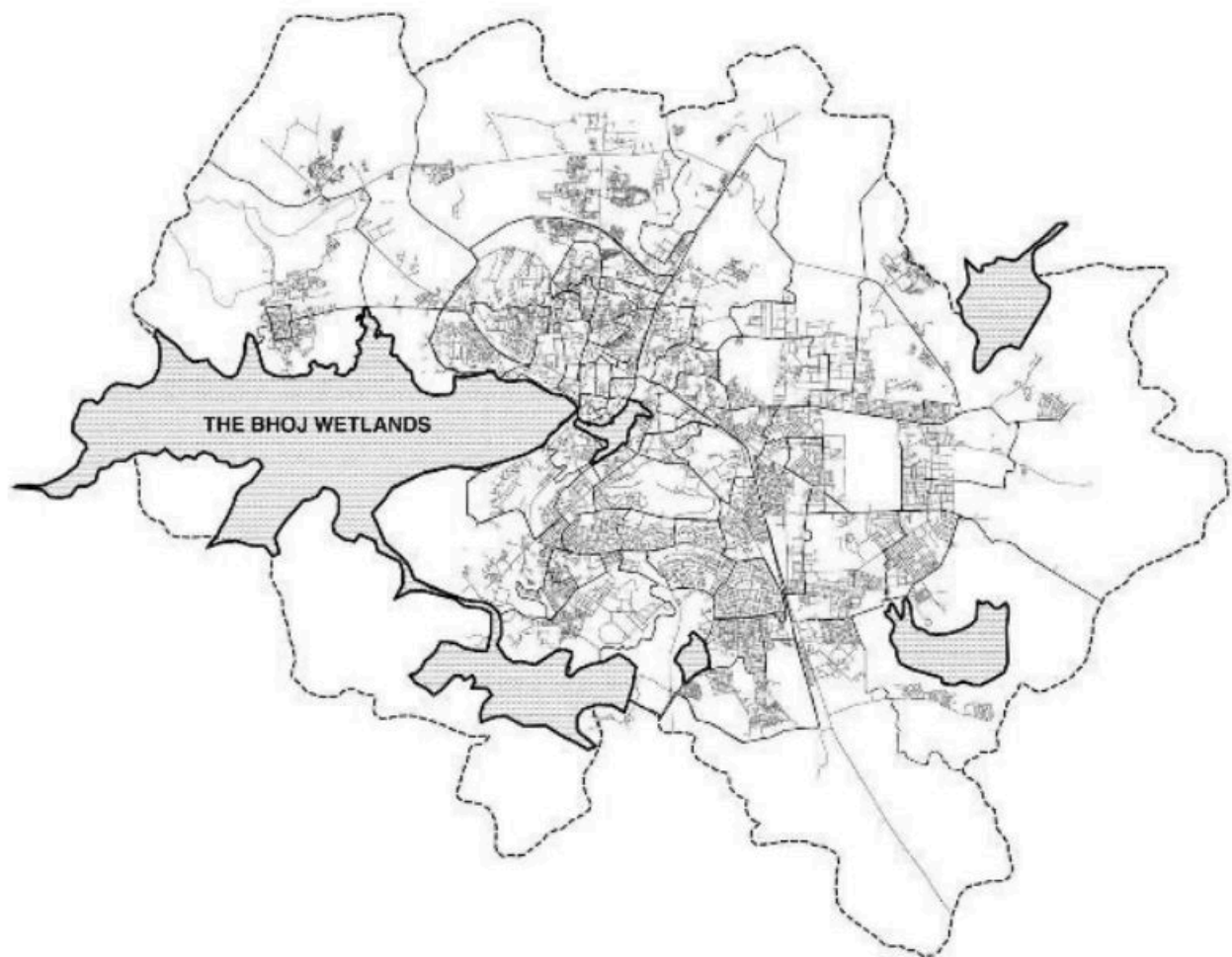
Part No.	Name
Part 1	1.1 Introduction to Bhoj Wetlands
	1.2 History of Bhoj Wetland Conservation Project
Part 2	Contemporary Edge Condition Study
Part 3	Discussion

Part 1: Introduction to Bhoj Wetlands and the History of the Bhoj Wetland Conservation Project

1.1 Introduction to Bhoj Wetlands

This part of the research examines the Bhoj Wetlands, specifically the Upper and Lower Lakes of Bhopal, to understand their historical significance and the ecological challenges they face. The Upper Lake, established in the 11th century by King Bhoj, has served as a critical water source for the region, especially in the context of erratic rainfall patterns. However, rapid urbanisation, particularly after Bhopal became the capital of Madhya Pradesh in 1956, has intensified anthropogenic pressures, leading to significant water quality deterioration due to factors such as increased siltation, untreated sewage, and agricultural runoff (Sobti, 1993). The study highlights the regulatory frameworks in place, including the Ramsar designation received in 2002, aimed at conserving these vital ecosystems.

Figure 9: Bhopal's extensive lake network, with the Bhoj Wetlands standing out as the largest and most crucial water source for the city's residents



Source: Shaurya Singh

1.2 History of Bhoj wetland conservation project

The Bhoj Wetlands conservation project, initiated in 1995 by the Government of Madhya Pradesh with support from Japan Bank for International Cooperation, aimed to address environmental issues caused by rapid urban expansion around Bhopal's lakes (Kodarkar, 2007). The project implemented a comprehensive range of measures including: protecting surrounding areas with no-build zones and vegetative buffers; improving water management through spill channel enhancements; controlling weed growth; preserving Takia Island; managing the catchment area with check dams and silt traps; upgrading solid waste and sewage treatment systems; mitigating pollution by relocating settlements

and laundry activities; enhancing lake capacity through dredging; installing water oxygenation systems; engaging the public through awareness campaigns and an Interpretation Centre; restoring ancient infrastructure; promoting organic farming; managing cultural practices like idol immersion; and regulating boating activities (Environmental Planning & Coordination Organisation (EPCO), Bhopal and Japan Bank of International Cooperation, 2006).

This project highlights the critical importance of adopting a holistic approach to lake management. It advocates active stakeholder engagement, the implementation of stringent protective measures for lakefront areas, effective administrative practices, the continuity of personnel, and a commitment to sustained conservation efforts that extend beyond the initial project timeframe.

Part 2: Contemporary Edge Condition Study

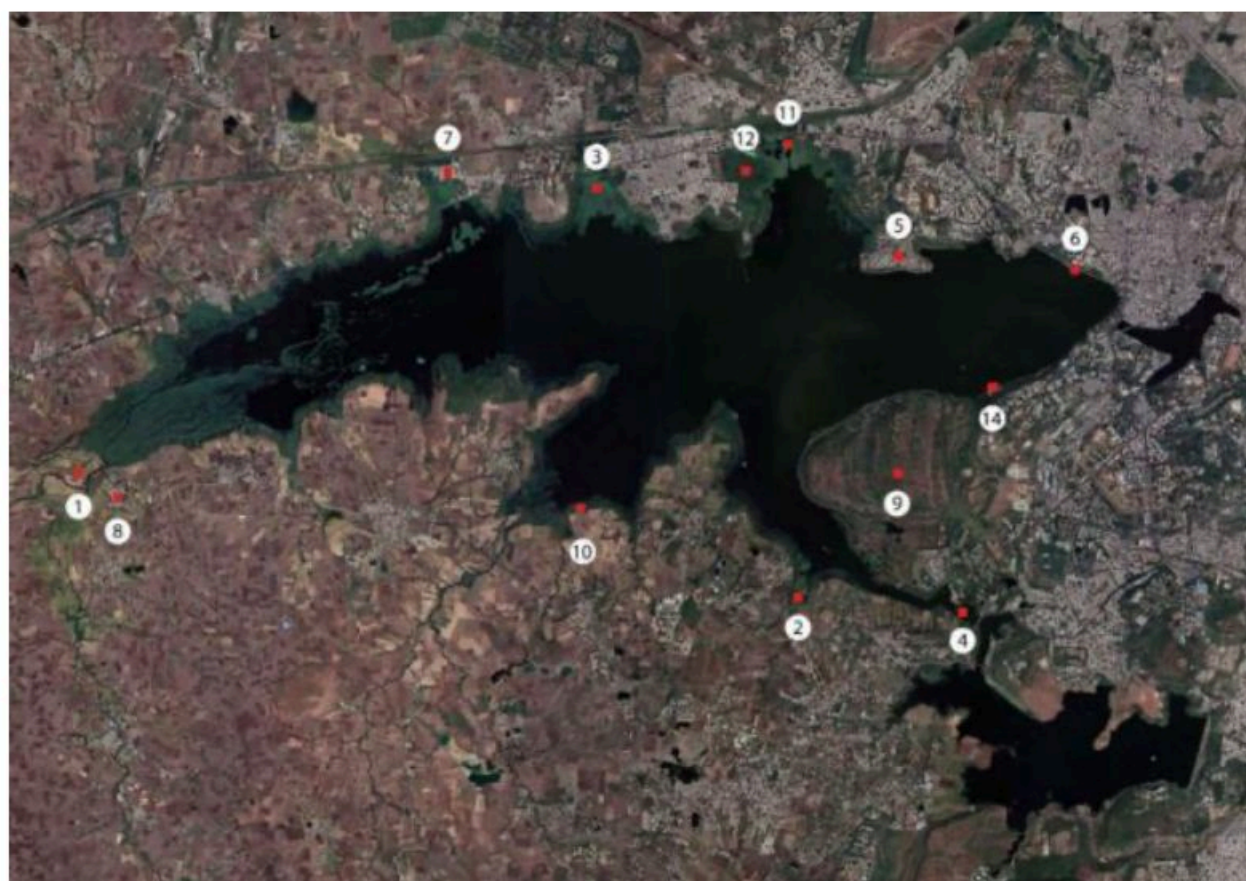
In this section of the research, 14 edge conditions have been documented, as indicated in the accompanying map below. This comprehensive effort serves the purpose of juxtaposing historical conservation practices and knowledge with the contemporary state. The objective is to gain insight into the contemporary conditions influencing the Bhoj wetlands, particularly in addressing the urban challenges they presently confront. The documentation process involved a combination of interviews, on-the-ground surveys, and the collection of both ground-level and aerial photographs. The dedicated effort spanned a total of five to six weeks, encompassing site exploration, interviews, and the systematic gathering of on-site data.

Table 2: Refer to the table above for a clear thematic distribution and chapter organisation, offering key insights into the research on contemporary edge conditions in the Bhoj Wetlands. This structured layout provides a systematic overview, enhancing

PART 2				
Section Number	Topic Name	Edge Condition Number	Edge Condition Name	Location Description
Section 1	Productive Practices	1	Agricultural Practices	Agricultural fields near Shree Chintaharan Ganesh Temple, Near Kamla Khedi
		2	Aquaculture Practices	Aquaculture Ponds, Near Gora Gaon
		3	Water Chestnut Cultivation	Water Chestnut Cultivation in Bhoj Wetlands, Near Bairagarh
Section 2	Impact of Infrastructure and Urban Development	4	Widened Spill Channel	Spill Channel, near Sair Sapata
		5	Retaining Wall (Khanu Gaon)	Location: Khanu Gaon Settlement
		6	VIP Road	-
		7	Rapid Developments in the Catchment Area	-
		8	Developments at the Wetland Edge (Case of Chirayu Hospital + Marriage Gardens)	Location: Settlement near Kamla Khedi
		9	Drainage Order Disturbed in the Catchment Area	Location: Van Vihar National Park

Section 3	Conservation of Natural/Managed Ecosystems	10	Flooded Green Covers/Dense Forest Covers	Location: Near Wetland Lake View (Tourist Attraction Point)
		11	Van Vihar National Park Edge	Location: Edge of Khajuri Sadak Road, Overlooking the Bhoj Wetlands
		12	Borvan City Forest	Location: Borvan City Forest
Section 4	Urban Infrastructure and Pollution	13	Sewage Outlets	(Please refer to the map in the chapter to refer to all the sewage outlets marked)
Section 5	Impact of Recreational and Economic Activities	14	Boating Club	-
		15	Water Quality Degradation	-

Figure 10: A map detailing all documented edge conditions with respect to the Bhoj Wetlands.



Source: Google Earth Satellite Imagery

Section 1: Productive Practices

The research revealed significant transitions in productive practices around the wetlands. Agricultural activities near Shree Chintaharan Ganesh Temple and Kamla Khedi were found to contribute to water pollution and eutrophication, highlighting the need for sustainable agricultural transitions. Aquaculture practices near Gora Gaon presented both economic opportunities and ecological challenges, altering the nutrient balance of the wetlands and potentially introducing non-native species. Water chestnut

cultivation near Bairagarh represented a unique economic-ecological interface, providing livelihoods while impacting the natural ecosystem balance.

Figure 11: Government-allocated marshy lands for licensed farming families to cultivate aquaculture, located along the streets of Suraj Nagar, Bisankhedi, Bhadbhada, and Gora Gaon



Source: Shaurya Singh

Figure 12: Farmers practising unauthorised water chestnut cultivation in the upper lake as observed on the northern side of the Bhoj Wetlands.



Source: Shaurya Singh

Section 2: Impact of Infrastructure and Urban Development

The study identified several key infrastructure transitions impacting the wetlands. The modification of the spill channel near Sair Sapata represented a significant hydrological transition, altering water flow patterns and potentially affecting the wetland's natural flood mitigation capacity. The construction of a retaining wall at Khanu Gaon exemplified the urban-ecological interface, where efforts to protect settlements directly impact wetland dynamics. The development of VIP Road illustrated the tension between urban connectivity needs and ecosystem preservation, highlighting the challenges of sustainable urban planning in sensitive ecological zones.

Figure 13: The Khanu Gaon settlement and the protective retaining wall constructed at its periphery to prevent water from entering the settlements



Source: Shaurya Singh

The case of Chirayu Hospital's construction in the catchment area underscored the legal and environmental challenges arising from unplanned urban expansion, reflecting broader issues of governance and environmental law enforcement in transitioning urban areas. Rapid development near Kamla Khedi was found to alter natural drainage patterns, exemplifying how unplanned urbanisation can disrupt crucial ecological processes.

Figure 14: The Chirayu Hospital can be seen in the background; the water collected in this catchment area can be seen near the street. As the water level continues to rise, the accumulated water near the street poses a flooding threat to Chirayu Hospital



Source: Shaurya Singh

Section 3: Conservation of Natural / Manicured Ecosystems

The research revealed a complex landscape of conservation efforts and challenges. The interface between Van Vihar National Park and the wetlands presented a model of controlled conservation within an urban setting, demonstrating potential pathways for balancing urban development with ecosystem preservation. Areas near Wetland Lake View showcased the resilience of natural ecosystems within urban contexts, highlighting the importance of preserving urban green spaces in transitioning cities.

Figure 15: The manicured landscape character near the Van Vihar edge



Upperstorey Species Identified:

TS_1a, TS_1b
 TS_2a, TS_2b
 TS_3a, TS_3b
 TS_4
 TS_5

Understorey Species Identified:

TS_1a, TS_1b
 TS_2a, TS_2b
 TS_3a, TS_3b
 TS_4
 TS_5

Middlestorey Species Identified:

TS_1a, TS_1b
 TS_2a, TS_2b
 TS_3a, TS_3b
 TS_4
 TS_5

Source: Shaurya Singh

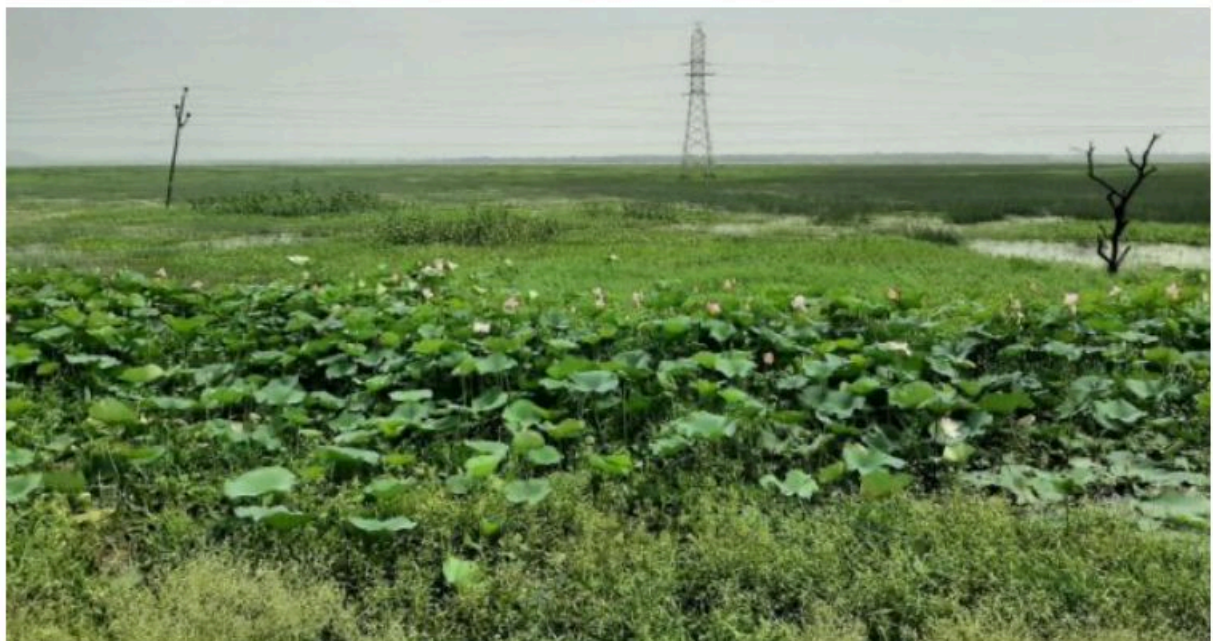
Figure 16: The flooded landscape characteristics observed near Wetland Lake View, Bisankhedi



Source: Shaurya Singh

The study of aquatic vegetation along Khajuri Sadak Road revealed the dynamic nature of wetland ecosystems and their response to changing urban conditions. Borvan City Forest represented a critical transition in urban land use, where efforts to maintain green cover clashed with developmental pressures, as evidenced by recent unauthorised tree felling incidents.

Figure 17: A dense view towards the aquatic plants that have taken over the northern fringe of the Bhoj Wetlands



Source: Shaurya Singh

Section 4: Urban Infrastructure and Pollution

The research uncovered significant challenges related to urban infrastructure and pollution. The documentation of unauthorised sewage outlets through drone photography revealed a critical infrastructure gap, exemplifying the challenges faced by rapidly growing urban areas in managing waste and protecting water resources.

Figure 18: 22 Sewage discharge points are located through on-site interviews and observations, with some of the identifications being hypothesis-based. National Green Tribunal, however, identified a significantly higher number of operational Nallas tha



Source: Google Earth Imagery

Evidence of widespread water pollution from various sources, including industrial effluents, domestic sewage, and agricultural runoff, represented a major transition challenge, requiring innovative solutions and policy interventions.

Figure 19: A sewage outlet spotted near the Kaliasot Dam



Source: Shaurya Singh

Figure 20: A sewage outlet spotted near Chirayu Hospital



Source: Shaurya Singh

Section 5: Impact of Recreational and Economic Activities

The section will examine the evolving nature of recreational activities and their impact on the wetlands. The transition from traditional, non-motorised boating to fuel-powered boats introduced new environmental challenges, including water and noise pollution. This shift represented the broader tensions between economic development, recreational needs, and environmental conservation in urban settings.

Figure 21: Following the petition filed to stop the fuel from entering the water body, only rowing and paddle boats were observed in the waters. All motorised boats were removed from the waters, with the exception of the cruise boat, which is currently



Source: Shaurya Singh

Mapping the 14 edge conditions of the Bhoj Wetlands underscores how urban transitions blur the boundaries between natural ecosystems and expanding urban infrastructure. These edges represent zones where ecological and human activities intersect, creating a dynamic space of conflict and adaptation. As urbanisation progresses, traditional distinctions between wetland and city dissolve, highlighting the need for flexible, adaptive strategies that embrace the complexity of these shifting boundaries. Understanding these blurred edges is key to developing sustainable urban transitions that protect ecological integrity while accommodating growth.

Part 3: Discussion

The Bhoj wetlands in Bhopal, vital for local ecology and water security, have faced significant challenges in conservation efforts. Initial funding from the Japan International Bank led to effective dredging and desilting, but these benefits diminished due to unchecked development in the catchment area and silt-laden runoff. A lack of strategic plans for environmental management, highlighted by ongoing issues like weed growth and sewage disposal, underscores a concerning neglect of these wetlands. Furthermore, urbanisation and the expansion of the Boating Club strain the ecosystem, necessitating a re-evaluation of urban planning. Traditional practices like agriculture and aquaculture also contribute to water quality

degradation, further complicating conservation efforts. To restore the wetlands' health, a comprehensive and adaptive management approach is crucial, combining ongoing monitoring and collaborative initiatives to ensure the region's water security and ecological vitality.

Urban transitions in the Global South, particularly in non-metropolitan centres, present complex challenges that demand nuanced understanding and adaptive approaches. The case of the Bhoj Wetlands in Bhopal exemplifies these multifaceted transitions, highlighting the delicate balance between urban development and ecological preservation. As cities expand and populations grow, the pressure on natural resources, especially water bodies, intensifies. This situation calls for a reimagining of urban planning and governance strategies that can effectively address the needs of burgeoning populations while safeguarding critical ecosystems. The interplay between demographic shifts, economic development, and environmental conservation in such contexts highlights the need for integrated, holistic approaches to urban management. Moving forward, it is crucial to develop adaptive strategies that can respond to the dynamic nature of urban transitions, particularly in data-scarce and informally developed areas. By fostering collaboration among diverse stakeholders and prioritising both ecological integrity and social equity, cities can navigate these transitions more effectively.

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PANEL 2

Urban Strategies for Sustainable Futures

Applicability of HEC RAS & Geospatial Tools for Flood Evacuation. A Case Study of Ganga Basin, Bihar, India

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Keywords: Flood, Evacuation, River Engineering, Disaster Relief Operation.

India ranks as the highest flood-risk country in the world. Every year millions of lives are affected due to various types of disasters such as floods, droughts, heavy precipitation, heat waves, landslides, storms, etc. It is estimated that every year approximately 80,000 lives are lost due to natural disasters in India. The flood hits almost the highest among all of them. In the past few years, the average death due to flooding in India has been approximately 800. These numbers can easily rise if the frequency of disasters such as floods or precipitation rises. Due to climate change and global warming precipitation and other natural disasters is abnormal. The frequency of most of the disasters is rising day by day. Various agencies working in the field of disaster management have estimated that the frequencies of various disasters may change in the upcoming days. Floods, drought, and heat waves will be some of the most severe among other disaster types. The death and displacement will be more due to floods. The cities near the river will be highly affected and also be catastrophic. In India, Uttar Pradesh, Bihar, Assam, West Bengal, and Gujarat will be the top five flood-affected states. These states need to strengthen their flood and disaster relief programmes better. Bihar needs special attention in evacuation and transportation services during the flood. The seven big river systems will be more catastrophic for twenty-two districts of Bihar. The rivers flowing from the Himalayan foothills such as Ganga, Ghaghara, Gandak, Budhi Gandak, Bagmati, Kamla Balan, Kosi, and Manahanda are more vulnerable in the state. Various disaster relief agencies are working to overcome the flood situation and reduce the flood effects on humans and the environment. There are several tools and technologies available these days that play an important role in flood and disaster relief operations. But these tools and techniques are very old and need to be reformed according to the advanced technologies available. The existing Indian disaster relief plan and the information system are not enough effective as compared to other developed nations. Emergency evacuation during disasters becomes difficult due to the unavailability of various scientific evidence, tools, skills, and most importantly near real-time data. Every year millions of lives are affected due to floods worldwide. The development of a highly precise information system operational both day and night is highly needed for the rapid evacuation and distribution of food supplies to the people living in remote areas. The submergence of road and railway networks into the flood water creates dilemmatic conditions for the rescue team without correct information about the surroundings.

The rivers flowing in these areas become the only sources of evacuation using small boats.

Organisations working in this field are facing a lot of issues related to wrong water depth information during nighttime. A study was needed to develop a few tools that can solve the problem and are easily operable in any conditions including weather. In this study, open-source hydrological models, satellite imagery, and open-source data were used. The study aimed to access the various vulnerable areas, make precise inland waterways navigation systems for mega evacuation operations, and also plan a disaster relief river corridor using existing river systems of north Bihar. The output obtained by the models can be exported to smartphones, tablets, and other devices for easy operation. In this study, various tools, models, and methodologies available in the open domain were used for the disaster

relief operation, especially during flood evacuation. The flood modeling software such as HEC-RAS along with (Glofas) near real-time discharge data, (GHSL) human settlements data was used. The result obtained by the study has been validated using field water level and sentinel 1 data sets. The main output of the study indicates the number of villages, including people who may be highly affected by the flood, the depth of water during the various flood discharges, locations of safe places to accommodate the flood victims, locations and channels for easy navigation to the flooded areas in both day and night time, and suitable vessels or boats which can be used in evacuation services. The post-flood management and strategies to replace flood victims of the areas.

The result also indicates that the various channels of the river systems have been blocked, and it needs de-siltation to maintain the ecological flow of the river. The current methodology has been developed especially for the Ganga basin under the Bihar state of India. It will be extended to other four states of India. The developed techniques will be useful in disaster relief operations, especially in flood evacuation services.

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Exploring the Potential of Nature-Based Evaporative Cooling Solutions for Enhancing Thermal Comfort in Urban Public Spaces

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The transition from agrarian societies to urban centres, accelerated by the Industrial Revolution, has reshaped global human settlement. Over 55 per cent of the world's population now lives in urban areas, expected to rise to 68 per cent by 2050 (UNDESA, 2018), with 70 per cent in the Global South (Yamamoto, 2006). While this rapid urbanisation has driven economic and social progress, it has also raised significant environmental concerns, such as the Urban Heat Island (UHI) effect. Additionally, global warming and the COVID-19 pandemic have altered urban lifestyles, increasing indoor energy consumption by up to 30 per cent in some regions, further disrupting the planet's ecological balance. Is there a way out?

Global Urbanisation Trends: the Next Big Thing

In the post-industrial era, the process of urbanisation has intensified, characterised by shifts of population to areas under specific administrative, economic, or geographic criteria (Bhagat, 2018). This transition is mainly motivated by the provision of better social amenities and public infrastructure, thus indicating better lifestyle, economic growth, and more developed cities in general.

However, this trend has not been the same in all parts of the world. In the Global South, for example, the trend of urbanisation has shown an instantaneous shift. In India, the level of urbanisation in the country as a whole increased from 27.7 per cent in 2001 to 31.1 per cent in 2011—an increase of 3.3 per cent points, as compared to 2.1 points between 1991–2001 (Census of India, 2011).

Urbanisation is not synonymous with development; this rapid shift is not inherently positive. In the 19th and early 20th centuries, urbanisation in the Global North often led to disease and poverty in overcrowded slums lacking water and sanitation. By the mid-20th century, however, many industrialised cities began to improve their infrastructure and services.

There is no guarantee that this cycle will repeat; urbanisation in the Global South is unfolding differently. While populations and demand for urban services are skyrocketing, many cities lack the revenue and investment needed to keep up. This puts them at risk of inadequate infrastructure and services, potentially trapping them in a downward spiral as population growth outpaces their capacity to meet residents' needs.

Urbanisation, the trend shift away from a pre-dominantly agrarian civilisation itself did not seem to be an issue, but the recent trends narrate a different story.

Urban Transitions and Heat Islands

To accommodate growing populations, urban areas have expanded, particularly in residential zones, leading to densely built environments. This increased development has resulted in more concrete surfaces, which absorb heat and create 'Urban Heat Islands' (UHI) —where city temperatures rise significantly compared to rural areas.

The Urban Heat Island (UHI) effect is a measure of the near-surface air temperature differential between urban areas and their rural surroundings. Global warming has resulted in a decadal temperature increase since 1850. Although this increase has been unitary (1°C) with an accelerated growth of 0.36 per cent

since 1980, the total accumulated effect has reached up to 3°C in urban areas. Therefore, the percentage of urban population facing heat stress has risen from 66 per cent in 1980 to 85 per cent in 2023 (Dahlman & Lindsey, 2024).

Major urban areas in the Global South are also experiencing severe UHI effects; for example, the average temperature difference on the outskirts of Beijing in China reached 3.3°C from 1961 to 2000, and the UHI effect in Shanghai reached 7.4°C (Tran et al., 2006). In India, nocturnal intensities up to 8–10°C have been reported in areas with dense urban and commercial pockets. Another study conducted by IIT Delhi in New Delhi has found the maximum and minimum heat island intensity to reach temperatures of 8.3° and 4.7°C, respectively (Mohan, Bhati & Sati, 2022).

UHI has a dual effect: rising surface and ambient air temperatures in urban areas. This drives increased reliance on cooling mechanisms like air conditioning to maintain indoor comfort. Additionally, discomfort from elevated temperatures reduces the use of public open spaces, leading to more indoor activities and further increasing the cooling load. This creates a vicious cycle of more use of indoor space, reduced green cover implies more heat retention, and subsequently increased use of ACs leading to higher outdoor temperatures.

Urban Transitions: the Shift in Urban Lifestyle

This reduced use of public spaces is reinforced by an urban, consumption-based lifestyle focused on maximising productivity and economic growth, which diminishes the value of recreational and community areas in favor of disjointed, autonomous spaces.

Recently, the COVID-19 pandemic further transformed urban lifestyles. While it highlighted the importance of public interaction and nature, many adapted to social isolation, leading to an increase in indoor living. In fact, 73.6 per cent of people reported feeling unsafe in nearby public spaces (Sampat, Chavda & Trivedi, 2020). Random urban sprawl and the construction of high-density buildings obstruct airflow, resulting in low wind speeds within the city, markedly exacerbating the UHI effect. In many cities, the urban heat island intensity (UHI) reaches about 5°C. UHI effect has become one of the important problems for urban environment and human health.

Recreational and community spaces have diminished in importance, with disjointed, autonomous spaces becoming the focus of urban development. This shift toward air-conditioned homes, offices, and malls has increased energy consumption and emissions, intensifying climate change, and exacerbating the UHI effect.

Breaking the Chains and Revival of Urban Public Lifestyle

Public open spaces and squares in cities will become increasingly unusable in the future without successful adaptation measures to the changing climatic conditions (Keeler et al., 2019; Nikolopoulou & Lykoudis, 2006). Maintaining the usability of these spaces is important from an ecological but also social perspective; recreation and leisure are essential for holistic demands of city dwellers.

Revival of these spaces essentially requires adaptation to the changing temperatures to improve liveability of these spaces and make these spaces purposeful (design to be apt for recreation like parks, squares, assembly spaces) to invite more people to use this shared commodity.

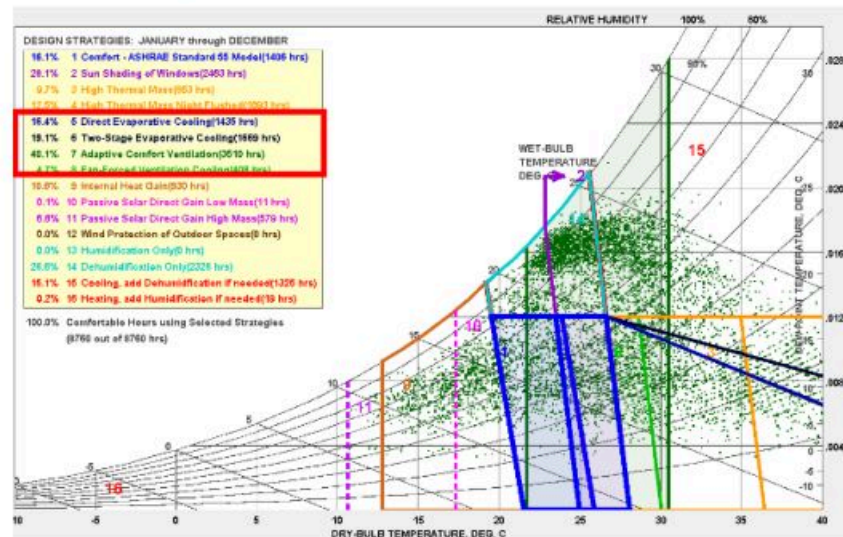
Natural Cooling for Thermal Comfort in Urban Public Spaces

To minimise the outdoor heat stress in urban areas, a two-step model can be used. The first step comprises minimising the heat retention and increasing the vegetation cover. Data collected on the

impact of vegetation on UHI has shown a rating of 6.25 out of 10 in a study for resilient UHI mitigation strategy (O'Malley et al., 2019).

The second step involves low-energy cooling solutions, like the presence of urban water bodies (excluding rivers and waterways). Based on a study on various climate strategies to be applied to achieve thermal comfort in large spaces in hot and dry climates, it infers that about 77 per cent of thermal comfort can be met using evaporative cooling and natural ventilation.

Figure 22: Psychrometric chart showing probable design strategies to achieve thermal comfort throughout the year in hot and dry climate (Ahmednagar, India)



Source: Author

Thus, using an evaporative cooling-based mechanism in addition to suitable landscaping measures can be an effective remedial approach. In order to ensure feasibility, the solution to have efficient utilisation of resources and minimal dependence on mechanical systems.

Towards Nature-Based Cooling Solutions for Public Spaces: CoolAnt's Evaporative Cooling Solutions

The inefficiency in the present evaporative cooling solutions for public spaces lies in their excess usage of water. The proposed solution is designed as an assembly of porous terracotta modules with water being circulated through this system, that cools the passing air through the principle of evaporative cooling. After evaluating the properties of different materials, terracotta was found to be efficient in retaining and releasing water through capillary action.

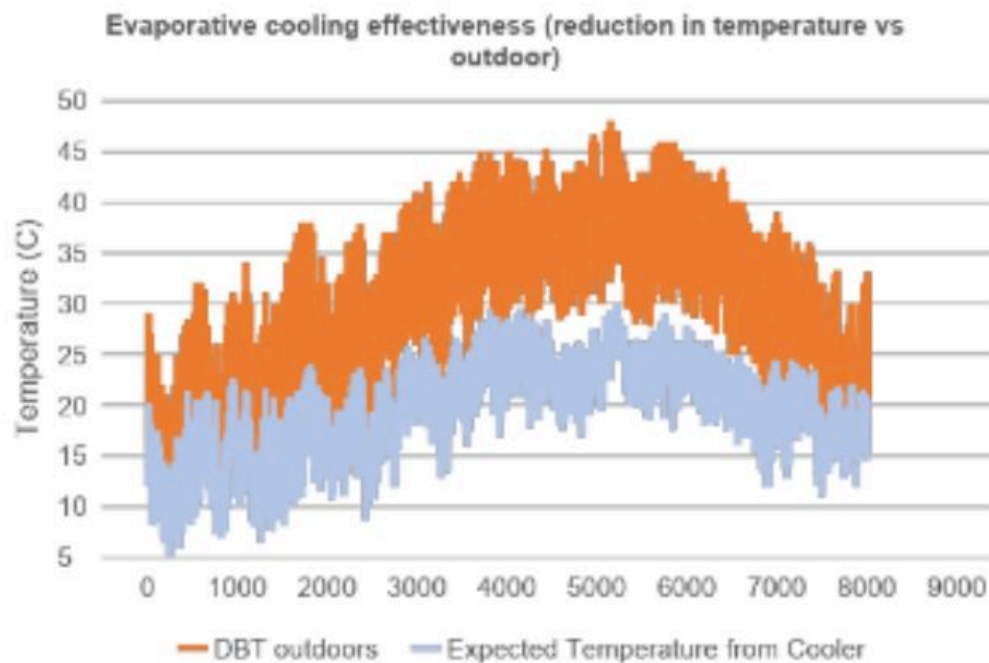
The system can manifest as a 'cooling screen', while also as an art installation/ feature that cools its surrounding air. The system can be used independently or as a hybrid with mechanical systems such as misting for a large open space. Different shapes and assemblies of the modules were tested for real-world applications at different scales, before arriving at the model(s) used for simulation(s) and testing.

Naturally Cool: Case Studies Showcasing Impact of CoolAnt

Case 1: Pavillion space in AlUla, Saudi Arabia

The modules are linear brick tiles arranged to obtain a jaali pattern, with punctuations of round cylindrical pots as a 'Cooling Screen'. An installation is conceptualised for a pavilion based in North-West Saudi Arabia designed to commemorate a site of archaeological importance. On comparing the dry bulb temperature outdoors and expected temperature indoors throughout 8760 hours in a year, an average drop of 12.25°C is observed. The mean peak temperature indoors remains between 22.5 to 27°C.

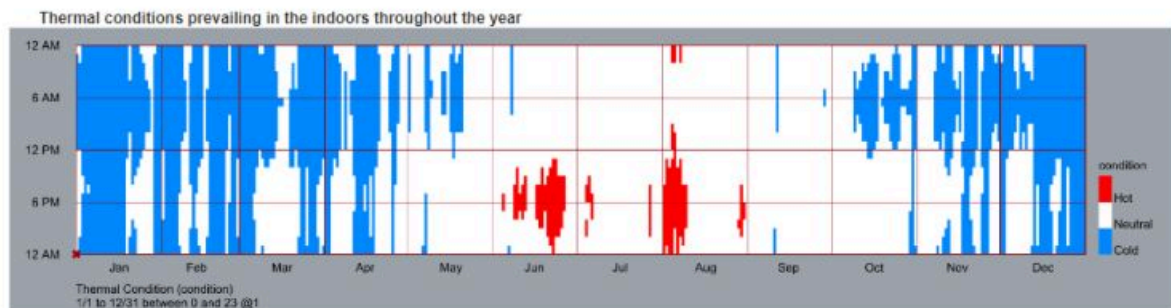
Figure 23: Potential drop in temperature based on the climate data of AlUla, Saudi Arabia



Source: Author

The semi-covered pavilion has walls of cooling panels that reduce the temperature of the space and provide thermal comfort complying with ASHRAE standards for 27 per cent of the year.

Figure 24: Simulation for indoor thermal conditions of the pavilion



Source: Author

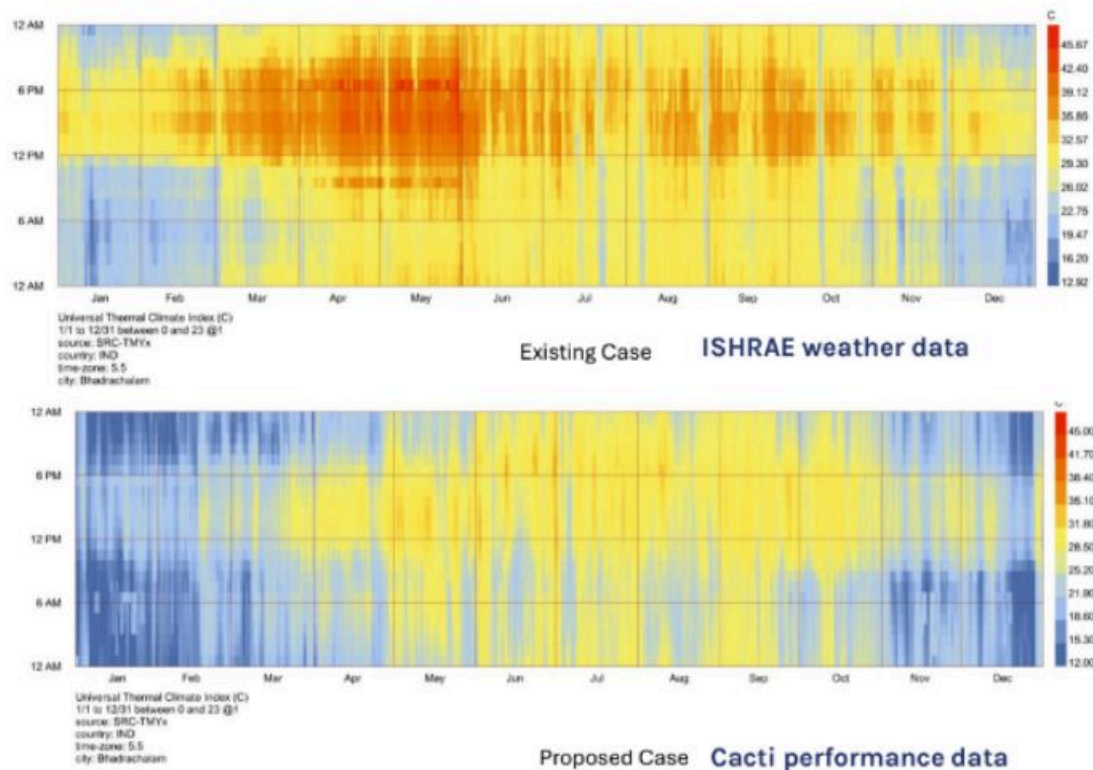
Case 2: Public seating in institutional campus in Telangana, India

Another exploration of the potential solution is in the form of a 15 feet tall 'Cactus', consisting of a terracotta cooling screen to retain water and cool the air that passes through it. It is placed inside a water feature drawing water from the tank below through pipes, which then spray water over the tiles resulting in cooling of the surface. Then air is sucked in from the surface of the cactus, losing heat while in contact with the wet terracotta surface. The cooled air is then redirected to specific locations such as seating areas through diffuser fans placed at human height can be placed to help in cooling the surrounding area.

The surface area for evaporative cooling here is found to be ~1.5 times higher than a conventional metal screen used in cooling towers, enhancing the effect of cooling the air. On simulating the application of such a structure in composite climate of Bhadrachalam, Telangana, up to 67 per cent of reduction in heat stress is observed in surrounding open area. As per thermal analysis, considering condition of

comfort as UTCI of 32 degrees or lesser the cacti can provide an additional of 2979 hours of comfort hence achieve 99 per cent thermal comfort.

Figure 25: Thermal analysis of the open space before and after installing Cacti



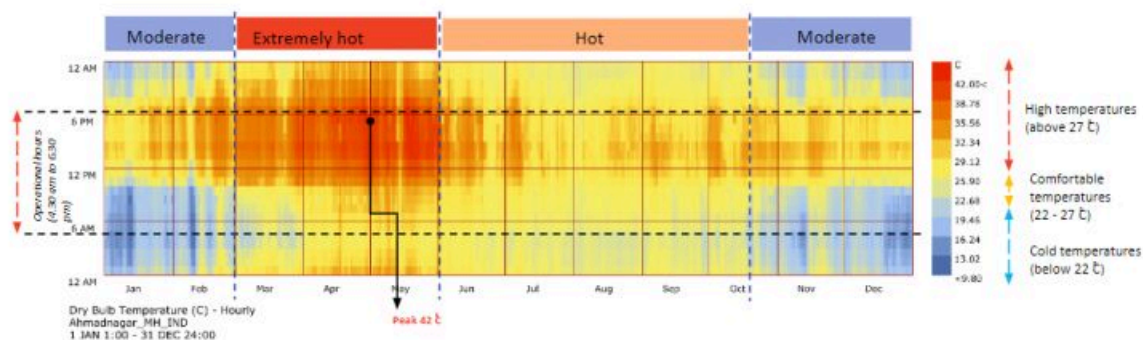
Source: Author

In the dry period (Jan–May & Oct–Dec), higher ventilation rates supported with evaporative cooling can help reduce the impact of heat stress (for 5,797 hours). During monsoon months, higher ventilation rates can help improve perspiration and reduce the risks from high Wet Bulb Globe Temperature (an increase in the fan ventilation rate by 15 per cent can induce better comfort during humid hours of the day).

Case 3: Assembly space in Ahmednagar, India

When analysing the potential for evaporative cooling in a large assembly hall for a religious centre in the hot and dry climate of Ahmednagar, it is observed to be subjected to heat stress during Mar–May.

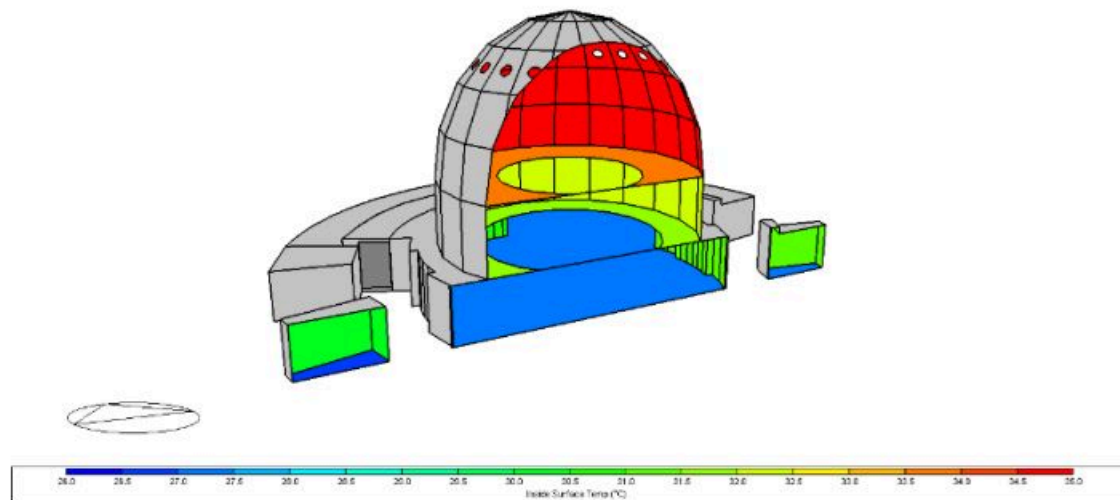
Figure 26: Heat stress experienced as per climatic data of Ahmednagar, India



Source: Author

To ensure cooling along the base, terracotta cooling screens are installed throughout the ground floor which can effectively bring down the average surface temperature to 33°C.

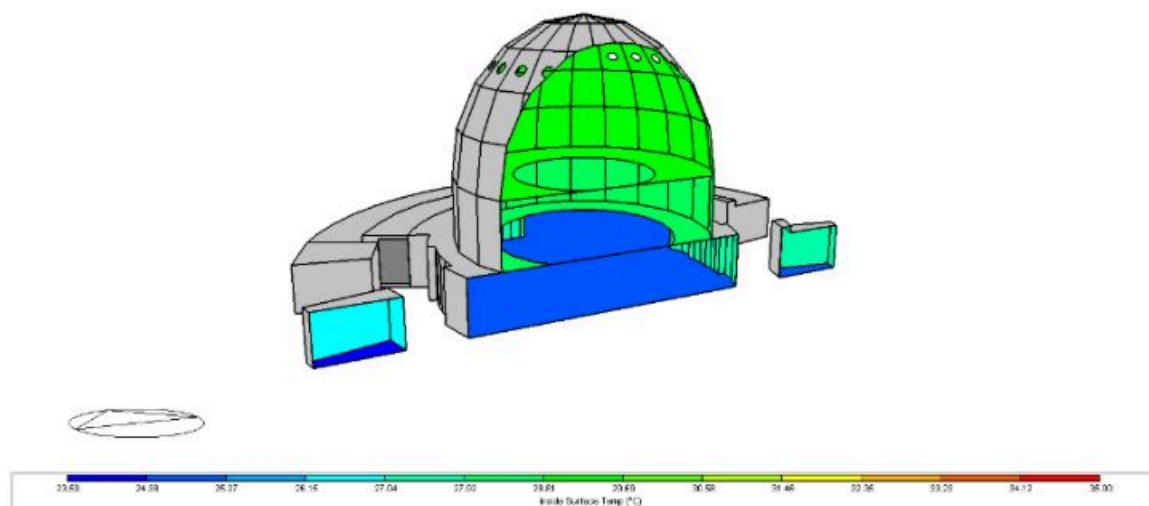
Figure 27: Thermal map on interior surface of assembly space with binary screens on ground floor



Source: Author

Another measure taken was installation of a 'cooling tower' that collects ambient air, cools it and directs it into the space via ducts. The structure is designed to cool the air up to 3.8°C below the ambient temperature. This helps in reduction of the average temperature to 26.5°C, hence making the space thermally comfortable.

Figure 28: Thermal map on interior surface of assembly space with binary screens on ground floor and Cacti for space cooling



Source: Author

Towards New Urban Trends: a Discussion

The analysis indicates that the cooling system significantly contributes to achieving thermal comfort in open areas and public spaces. This solution is particularly relevant for regions with hot, dry, and composite climates, functioning effectively as both cooling screens and cooling towers. These systems are beneficial for various public spaces, including open (public seating), semi-open (pavilions), and enclosed (assembly halls).

By cooling public spaces and reducing surface heating, these solutions encourage people to spend more time outdoors, promoting physical activity and social interaction. Increased outdoor engagement leads to energy and cost savings in the built environment, fostering a positive shift towards well-designed public urban spaces. Moreover, reducing reliance on air conditioning in private dwellings minimises heat release and greenhouse gas emissions from cooling processes, thereby mitigating overall air heating in urban areas.

Future potential lies in designing modular and temporary installations, broadening their use and applicability. There is also scope to investigate their effectiveness in other public spaces, such as malls or museums, where they can complement existing active cooling systems and reduce energy consumption. The use of evaporative screens to enhance large-scale cooling systems like chillers or cooling towers can further improve efficiency.

Reviving public spaces facilitates resource centralisation and promotes mindful consumption. Increased use of public areas generates community and governmental interest in expanding open spaces, paving the way for more sustainable cities and communities. Ultimately, this gradual shift towards urban public spaces can help cities build resilience against climate change.

Evaporative Cooling for the Urban Public

Conclusively, the rapid urbanisation and the resulting Urban Heat Island (UHI) effect present significant challenges to urban livability, particularly in developing regions (the Global South). Nature-based cooling systems, such as the proposed solution exemplify an innovative approach to mitigate heat stress through evaporative cooling enhancing public spaces and promoting outdoor activity. By revitalising these areas, the solution encourages social interaction and community engagement, fostering a sense of belonging among residents.

Emphasising the importance of well-used public spaces, this approach highlights the potential for sustainable urban development that prioritises both human comfort and ecological health. As cities continue to grow, implementing such strategies will be crucial for creating resilient, vibrant urban environments that can adapt to the challenges of climate change and urbanisation.

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Investigating Biomimicry-Based Architectural Design Solutions to Combat Extreme Heat and Decrease Space Cooling Load in Hot and Dry Regions: the Case of Ahmedabad

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Key words: Ahmedabad, air-conditioning, biomimicry, commercial building, hot-and-dry climate, heat wave, thermal comfort, space cooling load, urban heat island effect

This research investigates architectural design strategies based on principles of biomimicry³ to maintain indoor thermal comfort under extremely high temperatures and decrease the space cooling load, which in turn mitigates the urban heat island effect. The effectiveness and applicability of such strategies is assessed with respect to commercial buildings in the city of Ahmedabad, Gujarat.

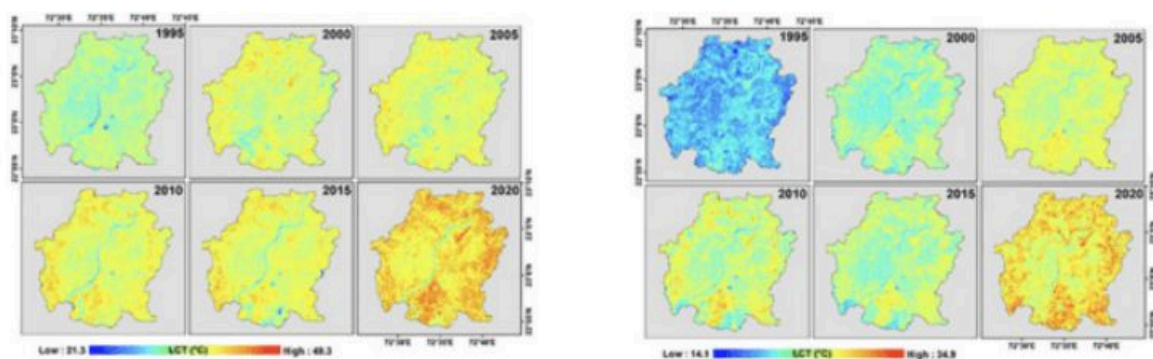
Introduction

Ahmedabad, like cities across the world, is grappling with the effects of global warming and climate change. With increasing intensity and frequency of **heat waves** over recent years, there is a dire need to find **innovative technological solutions to make the built environment more resilient to extreme climatic conditions**.

The **rapid urbanisation of the city** in recent decades has led to the replacement of natural land cover by high-thermal-mass built forms (buildings, roads, pavements) and has increased pollution and sources of anthropogenic heat (waste heat from vehicles, factories, air conditioners). This has led to the formation and growth of urban heat islands (seen in Fig. 29-30), which exacerbate the extremely hot temperatures in summer months, which often exceed 40°C during the day.

Higher urban temperatures are associated with increased energy use for cooling buildings, enhanced heat stress on humans, and changes to natural ecosystems (Stewart & Mills, 2021, p.8). The **urban heat island (UHI) effect** will enhance expected large-scale climate changes like global warming and heatwaves (Stewart & Mills, 2021, p.8). The poorest in the city—daily-wage labourers, street vendors, pavement-dwellers, et cetera—are the most vulnerable to extreme heat, since they often do not have the means to protect themselves.

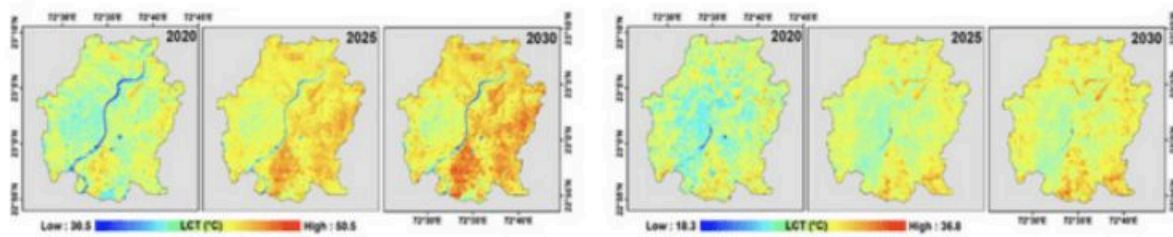
Figure 29: Summer (left) and winter (right) LST (land surface temperatures) for Ahmedabad from 1995 to 2020



Source: P. Mohammad, A. Goswami, S. Chauhan, S. Nayak (2022)

³ Biomimicry is "the emulation of strategies seen in the living world as a basis for design. It is the mimicry of an organism, an organism's behaviour or an entire ecosystem in terms of its form, material, construction method, processes or function" (Zari, 2010).

Figure 30: Predicted summer (left) and winter (right) LST (land surface temp.) for Ahmedabad from 2020 to 2030



Source: P. Mohammad, A. Goswami, S. Chauhan, S. Nayak (2022)

After the devastating 2010 heat wave that resulted in over a thousand deaths, the Ahmedabad Municipal Corporation (AMC) along with NRDC prepared India's first **Heat Action Plan (HAP) for Ahmedabad** in 2013. This Heat Action Plan (HAP) includes a "cool roofs" programme (Fig. 31-32), which involves painting roofs and terraces white or applying reflective materials to prevent excessive heat gain.

Figure 31: Poster for the cool roofs programme



Source: NRDC, GERMI, IIPH Gandhinagar, MHT (2022)

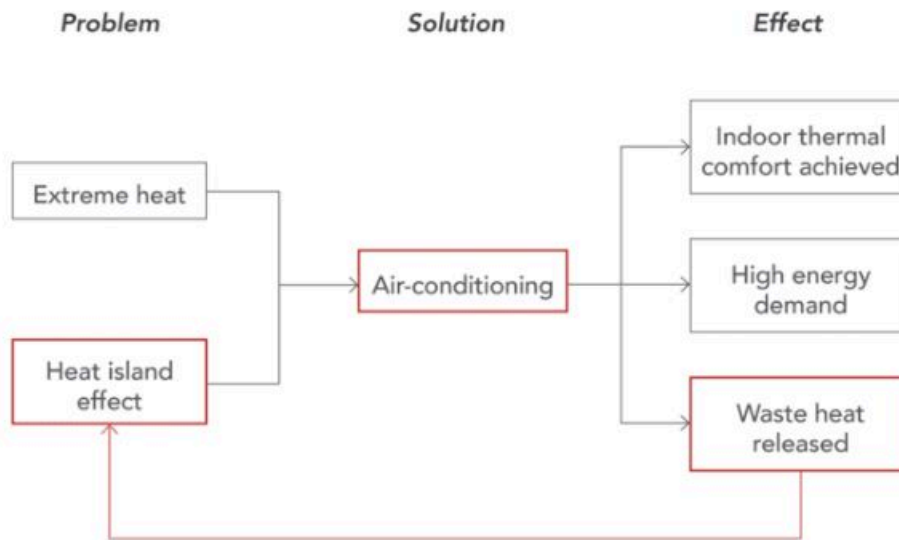
Figure 32: Slum roofs being painted white by former Ahmedabad mayor Gautam Shah



Source: NRDC, GERMI, IIPH Gandhinagar, MHT (2022)

While effective in low-rise buildings and self-built settlements, such roof-based strategies are not effective in preventing excessive heat gain in multi-storey buildings. Ahmedabad is experiencing a massive growth in construction of **commercial high-rises**, which tend to be fully air-conditioned. India is projected to have one of the largest air-conditioner stocks in the world by 2050 (International Energy Agency, 2019). A major contributor to the urban heat island effect is the **waste heat from air-conditioning systems** (refer Fig. 33). "Waste heat exhausted from air-conditioning can improve local air temperature by 2°C" (Salamanca et al., 2014). Hence, **decreasing space cooling loads** in buildings to reduce the need for air-conditioning would be an effective strategy to also mitigate the urban heat island effect.

Figure 33: Air-conditioning is a conventional method of adaptation to hot weather in cities, but it also adds to the heat island effect, creating a cycle of cause and effect.



Source: Author

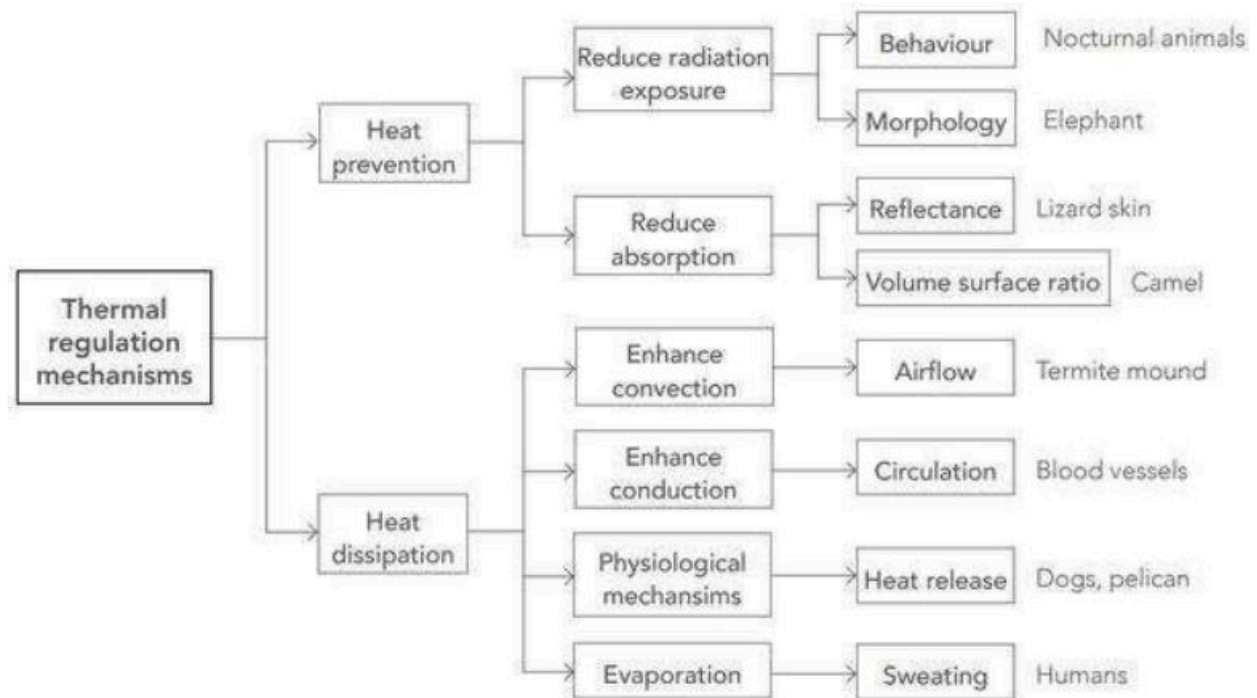
Several large-scale strategies and techniques such as urban greenery, water bodies and cool materials can be effective for UHI mitigation. However, restrictions on elevating city skylines, limited urban spaces, and already well-structured urban tissues limit these strategies (He, 2019). Furthermore, the implementation of such strategies at a city-level faces hurdles of funding and negotiating with various agencies and levels of bureaucracy. Hence, **developing technological solutions for individual buildings is useful, and aligns with the widespread incremental building-by-building method of extending and renewing the built environment** (Zari, 2010).

Aim

This research investigates **biomimicry-based design principles** that can help **increase the thermal efficiency of buildings in high temperatures** in order to **reduce the space cooling load**. This would also **mitigate the building's contribution to the urban heat island effect** by reducing the amount of waste heat released to the atmosphere from air-conditioning systems.

There are several arguments in support of biomimetic strategies being **key in creating long-term, regenerative changes**. Nature has perfected systems that adapt to extreme climatic conditions (seen in Fig. 34), and it is useful to study such principles and translate them into strategies for the built environment. In his book 'Biomimicry in Architecture', Michael Pawlyn argues that "biomimicry is one of the best sources of solutions that will allow us to create a positive future and make the shift from the industrial age to the ecological age of humankind" (Pawlyn, 2011). This research aims to **determine whether biomimicry is a workable design approach** to combat the issues of extreme heat in the built environment, in the context of Ahmedabad.

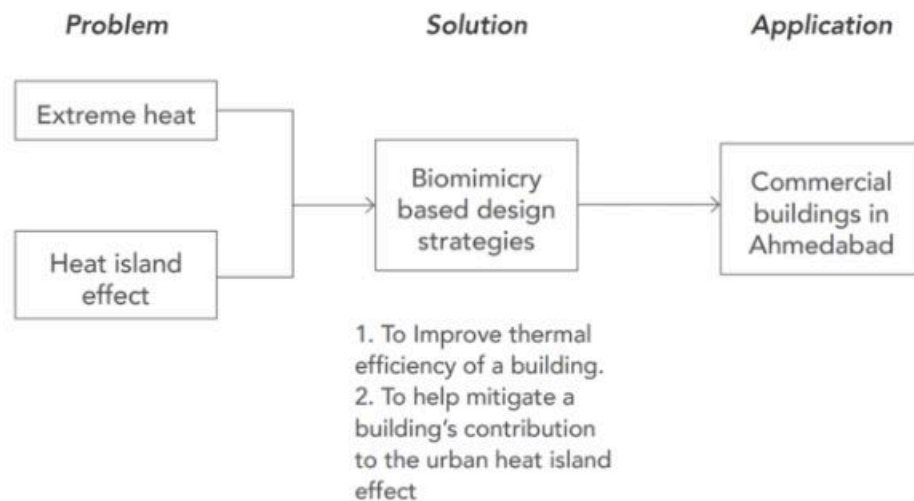
Figure 34: Thermoregulation mechanisms seen in nature



Source: Developed by author, from Badarnah Kadri, 2012.

The outcome of this research is an **assessment of the applicability of various biomimicry-based architectural strategies** that can help buildings (and ultimately, cities) adapt to increasing frequency and intensity of heat waves and mitigate the Urban Heat Island effect.

Figure 35: Overview of the research



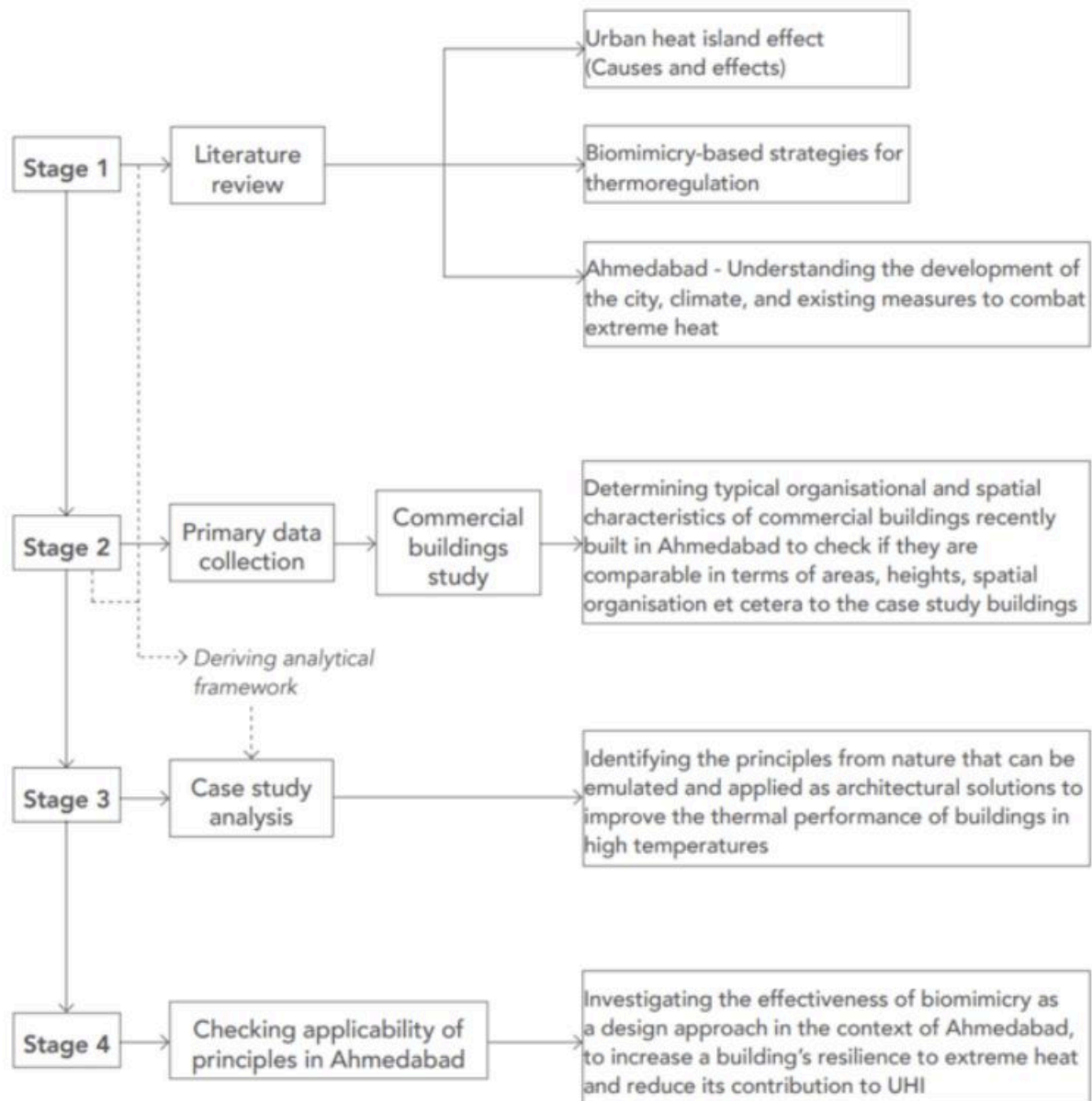
Source: Author

Methodology

This research looks at the application of such biomimicry-based principles on **commercial buildings in Ahmedabad**. Fifteen recently built commercial buildings in Ahmedabad are studied to gain an understanding of the “typical” commercial building found in the city, in terms of spatial layout and dimensions (Refer Fig. 37). An **analysis of case studies across the world**—buildings that have used **biomimicry-based design strategies for thermal regulation**—is done to determine the principles used, the relationship of these principles with space organisation and form, and their effect in maintaining

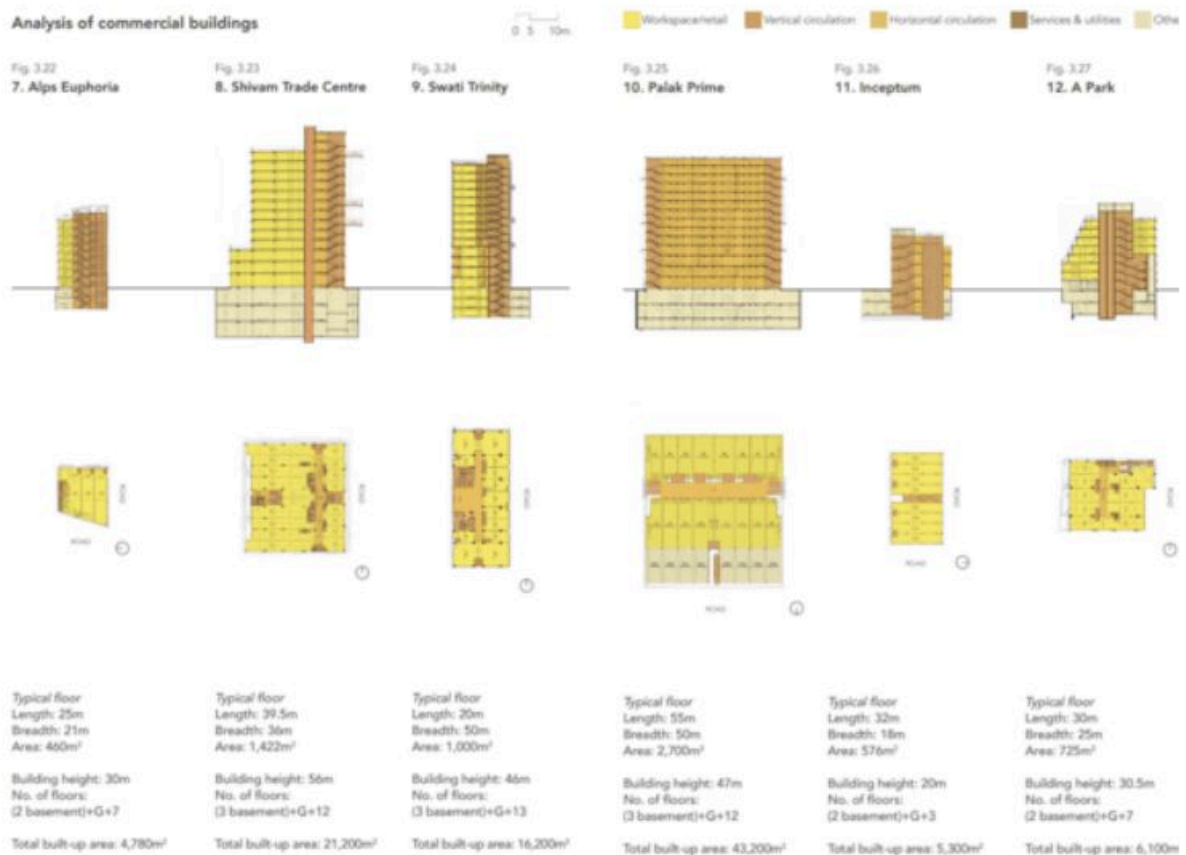
thermal comfort. **The applicability of these principles in the context of Ahmedabad** is then assessed with respect to climate and building type.

Figure 36: Methodology of the research



Source: Author

Figure 37: Part of the study of recently built commercial buildings conducted to determine typical organisational and spatial characteristics



Source: Author

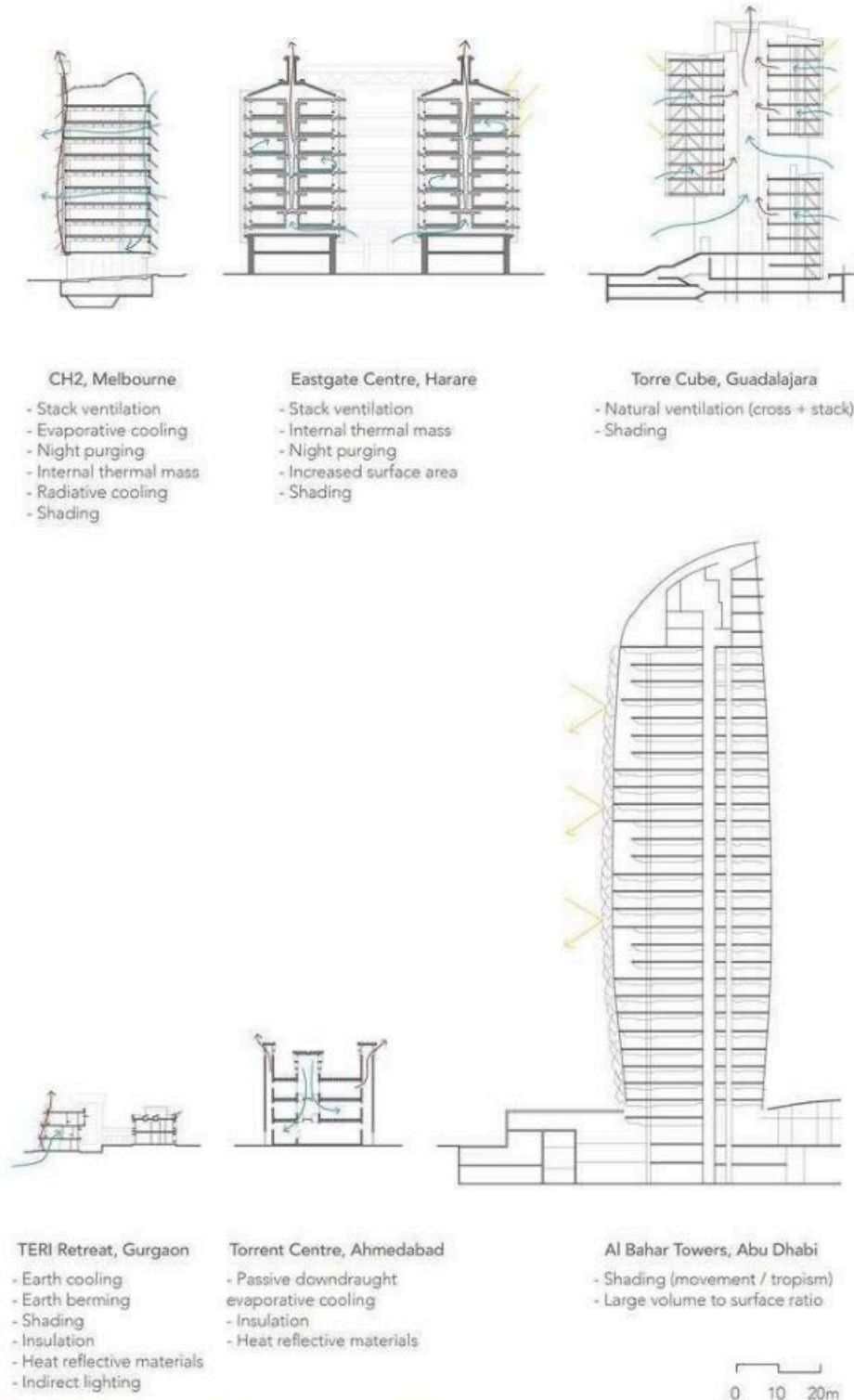
Scope and Limitations

The research looks at biomimicry at an integrated systems level as well as independent strategies for thermoregulation that draw inspiration from nature. Biomimicry is a systems-level design strategy, hence the application of such principles is limited to future development and not retrofit strategies of existing buildings.

Commercial high-rise buildings in Ahmedabad will be considered as the site to apply the various biomimetic principles. **The study will focus on understanding principles and strategies and their applicability in Ahmedabad, and not on quantifying or measuring the effect of the strategies.**

Overview of Buildings Studied

Figure 38: Six buildings that employ principles of biomimicry for thermal efficiency were studied. The biomimicry-based strategies for thermoregulation were analysed and assessed for their applicability in Ahmedabad.



Sources: Redrawn by author from drawings available on architects' websites

Figure 39: Overview of case studies: assessing the principles, strategies and applicability

Principle	Animal inspiration	Strategy (as seen in case studies)	Climatic conditions for the working of the principle	Climatic applicability in Ahmedabad
1. Convection / stack ventilation: use of temperature difference to move air. (CH2, Eastgate, TERI, Torre Cube)	Inspired from air passageways and ventilation mechanisms seen in termite mounds. Termite species are found in Gujarat.	Vertical ducts supply cool fresh air and remove warmed air, which is exhausted at roof level. Can be passively / mechanically driven.	"Use of natural convection to remove internal heat gains is dependent on the external (supply) air temperature being lower than that required internally" (Ford et al., 2020, p.32).	Applicable; additional cooling of external (supplied) air required when outside temperatures exceed comfort zone (all months except Nov-Feb)
2. Night purging of internal spaces / thermal mass that has absorbed heat during the day. (CH2, Eastgate, Torrent)	Processes of internal heat release are seen over shorter time periods in animals, such as panting in dogs, guller fluttering in pelicans.	Windows open at night to allow fresh air to pass through (CH2), mechanically or passively driven stack ventilation drives out warmed air at night (Eastgate, Torrent).	Large diurnal range of temperature necessary for night time temperatures to drop below that of the internal spaces. Low sky cover is helpful in radiating out heat to space.	Ahmedabad has an average diurnal range of temperature of 12.5°C (refer to fig. x), and low sky cover in summer months (fig. x).
3. Evaporative cooling (CH2, Torrent)	Sweating seen in humans, animals immersing in water to stay cool (seen in elephants, buffalo)	Passive downdraft evaporative cooling (PDEC) system (Torrent), shower towers (CH2)	Evaporative cooling systems are effective when the relative humidity of air is up to 60% (as seen in TERI Retreat).	Applicable in Ahmedabad in March-June when daytime temp. > 30°C and relative humidity < 60% (fig. x)
4. Earth cooling and earth berming (TERI)	Burrowing animals (rodents, lizards) dig underground during the hottest parts of the day to stay cool.	Earth air tunnels cool air to supply to internal spaces (TERI), sunken spaces take advantage of high thermal mass of earth (TERI).	Underground temperatures depend on ambient temperature, soil composition, moisture content, and depth from ground surface.	Temperatures in Ahmedabad 4m below ground are within comfort zone except for monsoon months (fig. x).
5. Shading / kinetic response to heat (in the skin of the building) (CH2, Al Bahar, TERI, Eastgate)	Tropism - movement in response to the sun (seen in plants). Certain birds use their wings to shade eggs / chicks from the sun.	Kinetic facade that modulates in response to sun position (Al Bahar), modulation of facade openings (CH2), vegetation grown to shade in hottest months (TERI, Eastgate)	Shading is effective in hot regions with high levels of solar radiation.	As seen in psychrometric chart of Ahmedabad (fig. x), sun shading is an effective strategy for most of the year.
6. External thermal mass / large external surface area (Eastgate) - slows heat gain into interiors, aids in heat dissipation at night.	Cacti, termite mounds (found in Gujarat)	Precast concrete projections on building facade, high thermal mass (exterior) masonry walls (Eastgate)	Large diurnal range of temperature required throughout the year to allow heated thermal mass to cool down in the night.	Ahmedabad has an average diurnal range of temperature of 12.5°C (refer to fig. x)

Principle	Spatial dependence	Applying the principle in a typical Ahmedabad commercial building	Need for manual systems / working after office hrs	Overall applicability in commercial highrise in Amd
1. Convection / stack ventilation: use of temperature difference to move air. (CH2, Eastgate, TERI, Torre Cube)	Ventilation shafts can be placed either centrally (CH2, Eastgate) or at the periphery (TERI) or a combination of both (Torrent).		Exhaust fan system can be automatically / manually operated during day. Can operate passively after office hours (or be automated).	Useful strategy in a high rise. However, additional cooling of supplied air required for most months. Typical corridor-room layout is suitable for this strategy.
2. Night purging of internal spaces / thermal mass that has absorbed heat during the day. (CH2, Eastgate, Torrent)	Open plan is ideal to allow cross-ventilation (in case of windows opening, as seen in CH2). Else central / peripheral shafts can be used to draw out air.	Open plan office typology is typically not found in Ahmedabad. Hence night purging via cross ventilation is not feasible. Shafts / stack ventilation can be implemented.	Windows must be manually opened and closed at night, if not automated.	Useful strategy in multi-level high-rises. However, this can only aid in decreasing AC load. Other cooling strategies required in addition to night purging.
3. Evaporative cooling (CH2, Torrent)	The principle is not space-dependent. Refer to row 1 for placement of air supply shafts.	Evaporatively cooled air can be supplied in any type of building according to the chosen placement of shafts.	Automated system. Can be centralised, or control can be given to the individual floors/ office spaces.	Effective strategy in Ahmedabad for most months except July - September. Ideal alternative to refrigerated air-conditioning.
4. Earth cooling and earth berming (TERI)	Earth berming would work only in underground / partially sunken spaces (hence not applicable to high rises).	Earth bermed office spaces can be partially sunken / located in basement. Basements are commonly seen in commercial buildings in Ahmedabad.	Earth-cooling is a natural process, though mechanical processes are needed to transfer cooled air.	Earth berming would work only in underground spaces. Earth air tunnels require long length and might not fit within the plot.
5. Shading / kinetic response to heat (in the skin of the building) (CH2, Al Bahar, TERI, Eastgate)	Shading systems are part of the "skin" of the building and are mostly independent of interior spaces.	Can be applied in almost any type of building since it is a skin-level strategy.	Kinetic shading system can be automated (central control), or manual control given at the level of each office space.	Effective strategy for multilevel buildings in Ahmedabad. Can be integrated into the architecture at multiple scales.
6. External thermal mass / large external surface area (Eastgate) - slows heat gain into interiors, aids in heat dissipation at night.	The high thermal mass skin must be separate from the building spaces to prevent heat transfer via conduction.	Can be applied in almost any type of building (skin-level strategy)	Fixed system / no control needed.	While this strategy helps keep interior spaces cool, the thermal mass will absorb and radiate large amounts of heat.

Source: Author

Inferences and Conclusions

Effectiveness of the strategies in decreasing space cooling loads

This research concludes that using various nature-inspired systems of cooling and ventilation—including strategies to improve thermal efficiency that are based on form and spatial arrangement—are effective (to varying degrees) in reducing the space cooling load and maintaining indoor thermal comfort in peak summer months. The **most effective principles for Ahmedabad are evaporative cooling, earth cooling, and night purging** (coupled with high thermal mass), with respect to the climate and commonly found

commercial building typology. Adapting building systems to improve thermal efficiency and replicating these strategies across buildings in the city can also mitigate the urban heat island.

To effectively eliminate the need for air-conditioning in hot climates, a group of principles, and not a single system derived from natural organisms, is needed. However, since daytime summer temperatures in Ahmedabad are extremely high, it is **very difficult to eliminate the need for air-conditioning for the entire year**. Commercial buildings are typically air-conditioned year-round, and the use of certain strategies can remove the reliance on air-conditioning for the months when temperatures are not very high.

Quantifying the effect of the strategies

Reducing the space cooling load or eliminating the need for air-conditioning drastically decreases the energy consumption of a building, as proved from studies conducted on some of the case study buildings. HVAC systems themselves generate heat in their operation. **By replacing them with passive or active cooling systems that consume less energy, the amount of waste heat generated is also greatly decreased.** This reduction in energy consumption is the major driving force behind the use of biomimicry-based strategies in the majority of buildings studied, and the decrease in contribution to UHI is an unintended benefit of using these strategies. While there have been studies conducted on the reduction in energy consumption and improvement in thermal comfort in the buildings, there are no impact studies conducted on the decrease in contribution of the building to UHI (as compared to a typical building of the same type and size). This calls for the **need to prioritise the study of UHI impact of buildings**.

Effectiveness and Feasibility of Biomimicry as a Design Approach

This research also reveals that although theoretically, biomimicry may have been identified as having great potential to design buildings from a systems level, there are few examples of buildings that have directly used biomimicry principles for thermoregulation. Buildings are not living organisms, and do not have a capacity to self-regulate. However, through advancements in technology, **there is a potential to design buildings to be truly adaptive to drastic climatic conditions**.

“Biomimicry knowledge is lacking among stakeholders in architecture and structural engineering, which hinders its adoption and application to enhance sustainability in construction and design industries” (Vrcelj & Jamei, 2021). Hence, there must be incentives given to developers from governments to be more environmentally responsible and invest in such measures.

Although the biomimicry-based strategies might be expensive in the shorter term, in the case of a commercial building, the additional costs can be divided among several buyers, and these costs will eventually be recovered over time by saving on electricity bills. Builders tend to have the capital investment potential to implement such strategies. Additionally, the use of such design-based solutions can be incentivised by being translated into policy, in terms of a rating system or nationally mandated building codes. This will also help in ‘image-building’ to promote the project, as seen in some case studies which achieved recognition by being “biomimicry-based”.

Although the research looks at development in Ahmedabad, which is one of the largest and fastest growing metropolitan areas in the country, **the findings are applicable to other developing areas in hot and dry climates**. This research calls for architects, developers, and governments to be mindful of the effects of the built environment beyond the site and the intended users, and to be sensitive to how their interventions affect the larger environment of the city.

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Sustainable Cooling Futures for the Marginalised Communities of Pune

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Background

Over 50 per cent of the global population now lives in urban areas, with 90 per cent of future urban growth expected in Asian and African cities, straining infrastructure, services, and the environment. One of the most visible consequences of this urban expansion, particularly in emerging economies, is the proliferation of informal settlements, which house a significant portion of the urban poor. These communities are especially vulnerable to climate impacts. According to a 2021 UN-Habitat report, nearly 30 per cent of urban residents live in informal settlements. While substantial research has been conducted on various socio-cultural aspects, encroachment issues, and sanitation improvements in these areas, there is a notable lack of studies focusing on the built environment and environmental comfort within informal settlements.

Marginalised communities are affected disproportionately due to climate-induced and natural disasters—heat stress being one of them. Heat stress intensifies due to several underlying factors including the nature of work, where the marginalised communities are exposed to long hours of outdoor work and very few hours of resting hours. This indirectly affects their health, but they are often unable to access and afford primary healthcare treatment, further increasing this problem. Socially marginalised people, who have no means of travelling to cooler locations or who have no means to cool their existing surroundings, are the worst affected. This is especially true for children, women and senior citizens. At times, even basic facilities like access to cooling aids like fans and coolers are beyond the scope of these marginalised communities as means of access to cooling and comfort.

In Indian cities, the demand for indoor cooling is particularly high due to the climatic conditions. Dwellings in informal settlements are often constructed with unconventional highly absorptive material palette, resulting in uncomfortable indoor environments for residents. There is lack of cooling means and access to cooling spaces for these residents making the heat stress unbearable and leading to health complications.

The Marginalised Futures of Sustainable Cooling in the Pune project was conceptualised by the project team of Sustainable Research Institute, University of Leeds, and Environmental Architecture Department, Dr Bhanuben Nanavati College of Architecture, Pune University. The project was supported by the Leeds Social Science Institute, University of Leeds. This project presents the cooling needs and aspirations in informal settlements of Pune city in India and outlines some key policy takeaways to alleviate heat stress amongst marginalised communities in Pune city in India.

Why Pune?

Historically, Pune has witnessed a rapid growth in slum population due to the high migrant population servicing different industries and commercial activities that have sprung up in the city over the last few decades. As per the ESR 2022-23, there are more than 500 notified and non-notified slums in the city

with more than 7,00,000 slum dwellers residing in them. This constitutes 28 per cent of the total city population, therefore requiring urgent attention. Heat stress and related cooling demand tends to accelerate in these communities and amongst this population with lack of access to basic services and amenities. These slums in the city and their conditions are degrading further adding to the heat stress or thermal injustices due to other issues such as gender, education, and work standards. Mazzone et al. (2023) have urged to heed this intersectionality within the heat stress and thermal need discourse.

Pune is also one of the most vulnerable cities to climate-induced heat stress. This is evident from the studies done to see the increase in the number of heat stress days (Desai et al., 2021). In particular, the mean annual nighttime surface urban heat island intensity (SUHI) has significantly increased by 1.3°C in the last 20 years—one of the highest growth rates of SUHI across major metropolitan cities (Jain, 2023). LST maps also demonstrate that the peripheral zones of Pune suffer from high heat incidence due to a mix of built and barren land-use patterns. Mehrotra, Bardhan, and Ramamrithan (2018) demonstrate that slums/ informal urban forms tend to be more prone to urban heat island effects in the context of Indian slums.

Methods

We use the co-production approach to examine the evolving narratives of heat stress, responses, cooling needs, and aspirations among the populations of two slums in Pune located in two different. The project co-produces critical hyperlocal knowledge on cooling poverty and aspirations in Pune's informal settlements using unstructured interviews, focus group discussions (FGD), and field observations. One FGD was also conducted in the neighbourhood where intervention for improving thermal comfort has been taken up to understand the differences in experiences. To make the FGDs as inclusive as possible, a combination of discussion and visual tools was employed. Questions primarily focussed on 1) Experiences and patterns of heat stress; 2) Mitigation strategies currently being used and their efficacy; and lastly, future aspirations to relieve heat stress. The study combines qualitative knowledge co-production methods with GIS-based visualisation methods that identify temperature gradients around these two settlements reflecting the thermal nature of the surrounding landscapes and assessing the distribution of building type (tin or bricks) in each settlement. This enquiry into heat stress experiences and aspirations of low-income households in informal settlements in Pune contributes by providing insights on an otherwise understudied segment of population of the city of Pune, not typically a focus of heat stress studies in India. Firstly, the findings of the project will assist stakeholders and policymakers in understanding the depth of the problem and vulnerabilities of heat stress amongst these communities. The findings also reveal the likelihood of the communities opting for active cooling options out of compulsion, deepening their economic adversities. We believe that the project has policy implications with respect to the development of design guidelines and both passive and active cooling strategies to enhance thermal comfort in informal settlements, ultimately contributing to improved living conditions in these underserved urban areas. Going beyond the discourse of recorded temperature data and statistics, the project co-produces knowledge on the lived experiences and future aspirations of these vulnerable communities. This aligns with the Plural Storylines framework that encourages use of multiple methodological approaches to complement physical projections of climate futures (Rusca et al., 2024). Generating intersectional perspectives on heat stress, this project hopes to posit these marginalised voices into mainstream policy circles for the development of inclusive urban climate policies.

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From Chips to Cities: the Unseen Semi-Conductor Revolution Driving South Asia's Urban Transformation.

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The semiconductor industry is the engine behind the digital transformation sweeping across the globe. These tiny chips have revolutionised everything from consumer electronics and industrial automation to telecommunications and energy systems. In South Asia, particularly in India, semiconductors are playing an essential yet largely unseen role in the way cities are evolving. The rapid adoption of semiconductor-powered technologies is driving urban development, economic growth, and innovation in ways that were unimaginable a few decades ago. This essay explores how the semiconductor revolution is shaping South Asian cities, with a focus on India's journey towards becoming a global tech and manufacturing hub.

Is Global Semiconductor Industry a Powerhouse of Innovation?

The semiconductor industry is one of the most critical sectors in the global economy. Valued at over \$500 billion in 2023 and expected to grow further, this industry is the foundation for virtually every modern technology. Semiconductors are the "brains" behind everything from smartphones and laptops to automobiles and medical devices. The pandemic has only accelerated the demand for these chips as industries ranging from healthcare to logistics rely more heavily on digital solutions.

The semiconductor supply chain is incredibly complex and globalised. While countries like Taiwan, South Korea, and the United States have historically dominated semiconductor manufacturing, the past decade has seen a growing push for diversification. India, with its burgeoning tech industry and large pool of engineers, is emerging as a key player in this global supply chain.

India's semiconductor market was valued at approximately \$24 billion in 2020 and is expected to grow to \$100 billion by 2025. To capitalize on this, the Indian government has launched initiatives like Semicon India, a \$10 billion programme aimed at attracting global semiconductor giants to set up manufacturing facilities in the country. The objective is not just to make India self-reliant but also to make it a leader in the global semiconductor supply chain. This initiative has significant implications for urban development, as cities hosting semiconductor plants will undergo massive transformations.

Semiconductors and Urban Transformation: a Synergistic Relationship

As South Asian economies grow and industrialise, cities are undergoing rapid transformations. The semiconductor industry, being at the heart of the digital revolution, is a key driver of these changes. This relationship is multi-dimensional, affecting everything from infrastructure development to economic growth and sustainability.

a. Infrastructure development: the backbone of semiconductor cities

The semiconductor industry requires specialised infrastructure, including clean rooms, advanced manufacturing plants (fabs), reliable energy, and water supplies. The sheer scale and complexity of semiconductor manufacturing mean that cities hosting fabs need to develop sophisticated infrastructure capable of supporting high-tech industries.

Hyderabad, for instance, is one of India's emerging tech hubs. The city has seen significant investment in tech parks, transportation systems, and smart grid technologies to support its growing semiconductor design industry. Hyderabad is also home to Micron Technology, a major player in the semiconductor space, and has attracted numerous tech startups specialising in chip design and embedded systems. This influx of high-tech industries has spurred urban development, creating new residential zones, business districts, and public services.

Another example is Bangalore, India's Silicon Valley. Known for its thriving IT sector, Bangalore is also becoming a key centre for semiconductor R&D and manufacturing. Companies like Intel, Qualcomm, and Texas Instruments have a strong presence in the city, contributing to its rapid urban expansion. As more

semiconductor companies set up operations in Bangalore, the city's infrastructure is being upgraded to meet the needs of this high-tech ecosystem, from better roads to improved energy and water management systems.

b. Smart cities: powered by semiconductors

Smart cities represent the future of urban living, and semiconductors are at the heart of this transformation. A smart city uses digital technologies to enhance the quality of life for its citizens, improve government services, and make urban systems more efficient and sustainable. From traffic management and waste disposal to water supply and public safety, every aspect of a smart city is powered by semiconductor-based technologies.

India's Smart Cities Mission, launched in 2015, aims to develop 100 smart cities across the country. The mission focuses on integrating information and communication technologies (ICT) into urban planning and governance. Cities like Bhubaneswar and Pune have already made significant strides in this area, deploying IoT sensors for traffic management, environmental monitoring, and energy-efficient street lighting.

Semiconductors enable the technologies that make smart cities possible. For example, IoT devices embedded with semiconductor chips collect real-time data on various urban systems, allowing city managers to make informed decisions. In Pune, the implementation of smart traffic management systems has reduced congestion by over 20 per cent in some areas. Similarly, smart street lighting systems in Bhubaneswar have led to energy savings of nearly 50 per cent, thanks to sensors that adjust lighting levels based on the time of day and the number of pedestrians.

c. Sustainable urban development: a semiconductor-driven future

One of the most significant challenges faced by rapidly growing cities is ensuring sustainable development. The semiconductor industry is helping cities tackle this challenge by enabling the development of clean energy solutions, energy-efficient systems, and sustainable transportation options.

India has set ambitious targets for renewable energy, aiming to achieve 450 GW of renewable energy capacity by 2030. Semiconductors are at the core of this transition, as they are used in solar panels, wind turbines, and electric vehicles (EVs). Solar inverters, for example, rely on semiconductors to convert sunlight into electricity, while EVs use semiconductors to manage battery power and optimise energy consumption.

In cities like Gurgaon, solar panels are becoming increasingly common in residential and commercial buildings, reducing the city's dependence on non-renewable energy sources. Semiconductors used in these systems help maximise energy efficiency, ensuring that urban areas can meet their energy needs sustainably. Additionally, cities are deploying smart grid technologies powered by semiconductors to manage energy distribution more efficiently, reducing waste and lowering carbon emissions.

Electric vehicles represent another area where semiconductors are driving sustainable urban development. India aims to have 30 per cent of its vehicles powered by electricity by 2030, and cities like Bangalore and Delhi are leading the charge. Semiconductors play a crucial role in EV technology, powering everything from batteries to control systems. The widespread adoption of EVs is expected to reduce air pollution, lower greenhouse gas emissions, and improve the overall quality of life in urban areas.

Economic Growth: Semiconductors as a Catalyst for Urban Expansion

The semiconductor industry is a significant driver of economic growth in South Asian cities. By attracting investment, creating jobs, and fostering innovation, the semiconductor sector is reshaping urban economies and contributing to the rise of new tech hubs.

a. Job creation and skills development

Semiconductor manufacturing and R&D require a highly skilled workforce. As semiconductor companies expand their operations in South Asia, cities must invest in education and training programmes to build the talent pool needed to support the industry's growth. This has led to the development of new universities, research institutions, and technical training centres in cities hosting semiconductor plants.

For example, Hyderabad has seen a boom in engineering and technical education, with numerous universities offering specialised courses in semiconductor design, embedded systems, and microelectronics. The city is also home to several semiconductor R&D centres, which have created thousands of high-skilled jobs. The presence of these institutions not only drives local economic growth but also attracts international talent, further boosting the city's status as a global tech hub.

Challenges to Urban Transformation in the Semiconductor Age

While the semiconductor industry offers enormous potential for urban transformation, it also presents several challenges that cities must address to realise this potential fully.

a. Infrastructure bottlenecks

Setting up a semiconductor fab requires significant infrastructure, including a stable power supply, abundant water resources, and reliable transportation networks. Many South Asian cities, particularly in India, face infrastructure bottlenecks that could hinder the growth of the semiconductor industry.

For example, the setup of semi-conductor industry in Jagiroad, Assam tends to intensify certain debates between states of Assam and Karnataka, regarding the incapacities of the land of Assam. Assam has historically been an underdeveloped state in terms of industrial and technological infrastructure. However, TATA Electricals who has invested about 27,000 crore, does mention about a narrow economic base which can pose a challenge to the ambitious semiconductor project, but both the Tata Group and the central government acknowledged these risks majorly due to its strategic location in the northeast and proximity to East Asian markets could potentially make it an attractive location for future semiconductor projects.

However, two days ago, a media interaction sparked debate where Minister of State of IT & BT and Science & Technology Karnataka, Priyank Kharge, stated Karnataka, particularly its capital Bengaluru, has long been regarded as the tech hub of India, with a thriving ecosystem of software, hardware, and semiconductor industries. The state boasts of a highly skilled workforce, research institutions, and a robust infrastructure that supports cutting-edge technological innovations. Companies such as Intel, Qualcomm, and Texas Instruments already have a significant presence in Bengaluru, making the city a natural choice for semiconductor investments.

In this context, Priyank Kharge's comments reflect frustration over Karnataka being overlooked for new semiconductor projects. The state government has been actively pursuing these investments to further cement its status as a global technology hub, and many industry experts have also voiced their surprise at semiconductor manufacturing being directed to states like Gujarat and Assam, which are not traditionally known for their technological prowess.

However, Bangalore, despite being India's tech capital, has witnessed struggles with inadequate water supply and frequent power outages over the past two years. These challenges need to be addressed if the city is to become a global semiconductor hub. The Indian government has already begun investing in infrastructure upgrades, but more needs to be done to ensure that cities can support the demands of the semiconductor industry.

b. Environmental Concerns

Semiconductor manufacturing is resource-intensive, consuming large amounts of water and energy. This raises environmental concerns, particularly in cities that are already facing water scarcity or high levels of pollution.

Urban planners must work closely with semiconductor companies to develop sustainable solutions that minimise the environmental impact of fabs. This could include investing in water recycling technologies, renewable energy sources, and green building practices to ensure that semiconductor plants contribute to sustainable urban development.

c. Skilled workforce shortages

While South Asia has a large pool of engineers and technical talent, there is still a shortage of specialised skills in semiconductor manufacturing and R&D. Cities must invest in education and training programmes to build a workforce capable of supporting the semiconductor industry's growth.

Governments and industry leaders must collaborate to develop curricula that focus on semiconductor technologies, materials science, and advanced manufacturing techniques. Additionally, cities should encourage partnerships between universities and semiconductor companies to provide students with hands-on experience in the field.

Conclusion

The semiconductor revolution is quietly transforming South Asian cities, particularly in India, where the industry is driving economic growth, infrastructure development, and technological innovation. From powering smart city technologies to enabling sustainable energy solutions and creating high-skilled jobs, semiconductors are playing an increasingly important role in urban transformation.

As cities like Bangalore, Hyderabad, and Pune continue to evolve into global tech hubs, the semiconductor industry will be at the heart of their growth. However, to fully realise the potential of this revolution, cities must address the challenges of infrastructure development, environmental sustainability, and workforce training.

In the coming decades, the connection between chips and cities will become even more pronounced, as semiconductors continue to drive the digital transformation of urban environments. By investing in the semiconductor industry, South Asia's cities are positioning themselves for a future defined by innovation, sustainability, and economic prosperity.



PANEL 3

Resilient Urban Services

Transportation Justice in the Face of Just Transition: Mobility and Livelihood Access in Bengaluru Slums

Aneesh Mugulur, UC Berkeley

Bengaluru, branded as the "Startup Capital" and "Silicon Valley" of India, hosts 80 per cent of Fortune 500 companies, over 15,000 startups, and more than 50 corporate technology parks (Mission Startup Karnataka, 2022). However, beneath this glamour lies a vibrant ecosystem of small-scale enterprises and self-employed individuals, including bicycle repair shops, garment industries, daily provision stores, tailoring services, carpentry workshops, and street food vendors offering treats like gobi manchurian, kababs, and dosas at iconic spots such as VV Puram and Mosque Road. Despite their significant role in the city's economy, these businesses often remain invisible in the dominant narrative that glorifies high-tech innovation and corporate success. Operating in a precarious environment, they provide essential services and products while facing challenges that often render their contributions 'informal'. Their owners and workers typically reside in low-income neighbourhoods and slums, navigating social challenges while making invaluable contributions to the community. These settlements function as pro-poor agglomeration economies, paralleling formal economic zones like IT parks and corporate enclaves (Balakrishnan, 2022). While the Karnataka state government identifies only 597 slums in the city, more recent studies suggest there could be as many as 2,000 (Rains et al., 2019).

The economies within these settlements are characterised by instability. Workers face low wages, poor social protection, unpredictable working conditions, and limited access to financial services. The cash-based, unregulated nature of informal economic activity exposes participants to exploitation and economic shocks. Additionally, slum residents face constant threats of eviction and demolition by civic authorities, undermining their economic stability. Despite their vitality, informal sector workers and enterprises lack institutional safeguards and policy support.

Accessible and reliable transportation is critically important for these workers. The precarious nature of their economy, the need for mobility to find jobs, and the procurement of supplies underscore the necessity for tailored transportation solutions that address the unique challenges faced by slum communities. However, navigating Bengaluru presents significant difficulties; the city ranks second globally in traffic congestion, with an average speed of just 18.7 kilometres per hour (TomTom Index). The average one-way commute spans 42.45 minutes over an average distance of 10.84 kilometres (Sridhar & Nayka, 2022). The increasing number of automobiles exacerbates this congestion. The public bus system operated by the Bangalore Metropolitan Transport Corporation (BMTC) serves as the backbone of the city's transportation network, with a fleet of 6,763 buses catering to over 3.5 million passengers daily. The Bengaluru Metro, the city's secondary transit option, spans two lines covering 73.75 kilometers and serves approximately 0.7 million passengers daily. Despite a doubling of private vehicles over the past decade, the public transport fleet has stagnated, underscoring Bengaluru's congestion problem (Kidiyoor, 2022).

My spatial analysis reveals that slum residents face minimal challenges regarding proximity to bus stops, with 83 per cent located within 500 metres and 96 per cent within 1 kilometre (Table 3, Figure 40). However, the situation is markedly different for metro rail stations, with only 5 per cent of slums within 1 kilometre and just 3 per cent within 500 metres (Table 4, Figure 41). As slum residents predominantly rely on buses for accessibility, they find that metro rail connectivity fails to reach critical destinations like dense markets and construction sites. Field interviews reveal that while proximity to bus stops isn't an issue, buses suffer from poor service frequency, reliability, and quality, rendering slum residents' transportation-disadvantaged. Motorbikes play a pivotal role in facilitating livelihoods, as slum residents choose them for their efficiency in navigating the city when state-provided transit options fall short.

Four key factors drive slum residents' preference for motorbikes:

1. **Speed:** Motorbikes offer faster travel times, which is crucial for individuals juggling multiple jobs across dispersed neighborhoods (Jindel et al., 2022a).
2. **Affordability:** Motorbikes represent the most economical motorised private transport option for low-income residents, particularly in the used market.
3. **Reliability:** Motorbikes provide greater reliability compared to public buses, which suffer from long waiting times and delays.
4. **Maneuverability:** Their compact size makes motorbikes suitable for navigating narrow and congested slum streets, enabling residents to weave through traffic, even utilising sidewalks when necessary.

Consequently, the aspiration to own motorised two-wheelers is economically critical for slum residents. Their ability to navigate the city efficiently is essential for sustaining livelihoods with motorbikes offering the most accessible means of transportation. Despite their advantages, the proliferation of two-wheelers contributes significantly to Bengaluru's congestion and pollution, with nearly 70 per cent of traffic congestion attributed to these vehicles, which maintain a 75 per cent share of vehicular traffic (Two-Wheelers Choke Bengaluru's Roads and Air, 2023). Additionally, two-wheeler riders constitute the most vulnerable road users, accounting for an average of 43 per cent of all accidents in the city from 2011 to 2017 (Verma et al., 2022).

When focusing on urban transition regarding transportation, options often lean toward promoting public transit or non-motorised transport. This shift is critical for sustainability, addressing transportation emissions and congestion. Yet, for slum residents, two-wheelers prove crucial for their livelihoods, raising questions about balancing sustainability and economic viability. Recommendations for curbing two-wheeler usage present a dilemma for city planners. Restricting their use could further marginalise slum residents and exacerbate their precarious economic conditions. This tension between addressing environmental, safety, and traffic concerns while preserving mobility for slum residents raises questions about achieving transportation justice in the context of just urban transition.

Research Methodology

My research employs a three-pronged methodology. In January 2024, I conducted field visits to MV Garden 2nd stage and Indira Gandhi Nagar, selected slums in Bengaluru, to gather in-depth insights through 21 qualitative interviews. I used convenience sampling due to the lack of a comprehensive sampling frame and directly approached working adults on the streets, ensuring equal gender representation. The interview guide, developed in consultation with the Slum Dwellers Association and pilot-tested, covered topics like travel purposes, transit accessibility, alternative transportation modes, and overall perceptions.

Second, I analyse the historical context of Bengaluru's economy, slum growth, and the political economy of slums, investigating the narrative portraying slums as unproductive, informal economies.

Third, I assess the existing transit network's effectiveness for slum residents, leveraging a database of 312 slums curated by the National Slum Dwellers Federation and bus stop and metro station data. Although studies indicate over 2,000 slums in the city, the lack of publicly available data restricts my analysis to 312 slums. Using ArcGIS Pro, I conducted network analysis to visualise transit accessibility disparities and measured walking distances from slum centroids to the nearest bus stops and metro stations. I integrate qualitative insights with historical analysis and quantitative transit accessibility findings to enrich understanding of slums' political economy and transportation challenges. Rich field visits were instrumental in this report.

Section Overview

My research consists of two components. In the first part, "Political Economy of Bengaluru Slums," I explore the economic history of Bengaluru and its implications for spatial planning, contextualising slums' precarious economies. I focus on mobility's role in sustaining livelihoods and address my first research question with detailed slum profiles.

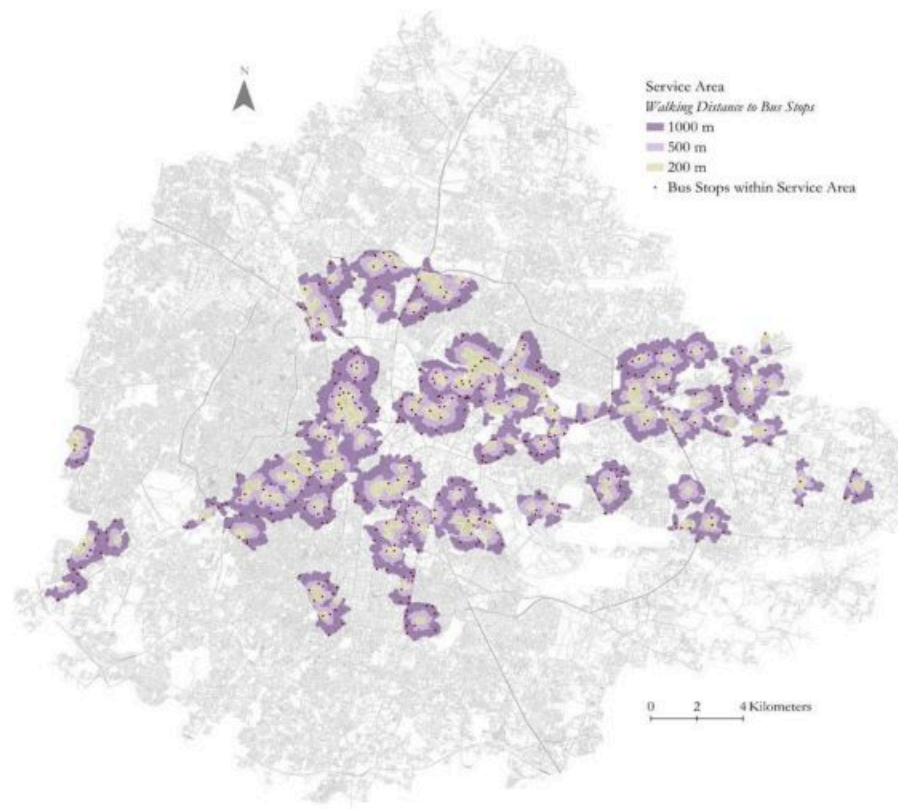
In the second part, "Transportation for Livelihood Access," I tackle research questions two and three. Through spatial analyses and maps, I examine whether transit options adequately serve slum residents, incorporating qualitative responses to delve deeper into transit accessibility and reliance on motorbikes. This chapter highlights the transportation dilemma facing the community, emphasising the need to balance addressing congestion with ensuring continued access to two-wheelers for livelihoods. In the final part, "Transportation Justice for Slum Residents," I define transportation justice and explore pathways to advance it in Bengaluru's slums.

Table 3: Accessibility of bus stops in Bengaluru slums across different service area ranges

Service Area Range (m)	Slums with Bus Stops Within Range		Slums without Bus Stops Within Range	
	Number	Percentage	Number	Percentage
200	125	40%	187	60%
500	260	83%	52	17%
1000	301	96%	11	4%

Source: NSDF 2015, [Opencity.in](https://www.opencity.in)

Figure 40: Service area buffers for slum proximity to bus stops



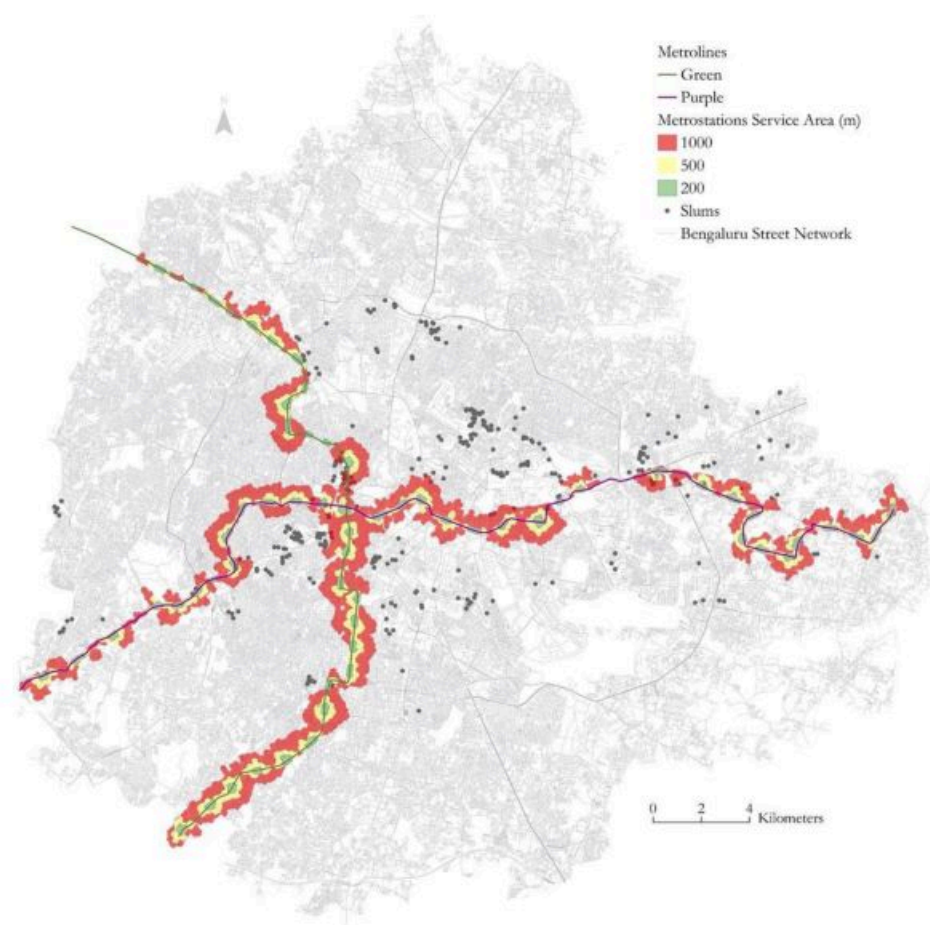
Source: NSDF 2015, [Opencity.in](https://www.opencity.in)
Projection: Indian UTM Zone 48N

Table 4: Accessibility of metro stations in Bengaluru slums across different service area ranges

Service Area Range of Metro stations (m)	Slums within Range		Slums outside Range	
	Number	Percentage	Number	Percentage
200	4	1%	308	99%
500	8	3%	304	97%
1000	17	5%	295	95%

Source: NSDF 2015, Opencity.in

Figure 41: Service Area Buffers for Slum Proximity to Metro Station, Bengaluru



Source: NSDF 2015, Opencity.in
Projection: Indian UTM Zone 48N

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Organic, Not Anomaly: How Slums Build Resilience to Fire in a Changing City

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Introduction

Primarily attributed to the rapid population increase, urbanisation in the Global South has experienced a socio-economic and politically distinct characteristic as compared to the Global North. Between 2010 and 2015, the global south marked a 94 per cent increase in global urban population, while the UNDESA has projected a total of 3.75 billion urban population in the global south by 2025 (54.3 per cent of its total population) (Smit, 2021). This burgeoning urban growth is often associated with infrastructural-commercial development and socio-political shifts, leading to urban transformations and ‘spatial inequality’, as evident in the rising income gap, lacking access to basic amenities, spatial segregation (e.g., development of gated communities) and housing unaffordability induced proliferation of slums (Davis, 2004; Bhan & Jana, 2015; Lehmann, 2023). Following Roy (2005), we call slums a ‘contradiction’ in planning, as the planners prefer to eradicate these settlements yet keep finding ways to integrate them in city plans. The heightened disaster exposure of the settlements and their vulnerability aided by limited resources and policy focus is globally recognised (Antonellis & Gill, 2018). Often considered ‘uninvited’, slums are deeply intertwined to the urbanisation in the Global South and demonstrate risk adaptation and resilience through localised strategies (Ahmed, 2014). Permanent yet temporary, slum households imply a certain dynamicity which is distinct from the urban transition of the parent city yet influenced by it (Roy et al. 2014). While the scholarly works on the slums in the Global South is well-developed, a discussion on building disaster resilience in these settlements has received scarce attention except few works by Harte et al. (2009), Ahmed (2014), Antonellis & Gill (2018), Patel & Gleason (2018), Khan et al. (2024) etc.

In this context, our research question is: how do slum households build disaster resilience through the interplay of social-economic-infrastructural-demographic-institutional factors? We choose the case of fire incidents in Jhuggi Jhonpdi clusters (hereby known as JJC’s) in Delhi, India. Unlike other countries in the Global South, human behaviour in fire in the context of urban fire in India has not been discussed vividly, despite 49 per cent⁴ of its urban population staying in the slums. The unique “contexts of entrenched inequality, destitution and vulnerability” cities of the Global South are needed to be explored more from a scholarly lens (Bhan, 2019), where bottom-up perspectives from household-level resilience collectively influence broader urban transformations. Our study is situated in the long-established narrative of urban inquiry through inequality and informality in the cities of the Global South. The study will uncover everyday practices that contribute to resilience of the occupants and how they constantly adapt to the changing surroundings.

Setting the Context: Informality, Urban Anxiety, and Resilience

Urbanism in the Global South has been an interplay between the ‘extremes’ and ‘contradictions’, where social-economic transformations and political shifts driven by a rising and persistent immigration and a not-so-clear rift between formality and informality contributes to a continuous making and un-making of the city. We call it ‘contradictory urbanism’, where intra-urban disparity and inequalities function as several micro-systems within the same urban space. The discussion of ‘informality’ in the Global South spans from housing to employment to service access, where Roy (2005) defined informality as a “state

⁴ Based on data derived from UN_HABITAT Slum_Estimates_2000-2020 (Retrieved from: <https://data.unhabitat.org/pages/housing-slums-and-informal-settlements>)

of exception from the formal order of urbanisation”, that “governs the process of urban transformation itself” (Roy, 2005). Davis (2004) viewed this as a “new urban order”, a negative externality of which includes rising urban inequality and squatting near the “toxic dumps, or in the margins of railroads and highways”. Not limited to the urban poor, informality can also become a domain of “the poor” as well as “the middle class” and the “elite, in second and third-world cities” (Roy, 2005), as ‘informality’ turns into a “necessity” for reaching “certain outcomes” and outlines “new planning practices” (Bhan, 2019). To Vasudevan (2015), squatting represents “alternative urbanism”, as “a response to and an expression of housing precarity”, and demonstrates “resistance”, “survival”, and “endurance”, where frequent “circulatory migration” to large urban centres necessitates building code violation as a “survival” strategy (Randolph & Storper, 2023). Often considered an ‘uninvited’ and ‘excluded’ part of the city, slum dwellers shape city morphology through their agency, which usually remains suppressed and indirect.

However, this often comes at the cost of access to housing, basic services and to the city. The prevalent “bourgeois anxiety” of eradicating slums as driven by the quest to become “world-class cities” often challenges the urban citizenship, by rejecting their right to the city (Ramakrishnan, 2013; Braathen et al., 2015). Inspired by Bayat (2012) and Braathen et al. (2015), we call this an ‘autonomised struggle’, where overcoming the daily “power struggle” presents a certain sense of autonomy to the slum residents within the formal urban order. In Delhi, for example, the allottees of the resettlement colonies have reported to return to their previous place of residence, due to their relocation to the peripheral areas without regular service access and transport connections. As they are trying to use ‘informality’ to create their “own spaces” for “recognition” and ‘legitimacy’, frequent stigmatisation of ‘slums’ might be a reason why we overlook their triumph over daily struggles for survival (Braathen et al., 2015). The notion of resilience and survival is socio-politically contested in slums, as the occupants usually access services indirectly using informal channels, for example, illegal electricity connections extended from the closest connection centre. While these informal arrangements help them survive in daily life, it also increases their exposure to risks, like fire. Despite the limited scholarly attention on fire incidents in informal settlements especially in India, the possible sources of ignition have been acknowledged, including cooking in an open stove, extending illegal electric wires, not using gas stove properly, throwing unextinguished cigarettes, using room heaters persistently in a closed room etc. High housing density and combustible building materials in the slums aggravate quick fire spread, affecting the entire cluster (Quiroz et al., 2021). Our survey results depict that houses in the JJ clusters are usually made of mixed materials, for example, brick and cement in three walls and tarpaulin sheet in the fourth one.

Lack of permanency and financial constraints further make the occupants less interested in housing upgradation, despite frequent fire incidents (Rush et al., 2020). Narrow roads inside the slums pose barriers for the fire tenders to enter the slum, resulting in delayed response to fire (Rush et al., 2020). In Delhi, the fire tenders often extend water pipes inside the slum. Underreporting and lack of “reliable data” pertaining to fire incidents in slums has an indirect impact on rising fire risk, since a consequent unawareness hinders effective fire suppression and management (Twigg et al., 2017). Our analysis of the online fire reports provided by Delhi Fire Service (hereby known as DFS) depicts that between 1624 fire incidents have been reported from the JJs between 2012-2022. However, our survey responses imply possibility of a higher number of incidents, since the DFS is only contacted during major fire incidents.

Materials and Methods

The study is part of the broader PhD research project on “Examining community resilience to fire in informal settlements”. Our study area is Delhi, the capital city of India and the third largest urban agglomeration in the world (32 million population as of 2023⁵). Urbanism in Delhi mirrors the other cities in the global south, where ‘mushrooming’ of slums is a long-standing phenomenon. Slums in Delhi are usually classified as ‘notified’ (declared as slums under the Slum Act 1956) and ‘non-notified’ (squatters on public land) categories, the latter ones are colloquially termed ‘JJ clusters’ as well. Often located on public lands near city centre (for economic opportunities and easy commute), JJs experience the risk of getting evicted and being relocated to someplace else (usually in the peri-urban areas) under JJ Rehabilitation Policy, 2015, further known as Jhuggi Jhonpdi Resettlement Colonies (hereby known as JJRs). At present, there are 675 JJs⁶ and 44 JJRs in Delhi.

In this study, we conducted household surveys and interviews in 28 JJs and 03 JJRs in Delhi between May-September 2023. The study sites were chosen using multistage cluster sampling technique based on three criteria: (1) history of fire incidents in the past in a JJ (data derived from online fire reports⁷ by Delhi Fire Service (hereby known as DFS)), (2) district wise location of the JJs (data⁸ derived from Delhi Urban Shelter Improvement Board (hereby known as DUSIB)), and (3) household density of the JJs (data derived from DUSIB). The survey was conducted in Hindi, and a field assistant was hired to cooperate during surveys and interviews. We received a total of 255 responses (excluding incomplete responses). In this paper, we will use a subset of the data to assess the impact of various factors on household resilience to fire in the JJs and JJRs in Delhi. The variables have been chosen ex-ante based on the existing scholarly works on household resilience to disaster. The selected variables are demographic characteristics, social support, sense of place, physical infrastructure, social infrastructure, community leadership, governance, community empowerment, household economy and previous experience.

For data analysis, we have used Partial least Squared Structural Equation Modelling (PLS-SEM) for three reasons (1) SEM is useful for multiple constructs, which is the case for our study (10 predictors and one dependent variable) (Hair et al., 2021), (2) SEM offers the potential to explore complex models by using mediating variables⁹, for example in our study, sense of place acts as a predictor for household resilience and also as a mediator between social support and household resilience (Hair et al., 2021), (3) categorical data can be analysed using PLS-SEM and it also has a strong prediction power, making it best fit for our study purpose (Ringle et al., 2012). Each of the 11 latent constructs (one dependent variable and 10 predictors) are made of manifest constructs, or observable indicators. After cleaning and sorting the data in MS Excel, we used “seminr” package in RStudio for conducting PLS-SEM. The detailed results are given below in Figure 42 and Table 5.

⁵ <https://www.statista.com/statistics/912263/population-of-urban-agglomerations-worldwide/#statisticContainer>

⁶ <https://delhishelterboard.in/main/wp-content/uploads/2019/10/JJBastisList675.pdf>

⁷ http://delhigovt.nic.in/FireReport/r_publicSearch.asp?user=public

⁸ Check footnote 2

⁹ Upon observing mediation effects of certain constructs in the existing scholarly works, we have introduced some variables as mediators in our study.

Figure 42: PLS-SEM model

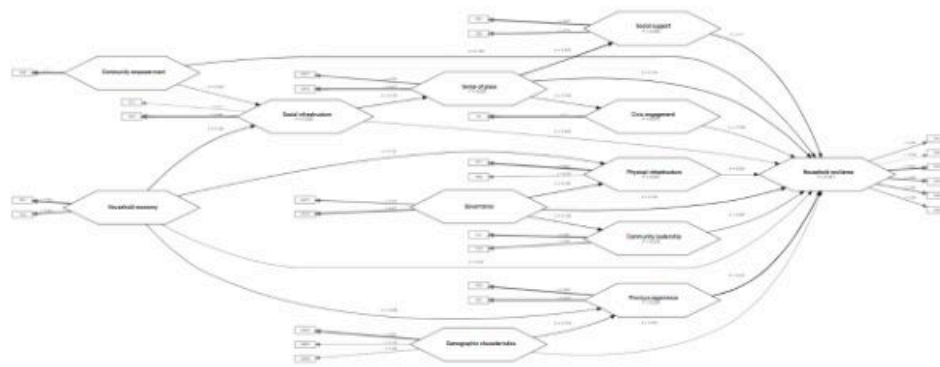


Table 5: Summary of PLS-SEM results

Variables	Household resilience	Sense of place	Social support	Civic engagement	Previous experience	Community leadership	Physical infrastructure	Social infrastructure
R ²	0.341	0.021	0.062	0.011	0.023	0.016	0.041	0.026
AdjR ²	0.312	0.017	0.058	0.007	0.015	0.012	0.034	0.018
Social support	0.17	-	-	-	-	-	-	-
Physical infrastructure	0.025	-	-	-	-	-	-	-
Social infrastructure	0.026	0.143	-	-	-	-	-	-
Sense of place	0.155	-	0.249	0.106	-	-	-	-
Demographic characteristics	0.005	-	-	-	0.122	-	-	-
Community leadership	0.094	-	-	-	-	-	-	-
Civic engagement	-0.089	-	-	-	-	-	-	-
Governance	0.184	-	-	-	-	0.126	0.165	-
Community empowerment	0.135	-	-	-	-	-	-	0.059
Household economy	0.02	-	-	-	0.086	-	0.12	0.142
Previous experience	0.275	-	-	-	-	-	-	-

Variables	alpha	rhoC	AVE	rhoA
Social support	0.429	0.773	0.632	0.458
Physical infrastructure	-0.125	0.365	0.512	0.326
Social infrastructure	-0.124	0.426	0.506	0.699
Sense of place	0.152	0.694	0.538	0.166
Demographic characteristics	-0.14	0.163	0.353	0.765
Community leadership	0.456	0.778	0.64	0.516
Civic engagement	1	1	1	1
Governance	-0.023	0.643	0.495	-0.027
Community empowerment	1	1	1	1
Household economy	0.433	0.778	0.637	0.439
Previous experience	0.794	0.902	0.822	0.926
Household resilience	0.407	0.609	0.265	0.541

Discussion

Our model results (figure 42, table 5) show a R square value of 0.341, which implies a moderately strong relationship, i.e., 34 per cent variance in household resilience is caused by the variance in the predictors. In PLS-SEM, the path coefficients showcase the strength of relationship between two variables. Here, previous experience has the highest path coefficient ($\beta = 0.275$), followed by governance ($\beta = 0.184$) and social support ($\beta = 0.170$). In the questionnaire, the questions on 'previous experience' were categorised in two indicators 'incident occurrence' (e.g., 'is fire a general occurrence in the slum?', 'how many incidents have occurred till date?'), and 'nature of the incident' (e.g., 'how many units have been affected by the most recent fire?'). Governance was measured using the intervention by DUSIB and local urban authority (e.g., 'do DUSIB officials come to this area?', 'after the most recent fire incident, was there any effort from the local government to assist during response or recovery or in any other way?'). Social support was measured using two indicators 'perceived support' (e.g., 'will community people help each other if there is a fire incident or any other trouble?') and 'actual support' ('have you helped anyone who has asked in the past?'). In case a construct is affected by mediating variable, we calculate the total effect on household resilience as a sum of direct and indirect effects (Hair et al., 2021). For example, the total effect of sense of place on household resilience including the mediators (here, social support and civic engagement) will be 0.187 (Figure 42, Table 5).

Concerning reliability of the constructs, previous experience remains the most crucial predictor here ($\rho C > 0.7$ and $AVE > 0.5$). Governance shows low reliability ($\rho C < 0.7$ and $AVE < 0.5$), possibly implying that in JJ clusters, informal organisations and social networks are more important in resilience building than formal external interventions. This is also consistent with the survey responses, where respondents mentioned that DUSIB officials rarely visit the areas. Apart from constructing pay and use public toilets in proximity to the clusters, they do not assist the residents whenever needed. Second, in most cases, the local MLA uses the residents as vote banks and does not cooperate well during any distress.

Disaster literature has regarded previous experience as a strong influence on resilience, including preparedness activities, response efforts and recovery measures. Sharma & Patt (2012) found how response to flood warnings is influenced by "past experience with false alarms and past evacuation experience", Onuma et al. (2017) observed a subsequent reduction in disaster-induced damage due to own and neighbours' learning from past incidents across different countries. Our survey responses demonstrate that despite the loss and destruction caused by incidents, experiences from past incidents add certain sense of vigilance among people. For example, a respondent in the Kusumpur Pahari Basti (JJ Code 571) mentioned that she double-checks gas knobs after cooking, since a major fire incident three years back had destroyed her home and left her elder son severely injured. In another case, frequent fire incidents in a JJC in Central Delhi (JJ code 05) have taught the residents to run away from fire immediately after it starts spreading, instead of delaying evacuation to collect and carry belongings.

A small path coefficient between household economy and household resilience might indicate importance of community-based approach in a limited financial context. Here we would like to bring in the seminal concept of Simone (2004), i.e., 'people as infrastructure', where he introduced how continuous interactions and cooperation foster social ties and interdependencies based on mutual trust, which assist the slum residents in Johannesburg (South Africa) to navigate through challenges, for example "economic transactions". Presence of social capital, in fact, has been massively recognised as a significant driver for community resilience (Prior & Erikson, 2013). Our survey responses yielded similar results, for example, one respondent from Jamia Nagar (JJ code 684) stated that he has been so well-settled in the locality, he strongly protested past eviction threats by bringing the community members together.

Conclusion

A planning paradigm influenced by the Global North often tends to overlook the bottom-up resilience strategies developed in the slums. Considering the limited resource access and negligible policy focus in such settlements, our study necessitates incorporating resident narratives from the slums in fire training and awareness sessions. In the backdrop of rapid urban transformation, we invite future research to explore the case of urban disaster resilience in the global south, especially in the slums. With this work, we attempt to contribute to the urban inquiry of the Global South, while acknowledging the intrinsic association of slums urban resilience and transition.

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Transitioning to Plastic-Free Water Bodies: A Case Study of Plastic Pollution in Cox's Bazar's Urban Ecosystems and Marine Environment Using a 3R Approach

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Background of the Study

Plastic pollution has become a pervasive problem globally, with urban and coastal environments facing the brunt of the impact. In cities of the Global South, particularly in rapidly urbanising coastal regions, the effects of plastic waste on marine ecosystems are profound. Cox's Bazar, Bangladesh's coastal city, exemplifies this challenge. This region, home to a significant population of both local residents and displaced Rohingya communities, coupled with a thriving tourism industry, has seen an exponential increase in plastic waste generation. The 124 tons of daily waste (BRAC, March 2024), of which a significant percentage is plastic, is polluting water bodies, impacting biodiversity, and posing serious health risks to humans through microplastic contamination.

Plastic waste, particularly low-density polyethylene (LDPE), is widespread in Cox's Bazar and often enters waterways, leading to ocean pollution. Beaches alone receive 34.5 tons of plastic waste per day (BRAC, March 2024). This plastic debris does not just harm marine life; it breaks down into microplastics, which enter the food chain, affecting both marine organisms and humans. Given this situation, there is a critical need for focused research to propose solutions that align with urban sustainability and environmental justice principles. This study is intended to explore how urban waste management, with a focus on the 3R (Reduce, Reuse, Recycle) approach, can address plastic pollution in coastal and marine environments, while also ensuring equitable outcomes for all stakeholders.

The Rationale of the Study

While there is growing awareness of the environmental hazards posed by plastic waste, comprehensive, data-driven research focusing on urban transitions in waste management, particularly in cities like Cox's Bazar, is still limited. The rapid growth of Cox's Bazar, fueled by tourism and migration, has created a critical gap between waste generation and effective management. A key driver of this pollution is the limited recycling infrastructure and the absence of robust policy enforcement. The Rohingya refugee camps alone contribute nearly 1 ton of plastic waste per day (BRAC, March 2024). Additionally, tourism-driven coastal pollution exacerbates the issue, with plastic waste from tourists and businesses entering marine ecosystems without proper disposal mechanisms.

The need for research lies in developing sustainable, scalable waste management models that can adapt to rapid urbanisation. The transition towards a plastic-free future must incorporate equitable strategies that consider local socio-economic realities. This paper addresses this gap by providing a detailed analysis of plastic waste generation, its impacts on both marine ecosystems and human health, and how the 3R model can help mitigate the crisis. The study

leverages primary data to provide actionable insights and proposes recommendations grounded in field-based evidence.

Research Objectives

The primary objectives of this study are:

1. To quantify plastic waste generation in Cox's Bazar's urban and coastal regions, particularly in municipal and refugee areas, and analyse how this waste pollutes water bodies and contributes to marine microplastic contamination.
2. To identify the specific impacts of plastic pollution on marine ecosystems, including biodiversity loss, and on human health, focusing on microplastic infiltration into the food chain.
3. To evaluate current waste management practices in Cox's Bazar and assess their effectiveness in reducing plastic waste, with particular focus on the challenges and bottlenecks faced by households, local businesses, and informal recyclers.
4. To propose a waste management model based on the 3R (Reduce, Reuse, Recycle) approach, tailored to the socio-economic and environmental realities of Cox's Bazar, with emphasis on inclusivity, sustainability, and scalability.

Research Methodology

This research adopts a mixed-methods approach, combining quantitative and qualitative data to provide a comprehensive analysis of plastic waste pollution in Cox's Bazar. The study is based on primary data collection, involving household surveys, waste audits, and stakeholder interviews. Additionally, waste composition surveys were conducted to classify the types of plastic waste generated in different sectors of the city.

- *Study area:* Cox's Bazar Municipality, covering both high- and low-income areas (Wards 1, 4, 10, and 12), and Rohingya refugee camps (Camps 1E, 1W, and 3).
- *Data collection tools:*
 - Household waste surveys using Kobo Toolbox.
 - Waste composition analysis at disposal sites.
 - Key Informant Interviews (KIIs) with local stakeholders, including waste collectors, recyclers, hoteliers, and municipal authorities.
 - Focus Group Discussions (FGDs) with waste pickers and collectors.
- *Sampling:*
 - Over 200 households were surveyed to determine waste generation rates and practices.
 - Data collection from beach clean-ups and hotspot identification to estimate marine plastic waste.
 - Interviews were conducted with 38 waste recycling shops in Cox's Bazar and 20 in Rohingya camps to assess their capacity and challenges.
- *Data analysis:* Both quantitative data (waste generation volumes and types) and qualitative insights (stakeholder attitudes, challenges, and behaviours) were triangulated to build a comprehensive understanding of the issue.

Study Findings

1. Scale and nature of plastic waste pollution

The research yielded several critical findings related to the scale and nature of plastic waste pollution in Cox's Bazar:

- A. Plastic waste composition: Household waste in Cox's Bazar contains an average of 38.77 per cent food waste and 12.46 per cent plastic waste, of which 10.35 per cent is LDPE plastic. In contrast, hotel waste contains 59 per cent food waste and 13 per cent plastic waste (9.5 per cent LDPE). In the Rohingya camps, plastic waste is slightly lower at 7.5 per cent but still represents a significant environmental hazard.
- B. Waste generation rates: Cox's Bazar households generate between 1.5 to 2.88 kg of waste per day, depending on income levels. Low-income households contribute the highest proportion of plastic waste at approximately 14 per cent of total waste, while middle- and high-income households contribute 11 per cent and 12.5 per cent respectively.
- C. Marine plastic pollution: Beaches in Cox's Bazar are heavily polluted, with high-density tourist areas accumulating up to 168 gm/m² of plastic waste, while low-density areas accumulate around 16 gm/m². An estimated 34.5 tons of plastic waste is deposited on the beaches daily, contributing to the contamination of marine ecosystems.
- D. Recycling infrastructure: Of the 38 recycling shops in Cox's Bazar, most operate without formal safety measures, licenses, or sufficient knowledge of waste management rules. However, there is a general willingness among recyclers to expand operations and adopt more environmentally friendly practices, highlighting the need for formalisation and capacity-building interventions. In contrast, the 20 recycling shops in Rohingya camps exhibited better awareness of waste segregation and recycling processes.
- E. Microplastics and human health: The infiltration of microplastics into the local food chain through contaminated seafood is a growing concern. Interviews with health experts and residents indicate rising public health risks, including respiratory and gastrointestinal issues linked to microplastic exposure.
- F. Bottlenecks in waste collection and disposal: The waste collection infrastructure in Cox's Bazar is insufficient to cope with the growing waste volumes. Many waste collection vehicles operate beyond their capacity, leading to incomplete or irregular waste collection. A lack of formalised waste segregation practices at the household level further compounds the issue, as mixed waste is difficult to recycle, leading to more plastic being dumped in landfills or water bodies.
- G. Tourism-driven pollution: The tourist industry in Cox's Bazar significantly contributes to plastic pollution, with tourists demonstrating low adherence to waste disposal guidelines. A gap in infrastructure for segregated waste disposal in tourist areas has led to unchecked disposal of single-use plastics in water bodies. While tourists exhibit some awareness of environmental issues, they often lack knowledge of local waste management regulations, exacerbating pollution in coastal zones.

2. Promoting 3R to deal with the crisis

The findings indicate a pressing need for a comprehensive waste management strategy to combat plastic pollution in Cox's Bazar's urban and marine environments. Based on the data, the following recommendations are proposed:

- A. Enhanced waste segregation and collection infrastructure:
 - a. Implement door-to-door collection systems for segregated waste in both urban and refugee camp areas.
 - b. Upgrade waste collection vehicles to ensure they can handle the increasing volume of waste.
- B. Public awareness campaigns:
 - a. Launch city-wide campaigns targeting tourists, residents, and businesses to promote the 3R approach and educate on the dangers of plastic pollution.
 - b. Collaborate with local schools and community groups to drive behaviour change, particularly around waste segregation and plastic reduction.
- C. Formalising the recycling sector:

- a. Provide training and financial incentives to informal recyclers to adopt safer practices and improve efficiency.
- b. Invest in building additional Material Recovery Facilities (MRFs) to increase recycling capacity, particularly for LDPE plastics, which are most prevalent.
- D. Plastic-free zones and policy enforcement:
 - a. Designate certain beach and tourist areas as plastic-free zones with strict enforcement of bans on single-use plastics.
 - b. Implement fines and penalties for businesses that fail to comply with waste disposal regulations.

Way Forward

The transition to plastic-free water bodies in Cox's Bazar is a complex but urgent endeavour that requires multi-stakeholder collaboration and sustainable waste management solutions. The application of the 3R model—reduce, reuse, and recycle—offers a pathway toward mitigating the adverse effects of plastic pollution on marine ecosystems and human health. However, this transition must also be equitable, ensuring that vulnerable populations, such as informal recyclers and refugees, are integrated into the solution. By addressing both the environmental and socio-economic dimensions of the plastic waste crisis, Cox's Bazar can serve as a model for urban transitions in waste management in other rapidly urbanizing coastal regions.

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Urban Environmentalism and the Changing Geographies of Waste in Patna

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Introduction

Indian cities are transitioning towards more modernist, techno-managerial and capital-intensive approaches to manage urban ecologies under national flagship programmes such as the Clean India Mission-Urban and the Smart Cities Mission. While these transitions in urban environmentalism are deemed crucial pathways for achieving 'sustainable development', very little is known about their implications on the situated socio-spatial relations shaping them and shaped by them. Therefore, it becomes imperative to critically engage with these transitions and their implications for urban political ecologies. Key avenues for enquiry are to explore emerging subjectivities; to examine socio-ecological inequities and injustices; and to do so in smaller non-metropolitan cities, epistemically marginalised from mainstream scholarship (Kundu & Samanta, 2023). This paper draws on my PhD project and focuses on the changing geographies of waste in Patna City. Insights from my ethnographic fieldwork show how shifts in urban environmentalism in Patna are shaping the lived realities of people, places, and practices occurring in the micro-spaces of everyday lives.

Urban Political Ecology (UPE) of Waste

Techno-managerial and neoliberal capitalist approaches to understanding and governing (read managing) urban environments in Indian cities have reduced complex socio-ecological issues to technical fixes, and depoliticised urban environmentalism while rendering the questions and contestations around social relations and socio-ecological inequities and injustices invisible. I, therefore, situate my research in the heterodox field of UPE, which approaches urbanisation as a "political, social, and economic process intertwined with ecological processes and produced through power relations occurring at various scales" (Véron, 2006, p. 2094, drawing on Swyngedouw, 1997). UPE, therefore, helps politicise urban transitions by emphasising the role of uneven power dynamics, social relations, and subjectivities across scales in shaping the uneven and unjust (re)production of urban spaces and ecologies. Rather than fixating on the traditional neoliberal gaze, the formal-informal binaries, and the rush to declare who wins and who loses from these urban transitions, it allows me to examine these transitions from a situated and relational perspective, to engage with the everyday lived realities of people, places, and practices, and how they are embodied, contested, and navigated (Cornea et al., 2017; Lawhon et al., 2014).

Urban Political Ecologists understand and approach 'waste' as a socio-ecological hybrid which is both an environmental artefact and a social relic (Heynen et al., 2006; Parizeau, 2015). Waste, thus, becomes a product of socio-economic factors and processes and is simultaneously "imbued with a cultural value" (Parizeau, 2015, p. 68), especially in India, where both waste and waste labour have specific socio-cultural meanings structured around the hierarchies of caste. These are affiliated with the notions of 'impurity' and 'pollution', producing caste-based differentiation of society and labour (Gill, 2009; Harriss-White & Rodrigo, 2016). Although discursively constituted, these notions of 'impurity' and 'pollution' encompass both the materiality of waste and that of the bodies enacting waste labour. These sensibilities have also manifested in the kinds of imaginaries Indian cities, including Patna, are aspiring to be, where urban environmentalism is often conflated with cleanliness and aesthetics, paying scant attention to identities, social relations, and subjectivities. This aestheticisation of urban ecologies has not only pivoted the agenda of 'scientifically' managing solid waste as the 2016 SWM Rules mandates but has also dictated what is socio-ecologically desired and what must be invisibilised. This gets legitimised by the Swachh Survekshans, which in recent years have heavily focused on the aesthetic aspects of

cities rather than the actual delivery of municipal services and performance in SWM. This has made cities, including Patna, prioritise better rankings in the Swachh Survekshans rather than working for SWM or improving the condition of thousands of (in)formal waste workers working on very precarious arrangements. These transitions primarily serve the bourgeoisie aspirations of the urban elites and, thus, become violent and exclusionary in both imagination and practice (Baviskar, 2018).

Waste Infrastructures in Transition

Like other cities, Patna Municipal Corporation (PMC), my case study, has also reformed its SWM. In 2018, PMC initiated door-to-door collection of waste, and its vision was to set up transfer stations where the garbage is dumped, dry waste is sent to Material Recovery Facilities (MRFs) and wet waste to compost pits, and the remaining discards to the municipal dumpsite at Bairiya for scientific treatment in bio-methanation plants and waste-to-energy plants (Rumi, 2023). These visions were to modernise SWM systems, eliminate manual handling of waste, scientifically manage municipal solid waste to rank better in the Swachh Survekshan and make Patna clean, green, smart, and sustainable under its 'Chakachak Patna' campaign. While this 'integrated SWM system' envisioned by PMC is still not fully in place, changes to the city's waste infrastructure are already having powerful effects. One major implication has been the 're-spatialisation of waste work', which has led to the emergence of certain gendered and casted subjectivities which are situated and relationally enacted and embodied (see also Wittmer, 2022). This paper focuses on the re-spatialisation of waste work to explore how these transitions are shaping urban spaces, socio-spatial practices, and the everyday lived experiences of waste workers.

Methodology

This paper uses 'transfer stations'¹⁰ to examine the situated implications of the broader transitions and discusses how social relations are reproduced, embodied, lived, and contested. I use data from my multi-sited ethnography in two administrative circles of PMC¹¹ from January 2024 to September 2024. This includes around 150 hours of participant observation of transfer stations and the socio-spatial practices and a range of formal interviews and informal conversations with around 70 waste workers, including municipal and self-employed waste workers, contractors, supervisors, drivers, helpers, security guards, along with 15 other relevant interlocutors. These ethnographic engagements helped me capture rich details of the workers' everyday labour and lives amidst these infrastructural transitions.

Re-spatialisation of Waste Work

When waste from both residential and commercial areas was dumped in open spaces in the alleys or the community garbage bins, waste workers roamed across the city to collect materials. This gave them agency over their working time, place, and frequency of work, which seems to be missing now as waste work has been re-spatialised and waste workers have been subject to new urban rhythms following the transitions in SWM in Patna. There are certain places where waste workers are expected to work, at certain hours, under the surveillance of CCTV cameras, PMC supervisors and guards. While this re-spatialisation and shifting urban rhythms have shaped all waste workers, the focus here is on workers at the two transfer stations mentioned earlier.

Gendered Subjectivities

While female workers prefer this re-spatialisation of waste labour, male workers, on the other hand, find it too restricting. Before this new regime, male workers preferred working during early morning or late-night hours. Female workers, on the other hand, worked after finishing their domestic chores and had to

¹⁰ Transfer Station is an important site of waste infrastructure where the waste collected as part of the door-to-door initiative is brought. From here, dry and recyclable waste is sent to MRFs, and the wet waste is sent to compost pits. Transfer stations house MRFs, where the 2016 SWM Rules talk about 'integrating' informal waste workers and their extended networks. However, in Patna, MRFs have failed to materialise, and all transfer stations have become temporary dumpsites and potential but precarious work sites for informal waste workers.

¹¹ Gardaniabagh Transfer Station in the National Capital Circle (NCC) and Pani Tanki/Boring Road Transfer Station in the Patliputra Circle.

come back early to cook and do other caring work. Now, both males and females must work at a designated place, from 7.00 a.m.–2.00 p.m., when the door-to-door vehicles dump the collected garbage. Several men complain about it as they have little to no agency on their schedule and mobility, while women prefer working at a fixed place at a fixed time, which makes them less tired and provides them with ‘relational autonomy’ to manage both productive and reproductive work (Millar, 2018). One common advantage both men and women perceive within this transition is that they are now relatively less accused of being ‘thieves.’ As they are being constantly surveilled by CCTV and the supervisors and guards, women also feel comparatively safer working in a surveilled space in broad daylight. Some women also mentioned with pride how the changes led them to work and earn, making them the only breadwinners in the family.

The transitions have also created unique arrangements at some of the transfer stations where men and women work on alternate days. PMC officials made these arrangements after women workers complained about issues they experienced while working with men in those confined spaces. These include being groped by male workers and ‘culturally inappropriate’ encounters with their close and extended relatives. While women prefer working only on alternate days, men, on the contrary, complain about sitting idle for two weeks a month and losing their incomes by almost 50 per cent, blaming this on their female counterparts.

Casted Subjectivities

The constricted geography of waste work also exposes several relational dynamics among municipal waste workers and self-employed workers, including supervisors and guards who exercise their situated power drawing on certain casted, gendered, and classed subjectivities. My participant observations of these socio-spatial interactions exposed how new hierarchies are produced in which dalit workers are subordinated and discriminated against. Supervisors, guards, drivers, etc., come from relatively upper castes, and they always ask dalit workers to sweep the stations, close the lids of the vans, verbally abuse them while they work, drive them away if they are resting near their seats or using the shade of municipal buildings to rest during hot weather or rainy days. They also seize dalit workers’ collected materials and even claim ‘good’ (dry) materials before the vehicles enter the stations, leaving the workers to recycle materials from the heaps of ‘bad’ (wet/mixed) garbage. Dalit workers also get a very short window to work before the garbage is loaded onto another truck to be sent to Bairiya and must consistently negotiate with these municipal workers to be allowed the time and space to conduct their work.

Networked Infrastructures

These transfer stations were supposed to have MRFs where PMC contracted agencies would buy recyclable materials from informal workers to boost the ‘waste-to-wealth’ agenda and integrate informal workers into the formalised SWM systems. However, these entrepreneurial initiatives miserably failed in PMC as they failed to acknowledge and incorporate other networks of social relations which hold these infrastructures together and make them work. Workers were threatened that they would not be allowed to enter the station and work if they did not sell their materials to the PMC-contracted agency. They were often paid late, and the prices were comparatively lower than the market. Workers living on everyday income resisted these forced transitions. For a couple of months, in the beginning, they sold half of their materials to the agency and the remaining half to their scrap shops; they now sell their entire materials to the scrap shop owners, who always help them financially during emergencies. They have built good relationships with these scrap dealers and frequently borrow money from them and repay it by selling their materials to them. One of the reasons these transitions failed is because of the lack of understanding of these situated social relations and the mutual interdependence of several actors tightly woven together who make waste metabolisms work in our cities.

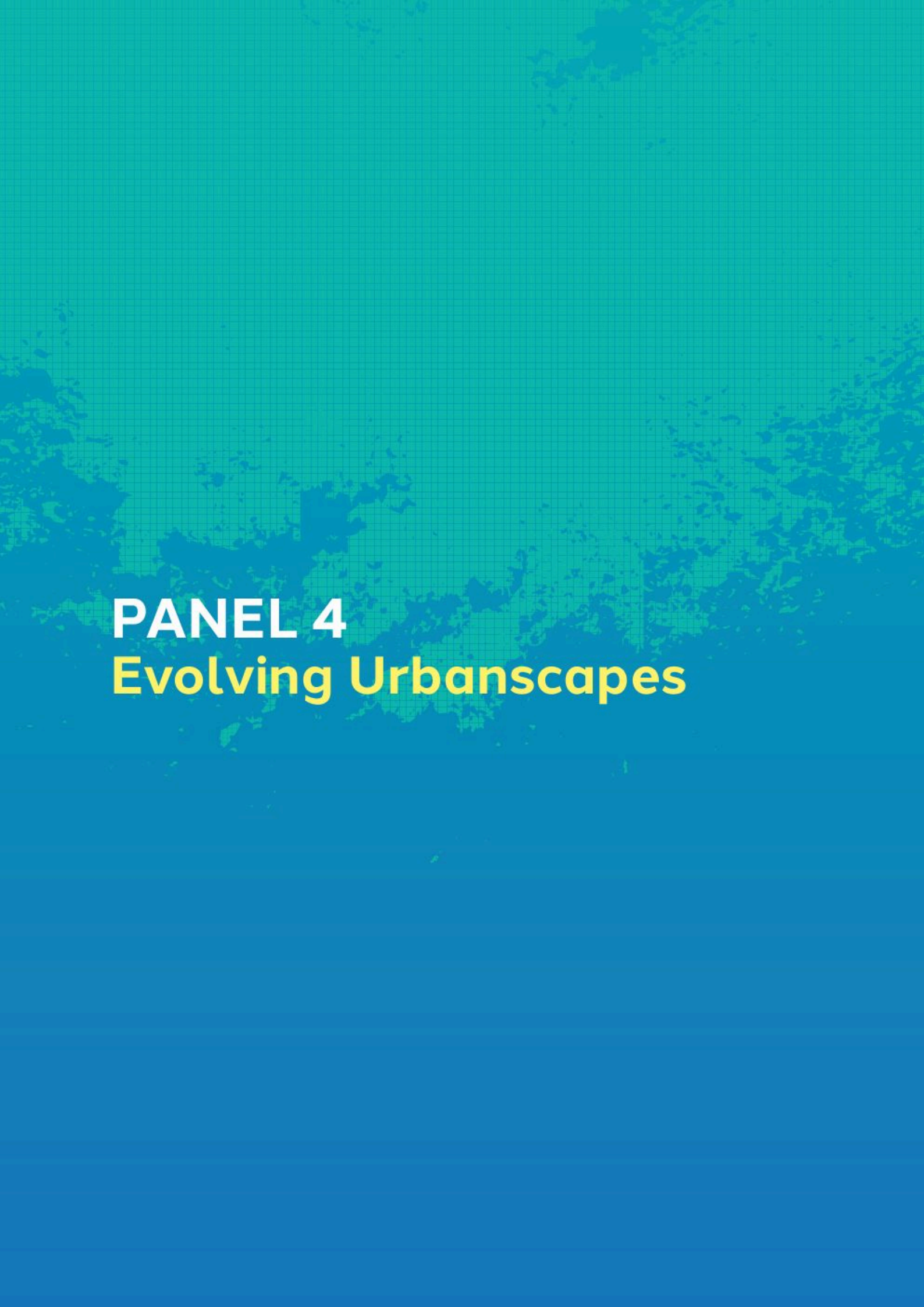
Conclusion

Drawing on the changing waste geographies in Patna, this paper indicates how urban infrastructural transitions are envisioned and materialised and how we can better understand and study them, especially in the Global South cities. Urban transitions are political processes which reveal the ever-present social relations and networks which are situated and 'always in the making', holding these infrastructures in place and making urban metabolisms possible. These situated networks of social relations (primarily, caste and gender) and the emerging intersectional subjectivities need to be studied more critically and carefully to examine urban infrastructures and transitions and the (re)production of (un)even, (un)just and (un)free urban political ecologies (Ranganathan, 2022; Sultana, 2020; Truelove & O'Reilly, 2021). Building on the critical conceptual and analytical frameworks of the post-structuralist, post-colonial, and feminist traditions in UPE provides a more situated, relational, and embodied approach to understanding urban transformations foregrounded in everyday lived realities. These uneven embodiments, contestations, and navigations of urban infrastructural transitions and their situated and relational understandings open new avenues for not only theorising diverse urbanisms of/from the Global South, which are socio-spatially rooted, ecologically aware, and politically engaged but also engaging with wider political claims around urban city-zenship and 'the right to city(life)' as McFarlane (2024) has convincingly argued for.

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PANEL 4

Evolving Urbanscapes

Lessons for Urban Transformation: a Conversation with Hyderabad's Past

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In August 2024, the Telangana State Government created a body for disaster response and the protection of assets in Hyderabad. One of the first projects that the Hyderabad Disaster Response and Asset Protection Agency, or HYDRA for short, took up is the beautification of the Musi River that flows through the city. This ongoing project has required HYDRA to carry out the demolition of 'illegal' structures (both formal and informal) that have been constructed along the banks of the river, affecting thousands of residents (Nanisetti, 2024). This project is in striking similarity to one also carried out along the Musi riverfront exactly a hundred years ago by the Nizam's government in the princely state of Hyderabad. The city was rebuilt at the time by demolition and evictions after first, an extreme natural event and then a health disaster.

Cities now need to transition to more sustainable ways of functioning while simultaneously building up resistance against the increasing frequency of natural disasters. Reshaping cities to make them more sustainable and resilient is a process that will affect every aspect of city life. In addition to reshaping cities in the more obvious physical sense, this transition also has the potential to impact the social dynamics of an urban space. It has, for instance, the potential to worsen social and economic inequalities, but if done with consultation and proper planning also has the potential to make cities more equitable. Although making decisions that have trade-offs in this process will be inevitable, governing bodies must be careful to consider the side-effects of each step taken while undertaking this transition.

How do cities learn to manage this delicate balance? One way to learn to manage this delicate balance could be to look to the past and study how cities throughout history have been shaped and reshaped in the aftermath of natural disasters like floods and learn the right lessons for the 21st century. A close analysis of Hyderabad's experience of rebuilding in the early 20th century after a flood and plague struck it in quick succession (1908 and 1911 respectively), for instance, may be particularly useful when trying to understand the modern context of navigating resilience amidst the climate crisis in Indian cities.

This paper will study in detail this experience and impact of post-disaster rebuilding undertaken by the City Improvement Board (CIB), that was set up in 1912 for this attempt at rebuilding Hyderabad and discuss the lessons this holds for cities in the 21st century.

The CIB undertook a variety of projects in Hyderabad between 1912 and 1941 ranging from beautification to the construction of grand civic buildings, commercial and public spaces, and even public housing. This work had numerous impacts on various aspects of the city. For instance, the work the CIB carried out concertised the direction of Hyderabad's growth until the late 20th century. The most notable impact of the CIB's work however, especially relevant to this paper, was the displacement of a large number of people across the city by the CIB while it carried out its projects.

One can conjecture two main types of lessons from the CIB's work between 1912 and 1941.

The first is surrounding the consequence of the Board's work for the poor while it rebuilt and redeveloped areas across Hyderabad. It did so through a systematic clearance of informal settlements across the city to acquire land, forcing the poor who were the overwhelming majority of those displaced, to shift to public housing that the CIB attempted to provide, mostly in the outskirts of the city. Acquired land was then used for the construction of civic buildings, roads, drains, public housing and others. All this was done in the name of preventing another natural disaster or the outbreak of a plague.

The second lesson is understanding the process by which the CIB carried out its work, and how significant a role a democratic state structure, in contrast to a non-democratic body, can play in the redevelopment and restructuring of an urban space. A main reason why the CIB's work led to the displacement of the poor was that at the time of the CIB's functioning Hyderabad State was not an electoral democracy. The CIB was representative of this state structure, termed 'ethical patrimonialism'—a state structure in transition—by Eric Beverley (Beverley, 2013). An undemocratic, ethical patrimonial state structure relieved the CIB of accountability for much of its work that often directly involved like the displacement of tens of thousands of people across the city.

This structure of the CIB, in theory, is not yet a thing of the past. Operating within a quasi-federal structure, Hyderabad, as well as other cities in India, continue to have urban governing bodies (like HYDRA and the Hyderabad Municipal Development Authority) that consist of members appointed by governments, rather than elected by the urban public. Urban development authorities across the country—which own land and are therefore more powerful than the democratically elected municipalities—are composed of 'experts' appointed by the state. Decisions taken by these development authorities are, as a result, taken without the consultation of the public.

How then can more equitable forms of resilience manifest within such governance frameworks? This paper will explore these ideas in detail by studying the history of the rebuilding of Hyderabad. It will do so by analysing both primary and secondary sources on Hyderabad. The primary sources for this paper include annual reports of the CIB, the first of which was published in 1919 and the last in 1945, accessed from the Telangana State Archives. These reports document the plan of, and resultant projects carried out by the CIB over the years. Also accessed from the archives are two other reports prepared by M. Visvesvaraya (1909 and 1930), who was hired as a consultant for the Nizam's PWD and the CIB to advise on measures of flood control and the redevelopment of Hyderabad. The secondary sources used in this paper include the work of historians of Hyderabad like Eric Beverley and Benjamin Cohen.

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Revitalising Urban Ecosystems: The Restoration of Barren Land into Urban Mini Forest a Home for Biodiverse Taxa to Thrive at Harit Upvan, Amarapur, India

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Keywords: Afforestation, biodiversity, community, ecological restoration, inventory, and urban-forest

Background

Urban forests are known to provide multiple ecosystem services and offer natural habitats for several residential and migratory birds and other associated urban biodiverse taxa. To enhance urban resilience and sustainability ecological restoration of barren/degraded lands becomes a crucial phenomenon. Urbanisation and unsustainable planning in the countryside have significantly led to the ecological imbalance in urban areas, leading to the degradation of natural habitats and a decline in biodiversity. In the current article, we are focusing on the restoration of degraded, encroached land into an urban green mini-forest 'Harit Upvan, Amarapur, Gautam Budh Nagar district of Delhi NCR' through ecological tools and techniques. To restore the site, we have followed the traditional method of afforestation following soil testing, land preparation, and native sapling species selection and grid-based plantation. So far, 75,000 + saplings have been planted belonging to around 40+ species of trees, shrubs, herbs, and vines since 2020 through regular community engagement. To understand the assemblages and create an inventory of biodiversity, we did regular systematic field surveys at the site. The total sampled area is 10.6 acres, and we found 43 species belonging to birds, mammals, butterflies, and other associated taxa. The baseline inventory contributes to ecological restoration efforts and its thriving biodiversity. Such restoration of barren land and biodiversity baselining may further support policymakers, urban planners, managers, researchers, and various stakeholders to understand the ecological importance of green spaces in decision-making and city planning, especially in a city like Greater Noida.

Introduction

The global trend of urbanisation in Asia and Africa is supposed to reach 68 per cent of the world's population, out of which, 55 per cent of the world's population live in urban areas. Urbanisation is a worldwide trend, though the extent and pace of urban growth differ across regions. In many cities in India, unchecked urbanisation has led to the degradation of natural resources and environmental conditions (Ray et al., 2011, Dutta et al., 2013). The surge in population has negatively impacted green spaces in urban India, resulting in a widening gulf between city dwellers and the natural environment (Marshall F. et al., 2009, Yeh et al., 2012). The rapid expansion of urban areas has significantly contributed to the loss of forest cover over the past few decades. The urban areas mostly consist of heterogeneous habitats such as smaller to larger isolated patches of woods, bushes, grasses on spatial scale (Grimm et al., 2000). Such isolated patches in the urban areas are crucial to study and, document which benefits us to understand the pattern of impact on urban biodiversity. Efforts to bridge the gap between environmental degradation caused by urbanisation involve a broad spectrum of strategies and initiatives. These include the implementation of nature-based solutions, restoration projects, sustainable urban planning, and community engagement activities aimed at addressing the challenges of urban ecosystem degradation.

To restore the barren land into an urban forest, its effort, and impact, we approached the land systematically through demarcation of land, soil preparation, selection of native species along with continuous monitoring. To create information about the local biodiversity, we initiated the creation of inventory of biodiversity from Harit Upvan. This baseline information is to provide a reference for future studies, create awareness for their conservation, and understand the positive impact of the mini urban forests.

Creation of Urban Mini Forest Following Public-Private-Partnership (PPP) Model

Harit Upvan Amarapur, is in Greater Noida, Uttar Pradesh between 77°33' E and 28°23' N. Harit Upvan, Amarapur is a mixed habitat of dense woody patches and open shrub land along with scattered water bodies. Since 2021, we have afforested the area of 10 acres with 75,000+ native saplings belonging to 40+ native species including shrubs, herbs and vines like Neem (*Azadirachta indica*), Peepal (*Ficus religiosa*), Banyan (*Ficus benghalensis*), Drumstick (*Moringa Oleifera*), Amaltas (*Cassia fistula*), Amla (*Phyllanthus emblica*), and Indian beech (*Pongamia pinnata*). The current survival rate in a span of three years was found to be 90 per cent. The fusion of these habitats provides a suitable shelter for several taxa and is beneficial in terms of ecosystem services. The site is an isolated patch of urban forest among agricultural fields, human settlements, and linear infrastructure.

The restoration steps followed are as below:

- Pre-plantation: the first step was to understand the land use and land change pattern; accordingly, the traditional method of plantation was selected with the demarcation of the site, and soil and water samples were collected for the lab testing.
- Site-preparation: based on the outcomes of lab reports, we prepared the land through leveling wherever required, organic manures were used to prepare the soil, grids were laid, and pits were dug not only for saplings but for the compost pits also.
- Material Sourcing: one of the crucial steps was the sourcing of materials which included species selection based on the soil and local geography, it was also through experts, including community members and literature review, organic liquid (locally known as Jeeva-amrit) was prepared using green waste and other organic material.
- Afforestation and community engagement: from the initial stage of the restoration we involved the local community, and government officials, including volunteers from HCLTech employees in the systematic plantation, watering, mulching, and regular monitoring of the planted saplings. So far, 3500+ individuals (age groups ranging between 7 to 50 years) from the community and volunteers at around 20+ independent events have been actively engaged for various field purposes. These events also include topical day celebrations like Environment Day, Biological Diversity Day, International Day of Forest, etc.

The local community and citizen science are key parts of restoration, especially in an urban context (Ewing et al., 2013). Our team consists of the technical team and around 30 women from the local community who were trained with various tools and techniques of habitat restoration and biodiversity assessment.

The site has one small water body, which was left undisturbed and currently became a natural pond ecosystem and stores rainwater. At a later stage a couple of water structures were developed which further support water storage during summers.

Finding the Impact through Biodiversity Assessment

Reconnaissance surveys were carried out and based on animal signs the camera traps were deployed to get the occupancy of the animals (Rowcliffe et al., 2008). Pre-monsoon biodiversity data collection was initiated following regular field surveys including point count, transect walk, camera trapping, and opportunistic documentation by a dedicated team (Rivero et al., 2010; Emlen et al., 1971; Ralph et

al.,1998.) using Carl Zeiss 10x42 model, binoculars, a hand-held camera Nikon P-1000 model, and Suunto compass at the study site in 2024. In total 122 independent surveys were conducted.

Birds were identified up to species level and documented using pictorial field guides such as (Ali, 2002) and (Grimmett et al., 2019). All the observations were recorded on the data sheets. From all the tools, 43 species belonging to birds, mammals, butterflies, and other associated urban taxa were documented. The avifauna were found to be high comparatively with other taxa, 29 species of birds were recorded belonging to 23 families (Annexure I)

The current findings of our efforts feature the importance of rejuvenation and restoring urban patches in conserving and enhancing urban biodiversity. In comparison to a previous study, our findings have demonstrated a higher diversity of species detected from fewer cameras deployed, indicating the positive impact of restoration and rejuvenation efforts in promoting a thriving urban ecosystem (Herrera et al., 2021). Also, the baseline biodiversity inventory confirms that Harit Upvan, Amarpur has become a healthy habitat that provides, roosting, and breeding grounds encouraging species diversity and aiding in the survival of native flora and fauna.

The success of ecological restoration projects relies heavily on active community participation, and the transformation of Harit Upvan Amarpur is a prime example of this. The project actively engaged residents, volunteers, and other stakeholders in the restoration process, fostering a sense of shared responsibility and ownership over the urban green space.

Take Home Message

The restoration of a degraded land into an urban mini forest represents a significant achievement in addressing the ecological challenges posed by several unplanned human interventions. This model not only highlights the successful restoration of degraded land but also emphasises the pivotal role of community engagement in ecological restoration efforts. We are continuously and effectively monitoring the site and implementing science-based techniques to understand the additions in the ecosystem services.

The biodiversity assessment conducted post-restoration shows a healthy species richness and diversity, signifying the positive outcomes of afforestation and habitat restoration. Furthermore, the active participation of volunteers and residents in both the plantation and educational workshops fosters a sense of ownership and stewardship over the urban green space, ensuring a sustainable approach to maintaining this mini forest for future generations. We are following and recommending for a long-term monitoring of restored sites in terms of ecosystem and biodiversity.

Ultimately, the Harit Upvan Amarpur model serves as a valuable example for similar urban ecological restoration initiatives elsewhere, illustrating that with collaborative efforts, it is indeed possible to reconcile urban development with the preservation of nature. This endeavour not only symbolises hope for sustainable urban living but also reinforces the critical need to integrate ecological considerations into urban planning, ultimately promoting resilience and environmental stewardship within rapidly urbanizing landscapes.

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ANNEXURE I

Table 6: List of bird species

S.No.	BIRDS SPECIES	Scientific name	IUCN Status
1	Egyptian Vulture	<i>Neophron percnopterus</i>	EN
2	Indian Pond Heron	<i>Ardeola grayii</i>	LC
3	Pied Bushchat	<i>Saxicola caprata</i>	LC
4	Indian Robin	<i>Copsychus fulicatus</i>	LC
5	Asian Green-Bee eater	<i>Merops orientalis</i>	LC
6	Indian Pied Starling	<i>Gracupica contra</i>	LC
7	Common Hawk Cuckoo	<i>Hierococcyx varius</i>	LC
8	Red Naped Ibis	<i>Pseudibis papillosa</i>	LC
9	Purple Sunbird	<i>Cinnyris asiaticus</i>	LC
10	Paddyfield Pipit	<i>Anthus rufulus</i>	LC
11	Grey Francolin	<i>Ortygornis pondicerianus</i>	LC
12	Black Drongo	<i>Dicrurus macrocercus</i>	LC
13	Ashy-crowned Sparrow Lark	<i>Eremopterix griseus</i>	LC
14	Asian Koel	<i>Eudynamys scolopaceus</i>	LC
15	Cattle Egret	<i>Bubulcus ibis</i>	LC
16	Wire-tailed Swallow	<i>Hirundo smithii</i>	LC
17	Eurasian collared Dove	<i>Streptopelia decaocto</i>	LC
18	White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	LC
19	Scaly-breasted Munia	<i>Lonchura punctulata</i>	LC
20	Greater Coucal	<i>Centropus sinensis</i>	LC
21	Jungle Babbler	<i>Argya striata</i>	LC
22	Red-vented Bulbul	<i>Pycnonotus cafer</i>	LC
23	House Sparrow	<i>Passer domesticus</i>	LC
24	Shikra	<i>Accipiter badius</i>	LC
25	Red Avadavat	<i>Amandava</i>	LC
26	White-throated Kingfisher	<i>Halcyon gularis</i>	LC
27	Bay Backed Shrike	<i>Lanius vittatus</i>	LC
28	Baya Weaver	<i>Ploceus philippinus</i>	LC
29	Red-wattled Lapwing	<i>Vanellus indicus</i>	LC

Source: Authors

Table 7: Butterfly species list

S.No.	BUTTERFLY SPECIES	Scientific name	IUCN STATUS
1	Plain Tiger Butterfly	<i>Danaus chrysippus</i>	LC
2	Striped Tiger Butterfly	<i>Danus genutia</i>	LC
3	Common Crow Butterfly	<i>Euploea core</i>	LC
4	Common Grass Yellow Butterfly	<i>Eurema hecabe</i>	LC
5	Cabbage White Butterfly	<i>Pieris rapae</i>	LC

Source: Authors

Table 8: Dragonfly and damselfly species list

S.No.	Dragon fly & damsel fly species	Scientific name	IUCN STATUS
1	Little Blue or Azure Dartlet	<i>Amphiallagma parvum</i>	LC
2	Three-striped Blue Dart	<i>Pseudagrion decorum</i>	LC
3	Common Blue Tail	<i>Ischnura heterosticta</i>	LC
4	Common Picture Wing	<i>Rhyothemis variegata</i>	LC
5	Scarlet Skimmer	<i>Crocothenis servilia</i>	LC

Source: Authors

Table 9: Mammal species list

S.No.	MAMMAL SPECIES	Scientific name	IUCN STATUS
1	Jungle Cat	<i>Felis chaus</i>	LC
2	Five-striped Palm Squirrel	<i>Funambulus pennantii</i>	LC
3	Nilgai	<i>Boselaphus tragocamelus</i>	LC
4	Blackbuck	<i>Antilope cervicapra</i>	LC
5	Indian Crested Porcupine	<i>Hystrix indica</i>	LC
6	Wild pig	<i>Sus scrofa</i>	LC
7	Indian Grey Mongoose	<i>Herpestes edwardsii</i>	LC

Source: Authors

The Political Imagination of the Post-Apartheid Township in South Africa, 1990 -1993

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Keywords: postapartheid, township, political imagination, apartheid, South Africa

The paper aims to focus on the formation of the postapartheid township in South Africa through the tricameral parliament debates on low-cost state housing from 1990 to 1993. In doing so, the paper is interested to understand how black life in South Africa was formed through place making (townships) towards the end of apartheid and how the political debates/thoughts were framed by the late apartheid state/parliamentarians in imagining the postapartheid township for black folks. The paper seeks not to rehearse the old debates about the apartheid township but rather, is interested to interrogate and understand the political imagination of the postapartheid township. The political imagination in this paper has to do with the imaginative processes that have been formed, shaped and articulated by the late apartheid state parliamentarians in order to realise the political aims in forming the postapartheid township for the black poor. In this paper, I use the concept postapartheid, without hyphenation, drawing from the intervention made by van Bever Donker et al.—to refer to it ‘as a form of remainder: as the remains of apartheid, as those remains that apartheid produced and, indeed, continues to produce...’¹². As they point out, ‘the postapartheid operates as a signifier for a condition’¹³ which has to do with a condition of life. Fundamentally, the paper seeks to examine these conditions through the lens of parliamentary debates that signify the flow/movement from the liminal phase of apartheid to the postapartheid. In analysing the archival parliamentary debates data, critical discourse analysis is employed as an analytical tool to highlight the formation of the postapartheid and the political imagination of housing policy for the future of township after apartheid.

¹² Maurits van Bever Donker, Ross Truscott, Gary Minkley & Premesh Lalu, (eds). *Remains of the Social: Desiring the postapartheid*. (Wits University Press: South Africa: 2017). 7. Premesh Lalu has long been grappling with this concept ‘postapartheid’, on this see further his book. Premesh Lalu. *The Deaths of Hintsa: Postapartheid South Africa and the shape of recurring pasts*. (Human Science Research Council: 2009). And also see, Premesh Lalu ‘When was a South African history ever postcolonial?’ *Kronos*, 34, (2008), 267 – 281

¹³ *Remains of the Social*

A Political Industrial Ecology of Water in Bodh Gaya Pre- and Post-World Heritage Site Designation

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Bodh Gaya, a small agrarian town in Bihar, India, is renowned as the cradle of Buddhism. The Mahabodhi Temple in Bodh Gaya was designated as a UNESCO World Heritage Site in 2002. Every year, millions of visitors come here to quench their spiritual thirst. The town is experiencing significant strain on its water resource capacity due to tourism and haphazard urbanization. Against this backdrop, the study employs a political-industrial ecology (PIE) approach to assess water flows by using water mass balance equation before and after the designation of world heritage status to evaluate the impact of tourism on the water resources and examine the socio- economic inequalities in accessing water supply infrastructure. We found that the urban water metabolism of Bodh Gaya underwent a drastic transformation between 2001 and 2019 (pre- and post-World Heritage Site designation). Direct tourist consumption increased approximately eightfold, rising from 92 ML (million litres) to 730 ML and groundwater extraction increased from 1586 ML to 4271 ML over the same period. We also showed how the residents are facing issues in accessing piped water because of precarious networks and persistent social inequalities, particularly caste. Lastly, we recommend addressing the water demands of tourists in the broader urban planning for sustainable water management.

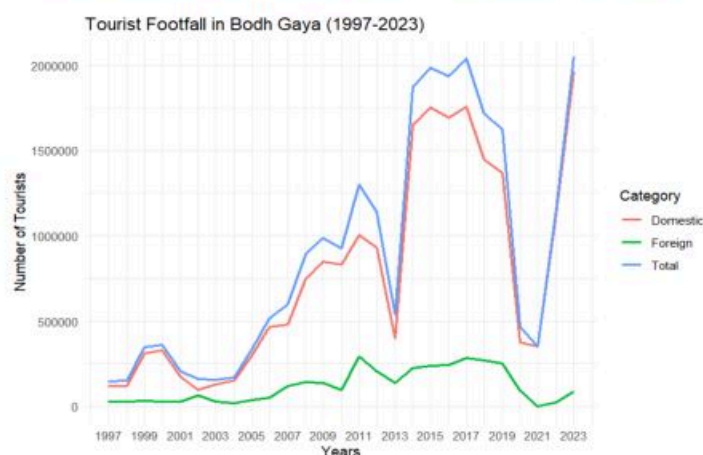
Keywords: Urban metabolism, industrial ecology, infrastructure, tourism, heritage town, Bodh Gaya

Introduction

Bodh Gaya is known as the birthplace of Buddhism. The Mahabodhi temple was built as the first shrine in Bodh Gaya to mark the enlightenment site in 256 BC by the then emperor, Ashoka (Dhammika, 2018). Given its outstanding universal value, the temple was labelled as the United Nations Educational, Scientific and Cultural Organization (UNESCO) world heritage site (WHS) in 2002 (UNESCO, 2001).

The town was a big village in the 20th century which is now changed as a space of global memory and connection (Dhammika, 2018; Geary, 2017). The town has been witnessing an immense tourist footfall. Figure 43 depicts the footfall of domestic and foreign tourists from 1997 to 2023. The tourists' influx has been increasing except in 2013 because of the bomb blast incident in the Mahabodhi Temple Premises and in 2020–2021 because of COVID-19.

Figure 43: The tourist inflow in Bodh Gaya in the last 27 years (1997–2023)



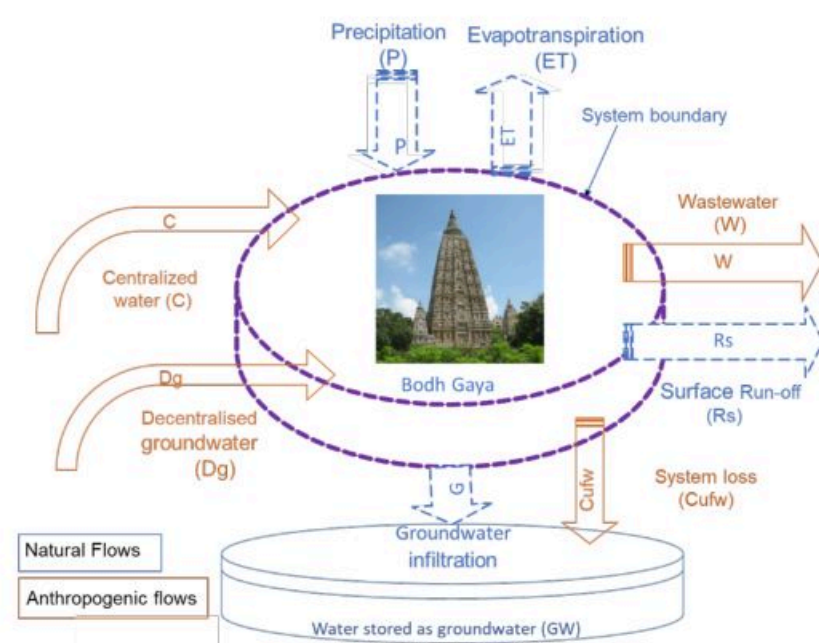
Source: Tourism Department, Government of Bihar

Hence, the tourists' footfall and haphazard urbanisation has impacted the natural resources of this agrarian town. Against this backdrop, this paper aims to examine the impact of tourism on the local water resources between 2001 and 2019 and assess the status of water supply infrastructure in the town using the PIE. It is a novel attempt to study the water metabolism of a small-town by evaluating the impact of tourism on water resources using the PIE. Against the conventional approach, the PIE allows us to have robust understanding of water in an urban system by bringing together the water flows, infrastructure, governance, and politics.

Methods

To estimate the urban water flows, Kenway et al. (2011) present the equation: $\Delta S = \Sigma Qi - \Sigma Qo$, where ΔS represents the change in water storage within a defined system boundary, ΣQi is the sum of all inflows, and ΣQo is the sum of all outflows. We apply this equation to quantify water flows in Bodh Gaya as demonstrated by Paul and her colleagues in case of Bengaluru, India (Paul et al., 2018). The final equation for estimating Bodh Gaya's water mass balance is given by $S = (P + C + Dg) - (W + Rs + G + ET + Cufw)$. Figure 44 represents an overview of Bodh Gaya's urban water metabolism.

Figure 44: Urban water metabolism of Bodh Gaya



Source: Adapted from Paul et al. (2018)

A comprehensive document analysis of planning and infrastructural documents and in-depth semi-structured interviews was conducted to analyse the evolution of water supply infrastructure and the social metabolism of water. This analysis encompasses the impact of tourism and the persistent inequalities among residents in accessing water. Twenty semi-structured interviews with the residents, monasteries, and hotels were conducted between December 2019 and March 2020 and in March 2022 to understand water infrastructure conditions in the town.

Status of Water Infrastructure

The piped water supply is primarily confined to the town 'core' around the Mahabodhi Temple and nearby settlements (Rajput & Sharma, 2023). According to a survey (180 households) by WaterAid Report, only 9.4 per cent of households are equipped with piped water supply; more than 21 per cent depend on the stand posts while others rely either on borewells or hand pumps (68.9 per cent) (Vishwanathan, 2021). Furthermore, the piped water supply does not extend to the slum households;

these residents are either dependent on the stand-post (if available nearby) or the community hand pumps which get dried during the dry period (May–June). More than 80 per cent of the slum population belongs to the scheduled castes or particularly, Maha Dalits (a category use in Bihar to refer the poorest of the poor among the Dalits), experience acute water stress during the summer months when the groundwater table declines beyond their access capabilities (Rajput & Rai, 2023; Rajput & Sharma, 2023). Around 40 per cent of households depend on hand pumps (~ 30 feet deep both public and private handpumps) which do not have the capacity to have borewells (~ 150 feet, 27.8 per cent of the households depend on private borewells) are facing immense water challenges which are further aggravated because of groundwater scarcity induced by the tourism over-consumption of groundwater. As the tourism industry is dependent on groundwater to cater to their water needs. However, it does not face any water stress, as they possess the resources to access deeper groundwater and have less or no water demand during the off-tourist season, which is the dry season in the region. Hence, the tourism industry due to over abstraction of groundwater induced scarcity for the vulnerable communities in the town.

Table 10: An overview of water supply interventions in Bodh Gaya

Water supply programmes	Year	Source of water and coverage	Installation, operation, and maintenance
Rural Water-Supply and Sanitation Programme, Government of India	1956	Groundwater and 800 households by 2000	Public: Public Health and Engineering Department (PHED), Government of Bihar
Water Supply under Jawaharlal Nehru National Urban Renewal Mission (JNNURM) Government of India	2011 (operationalized in 2017)	Groundwater and 6000 households targeted	Public-private: Jindal Water Infrastructure Limited
Har Ghar Ganga Jal, Government of Bihar	2022	Surface water (from the Ganga River)	Public -private: Megha Engineering and Infrastructures Limited (MEIL) to bring water from Ganga River

Source: Draft Master Plan (1966); City Development Plan (2011)

Urban Water Metabolism of Bodh Gaya

Both in 2001 and 2019, Bodh Gaya was dependent on groundwater to meet its water demands. In 2001, the centralised piped water supply (C) to the residents was provided by a state government agency, the PHED. By 2019, the centralised water supply was expanded under a recent public-private venture of the JWIL under the JNNURM in 2017. The summary of the water mass balance of the town is given in Table 11.

Table 11: The summary of water mass balance of Bodh Gaya

Year	2001*	2019**
Area/ system boundary (km ²)	19.58	19.58
Population	30857	50570
Tourists (floating population)	206141	1624497
Centralized (C)	985.50	2628.00
Decentralized groundwater (Dg)	798.42	1643.01

Year	2001*	2019**
Rainfall on urban areas (P)	19319.59	17370.80
Wastewater generated (W)	1427.13	3416.80
Urban stormwater run-off (R)	4059.08	5012.02
Groundwater seepage (G)	3081.47	2744.59
Evapotranspiration (ET)	12179.03	9614.19
Leakage (Cuwf)	147.80	919.80
Stored water (S)	208.98	-65.60

Source: Authors, (in Million Litre)

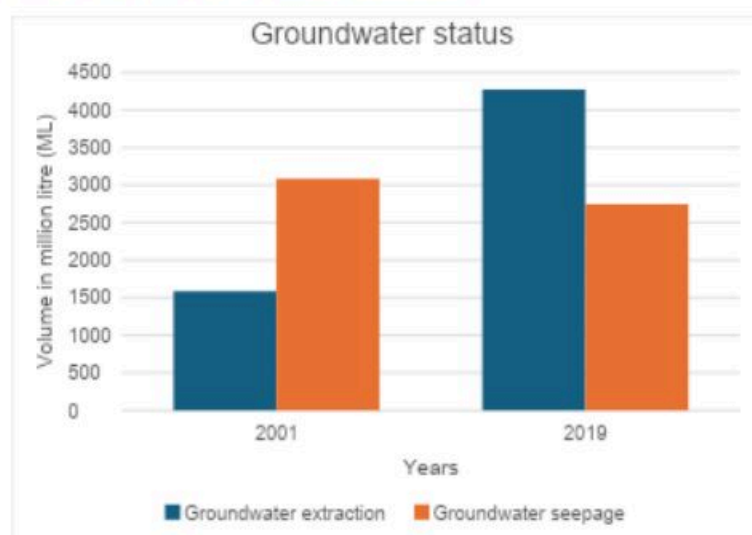
*land used based on official survey (CDP, 2006)

**land use based on the satellite data)

In 2019, the stored water was approximately 65 ML deficit, a stark contrast to the 200 ML surplus in 2001. Technically, both the stored water values must be zero; however, due to data inaccuracy or under or over estimation of water flows (Kenway et al., 2011; Paul et al., 2018).

Given the town's historical dependence on groundwater resources, this surge in demand has resulted in a more than twofold increase in overall groundwater extraction. Concurrently, urban expansion and associated built-up areas have contributed to a decline in groundwater recharge rates. Figure 45 illustrates that groundwater extraction increased from 1,586 ML in 2001 to 4271 ML in 2019, while seepage decreased from 3,081 ML to 2,745 ML during the same period.

Figure 45: The status of groundwater in Bodh Gaya



Source: Author

Discussion/ Conclusion

Bodh Gaya presents a unique yet a familiar story of infrastructure failure in Indian cities. Despite a long history (since 1956) of piped water supply, the town has yet to realise universal tap coverage in the town. The water supply infrastructure, encompassing both the legacy system managed by the PHED and the more recently installed system by the JWIL, is in a critically vulnerable condition. The PHED pipelines are dilapidated due to their age, while the JWIL pipelines suffer from improper installation and are often found lying on the roads without taps or installed into households. This deteriorated infrastructure has

led to significant wastage of centrally supplied piped water. Furthermore, discrepancies were noted in the volume of water abstracted centrally to supply the town, particularly in 2019 estimations. The estimated water demand, based on a population usage rate of 150 litres per capita per day, was 2768 million litres. However, the town abstracted approximately 2628 million litres, which is nearly equivalent to the population water demand while only 30.5 per cent of households (~1800 HHs) are relying on the centralised water supply (Vishwanathan, 2020). Additionally, according to a report from the Bodh Gaya Nagar Parishad (urban local body) from 2019, officially the JWIL piped water connected 3,900 households out of the targeted 6000 households (Rajput & Sharma, 2023). The water mass balance also enabled us to identify inconsistencies in the centralised water supply, which may be attributed to discrepancies in the available data or indicates towards extreme leakage of water as underscored the interviewees and observed in the town. Although Bodh Gaya stands out as an exceptional case given its global and national importance, with available data from planning and infrastructural documents and reports, such data or documents are generally not available for any other cities, except for the megacities.

From Bodh Gaya, we argue that there is an urgency in incorporating water requirement for tourism into the broader urban planning regime of similar towns. Moreover, it is crucial to address tourism-induced water stress, ensuring that water resources are not allocated to meet tourism demands at the expense of marginalised and vulnerable residents. Furthermore, there is an urgency to integrate the gender and caste question in water planning and policy.

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Traditional Norms in Modern India: A Survey Study

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Social psychology has paid a fair amount of attention towards examining the impact of demographic factors like age, gender, social class, on social attitudes. However, the role of the family is treated quite narrowly. Using a secondary survey dataset that captures the attitudes and beliefs of 6,122 Indians, this study seeks to address this gap by investigating how the endorsement of traditional attitudes related to caste and gender hierarchies in India is shaped by various pertinent demographic and familial factors. These determinants include an indicator assessing concern for family obligation, and demographic variables like marital status, education level, family size, and the development status of one's city or town. I utilise a Structural Equation Modelling approach and, within three distinct models, explore different sets of associations

1. the relationship between concern for family obligation and traditional attitudes,
2. between demographic factors and traditional attitudes, and
3. between demographic factors and a concern for family obligation.

The first model, '*A Suitable Girl*', investigates traditional attitudes concerning gender norms applicable to women. The second model, '*Bad Romance*' centres on moral judgements about romantic relationships that challenge caste and gender norms. The third model, '*Your Friendly Neighbourhood*', investigates traditional attitudes relating to discomfort with neighbours who deviate from traditional caste and gender norms.

Across all three models, I find that the endorsement of traditional attitudes is associated with heightened concern for family obligation. Moreover, this concern for family obligation is influenced by factors such as gender, family size, and urban versus rural living conditions. By emphasising the pivotal role that concern for family obligation has in shaping the endorsement of traditional attitudes concerning caste and gender in the Indian context, this research augments the study of attitudes within social psychology, directing attention to relevant contextual dimensions that influence traditional attitudes.

Theoretical Background

Traditional attitudes and beliefs do not exist in a vacuum. They represent a deeply embedded set of norms, shaped by a complex interplay of factors. Moreover, these attitudes are likely to perpetuate social hierarchies. Situating this within the Indian context of caste and gender, espousing such attitudes profoundly impacts modern Indian society. For instance, labour market data (Deshpande, 2011; Jayachandran, 2021) and the housing issues faced by Muslims and members of marginalised caste groups (Thorat et al., 2015) indicate significant discriminatory consequences arising from these attitudes.

Ethnographic evidence indicates that, besides affiliation to social categories like caste and gender or socio-economic determinants such as education levels (A. Shah, 2007; Titzmann, 2017), the family unit also moulds these norms (Dhar et al., 2019; A. Shah, 2005), acting as the guardians of honour and tradition. Moreover, one's orientation to one's family is influenced by factors like caste, gender, and other socio-economic considerations (Prasad et al., 2020, p. 9). Hence, exploring the dynamic interrelation of these constructs and acknowledging the pivotal role of the family in shaping attitudes are critical to grasping the persistence of traditional attitudes in the dynamic Indian context.

India is a society in flux, experiencing a collision of traditional and modern values. This conflict necessitates a contemporary understanding of how traditional norms continue to evolve in India's 'modern' contexts. Gilbertson (2018, p. 130) highlights the growing perception of traditional views—that

women should be restricted from public domains like education and employment and be subservient to their husbands and families—as ‘backward’ and a hindrance to national progress. In contrast, others note that despite modern discourses on the expanded choices available to women, many Indian families uphold conventional gender roles (Scrase, 2006), even in urban and suburban settings. Thus, India’s modernity is often juxtaposed with its traditions, with the family being central to how caste and gender are navigated.

Following from the above, the primary research question guiding this paper is:

How do demographic factors and a concern for familial obligation relate to the espousing of traditional attitudes in India?

A secondary question that further unpacks the dynamics related to a concern for familial obligation is: How do demographics factors relate to a concern for familial obligation?

Methodology

Data and procurement

The dataset employed in this paper is the 2017 “Attitudes, Anxieties and Aspirations of India’s Youth: Changing Patterns’ survey” (Kumar, 2017a) commissioned by Lokniti, CSDS, and Konrad Adenauer Stiftung (KAS). The survey-based study sought to answer key questions about how India’s youth thought and lived. Conducted between April and May 2016 across 19 states of India, the survey engaged 6,122 respondents aged 15–34 years. This “Youth Study” follows the Lokniti-CSDS-KAS Youth Surveys of 2007 and 2011. After reviewing the publicly available resources (e.g., the questionnaire, preliminary report, and descriptive findings), I selected roughly 72 variables of interest. These variables, reflecting my broader thematic interests, span questions on caste and gender attitudes, measures of worry for family tradition, and indicators of kin and friend networks’ composition. These variables included demographic indicators, measures of orientation towards one’s family and questions on attitudes and preferences that were measured on a Likert scale.

Participants and procedure

According to the report published by the organisation (Kumar, 2017a), the survey deliberately over samples urban youth (particularly those living in the largest and large cities in terms of population) relative to rural youth. This was done to obtain sufficiently large sample sizes to allow for a deeper analysis of youth living in different types of urban areas—both big and small. The survey was conducted using a standardised questionnaire (Kumar, 2017b), which was administered face to face at the residence of the respondents. In each of the 19 states where the survey was conducted, the questionnaire was translated into the local language understood by most people of the state. Most questions in the questionnaire were structured, i.e., close-ended.

Analysis plan: the SEM approach

The variables in the dataset coupled with my research aims aligns well with a Structural Equation Modelling (SEM) approach (Kline, 2015). SEM is particularly relevant for exploratory work aimed at understanding complex relationships between variables, as can help visualise relationships between a vast array of concepts. It permits the simultaneous examination of relations between diverse variables and includes latent variables measured by observed indicators.

Findings

- *The endorsement of caste and gender attitudes is generally sensitive to demographic factors.*
 - o When looking at gender, for example, evidence suggests that being female correlates with an increased concern for family obligation. However, the relationship between gender and traditional attitude endorsement varies by context. While women display less traditionalism regarding gender norms, they tend to have less diverse social circles (defined by caste, gender, religion) and are more uncomfortable with neighbours who challenge Hindu, upper caste norms.
 - o I find that living in a village, compared to more developed towns, cities, and metros, is associated with stronger traditional attitudes across all models. A vast body of prior ethnographic and sociological work supports this; the urban as 'modern' and rural as 'traditional' argument is well-established in the literature (Shah, 2007). However, understanding what urban areas offer that rural areas lack, contributing to a more modern, less traditional outlook, is crucial. Past work (Choukroune & Bhandari, 2018) has highlighted that urban spaces are typically more anonymous. People in rural areas are likely part of larger families and face scrutiny from their extended kin networks. Consequently, even the public is not necessarily anonymous (Thiranagama, 2019). This suggests a potential opportunity to explore the interactions between urban/rural locales and family size or undertake qualitative work to grasp the deeper nuances of familial scrutiny in rural areas, which might drive norm adherence.
 - o Connected to the area of residence is family size. Here, too, I discover that being part of medium or large families, compared to smaller ones, is associated with higher levels of traditionalism. Much like the urban-rural divide, there are underlying mechanisms related to large family sizes that influence traditional attitudes differently from small families.
- *Next, my findings indicate that concern for family obligation correlates with higher traditionalism across all three models.*
- *Finally, across all models, evidence suggests a relationship between demographic factors and a concern for family obligation.*
 - o This concern is related to one's gender, marital status, family size, residence area, and education. Results largely corroborate existing knowledge, such as women exhibiting greater concern for family obligations, or urban inhabitants being less preoccupied with family tradition compared to their rural counterparts.

Conclusion

Applying a Structural Equation Modelling approach to a secondary dataset on the attitudes of young Indians has helped unearth some of the contextual underpinnings of traditional attitudes surrounding caste and gender in India. I present a comprehensive view of how the social categories to which we belong, various demographic indicators, and concerns for family obligations shape the endorsement of traditional attitudes related to caste and gender. In doing so, I map three sets of interconnected relationships. Firstly, I find that our social categorisations and objective indicators of culture shape how traditionally we think. Next, I ascertain that a heightened concern about family obligations, in general, is associated with increased levels of traditionalism. Lastly, I determine that concerns for family obligations are influenced by several other socio-economic indicators, including gender.

I highlight three main contributions. Firstly, the family unit is identified as crucial when studying traditional attitudes related to caste and gender. Secondly, concerns for family obligation provide insights into the social pressures associated with the endorsement of traditional attitudes, drawing attention to the ever-evolving nature of context. Thirdly, the relationship between social category

memberships and attitude endorsement is intricate and nuanced. For instance, some tensions emerge, such as women expressing concerns about familial obligation, while simultaneously disagreeing with traditional attitudes. These insights underscore the importance of the role of familial obligation, adding yet another dimension to the role of the family in perpetuating prejudice.

My analysis reveals additional avenues for research. I demonstrate that young people express concerns about family obligations and challenges, which influence their alignment with traditional attitudes. Is this concern rooted in the fear of upsetting parents, or does it hint at graver implications, such as the avoidance of stringent repercussions? Delving deeper through qualitative research could provide a clearer understanding of the implications of concerns for tradition and the conceptualisation of caste and gender hierarchies. My findings also pinpoint a dichotomy, wherein concerns about family obligations appear to coexist with a rejection of traditional attitudes. Once more, employing qualitative methodologies and in-depth interviews could unravel the implications of this tension in the context of norm adherence, and shed light on how marginalised groups navigate these societal pressures, as they resist such norms.

Traditional beliefs, when integrated into diverse contexts, can serve as catalysts in perpetuating deep-seated hierarchies. Whether it stems from reluctance to have a neighbour from a different caste, or the belief that inter-religious relationships are ethically and morally unacceptable, such beliefs can lead to extensive discriminatory repercussions. In an ever-evolving world, efforts to comprehend how age-old, inflexible hierarchies persist via the endorsement of traditional attitudes hinge upon a careful examination of context. With this paper, I have aspired to lay the groundwork for understanding the initial stages of comprehending the factors that sustain these enduring hierarchies in contexts that are ever-changing.

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PANEL 6
**Urban Governance and
Participation**

Transitions of Expertise: Exploring the Operation and Influence of Engineering Consultants as Sustainability Advisors in Municipal Governance

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In the context of resource-constrained municipalities transitioning towards ensuring 'sustainability' in implementing basic service provisions, the paper explores how the conceptualisation and operationalisation of expertise in the wastewater sector enables engineering consultants to build their business prospects by transitioning to being sustainability advisors. However, this limits the opportunity for democratisation of expertise in municipal governance, often to the detriment of enabling a holistic and equitable transition towards sustainability.

Background

Global economic and political interconnections, along with a neoliberal competitive and profit-oriented approach towards development, guide the knowledge and ideas shared for city planning and urban governance. This has led cities, particularly in the Global South, to focus on infrastructure development and economic growth to vie for becoming 'global' and 'world-class' (Harris & Moore, 2013). However, cities are increasingly threatened by the adverse effects of such growth, manifested in the climate crises experienced by cities across the globe, putting pressure on the durability of their infrastructures, questioning the carrying capacity of cities and their ability for future sustenance (Goh, 2021). As a result, cities today are dealing with the urgent need to transition towards sustainable development, reflected in the rise of global collectives and knowledge flows to build 'sustainable' and 'resilient' cities (Bigger & Webber, 2020).

In cities of the Global South, such as in India, city governments, already less empowered and not autonomous (Pethe et al., 2011), are facing the pressure of dealing with 'new' problems related to the climate crises while having to implement and follow top-down directives for making their cities sustainable. Municipal administrators are neither well-equipped nor trained in many of the issues they are now tasked with solving (Bhardwaj & Khosla, 2021). As a result, governments are increasingly appointing consulting firms as 'experts' to support them in planning and executing municipal functions.

Consulting firms that grew with a post-Fordist global economy driven by the need to build infrastructures across cities, developed networks with sovereign governments, international financial institutions, multinational companies, and intergovernmental agencies, instilling confidence in the value of their advice (Mazzucato and Collington, 2023). With a rise in focus on climate change, consulting firms have expanded to climate and environmental governance. Governments prefer consultants particularly due to their promise of being able to operate on "both sides of the street" (ibid.), i.e., ensure economic growth and also show that it is sustainable.

However, this often leads climate action to be "superimposed" (Bhardwaj & Khosla, 2021) on development projects, where governments operate through "ambivalence" (Kamath & Tiwari, 2022) in tackling issues related to the environment while focusing on visible and bankable infrastructure projects in the city. The involvement of consultants is also critiqued for making governance technicalised, decontextualised and depoliticised (Goldman, 2005; Purandare, 2021). Moreover, consultants often bypass political representatives and reduce participation of citizen groups, weakening locality-based decision-making (Strapper et al., 2020).

While an emerging "consultancy urbanism" (Sadoway et al., 2018) in India through national-level policies has been prior-researched (Purandare, 2021; Sami, 2018), how consultants operate in governments (Gibson et al., 2023; Sajjanhar, 2022), particularly in the context of municipal projects related to

sustainability, has been limited. By understanding how expertise is conceptualised and operationalised in municipality-led governance of a basic service function—wastewater management—our study explores the trajectories and influence of consultants as experts assisting municipalities in their transition towards sustainability.

Methods

The research adopts qualitative methods of enquiry, which provide an opportunity for in-depth analysis essential for studying perceptions, relations and processes in our study. The study is based in the Mumbai metropolitan region, which has had a wide presence of consulting firms influencing its planning, infrastructure, and more recently, sustainability concerns.

The study participants included administrative officers, consultants and other actors, who were purposively sampled based on their association with a wastewater management project in a municipal corporation in the Mumbai metropolitan region.

In our paper, ‘consultants’ refer to individuals and organisations outside of the government considered to be experts in their relevant sectors, involved through formal processes such as contracts for a particular time period and performing specific functions for the government. They were alternatively referred to as contractors, advisors and experts by our participants.

Data was collected using semi-structured, in-depth interviews and observations of the department/project site. Field notes and detailed post-interview notes were made and collated. Insights from the interviews were collated to build on the major inferences and themes emerging from the study. Data was triangulated by verifying events/practices with the participants and referring to secondary data such as government and news reports.

The research and its purpose were explained to all the participants before obtaining their consent. The names of individuals/organisations and the project/municipality have been anonymised. Nevertheless, to provide context, we have clarified that the research was conducted in the metropolitan region of Mumbai. No harm to the reputation or otherwise of governments/organisations and their representatives is intended from this research.

Findings

The research explores the operation and influence of consultants associated with a municipal department for the design and monitoring of wastewater treatment facilities (WWTFs) as a part of implementing a wastewater management project for a municipal corporation in the metropolitan region of Mumbai. While the municipality already had existing WWTFs, a central government directive for change in the sewerage discharge norms to reduce pollution in cities (Anand, 2022) was one of the reasons for the decision to set up new upgraded WWTFs for the city. The municipality had prior association with international financial institutions and consultants in shaping its sewerage plans. In order to implement the project for setting up WWTFs with tertiary-level treatment, the municipality sought consultants for several separate contracts regarding the design, construction, tender management and project management of the WWTFs.

Expertise and Experts in Municipal Wastewater Management

The officers of the municipal department overseeing the project were mainly engineers (civil, mechanical, electrical). They reported not having adequate know-how of climate change or sustainability concerns, nor were they a part of any of the city’s climate initiatives. Municipal officers considered that WWTFs primarily required specialised knowledge and technical expertise in engineering. Citing a lack of experience and shortage of staff, the municipality sought engineering ‘experts’ to manage the WWTF project. Specific expertise related to environmental or social concerns of

the project was not sought, nor was it considered to have a diverse set of expertise among consultants in the project.

Moreover, private for-profit companies were primarily invited as 'experts'. Municipal councillors were not considered to have expertise on 'technical' matters, while suggestions from environment or community-based organisations were regarded more as a hindrance than advice. The project had consequences for urban planning and land-use, environmental pollution and sustainability, socio-economic impact on communities, and implications for the future use of treated water supply by various actors in the city (residents, commercial units and industries). However, the understanding of expertise and who was considered an expert, limited the participation in policymaking and implementation to for-profit companies with specialised engineering know-how.

Further, no criteria existed for inviting sector-specific companies to participate in the project. Consequently, most of the firms appointed as consultants had their primary business in infrastructure, working in oil and gas or road transport engineering, and had only recently expanded into the water sector. Most consultants in such firms did not consider themselves experts in the field of environment or sustainability. Only a couple of firms which were part of the project specialised primarily in the water sector. These firms often despised the former as lacking adequate expertise in understanding issues of the sector.

Apart from the techno-legal criteria of educational and professional experience mentioned in formal tender documents, which acted as a marker of expertise, socio-political factors were essential for consultants to become a part of and operate in governance processes. This points to an expanded, often informal nature of what constitutes expertise. For instance, consultants mentioned the need for local people—such as Marathi-speaking persons or those who had worked in Maharashtra—to be listed in the submitted tender documents. Past relations of consultants with the municipality and its officers or state/central governments were also considered essential to winning contracts.

How Engineers Influenced Sustainability-Related Outcomes of the Project

Our research shows that consulting engineers tasked with implementation (tender processing, project management, construction, etc.) moved beyond their mandates to provide advice and suggestions to the municipality on various issues associated with project planning, which had implications for environmental sustainability.

The ability of engineers to advise governments on matters of project planning and sustainability concerns arose from the governance processes and how their expertise was operationalised for the project. Consultants were involved in the everyday processes and practices of the department, which included both formal meetings and informal interactions. They had direct access to government functioning and decision-making tables—not just in the department but also in the municipality headquarters and the state government. The proximity of consultants to government processes enabled them to give suggestions and be involved in the project beyond its implementation. Consultant companies also actively shaped the project through the appointment processes, even before formal contracts were signed.

The influence of consultants is also related to the commonality of backgrounds—both administrative officers and consultants were mainly engineers and found it much more suitable and comfortable to share information and ask for advice. Moreover, most consultant representatives were 'locals'—Marathi-speaking and male, a socio-demographic profile similar to the administrative officers in the department. This provided a common ground and affinity for building relations. It also served as a means for consultants to interact with different levels of officers—from lower-level officials in the department to secretaries and elected representatives in the state government.

The nature of suggestions by consultants was associated with the field of engineering and was technicalised—related to the construction, the technology used, making the plant more efficient, etc. Sustainability issues related to the project were thus also seen from a technical engineering perspective. Consultants deployed their engineering know-how and the backing of their company's "collective expertise" (Srinivasan, 2014) and experience to advise on decisions impacting environmental sustainability.

For instance, suggestions for the use of 'open' technology, i.e., different types of technology as favoured by the project bidders, were made to promote new technologies considered more compact, requiring less coastal land for construction and therefore touted as being sustainable. However, the new technologies adopted were capital and energy-intensive, spelling long-term technology and expertise dependence of the municipality on global companies and using material parts from the petroleum industry, considered a significant contributor to climate change. Other suggestions for recycling wastewater and converting sludge to energy, promoted as sustainability-enhancing aspects of the project, were made without concrete implementation plans aimed at continued dependence of the municipality on consultancies. Whereas such suggestions were showcased as being 'sustainable', environmental or social impact assessments or plans were not made for the project, nor was the impact on habitats, particularly mangroves, considered important.

The implications of engineers and companies not primarily working in environmental sectors providing sustainability-related advice was thus often a means to propagate business and profitability and involved environment-related trade-offs. Nevertheless, such involvement in the project gave consultants the ability to build and claim their expertise in sustainability, in order to get further business for similar projects.

Conclusion

The responsibility of cities transitioning to 'sustainable' development is borne heavily by resource-constrained municipalities implementing basic services such as water and waste management. While municipalities appoint specialised expertise to assist them, this is limited to for-profit engineering consultancies, which in turn operate through everyday governance processes to transition from being solely engineers to advisors on matters of sustainability, in order to build their business prospects in this emerging sector. This has led to a close-knit, opaque nexus of engineering consultants supported by municipal officers (engineers) who influence sustainability-related outcomes for the city, with limited knowledge or expertise related to it and with the exclusion of other actors and expertise. Our study highlights the need for a transition in urban governance to provide training, know-how and decision-making powers to municipalities in the field of sustainability along with the democratisation of expertise (Backstrand, 2003), including both epistemic and performative knowledge (Tellmann, 2016) in planning and implementation processes, to ensure a holistic and equitable transition towards a sustainable city.

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Analysis of Urban Transitions Through Digital Narratives: Cybersemiotic and Grounded Theory Analysis of City Infrastructure Services in Smart City Pune

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Keywords: Smart City; Urban Transition; Public Services; Cybersemiotics; Textual Grounded Theory

The evolution of smart cities has brought both technological advancement and significant shifts in public service delivery. Pune, as one of India's leading smart cities, offers a dynamic landscape where these transitions are particularly visible in its urban services, such as waste management, transportation, and e-governance. This paper employs an interdisciplinary approach that integrates Cybersemiotics and Textual Grounded Theory to analyse these urban transitions and identify the gaps in public services. Cybersemiotics is used to interpret digital narratives, drawing insights from user comments, feedback, and social media discourse, while Textual Grounded Theory allows for the systematic categorisation and analysis of this data to derive theoretical insights. By exploring the symbolic representations of public services through online platforms and decoding the textual patterns that emerge from user-generated content, this study provides an in-depth understanding of the gaps between policy implementation and citizen experiences in Pune's smart city initiatives. The findings contribute to urban governance by offering actionable recommendations for enhancing public service delivery through the alignment of citizen expectations with service outcomes.

Introduction

Urban transitions driven by technological advancements have redefined how public services are managed in cities, with smart cities emerging as a prominent framework for improving urban governance (Kitchin, 2014). The concept of smart cities integrates technology, data, and automation to create more efficient, sustainable, and responsive environments, particularly in growing urban centres like Pune (Saha, 2021). As cities continue to evolve, challenges remain in ensuring that public services such as waste management, transportation, and e-governance align with citizen needs and expectations (Mahendra et al., 2021). Public services in smart cities often face discrepancies between policy goals and real-world service delivery, which can impact citizen satisfaction (Kowalski, 2020). In Pune, a city recognised for its smart city initiatives, services like waste management and public transportation have been criticised for inefficiencies and delays, while e-governance systems have been generally praised for their responsiveness and transparency (Brier, 2008). Despite the development of advanced systems, the success of these services depends heavily on how well they are perceived and utilised by the public (Charmaz, 2014). The rise of digital platforms has enabled citizens to express their experiences with urban services more openly, providing valuable insights into service gaps and successes (Kowalski, 2020). By analysing this digital content, such as tweets, online comments, and social media posts, city planners can better understand the urban transition process from the perspective of the citizens they serve (Brier, 2008). However, there remains a gap in research that systematically analyses this data to inform urban governance and service improvements (Saha, 2021). This study addresses this gap by employing Cybersemiotics and Textual Grounded Theory to analyse citizen feedback on public services in Smart City Pune (Brier, 2008; Glaser & Strauss, 1967). By decoding the symbolic representations of public services and categorising recurring themes, this research provides actionable insights into improving public service delivery in alignment with citizen expectations (Charmaz, 2014). The study's findings contribute to the broader discourse on smart city governance by revealing the critical issues in urban service delivery and identifying potential solutions for enhancing service quality (Saha, 2021).

Literature Review

Smart cities and urban governance

The concept of smart cities has gained considerable attention in urban studies and governance, largely because of its potential to address the challenges posed by rapid urbanisation and population growth. A smart city integrates technology and data to create more sustainable, efficient, and responsive environments (Kitchin, 2014). Smart cities typically leverage technologies such as the Internet of Things (IoT), big data analytics, and artificial intelligence to improve public services, urban infrastructure, and governance systems (Batty, 2018). In India, the Smart Cities Mission has been a pivotal initiative to modernise cities and improve public services. The objective is to transform urban spaces by making them more liveable and citizen-centric through better management of resources, real-time governance, and participatory frameworks (Joss et al., 2019). While this initiative has made considerable progress in cities like Pune, challenges remain in implementing smart city solutions effectively. This study addresses these challenges by focusing on public service delivery in Pune, a frontrunner in India's smart city mission. Several scholars have highlighted that while the technological backbone of smart cities is crucial, the success of smart cities is also dependent on how well they engage with citizens and meet their expectations (Meijer & Bolívar, 2016).

Public services in smart cities

Public services are at the heart of smart city development. Services such as waste management, public transportation, water supply, and e-governance are often the primary focus areas in smart city projects (Kitchin, 2014). Scholars have extensively studied how public services in smart cities can be enhanced through technological solutions, yet there is still a significant gap between policy frameworks and actual service delivery outcomes (Saha, 2021). This study aims to address that gap by analysing public services in Pune through digital narratives and citizen feedback. Waste management is one of the most critical challenges faced by smart cities, particularly in the Global South (Roy, 2009). Many smart city initiatives attempt to solve the waste problem through IoT-enabled smart bins and tracking systems, but citizens often express frustration when these systems fail to meet expectations (Batty, 2018). For instance, irregular waste collection, overflowing garbage bins, and inefficient recycling programmes remain key concerns in cities like Pune (Kowalski, 2020).

Cybersemiotics in urban studies

Cybersemiotics is an interdisciplinary framework that integrates insights from cybernetics and semiotics to understand how meaning is constructed in complex systems (Brier, 2008). As cities become more digitised, online platforms have emerged as spaces where citizens express their experiences, frustrations, and expectations related to public services (Kowalski, 2020). By applying cybersemiotics to the analysis of citizen feedback, scholars can uncover the deeper symbolic and cultural meanings that people attach to their experiences with urban services. For instance, images of overflowing garbage bins shared on social media not only represent a service failure but also symbolise broader concerns about environmental degradation and governance failures (Brier, 2008).

Textual grounded theory in urban research

Grounded theory, first introduced by Glaser and Strauss (1967), is a qualitative research method used to generate theories based on systematically collected and analysed data. It is particularly useful for understanding complex social phenomena where existing theories may not fully explain the observed behaviours. Textual Grounded Theory adapts grounded theory to the analysis of textual data, such as interviews, reports, or online comments (Charmaz, 2014). In the context of urban research, textual grounded theory has been applied to understand how citizens engage with urban governance, public services, and policy frameworks through their online expressions (Charmaz, 2014). By categorising and

coding citizen feedback, researchers can identify recurring themes and patterns that inform the development of new theories or frameworks for urban governance (Glaser & Strauss, 1967).

Citizen feedback in urban planning

The growing reliance on digital platforms has revolutionised the way citizens engage with urban governance and planning. Social media, online forums, and e-governance portals provide new avenues for citizens to voice their opinions and feedback on urban services (Saha, 2021). Citizen feedback is now considered a vital component of modern urban planning, offering policymakers real-time insights into how public services are being experienced at the ground level (Meijer & Bolívar, 2016). Recent studies have emphasised the need for urban planners to incorporate citizen feedback into decision-making processes to create more responsive and adaptive public services (Mahendra et al., 2021). In cities like Pune, social media platforms have become important tools for monitoring public sentiment and identifying service delivery gaps. Analysing this digital feedback provides policymakers with the opportunity to make data-driven adjustments to urban services, thereby improving their efficiency and relevance (Glaeser & Kallal, 2020). However, despite the increasing importance of citizen feedback, there are challenges in collecting and analysing this data. Social media feedback can often be noisy, with a mix of relevant and irrelevant information, making it difficult to derive actionable insights. Moreover, issues such as digital literacy and the digital divide can limit the representativeness of online feedback (Kitchin, 2014).

Gaps in existing research

Despite the extensive literature on smart cities, urban governance, and public services, there is a notable gap in studies that systematically analyse digital narratives and citizen feedback through the lens of Cybersemiotics and Textual Grounded Theory. Most studies on smart cities focus on technological implementation and policy frameworks but often overlook the qualitative aspects of citizen experiences (Brier, 2008). This study fills that gap by offering a novel approach to understanding urban transitions in Pune through an analysis of digital feedback, thereby providing actionable insights for improving public service delivery.

Methodology

This study employs a two-part methodology combining Cybersemiotics and Textual Grounded Theory to analyse digital feedback on public services in Pune. Data was collected from various online platforms, including Twitter, Facebook, and citizen feedback portals related to Pune's smart city services. The focus was on three critical areas: waste management, public transportation, and e-governance.

Step 1: Data collection

The first step involved collecting qualitative data in the form of tweets, comments, and feedback posted by Pune's residents regarding their experiences with public services. The data was sourced from public posts on social media platforms between January 2023 and August 2024, focusing on keywords such as "Pune Smart City," "public transport," "waste management," and "e-governance."

Step 2: Textual grounded theory analysis

Textual Grounded Theory was applied to systematically code the collected data. The coding process involved identifying key themes and subthemes related to citizen satisfaction, service delivery gaps, and policy expectations. Recurring patterns in the data were categorised to develop a grounded theory of citizen perceptions as shown in Figure 46.

Step 3: Cybersemiotic analysis

Cybersemiotics was used to interpret the symbolic and semiotic aspects of the digital content. This involved analysing how public services were represented in online discourse, focusing on the use of language, imagery, and symbolic representations. For example, how waste management was portrayed as a failure or success through online memes, hashtags, and public discourse.

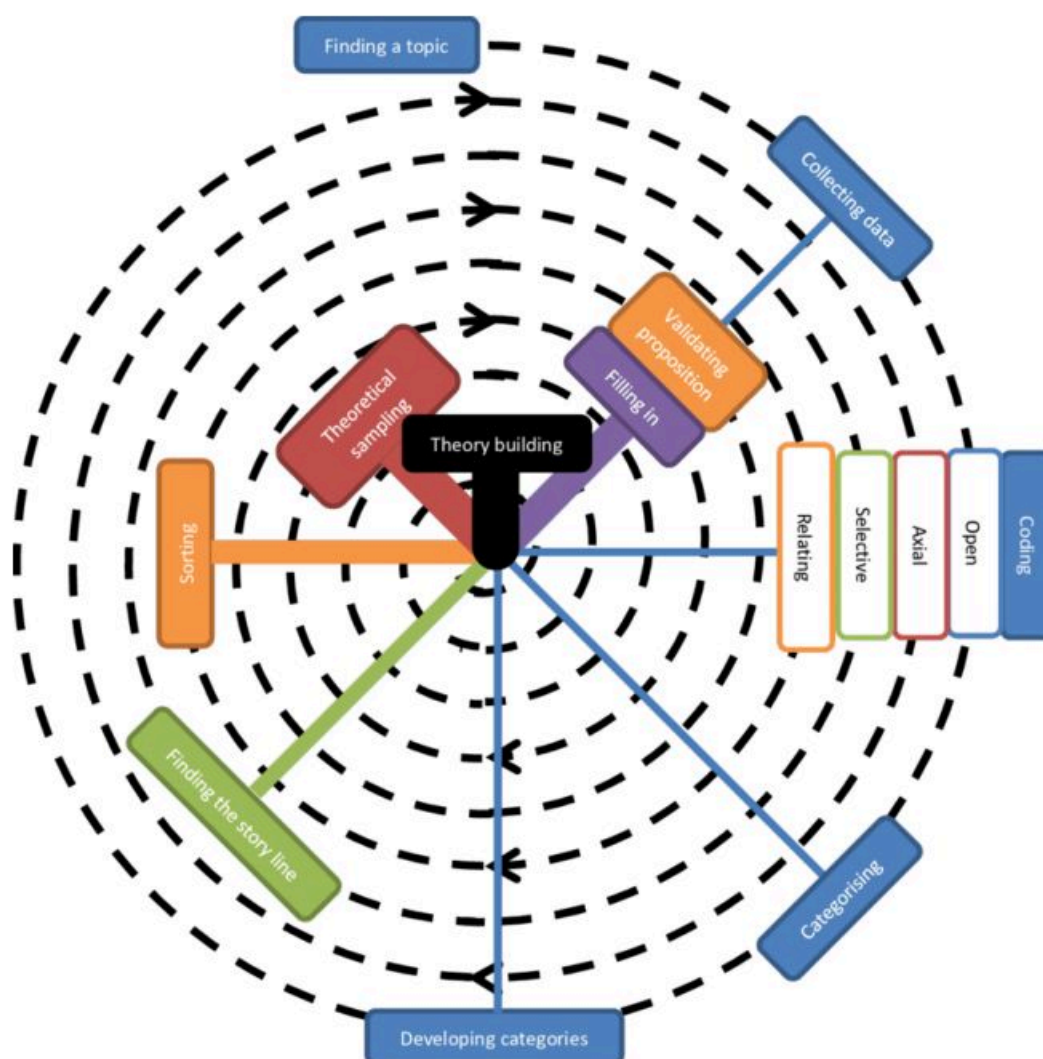
Step 4: Integration of findings

The results from both analyses were integrated to provide a comprehensive understanding of the public service gaps in Pune's smart city initiatives. The combined insights were used to generate recommendations for improving public service delivery in Pune.

Results and Discussion

The findings revealed several gaps in Pune's public service delivery, as expressed through digital narratives. The analysis identified significant discrepancies between citizen expectations and the actual performance of services, particularly in the areas of waste management and public transportation.

Figure 46: Flow diagram illustrating the key steps in Grounded Theory, from Finding a Topic to Theory Building, through processes like Data Collection, Coding (Open, Axial, Selective), Categorising, Developing Categories, and Filling in Propositions



Source: Author

Waste management

Waste management was one of the most frequently discussed topics in the collected data. Citizens expressed frustration with the irregularity of waste collection services and the inefficiency of waste segregation systems. The Cybersemiotic analysis revealed that waste management was often represented through negative symbols, such as overflowing garbage bins and polluted streets, which were frequently shared on social media. Textual Grounded Theory analysis further highlighted recurring themes of dissatisfaction and mistrust in the municipal authorities' ability to manage waste effectively.

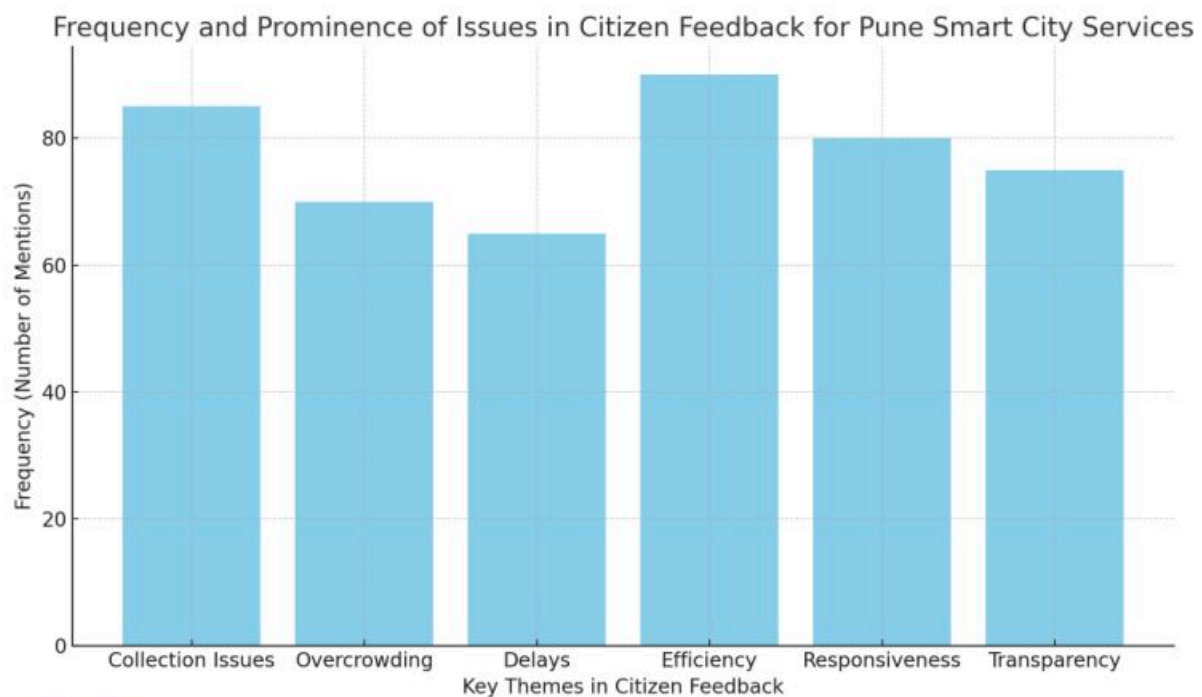
Public transportation

Public transportation also emerged as a critical issue, with many citizens expressing concerns about the reliability and accessibility of buses and public transit systems. The symbolic portrayal of public transportation, as identified through Cybersemiotics, often included images of overcrowded buses and delayed services. The Textual Grounded Theory analysis revealed that citizens were particularly dissatisfied with the lack of infrastructure to support the growing population, despite the promises of smart city improvements.

E-Governance

In contrast, e-governance services were generally well-received, with many citizens praising the ease of access to digital services such as tax payments, license renewals, and public grievance portals. The Cybersemiotic analysis showed that e-governance was often symbolised through positive imagery, such as smooth online transactions and responsive customer service.

Figure 47: Frequency and prominence of issues in citizen feedback for Pune Smart City services



Source: Author

The bar chart displays the frequency and prominence of key issues based on citizen feedback regarding Pune's Smart City Services. The chart categorizes the feedback into six main themes as shown in Figure 47:

1. Collection issues (waste management): This issue is the most frequently mentioned, with a high frequency of over 80 mentions. This suggests that citizens are particularly concerned about how waste collection is handled, indicating inefficiencies or dissatisfaction in this area.
2. Overcrowding (public transportation): Overcrowding in public transportation is another critical issue, with around 70 mentions. This reflects widespread dissatisfaction with the capacity and management of public transport in Pune.
3. Delays (public transportation): This theme has a lower frequency compared to Collection Issues and Overcrowding, with around 65 mentions. While still a significant issue, it appears to be slightly less of a concern than overcrowding.
4. Efficiency (e-governance services): Efficiency in public service delivery, particularly in e-governance systems, is a positive highlight. With around 90 mentions, this theme has one of the highest frequencies, suggesting that many citizens appreciate the effectiveness of digital services.
5. Responsiveness (e-governance services): Responsiveness is also highly mentioned, with around 80 mentions, indicating that citizens value quick replies and interactions through online platforms.
6. Transparency (e-governance Services): Transparency has around 70 mentions. This reflects the importance of open and accountable processes in citizen interactions with governance systems.

Figure 47 highlights significant gaps in waste management (collection issues) and public transportation (overcrowding and delays) in Pune's smart city services. However, it also underscores the positive feedback regarding e-governance, particularly its efficiency, responsiveness, and transparency. This suggests that while some sectors require urgent improvements, others are meeting citizen expectations effectively. These insights can guide policymakers and urban planners in prioritising areas for development and service improvement.

Recommendations

1. *Improvement of waste management systems*

The findings suggest the need for enhanced waste management services, particularly in improving the consistency of waste collection and segregation practices. Municipal authorities should invest in smart waste management systems that allow for real-time tracking of waste collection activities.

2. *Infrastructure development for public transportation*

Given the recurring themes of dissatisfaction with public transportation, the city should prioritise the development of infrastructure to support the growing population. Expanding bus routes and improving service reliability are critical to

Conclusion

This study provides a novel approach to understanding urban transitions and public service delivery in Pune's smart city initiative by integrating Cybersemiotics and Textual Grounded Theory. The analysis of digital narratives has revealed critical gaps in waste management and public transportation, while e-governance services have been positively received by citizens. The combined methodology offers a powerful tool for city planners and policymakers to identify areas where public services need improvement and to better align service delivery with citizen expectations.

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Governance, Growth, and Sustainability: Navigating Urban Transitions and Challenges in Post-Bifurcated Andhra Pradesh

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Urbanisation is one of the defining trends of the 21st century, with significant implications for economies, societies, and environments worldwide. According to the United Nations (2018), by 2050, nearly 68 per cent of the global population is expected to live in urban areas, with much of this growth occurring in Asia and Africa. Cities are widely regarded as engines of economic growth and innovation, but rapid urbanisation also poses challenges related to infrastructure development, governance, resource management, and environmental sustainability. Urban transitions, the processes by which cities evolve and adapt, are thus critical for balancing growth with sustainability. Globally, these transitions are influenced by a variety of factors, including technological advancements, migration patterns, and industrialisation, all of which contribute to the ongoing reconfiguration of urban areas (Seto, 2013).

In India, urbanisation is progressing at an unprecedented rate. As of 2020, approximately 34 per cent of the country's population lives in urban areas, but this figure is projected to rise sharply in the coming decades, adding over 400 million urban dwellers by 2050 (Census of India, 2011; United Nations, 2018). Indian cities, which contribute more than 60 per cent of the country's GDP, are pivotal to national economic growth (Ministry of Housing and Urban Affairs [MoHUA], 2020). However, rapid and often unplanned urbanisation in India presents a host of challenges, including overburdened infrastructure, inadequate public services, housing shortages, and environmental degradation (Kundu, 2014). This unplanned growth has led to the proliferation of informal settlements, exacerbating social inequality and complicating efforts to manage urban transitions sustainably (Bhagat, 2016).

Recognising these challenges, the Indian government has introduced key governance reforms to better manage urban transitions, most notably the 74th Constitutional Amendment Act (CAA) of 1992. The 74th CAA was designed to decentralise governance by empowering Urban Local Bodies (ULBs) to manage local development, infrastructure, and public services (Government of India, 1992). Despite the legislative framework provided by the amendment, ULBs in many cities remain constrained by limited financial autonomy, inadequate administrative capacity, and bureaucratic inefficiencies (Sivaramakrishnan, 2011). These challenges have hindered the ability of ULBs to effectively manage urbanisation, particularly in smaller cities.

To address the broader issues of urban development, the Indian government has also implemented initiatives such as the Smart Cities Mission and the Atal Mission for Rejuvenation and Urban Transformation (AMRUT). These programs aim to modernise urban infrastructure and promote sustainability, with a particular emphasis on the use of smart technologies to improve urban management (MoHUA, 2019). However, the implementation of these initiatives has been uneven, with larger cities often receiving more resources and support than smaller cities (NITI Aayog, 2020). This has led to disparities in infrastructure development and service delivery, exacerbating the challenges of managing urban transitions in rapidly growing urban centers.

Against this backdrop, the urbanisation of Andhra Pradesh post-bifurcation offers a compelling case study of how urban transitions are reshaping smaller cities in India. The bifurcation of Andhra Pradesh in 2014 resulted in the creation of Telangana, with Hyderabad as its capital, leaving Andhra Pradesh without its primary economic and administrative hub. In response, the state has focused on developing smaller cities such as Vijayawada, Visakhapatnam, Guntur, and Tirupati as key urban centres (Government of Andhra Pradesh, 2015). These cities have absorbed much of the population and

economic growth that was previously concentrated in Hyderabad, leading to rapid urban expansion (Bhagat & Mohanty, 2019).

The drivers of urbanisation in these cities are varied. Visakhapatnam, for example, has emerged as a major port city and industrial hub, while Vijayawada has taken on increased political and administrative importance (Ramachandraiah, 2015). These cities have also benefited from the growth of the IT and services sectors, as well as the development of tourism and infrastructure projects. However, this rapid growth has created significant challenges, particularly in terms of infrastructure capacity, environmental sustainability, and social inclusion (Mohan & Kumar, 2019).

One of the key themes of this paper is the role of governance in managing these urban transitions. While the 74th CAA provides the legal framework for decentralisation, ULBs in Andhra Pradesh have faced numerous challenges in fulfilling their mandate. These challenges include financial dependency on state and central government transfers, limited administrative capacity, and a lack of coordination between different levels of government (Sivaramakrishnan, 2011). These issues have impeded the ability of ULBs to effectively manage infrastructure development and public services, complicating efforts to promote sustainable urban growth.

The sustainability of urban growth is another critical focus of this paper. Rapid urbanisation in Andhra Pradesh has led to significant environmental challenges, including poor waste management, water scarcity, and pollution (Ghosh, 2018). For instance, Visakhapatnam's coastal environment faces severe degradation due to industrial pollution, while Vijayawada struggles to manage its riverine ecosystems amid encroaching urban development (Bhardwaj et al., 2020). These environmental challenges threaten the long-term viability of urban growth, as they undermine the capacity of cities to provide clean water, clean air, and green spaces for their residents.

To address these issues, the Smart Cities Mission and AMRUT have been implemented in Andhra Pradesh's major cities, aiming to improve urban infrastructure and promote sustainability through the use of smart technologies (MoHUA, 2019). However, the success of these initiatives has been mixed. While Visakhapatnam has made progress in incorporating smart mobility and energy-efficient technologies into its urban planning, other cities have struggled to implement these innovations due to resource constraints and administrative bottlenecks (NITI Aayog, 2020).

In addition to environmental sustainability, the paper examines the economic inclusivity of urban transitions in Andhra Pradesh. Despite the economic growth experienced by cities such as Vijayawada and Visakhapatnam, much of this growth has disproportionately benefited wealthier sections of society, while marginalised communities have been left behind. The housing crisis in these cities, for example, reflects this inequality, with many low-income residents living in informal settlements or inadequate housing (Kumar & Dandekar, 2018). Although government programmes like Pradhan Mantri Awas Yojana (PMAY) aim to provide affordable housing for low-income groups, the demand for housing far exceeds the supply (MoHUA, 2019).

The role of public-private partnerships (PPPs) in financing urban infrastructure projects is also explored in this paper. PPPs have been used to develop critical infrastructure such as transportation systems, waste management facilities, and energy grids (NIUA, 2019). While PPPs have allowed cities to attract private investment for infrastructure development, questions remain about the long-term sustainability of these projects and their impact on social equity. In some cases, PPPs have prioritised profit over public interest, exacerbating inequality in access to services (Deloitte, 2018).

Finally, this paper addresses the financial health of ULBs in Andhra Pradesh, which is crucial for managing urban transitions effectively. Many ULBs lack the financial autonomy needed to invest in large-scale infrastructure projects or pursue sustainable urban policies (Sivaramakrishnan, 2011). Instead, they are reliant on state and central government grants, limiting their ability to engage in long-term financial planning. The paper explores potential solutions to improve the financial capacity of ULBs, including expanding local revenue-generation mechanisms and improving financial management practices (IIPFP, 2021).

In conclusion, this paper highlights the complex challenges of urban transitions in post-bifurcation Andhra Pradesh, particularly in terms of governance, sustainability, and social equity. The findings underscore the need for a more integrated approach to urban governance, one that balances the demands of rapid growth with the imperatives of environmental and economic sustainability. As Andhra Pradesh continues to navigate these urban transitions, the lessons learned from its cities will be critical for shaping the future of sustainable urban development in India.

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Mapping Power and Participation in Greenfield City Development: the Case of Amaravati's Land Assembly Mechanisms and Evolving Stakeholder Dynamics

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Keywords: Land Pooling, Land-based financing, Greenfield City, Governance frameworks

In this paper, I examine the complexities involved in building greenfield cities, specifically the interplay between technocratic, privatised, and entrepreneurial city development models and the various stakeholders involved. To ground this analysis, I explore the case of Amaravati's land assembly mechanisms and planning processes, with a particular focus on the "Land Pooling Scheme" (LPS). In this model, the government acquired land from farmers and landowners, who contribute it as their investment share, while private companies bring in capital for the city's development. At the same time, the government took on debt from multilateral agencies like the World Bank and the Asian Infrastructure Investment Bank (AIIB) to fund the development of critical infrastructure.

The financial logic underpinning the land pooling system rests on the expectation that the 'reconstituted plots' that landowners receive as compensation will eventually be worth more than the agricultural land they initially gave up. In my analysis, I examine how these financial relationships—between the government, farmers, private investors, and international financial institutions—have shaped Amaravati's development. I pay particular attention to the differing positions of landowning and landless farmers, as these actors' roles and power dynamics have evolved between 2014, when land pooling began, and today. After the bifurcation of Andhra Pradesh in 2014, the newly formed state faced the challenge of losing Hyderabad, a key economic hub that went to Telangana. In response, Chief Minister Chandrababu Naidu proposed Amaravati as the new capital. Envisioned as a greenfield smart city, Amaravati was to act as the engine of growth for agrarian Andhra Pradesh's development, counterbalancing the loss of Hyderabad.

The first section of this paper provides a spatial and financial analysis of the rural-to-urban transitions in this period, particularly the way land use and development patterns shifted under Naidu's administration. Naidu's economic reforms, which had previously transformed Hyderabad into an IT hub by attracting foreign investments and securing World Bank loans for infrastructure projects, served as a model for the Amaravati initiative. With the promise of replicating this success, Naidu persuaded thousands of land-owning farmers to voluntarily give up their land for the development of the new capital. However, the immense amount of debt accrued, coupled with the slow pace of development projects, raised concerns. These concerns were compounded by the government's failure to conduct adequate environmental and social impact studies, as well as allegations of corruption, all of which diminished public confidence in the project.

The second section of this paper explores the political transitions that occurred between 2014 and 2024, analysing how these changes affected relationships among key stakeholders in the project. In 2019, YS Jagan Mohan Reddy's rise to power marked a significant political shift. Reddy focused on scaling back Naidu's ambitious development plans, instead prioritising welfare schemes and debt reduction. His administration's decision to abandon the Amaravati project in favor of a decentralised model, proposing three separate capital cities for Andhra Pradesh, caused further delays in the development of Amaravati. This political shift led to growing disillusionment among landowners who had surrendered their land in exchange for promises of future gains. The lack of progress exacerbated tensions between the state government and the landowning farmers, particularly those who had been banking on the rise in property values that Amaravati was supposed to bring.

Reddy's decentralisation efforts ultimately failed to resonate with the public. Facing increasing pressure from land-owning groups and the public's frustration with the stalled project, Chandrababu Naidu was reinstated as Chief Minister in 2024. In this section, I also examine how the political relationship between the state government of Andhra Pradesh and the central government in Delhi evolved during this time. Naidu's close ties to the central government, particularly under Prime Minister Narendra Modi's administration, facilitated access to international funding for Amaravati's development. However, the political shift under Reddy's administration, coupled with slow progress and rising debt, led multilateral development banks (MDBs) such as the World Bank and AIIB to reevaluate their involvement in the project. As a result, some international financial institutions ultimately withdrew their support.

The third section delves into the evolving financial dynamics of the project and the differentiated power of landowning versus landless farmers. These dynamics are influenced by land categorisation in local revenue systems, which affects farmers' ability to negotiate favorable terms. I critically assess the compensation packages offered to different stakeholders under the LPS, alongside the World Bank's resettlement policy framework. Land-owning farmers, organised under groups like the "Amaravati Rajadhani Samikarana Rythu Samakhya," played a crucial role in lobbying the government to resume development work in Amaravati. These farmers leveraged their caste-based networks and political connections to press for the continuation of Naidu's policies, which would eventually benefit them. Indeed, their advocacy played a significant role in Naidu's return to power in 2024.

However, the ability of these groups to secure favorable outcomes highlights the inequities embedded in the Amaravati project. Caste-based power dynamics, rather than institutional mechanisms, enabled land-owning farmers to influence the development process. Non-landowning farmers, on the other hand, were largely left out of these negotiations and faced significant disadvantages under the LPS. Although land pooling was framed as a more inclusive and participatory form of land acquisition, the process effectively marginalised landless farmers and other vulnerable groups who lacked the political capital to advocate for their interests. The exclusion of these groups calls into question the broader claims that land pooling is an equitable financing mechanism for city development.

In this section, I also explore how the spatial inconsistencies in Amaravati's development reflect and reinforce existing social inequalities. While the Master Plan for Amaravati laid out ambitious goals for the city's spatial and economic development, the actual allocation of reconstituted plots to landowners has been uneven. This unevenness stems, in part, from the way that caste hierarchies intersect with local land revenue systems to shape who benefits from the urban transition. Amaravati's development has exacerbated pre-existing caste-based disparities rather than addressing them, and the distribution of plots and the disparities in compensation packages offered to different groups reflect this.

The final section of the paper reflects on the broader roles of state actors, private investors, and international financial institutions in the planning and building of Amaravati. The exclusion of marginalised groups—particularly landless farmers, the poor, and those from disadvantaged castes—was not incidental, but rather systematic. The planning and development processes, driven by private capital and state actors, privileged the interests of dominant landowning groups at the expense of others. Even within the landowning class, the ability to negotiate favorable terms for compensation and development varied significantly based on caste and political connections.

I conclude by considering the long-term implications of this exclusion for the governance of Amaravati and other greenfield cities. While the involvement of private investors and international financial institutions is often justified by the need to fund large-scale infrastructure projects, these actors tend to prioritise financial returns over equitable outcomes. The Amaravati case demonstrates the limitations of

current governance models for greenfield cities, which too often prioritise technocratic expertise and economic growth over robust local governance frameworks. Without meaningful involvement from all stakeholders—particularly marginalized groups—these projects risk entrenching existing inequalities and undermining their own sustainability.

Through this analysis, I argue for the need to rethink governance frameworks for greenfield city development. Innovative governance mechanisms that centre equity and inclusion are crucial if these projects are to deliver on their promises of sustainable, inclusive urban development. Through the case of Amaravati, I reflect on participatory governance for greenfield cities, highlighting the importance of balancing economic imperatives with social and political justice.

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Property Technics: (Re)Tracing Socio-Technical Transitions at Delhi's Agrarian-Urban Frontier

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My research project interrogates the conjuncture of colonial, biopolitical, technological, and digital epistemes that come together as contemporary practices of “property-making” (Blomley, 2004; Cowan, 2022; Pati, 2022) under India's agrarian mode of urbanisation (see Cowan, 2022; Gururani, 2020; Balakrishnan & Gururani, 2021). It understands emerging peri-urban imaginaries and ongoing speculative transformation of diverse agro-pastoral land regimes and tenurial systems at the edge of the Indian city into globally fungible urban property regimes as a situated articulation of digital, legal and biopolitical technologies that I collectively conceptualise as property technics. Property technics here represent a continuum from colonial to postcolonial technics and analog to digital technics that are crucial to recasting rural land as urban property. In this presentation, I focus on recent proposals by the Delhi Development Authority to urbanise more than 50,000 acres of agricultural land in 100+ peripheral villages within the National Capital Territory of Delhi (hereafter Delhi). The city-state of Delhi is comprised of 367 urban and rural villages—the legacy of India's colonial-agrarian history, that also houses the capital New Delhi, while forming the core of the global south's largest urban agglomeration (UN 2019). Through my presentation, I will demonstrate how emerging urban policy imaginaries of property-making to transform Delhi's agrarian-urban peripheries—areas popularly termed as Dilli Dehaat or Delhi's countryside—showcase the scale of aesthetic aspirations for the capital's “world-class” futures (Ghertner, 2015) while also revealing the centrality of liberal-colonial orders of private property regimes to its planned futurity (Bhandar, 2018), and attendant questions of ecological sustainability in the region.

My theoretical framing will draw from the fields of urban geography and Science and Technology Studies (STS) by both expanding Blomley's (2004) project of tracing genealogies of emerging modern property relations and following Ranganathan and Bonds (2022) recent call for transnational solidarity by moving beyond settler-colonial frameworks to study “racialised property relations” in the post-colony. Here, I aim to advance a postcolonial technoscientific (Seth, 2009) agenda within critical property studies with a focus on India's agrarian urbanisation; one that accounts for the “digital turn” in geography (Ash et al., 2016) as it unfolds across the global south (Datta, 2022). Furthermore, I understand emerging digitally-mediated property regimes as relations that continue the work of empire through enlightenment logics and technologies, socio-spatially reinforcing the liberal-colonial discourse of a propertied self as the self-possessive individual (Ranganathan & Bonds, 2022; Schacherreitter, 2014) i.e., one who is proprietor of their own personhood and capacities and does not owe anything to society while the socio-technical order in turn is contrived to protect their individual rights in (landed or real) property (Macpherson, 1962). At the core, this shift entails a metaphysical maneuver that simultaneously sutures ontologies of the human to legal formations of property (Bhandar, 2018). With my broader conception of property technics, I aim to study the “material-discursive” (Barad, 2003) transformations of land and associated subjectivities at the rural-urban frontier of the postcolonial Indian city where due to colonial-agrarian histories, both rural land and marginal lives are being biopolitically and technoscientifically re-coded—through entanglements of racialised regimes of property and digital regimes of technology—into differentiated spatiotemporal and socio-material orders of urban life that normatively advance homogenised capitalist futures whilst foreclosing possibilities for other rural-urban dialectical futurity. Land then, here in its commodity-form, as property, (Sud 2021)—buttressed by the latter's appropriative and alienated conception—emerges as fundamental to the infrastructural base that anchors modern technology's (urban) “enframing” of (rural) nature into a Heideggerian “standing-reserve” i.e., a resource-based re-arrangement of land relations that simultaneously guarantees empire's continuity by ensuring durability of (settler/post-)“colonial futures” (Liboiron, 2021).

My research ultimately aims to reveal, challenge, and sever such continuity and attendant subject-formations to enable a reclaiming of property technics towards more emancipatory endeavors such as furthering ongoing critical cartographic efforts in the form of “refusals” by the youth of Delhi’s villages (Simpson, 2016). My overall goal here is to understand the situated co-constitution of property regimes, technoscientific regimes, and racialised regimes of social difference that material and immaterial technologies of property-making (Cowan, 2023; Campbell, 2016) are engendering through statist techno-futurism: visions, plans, and technologies that material-discursively and digitally alter Delhi’s rural hinterlands. How do we understand these entanglements of property-making, caste-based racialisation (Ranganathan, 2022), and agrarian urbanisation (Balakrishnan & Gururani, 2021) in an information age of a postcolonial south where digitalisation is relatively new, largely incomplete (Datta, 2022) and becoming yet another “nomospheric” conduit (Delaney, 2010) for empire? For preliminary answers, I turn to the notion of technics. Technics for philosopher Oswald Spengler are humanity’s “tactics of living” —techniques that are conscious, alterable, personal, inventive, and capable of development (1932, 17). Following Stiegler’s theorisation of “modern technics” (1998) as prostheticity i.e., appendages that extend modern human life and its capacities towards either curative or toxic possibilities (Stiegler, 2013), I further this notion to reconceptualise emergent co-framing of technologies, subjectivities, and liberal-colonial propertisation in Delhi as property technics: an assemblage of evolving digital cultures in the technoscience of property-making and racialized subject-formation along lines of caste, religion, and gender that arises from entangled state and non-state practices.

My hope from this exploration is that by revealing work that goes into creating and maintaining underlying liberal-colonial orders of urban planning centred on social differentiation through private property relations in Delhi, I can begin theorising alternate registers for living with the land that go beyond viewing rural land as merely future urban property with its concomitant anthropocentrism (Simpson, 2017). Maybe then, in the Global South, a new critical perspective on and relationship can emerge with land, seeing it in its plurality by evolving a new technics of relating with it in its multiplicity i.e., land as biology, as geology, as hydrology, etc. rather than as only commodity i.e., property—a shift that could also be crucial for just climate futures in the urban Global South.

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PANEL 7
Labour and Employment
Transitions

Are the Peasants Reporting for '*Dipty*' (Duty)?: Everyday Lives of Depeasantisation in Urbanising Coal Fields in India

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Concomitant to the projections of its rapid economic growth, India's energy requirements are also expected to rise dramatically. Coal is firmly placed at the centre stage for the planned growth in the state-led vision of becoming a developed country by 2047 (Ministry of Coal, 2024). This has been theorised in scholarship as India's transitions to more fossil fuel-based energy, particularly coal (Oskarsson et al., 2021; Roy & Schaffartzik, 2021)

Intertwined with this transition to coal in pursuit of economic growth is India's larger rural-urban transition, also transpiring in its coal bearing hinterlands, which forms the larger context of this paper. There is an empirically well established positive correlation between economic growth and rate of urbanisation (Alkema et al., 2013; Henderson, 2002; Spence et al., 2009). However, despite an accelerating economic growth rate, the rate of urbanisation in India is actually declining (van Duijn, 2019; World Bank, 2023). With processes of urbanisation in developing countries often remaining hidden in official statistics (Ellis & Roberts, 2016), India's hidden urbanisation has become an important topic of academic interest in understanding the larger sociospatial transformations intertwined with its rapid economic growth.

Dimensions of this hidden urbanisation have been examined in diverse empirical sites, from small but vibrant growing towns (Mukhopadhyay et al., 2021), rural hinterlands of Bihar (van Duijn, 2019), across the wide and expanding networks of highways (Balakrishnan, 2020), to cities growing within agrarian expanses (Gururani, 2023). Empirically, this paper is situated in the North Karanpura coalfield in Jharkhand, one of the largest in the country with reserves of almost 20 billion metric tonnes (MT) spread over more than 1230 square kilometres (Oskarsson et al., 2019). More specifically, it is concerned with the multiple coal blocks carved out in the eastern part of this coal field that are in various stages of operationalisation. Following a preliminary study in October–December 2021, a six-month situated qualitative fieldwork was conducted between October 2022 and March 2023, covering multiple sites while anchored in Barkagaon in Hazaribagh district.

Part of a larger thesis that examines the ongoing sociospatial transformations of the fieldsite associated with coal extraction through the lens of the urban reconceptualised as a theoretical processual category (Brenner & Schmid, 2015), this paper engages with the changing everyday life in this predominantly agrarian region. Bringing in conversation critical urban and critical agrarian studies, it analyses the changing relations of production that are intertwined with the ongoing spatial churn in the region, broadly land use change from farming towards coal mining and evacuation, but also emergent spaces of centrality (Stanek, 2008). Specifically, this paper engages with particular aspects of the evolving formulations of the 'classic' agrarian question that share a common core, the enduring interest in 'urban/industrial as well as rural/agricultural transformations' (Ghosh & Meer, 2021).

Agrarian Question in an Urbanising Space

Covering almost 10,000 acres of land in 25 villages, and a target peak annual production capacity of 22 million MTs, the Pakri Barwadih coal project in Barkagaon, one of the projects anchoring this study, is a massive undertaking gradually transforming the region. Allocated to NTPC in 2004, the project became operational more than a decade later, sending out its first rake of coal in 2017. This delay was in large part due to explosive protests by the primarily agrarian community, mobilising under the broad narrative of refusal to part with land. This narrative also contained a refusal of the changing economic

relations underlying this dispossession, formulated broadly as going from a kisaan, a farmer, to a worker in the coal extraction operations.

However, the ensuing spatial churn, assisted by the state machinery and internal difference within communities in overcoming resistance, is gradually transforming forests, farmlands, commons, and village settlements not only into mining pits, coal evacuation points, and site offices but also new residential concentrations and burgeoning markets. Observations and narratives generated in the fieldwork present a complex picture of the changing relations of production in everyday life. This paper draws on debates in critical urban studies around the metatheoretical aspects of the urban (Brenner & Schmid, 2015; Brenner, 2018; Buckley & Strauss, 2016; Oswin, 2018; Roy, 2016), along with critical agrarian debates (Ghosh & Meer, 2021; Harriss-White, 2023; Kumar, 2021) and urban-rural relationality (Balakrishnan & Gururani, 2021) to examine the dimensions of these transformations that cannot be neatly contained within binary frames such as rural-urban, peasant-proletariat, and even theoretical approaches of critical political economy and cultural studies that are understood as distinct in their analysis of social relations.

Coming from the third wave reading of Henri Lefebvre's works that eschews the theoretical divide between political economic approaches, concerned with material social relations, and post-theories that deal with subjectivities, identity, and difference (Kipfer et al., 2008), Brenner & Schmid (2015) propose a new epistemology of the urban. Taking forward Lefebvre's assertion that the urban is becoming the episteme of our time, and its reconceptualisation is a necessary precondition to understand contemporary social realities, they offer a set of theses that decentres the mainstream understanding of the urban as an empirical category linked to 'the' city, conceptualising it instead as a theoretical processual category to examine multiscalar processes of sociospatial transformations occurring in distant hinterlands across the planet. Drawing on Lefebvre's spatial triad, they offer three dialectically related dimensions of the multiscalar processes of urbanisation—spatial practices, territorial regulations, and everyday life. It is everyday life and difference which forms the anchor for this study.

This conceptualisation, however, has drawn criticism, primarily from feminist, post-colonial, critical race, and queer theorists (Brenner, 2018; Oswin, 2018; Roy, 2016), who have questioned what they consider as its totalising tendency that seeks to absorb all difference within a planetary wide scope of capitalistic urbanisation. A related critique is the erasure of rural pasts, presents, and futures within the framing of planetary urbanisation as an urban theory without an outside (Brenner, 2014). Buckley & Strauss (2016) have demonstrated that a neo-Lefebvrian approach needs to consider and go beyond Lefebvre's emphasis of a focus on the role of difference and everyday life in understanding capitalist urbanisation and highlighting the role of feminist and radical literature in illuminating the manifold 'outsides' of the urban. Acknowledging the political valence of the notions of 'outside' and 'constitutive outside' in diverse fields including queer, feminist, post-Marxist theories, Brenner (2018) calls for an engaged pluralism in critical urban research.

In this vein, arguing for engagement with agrarian scholarship attentive to interrelations of urban and rural socio spatial relations, Ghosh & Meer (2021) suggest a focus on 'depeasantisation' as the labour dimension of extended urbanisation. Focusing on both changing material relations and changing subjectivities, this paper examines three intertwined aspects of the ongoing depeasantisation in the fieldsite from a rural-urban relational lens: a) the dominant framing of peasant to worker transitions, widely considered more favorable in a state-led model vs innovatively adverse and precarious in neoliberal economic regimes is complicated by multiplicities of realities; including b) preexisting structural differences that translate into complementary unequal relations (Harriss-White, 2023; Pattenden, 2023); c) the kisaan as a focal point of identity obscuring classes of labour, despite a new

generation with urban aspirations towards work in this transforming region. This has implications for a research agenda for progressive rural politics (Borras Jr., 2023; Pattenden, 2023)

Looking Behind, Looking Ahead the Kisaan/Peasant Monolith

Historically, under the state led model of development, public sector enterprises or PSEs, particularly in the resources sector, are associated with ushering urbanisation in marginalised hinterlands affected by their operations through establishment of industrial townships and formal government employment opportunities (Glover, 2012; Kale, 2020). Coal India and its subsidiaries, with multiple coal extraction operations, are a special point of reference in Jharkhand in this regard. On the other hand, the contemporary neoliberal regime is broadly understood to limit the role of the state and allow market-based growth, also introducing adverse and precarious workforce transitions. Research, however, has demonstrated a continued and central presence of the state in the liberalising landscape (Sud, 2009) and the adverse working relations, instead of exceptional innovations (Ong, 2006), are better understood as a formalisation of preexisting structural conditions of precarity and political subjectivities (Cross, 2010). It is in this context that this paper examines the ongoing depeasantisation in the fieldsite.

The recent reforms introduced in the coal sector have modified the organisation of extraction work. While allocated to NTPC, a PSE of the central government, for captive coal use primarily for electricity generation, the mining and evacuation work in the Pakri Barwadih block has been outsourced through the Mining Developer cum Operator (MDO) model, which entails the contracting out of end-to-end mining and transport activities to a private service provider. While there is significant debate in the field about the divergence from the opportunities of government employment with the concerned PSE, this state of depeasantisation can be better understood as a formalisation of preexisting conditions of precarity.

As debates in critical urban studies have highlighted, a progressive agenda for rural politics needs to go beyond the preponderance of the interest of the landed peasantry and consider the reality of different classes of labour that work in the rural countryside (Pattenden, 2023). Obscured by the monolith of the land holding peasant or the raiyat, the majority of rural masses, the small and marginal land holding farmers and landless laborers are already living in precarious conditions, relying on non-farm daily waged work for which they migrate to neighboring urban spaces or even to distant cities for longer periods. The larger derision shown towards daily wage workers, through the devaluing of the term, dihani, is also seen within the supposedly egalitarian rural community of which they are a part.

Changing relations of labour and precarity are complicated further by an informal multilayered subcontracting regime, where activities are parceled and subcontracted to various small parties, or petty contractors. Consequently, it is difficult to ascertain who the employer really is, even as people debate whether it is a private or sarkari government job. Receiving big sums in compensation, the small cohort of peasants who own a large share of the land have emerged as petty capitalists. As owners of earth moving machinery and proprietors of businesses including schools and clinics, their positioning in the economy precludes such mobilisations. This new generation of petty capitalists look at farming as a rural dehati lifestyle that holds no prestige in the modern world.

In conclusion, it is argued in the paper that these transformations are protracted and binary identities of peasant and proletariat only present a broad picture, obscuring nuances that have arisen from internal differences within the communities in this ongoing transformation. While there has been a drastic restructuring of the materiality of work, from farming to a mining and urban economy, the preexisting structural conditions of precarity are broadly reproduced. This is complemented by the stickiness of the frames of meanings, the rural equating the land owning kisaan and even as they are gradually evolving towards another hierarchy, the business professional in the emerging urban space. The peasant persists

as the dominant sociopolitical identity, deflecting political articulations of emergent realities (Li, 2019). Thus, in order to have a comprehensive scope of the research agenda for progressive politics, in addition to paying attention to rural-urban migration-based relations, as Pattenden (2023)

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Navigating Just Transitions in Exhausted Extractive Industries: Insights from the Kolar Gold Fields

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Current discussions surrounding Just Transitions strongly focus on shifting to a low-carbon economy while carefully considering the social implications of decarbonisation. The strategies proposed by various stakeholders—spanning economic, ecological, and labour concerns—often vary significantly. This paper explores the potential for achieving a Just Transition in a region that once thrived as a prominent extractive industry whose resources have been largely depleted over the past century.

The Kolar Gold Fields (KGF), historically a land of promise, mobility, leisure, and stark inequality, represented different realities for British colonisers, caste-Hindus, coolie labourers, and migrant workers. KGF was once a hub of British interest, becoming the first site in India to be electrified in 1902, and now exists as a distant memory. We aim to examine the developmental trajectories that shaped this space across distinct historical periods: from colonial times to its nationalisation and eventual closure, and finally, to the contemporary visions for the region's development. By conducting a longitudinal analysis of the limitations KGF has faced in development across different periods, we aim to understand the region's current challenges and opportunities for future progress.

By analysing changes in education, healthcare, mobility, migration, and access to resources like electricity and water, we seek to identify strategies that can facilitate a Just Transition in a region once dominated by an extractive industry but now facing neglect. By drawing on existing literature on extractive industries and non-metropolitan development in the Global South, this research aims to contribute to a broader understanding of strategies for achieving Just Transitions in other resource-rich, non-metropolitan spaces of the Global South that rely on extractive industries.

Background

Kolar is a district in the southeastern part of Karnataka, India, bordering Andhra Pradesh and Tamil Nadu. It is historically significant for the Kolar Gold Fields (KGF), one of India's oldest and most productive gold mining centres.

Mining activity in the region gained prominence under British colonial rule. After Tipu Sultan's defeat, Lt. Warren, a British geologist, identified KGF's mining potential but lacked the necessary technology (Warren, 1802). Major mining efforts began when Irish geologist Michael Fitzgerald Lavelle secured mining rights in 1873 but lacked the capital. This led him to sell these rights to John Taylor & Sons, a British mining firm. In 1880, this firm began large-scale mining operations that would transform KGF into one of the world's most important gold mining centres (Gowda, 2023).

At its height, KGF became known for deep-shaft mining, with shafts reaching over 10,000 feet, making it one of the deepest mining sites in the world. The introduction of electric power from the Shivanasamudra hydroelectric power station in 1902 enabled deeper and more efficient mining operations. The British brought in Cornish miners as experts to manage the complex mining operations, and their elite lifestyle in "Little England" starkly contrasted with the living conditions of the local labour force.

The majority of the workforce was composed of marginalised communities, including Dalits, who lived in overcrowded "coolie towns" with inadequate access to clean water, sanitation, and healthcare. The miners worked under gruelling conditions, subject to strict searches and harsh punishments for

smuggling gold (Dev, 2021). While most of the wealth generated from mining was extracted by the British, workers and their families endured poor living standards.

After independence, KGF was nationalised and came under Bharat Gold Mines Limited in 1956. However, by the late 20th century, the productivity of the mines had severely declined, and the operational costs had risen. Despite strong labour unions and worker movements, the mines were officially closed in 2001, leading to widespread unemployment. The closure devastated the local economy, leaving the region neglected, with people suffering from illnesses related to mining byproducts like cyanide (Kajal, 2020).

Despite attempts to revive KGF, including an auction in 2016, the region remains in economic hardship, with limited progress toward recovery.

Research Questions

This research addresses the scope, necessity, and challenges of Just Transitions within the context of an exhausted extractive industry, examined through a longitudinal analysis of the Kolar Gold Fields (KGF). The KGF case is particularly relevant today, as it represents a society that can no longer depend on gold mining as a means of development.

1. What factors contributed to the decline of the Kolar Gold Fields and its current socio-economic state?
2. How have various stakeholders—such as the British colonial authorities, labour unions, and the Indian state—shaped the development and transformation of KGF over time?
3. What limitations does the concept of Just Transitions face in addressing the needs and rights of blue-collar workers within the framework of neoliberal policies?

Theoretical Framework

The study is situated within a Marxist-ecological framework that recognises the critical importance of maintaining extractivism for the survival of capitalism by emphasising how growth within this capitalist framework is intricately linked to the global hunger for raw materials (Foster, 2024). This perspective aids in understanding the limitations of development in the Kolar Gold Fields (KGF), which operates under a broader capitalist system. Utilising Alberto Acosta's definition of extractivism, which refers to “activities that remove large quantities of natural resources that are not processed (or processed only to a limited degree), especially for export” (Acosta, 2012), we also draw on Eduardo Gudynas's theory of extractivism. Gudynas views it not merely as an economic process but as a complex socio-political phenomenon (Gudynas, 2020). Additionally, our study engages with the debates surrounding extractivism and neo-extractivism in Latin America, considering how the development trajectories of these regions have historically been linked to extractive industries. This context aids in understanding the current model of extractive industries within the contemporary framework of neo-extractivism. We reference scholarship that identifies a 21st-century resurgence of natural resource extraction as a driver of capitalist growth (Dunlap & Jakobsen, 2019) to analyse the present imagination of development in KGF critically. Furthermore, we incorporate research that critically links green growth with Just Transitions, exploring the limitations imposed by the former (Hickel & Kallis, 2019; D'Alisa et al., 2014; Hickel, 2020).

Methodology

This research will employ a mixed-method approach to explore the complexities of development in Kolar Gold Fields (KGF) across different historical periods. Our objective is to conduct a longitudinal study that examines the development trajectory of KGF over time. As part of our research methodology, we will conduct qualitative interviews with individuals possessing extensive knowledge and experience related to KGF. This will include scholars who have conducted significant research on the region, as well

as journalists and other key informants familiar with the socio-economic and historical context of KGF. We will also utilise secondary and tertiary sources, including studies and reports from prior to the closure of the mines, to enrich our analysis and provide a comprehensive understanding of the region's development.

We will employ a snowball sampling method, whereby initial interviewees will help identify further relevant participants, allowing us to gather diverse perspectives and deepen our understanding of the lived experiences of those connected to the KGF area.

In addition to qualitative interviews, our research will incorporate secondary data sources to enhance our analysis. We will utilise archival data, including census records and annual reports from the Chief Inspector of Mines, which provide essential insights into the demographic and operational aspects of KGF. Furthermore, we will review relevant journal articles that explore historical and contemporary issues related to KGF, Just Transitions, and the socio-economic implications of extractive industries.

This combination of primary qualitative interviews and comprehensive secondary data, including archival resources and scholarly articles, will enable us to develop a nuanced understanding of the complexities surrounding the potential for achieving Just Transitions in KGF.

Expected Outcome

This research is anticipated to significantly contribute to the existing scholarship on extractive industries in the Global South and the potential for achieving Just Transitions in these contexts. Through a longitudinal analysis of the Kolar Gold Fields, we expect to uncover insights into the region's development trajectory, highlighting the complexities involved in transitioning from an exhausted extractive industry. Moreover, the research aims to identify the limitations imposed by various interests, underscoring the need to envision a radical alternative that truly achieves the goals of Just Transitions.

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Transitioning Collective Labor Agency: Multiple Geographies of Constrained Labour Agency in Kerala's Software Industry.

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Introduction

The labour and labour agency of knowledge-intensive employees is an interesting question in the contemporary post-Fordist world. There are several constraints on the formation of collective agency in knowledge-intensive sectors. The existing literature states that these constraints come in two ways. On the one hand, it is the new managerial practices which are more intricately nuanced than the assembly line (Upadhyaya & Vasavi, 2006; Upadhyaya, 2008). On the other hand, the global corporate culture has transcended the neoliberal thoughts of individualism and entrepreneurism in employees, which hinder employees from developing a collective consciousness and making apathy towards collective associations (Steven, 2014). However, this body of literature undermines the regional particularities of the area, conceptualising the question as one shaped only by global trends while neglecting the socio-political context specific to the region. Nevertheless, the emergence, adaptation, and responses of labour agencies are inherently place-specific, too, and this cannot be overlooked, even in the context of knowledge-intensive industries. The present article deviates from the existing literature by exploring the transition of collective labour agency, analyses its existence with respect to both global and local structural contexts and constraints, and examines its responses, day-to-day actions, collaborations and multiscalar dimensions.

With this objective, the article conducts a case study of "Pradhidwani", an employee welfare association of software employees in Technopark and Infopark, Kerala, India. Pradhidwani is the largest employee welfare association of IT employees in the state. The particular choice of this association is important in two ways. On one hand, it is the regional peculiarity of the state and its history in a socio-political sense. In that sense, the establishment of software parks in Kerala, particularly the creation of Technopark, marks a watershed moment in the state's development (Arun, 2009). Its significance lies not only in boosting exports and generating employment in a state with a low manufacturing base but also in its role in transitioning Kerala from a pro-employee stance to a more pro-business orientation. Because the integration into a global business network requires a low labour welfare enforcement system. So, a shift in the regional political economy of labour control was necessary for the functioning of such a software park and to attract business to the state. This presents a new dilemma for trade unions as their scope becomes increasingly uncertain. Moreover, the vested interests of both left- and right-wing governments in Technopark further narrow their space for action. This local-level conflict prompted employees to reconsider the possibility of forming associations in alternative ways, even as neighbouring states like Karnataka and Tamil Nadu had already established registered trade unions. On the other hand, since "Pradhidwani" is a non-traditional employee union, the imagination, mobilisation, main demands, and the organisational practices that Pradhidwani adopts are different. In fact, to some extent, it differs from the trade unions in neighbouring states and emerging industrial clusters. So, the imaginations and the concerns of Pradhidwani vary over employee issues, local infrastructural issues, welfare issues, and larger-local community-level issues. Organisational practices also vary, including cultural activities, technical sessions, job-hunting platforms, community gatherings and programmes. When looking into the evolution of the association, there is a transition from cultural association to welfare association and to community organisation. For this purpose, Pradhidwani extends collaboration with regional residence associations, and employee unions of service providers, regional level schools and this collaboration is very important in urban life and the social reproduction of their employees. This adaptation is also a response to the global corporate culture, where a militant association is not at all possible, whereas mild, need-based programmes are validating rather than right-based. In this context, this article examines the local and global structure that constrain the transition of collective trade unions, along with their adaptations and collaborations in response to these challenges.

Analytical Framework

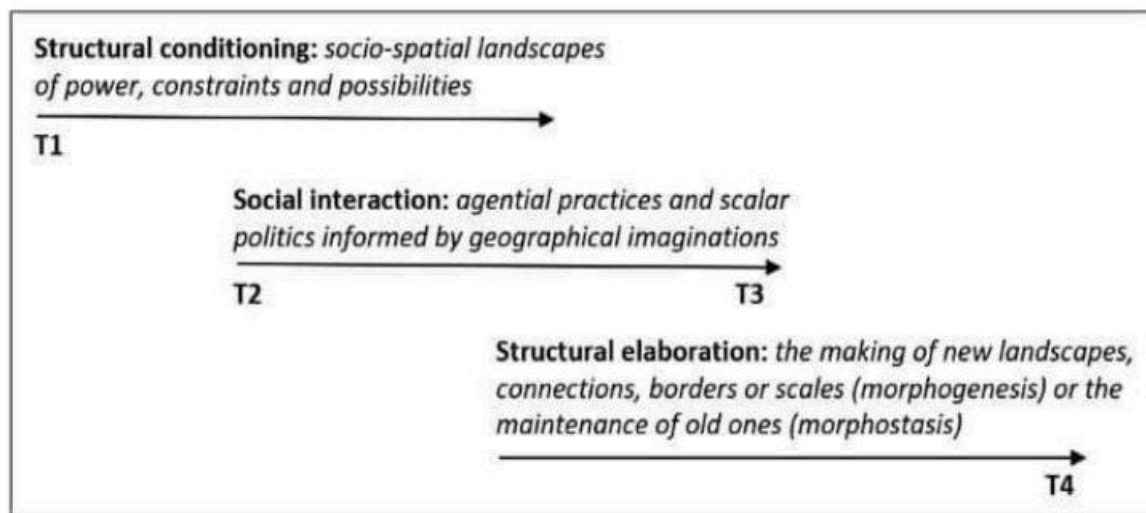
The analytical framework for the article draws on the concept of multiple geographies of constrained labour by Coe and Lier (Coe & Lier, 2023) —the analytical lens which explores a morphogenetic approach to the constrained agency. By that analytical tool, the article conceptualises the labour agency as “both the intention and practice of taking action for one’s own self-interest or the interest of others: It is the capability of labourers to act, to change, to challenge, and resist the labour capital-relation” (Castree, 2004, pp. 159-160). Hence, the labour agency can be individual or associational, formal or informal, and spontaneous or goal directed. Nevertheless, the article only looks at the collective agency and not the individual-level agency that employees possess and act. In that conceptualisation, the labour agency is manifested in various forms, such as trade unions, workers’ cooperatives, and so on, to address and negotiate power dynamics in labour markets and production systems. (Coe & Lier, 2011). In that sense, the article has conceptual limitations. This is because the main objective of the paper is to analyse the transition of collective agency.

The article follows the idea of constrained labour agency of Lier and Coe (2011). The constrained labour agency is conceptualised as the capability of a labour agency constrained by structural factors, such as institutional frameworks, economic conditions, and social context. Therefore, the social domains within which labour agencies engage become very important.

The morphogenetic approach to the constraint agency (agency-structure dynamics) explains the dynamic interaction between structure and agency (Coe & Lier, 2023). The analytical lens draws from Margaret Archer’s (1995, 2000) theoretical framework on the dynamic relationship between structure (social context) and agency (human action).

The Archer’s morphogenesis cycle of constrained agency illustrates the dynamic interplay between structure and agency. There are three phases in this process, which include Structural Conditioning (T1→T2), social interaction (T2), and structural elaboration (T2→T3).

Figure 48: Geographical adaptation of Archer’s morphogenetic cycle



Source: (Coe & Lier, 2023)

In a dynamic way, Coe and Lier introduce an analytical tool to explore the transition of constrained labour agency. Similar to the T1, T2, T3, and T4 stages, they propose four moments, including geographies of structural conditioning, geographies of imagining, geographies in action, and geographies of action. The first temporal moment (T1 to T2) is the existing social structural context that includes institutional setup, socio-political and economic conditions, and existing class politics, culture and norms which shape labour agency. It highlights the constraints and opportunities that an agency

faces. The second temporal moment (T2) is the phase of aspirations, beliefs, and narratives that influence workers' perceptions and motivations. This is the phase of reflexivity, intentionality, and imagination for the future on the basis of the T1 stage. The third temporal moment (T2 to T3) is geographies in action, which is the phase that includes immediate practices and strategies employed by workers to navigate their environments. This reflects the day-to-day realities of labour agencies, their agential practices and spatial strategies. The final temporal moment of the cycle is the geographies of action (T3), which encompasses the broader outcomes of these actions. This stage maps the long-term structural changes that arise from labour agencies. The structural elaboration phase characterises this moment due to the active action of the labour agency.

Methodology

The methodology for this article is grounded in a qualitative case study approach. The research involved conducting semi-structured interviews with a range of stakeholders, including office bearers and members of Pradhidwani (an employee association), IT employees, residents' association members, service providers, and members of service-provider trade unions (like transportation, cleaning, and so on). Additionally, the study incorporates data from secondary sources such as news reports and other relevant documents.

Initial findings

The structural context of the late twentieth century marks the initial temporal point for the collective labour agency in Technopark. This phase is characterised by a transition of the state from a business-oriented era to a pro-labour stance, which cannot be viewed in isolation from global trends. The acceptance of the welfare state diminished, and militant trade unionism declined. In the production sphere, the significance of the service sector, particularly in IT, increased drastically. The Y20 crisis further broadened the scope for outsourcing, leading to heightened demand for Indian service providers due to the availability of low-wage labour in the south. During this period, both state and central governments-initiated software parks and infrastructural developments to catalyse business growth. It is not merely the concessions in infrastructure and capital that enhanced industrial growth; rather, it is the inadequate institutional support and weak enforcement of employment-related regulations that facilitated this industrial expansion (Noronha & D'Cruz, 2016)

In the Kerala context, the introduction of computers initially faced resistance from workers, especially leftist groups concerned about mechanisation and its employment implications. However, the state's focus gradually shifted towards promoting industry, driven by rising unemployment among educated youth and low manufacturing growth. Consequently, during the left government's tenure in the 1990s, Technopark, the first software park, was established. Despite this, the sector's growth has been significantly affected by narratives around the state's poor business environment and the presence of a militant labour agency (Vijayaraghavan, n.d). However, both the left and right factions of the state addressed these concerns by fostering a flexible work environment to facilitate business growth.

Moreover, the global corporate culture has fostered a strong emphasis on individualism and entrepreneurship among employees, leading to apathy towards collective movements (Firdausi, 2020). This cultural shift, combined with regional indifference towards trade unions, has significantly hindered such collective formation within the IT industry in the state. Consequently, the interplay of regional and global contexts, along with the prevailing class dynamics and political structures, has created an environment that obstructs the formation of registered trade unions in this sector.

Upon this background, the employees were imagining a better environment and space for collective action since 2010, and finally, in 2012, a collective association named Pradhidwani was formed as a response to the insecurity faced in the sector. The initial activities were film and literature-related programmes rather than any employment activities

However, over time, the association started to engage with the day-to-day activities of employees and evolved from an employee welfare association to a community association. Now, there are various committees, including a technical forum, job portal forum, women's forum, Kalimuttam sports forum, literacy club, film club, travel club, health club, environment club, KSRTC & train forum, blood forum, My Government School, and relief activities forum. The organisation has active WhatsApp and Telegram groups and has a level committee in each Technopark building.

Other than that, it directly involves the issues of layoffs and the sudden closure of the firms, which recently happened at MCKincey and BYJU'S. In the case of BYJU'S, Pradhidwani approached the State- labour minister to negotiate the abrupt closure of BYJU'S, and the minister directly involved in the issue ordered an extension of the notice period.

The association closely engages with salary and certificate withholding issues, and members of the organisation approach the Kazhakkottam Police Office to have a negotiation discussion before going into Labour Beureo. The organisation also initiated litigation to negotiate labour-related issues.

The organisation actively collaborates with local residential associations and action committees to enhance community engagement and address shared concerns and infrastructural challenges. Their collective efforts aim to improve public transportation facilities, including initiatives for upgrading the Kazhakootam railway station, increasing the frequency of state buses (KSRTC) to Kazhakootam and Kochuveli, and extending technical assistance to prepaid auto services. Most recently, in November 2023, the closure of Nila Gate prompted the formation of alliances and joint action councils advocating for its reopening, as it served as a crucial access point for employees near economical restaurants and accommodations. So, through the actions of agential power, the Pradhidwani tries to explore scale by effectively collaborating with service providers and residents and expanding to the urban spaces

At the structural elaboration level, Pradhidwani is an active agency in framing an IT /IT employee welfare scheme in Kerala. The negotiation with the state government on employment-related issues and welfare scheme formation opens up the possibility of a new temporal position in its transitional path.

Implications and Discussions

This paper does not aim to portray a "success story" or a "failed attempt" but rather to trace the transitions of labour agencies, especially in an industry where traditional organisational models are constrained. The emergence and evolution of Pradhidwani highlight how structural conditions, place, and regional contexts shape labour actions. It underscores the importance of geography in labour dynamics and reveals new scalar strategies in urban spaces, emphasising the role of geographies in shaping labour agency. In this sense, the literature diverges from existing studies on labour agencies within knowledge-intensive sectors, which often lack a geographical perspective and fail to account for the dynamic interplay between structure and agency.

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Waiting for the City: Auto-Rickshaw Drivers and Urban Change in a Smaller Indian City

Ian M. Cook, Allegra Lab

India's cities have long been temporally and spatially structured by expectations by their futures; from the exporting of colonial urban planning ideologies relating hygiene and shaping of populations through the design of the physical environment (King, 1977), to scholarly and developmentalist state attention in the decades following independence into 'India's urban future' (Turner, 1962), for instance in creating newly developed towns for a hoped new type of citizen (Roy, 2007, pp. 133–156). Since India's neoliberal turn from around 1991, bombastic rhetoric about India being 'unbound' (i.e. Das, 2000), shining (Brosius, 2010) or 'arriving on the global stage' (Kaur & Hansen, 2015) has fed into uncritical celebrations of 'urban awakening' (Sankhe et al., 2010), an embracing of smart city 'mythologies of speed' in which nationhood-as-morality and technological solutionism are refracted through the urban scale (Datta, 2019), and a speculative urbanism driven by the hyper-mobility and unceasing dynamism of finance capital (Goldman & Narayan, 2021) which shape the contours for popular conceptions about what 'world-class' or 'modern' cities are.

However, just as western-derived universalistic claims about modernity cannot withstand critique that situates India's processual and relational modernities within alternative processes of individualisation and agency (Fuchs, 2019), an understanding of the 'modern city' must also account for the myriad ways in which dominant social imaginaries are undercut, contradictions are produced and addressed, and entangled futures remade. Long-standing pre-urban caste relations structure processes of land accumulation (Upadhyay & Rathod, 2021), the 'real urban fantasies' of masterplans are blocked by both local politics' resistance and the general context of informality within which they operate (Bhan, 2014), and cities are both an entanglement of slums, gated communities, shopping malls, and temples as well as the thresholds and barriers obstructing different groups even as it entangles them (Srivastava, 2015).

Mangaluru (formerly Mangalore), a smaller city of around three-quarters-of-a-million located on the Karnataka coast, offers a fascinating window into how India's urban transformation is reworking identities, imaginaries and spatio-temporal modalities of everyday life. I have been conducting ongoing anthropological research in Mangaluru for more than a decade amongst housing and land brokers (Cook, 2015, 2022), autorickshaw drivers and moving vendors, and on topics including environmental injustice and land acquisition (Cook et al., 2013), real estate imaginaries (Cook, 2014), how colonial/post-colonial and indigenous formations appear in the built environment (Cook, 2020), vigilantism / 'moral policing' (Cook, 2019), and how the relational 'smallness' of cities in the global south can help us re-theorise the urban (Cook, 2018). In this work-in-progress paper, I theorise the urban change through an ethnography of the lives of auto-rickshaw drivers and the particular place one group of them wait. Auto-rickshaw drivers in Mangaluru wait on multiple temporal and spatial scales for the city around them. In this paper I explore two cross cutting forms of waiting: everyday waiting for fares and waiting for 'development',

Everyday Waiting for Fares

Waiting is often thought of, in common sense understanding, as something passive, with those who wait in an unequal power relation with those who make them wait. Not all waiting exhibits such passivity however. Other types of waiting are extremely active; indeed they are characterised by their activeness and their need for attention, because "...waiting is doing something. It comprises a discipline, a 'use of time'... The word itself suggests strong and purposive action: to keep watch, to lie in wait, to stalk a prey, to take by surprise. Its connotations are preparedness, stealth, and seeking advantage... (Corcoran, 1989, p. 517) Such a waiting well characterises those auto drivers who do not wait in stands, but rather roam the city looking to pick up passengers at busy junctions or outside offices where there are no stands. There is also a difference between waiting for and waiting on someone or something. For the auto

drivers in Mangaluru, we might say that waiting for a passenger is not defined by a time period measured by a clock, but by the closing of offices, the temperament of the traffic policemen or the swell of the city crowd as they move about the city to work, worship, or shop. Passengers then are waited on, not because there is a pre-defined category of waiting time with set temporal or material structure, but rather because it is a practice that is given its meaning through the actions of the drivers who chose when to and when not to drive in relation to one another amongst shifting circumstances.

Nevertheless, once we recognise that waiting is a relational practice and that certain types of waiting require deeply embedded and complicated relations, it becomes clear that waiting can take place in a non-linear fashion. Whilst within a queue, waiting is, for the most part, linear (from the front to the back, with both formal and informal rules established), other types of waiting requires a more active awareness of others; it involves a back and forth as part of a closer entanglement with those one is waiting on (and with).

Waiting at auto stands temporally allows certain jati and community relations to alter (cf. Jeffrey, 2010). Because Mangaluru was known as a place with active Hindu nationalist groups (see: Chapter One), and because many people alleged that auto drivers often acted as the eyes and ears for violent vigilante groups from the Hindutva movement, I often asked the drivers about these issues. Whilst, especially close to elections I would hear more 'communal' sentiments, more often than not the drivers expressed cross-religious community solidarity. Most auto drivers, especially if auto driving is their main job, will have a stand they consider as their own, although there are no formal restrictions about which stand an auto driver can wait. This is the stand which they will go to first thing when they start working, where they will return to most often.

The sociability of auto stands slides into notions of mutual help that appear in variously formal and informal ways. Most drivers are members or a stand-specific formally or informally constituted 'organisation'¹⁴. Some local organisations will have regular fees and set meeting dates, whilst others meet as and when the need arises. They can be important sources of solidarity, information exchange, money lending through loans and social security. The work of these local organisations naturally cross-cuts those of the city-wide unions. Where they differ is in levels of formality and, quite obviously, scale. Unions promote insurance schemes, organise protests/strikes, donate books to school children and have links to wider political or ideological movements/groups/parties, whereas local organisations would become more intimately involved in individual troubles and everyday local issues. Morgan's Gate is a local organisation on the informal side. There are no set fees, meetings are irregular and 'leadership' is uncontested.

Male sociability and (in)formal relations of mutual help take place within a tightly regulated social system of waiting: the queue. Queues at auto stands, as queues elsewhere, generally have both formal and informal rules and sanctions are formulated to regulate behaviour, such as 'pushing in', and appeal to values, such as egalitarianism and orderliness, that may not necessarily link to wider cultural norms outside the queue itself (Mann, 1969). The low-stake queuing during the day changes at night. Most night work is done outside hospitals, the train station, bus station, and at points in the city where long distance buses drop off passengers. Officially drivers can charge one and half fare, but unofficially this only holds till midnight, after which double fare is charged or prices are individually negotiated with passengers before the journey. Unlike during the day when drivers almost universally keep to the queuing system or find another driver with whom they are happy to exchange their place, at night some drivers attempt to break the established rules and this leads to disputes. This is not to say that there are not possibilities for mutual help or sociability, but rather that they are much diminished.

¹⁴ The term used locally is samthi. This can also refer to unions. I use 'local organisation' to refer to stand-specific samthis and 'union' to the city/district wide bodies.

Waiting for 'Development' (Otherwise known as 'Roads')

As discussed above, different types of waiting can take place simultaneously on various scales. Maybe the most awaited for happening amongst auto drivers is an improvement in the state of the roads. In their waiting they are in good company, as Mangaloreans and incomers have long been waiting, and complaining. In 1800, Thomas Munro, the first Collector of South Kanara wrote: "Ten miles a-day is as much as a cutcherry can go on an average in this country; and as nobody travels at night, by the badness of the roads and interruptions at ferries, it is usually late before we get to our ground; and with prayers and ablutions, and waiting for baggage, nothing is ever done on these days." (quoted in Gleig, 1831, p. 289)

Yet road improvement was not taken up seriously by the British, with responsibility for maintenance passing through a number of bodies that never had the funds required, and new roads for the most part were limited to connecting important commercial areas and linking military stations with 'trouble spots' (Rai, 2003) —the colonial administrative head, in distant Chennai, was not overly concerned with a provincial backwater like Mangalore. Independence brought about considerable infrastructural development in the city—an airport, an all weather port, a road bridge across the Netravathi River—but the condition of roads remained, and remains, a problem. Indeed, in the 1980's, the Consumers' Education Trust was running an annual 'spot the pothole' contest in an attempt to shame the local administration into repairing bad roads (Javeed, 1988).

In 2012 Jaago [Wake Up] Mangalore Association urged a district wide horn-honking protest against bad roads, blaming lack of coordination between government departments, bad planning, non-payment of contractors and poor-quality work claiming, "good roads are the citizen's birth right". In 2024, as part of Manglauru's inclusion in the Smart Cities Mission, the road in front of Morgan's Gate was re-made, and whilst it improved the quality of the surface, it created a dangerous situation, leaving pylons in the middle of the road, something which was the source of local derision (see Figure 49).

Figure 49: Pylons in the middle of the road



Source: Mangalore Meri Jaan Instagram

The biggest road project, however, was one that was never completed: a six-lane ring road named the Mangalore Corniche. Mangalore Corniche, which would have swept along the waterfront of the city mimicking Marine Drive in Mumbai, will eventually, if started, encircle the city (see Figure 50). Land was mooted to be acquired as part of the project on each side of the road for 'comprehensive redevelopment': the building of housing, commercial buildings and recreational centres. Much of the land that may one day be subsumed by the Corniche is owned by the port, with renting tenants easily moved, but other land earmarked for the Corniche is privately owned, and real estate developers were buying this up with the future increase in land prices in mind. Indeed there was one building project completed named The Corniche in expectation of a road that never came.

Figure 50: Proposed route of the corniche. Morgan's Gate is close to "Ullal Bridge"



Source: Pre-Feasibility Report

Mangalore Corniche is (or was) not quite a state, not quite a private project. For a while it was under the auspices of the Coastal Development Authority (CDA); they soon handed it on to Mangalore Urban Development Authority (MUDA) citing a lack of capacity. In MUDA if you ask about the project, people will tell you it is the pet project of the most influential real estate developer in the city and planner behind the above discussed road-widening project. The two are close, with MUDA often advised by his consultancy firm for free.

Concluding Remarks

Waiting for the Corniche is a different type of waiting than that of auto drivers waiting for their customers. The relative power of individuals within a closed social system influences waiting in relation to the distribution of time (Schwartz, 1974)—i.e., powerful people often have to wait less—but in complex social systems like cities, relative power allows people to wait in ways that others cannot. Whilst some auto rickshaw drivers who have sold land around Morgan's Gate or the proposed route of the Corniche may have made what they considered to be considerable sums of money, their ability to wait for better returns in the future was constrained by immediate financial concerns and the lack of knowledge about the likelihood of increased value. Real estate developers not only have the resources

to wait, but also, due to their closeness to politicians and other state apparatuses, the knowledge of the details of future projects—knowledge that allows them to wait for longer periods, from greater spatial and temporal distance. The coffee company behind Cafe Coffee Day, for instance, bought up the colonial bungalows owned by the British traders who gave Morgan's Gate its name and a Swiss-Indian developer now bought a plot of land and constructed a luxury high-rise where another Morgan bungalow once stood.

The active, sociality-generating, class/caste-blurring waiting on stands may provide avenues to rethink the 'waiting for development' in times of urban transition, especially in smaller cities who often ape metropolitan centres in their social imaginaries and plans. Rather than generating feelings of lack in relation to larger urban centres in the Global North, maybe an inward-facing reflexive waiting can produce new urban imaginaries beyond seemingly overly determined linear pathways of transition.

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Waste Work(ers) in the Contemporary Bangalore: Changing Labour Dynamics and Implications for a Just Transition

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Part 1: Introduction: Rising Urbanisation, Waste Generation and Work of Waste Picking

India's rapid economic growth, urbanisation coupled with an expanding middle class, has driven up consumer demand and led to a significant rise in the country's waste generation. Cities like Bangalore are now facing an overwhelming waste management crisis, with waste output exceeding the capacity of municipal systems to process it (Chatterjee, 2012).

As cities grapple with this issue, the informal waste sector has expanded significantly, absorbing surplus labour into precarious, low-wage jobs (Harriss-White, 2010). Along with increased consumerism, the exclusionary nature of the urbanisation pattern in cities like Bangalore (Basu & Bazaz, 2016), has also contributed to the vast majority of the poor and the marginalised finding suitable employment options only in the informal sector (Micheal et al., 2018, 6). This is especially true for the migrant workforce, for whom the informal waste sector provides a temporary holding space for rural-urban migrants who pursue varied insecure livelihoods with the anticipation of getting absorbed into the formal sector (Gidwani & Maringanti, 2016).

The informal waste sector comprises waste pickers, itinerant waste buyers, and other waste workers who are involved in the collection, segregation, and sale of recyclables such as paper, plastic, metals, glass, and any other material that has a market (Gill, 2010). Following segregation into several categories of recyclables, these items are sold to scrap dealers, who further sell them to itinerant buyers, scrap dealers, and aggregators. This process of sale and purchase continues until it eventually reaches the largest recycling firms in the chain. For the purpose of our study, we focus on waste pickers and other informal waste workers such as sorting within this recycling value chain who are amongst the most vulnerable in the informal waste ecosystem.

It is important to emphasise here that waste picking is an urban activity; it does not align with any traditional rural occupation (Shankar & Sahni 2017). These waste pickers are typically small-scale, self-employed individuals active within the urban informal economy (Viljoen et al., 2016). Given the precarious nature of their work, they lack access to formal labour protections, leaving them exposed to exploitation and hazardous working conditions (Singh, 2023). This vulnerability is a critical aspect of the shifting dynamics in Bangalore's waste sector.

Part 2: Changing Nature of Waste Work(er)

In this paper, we focus on understanding the changing nature of the labour workforce in the informal waste sector specifically by looking at the case of Bangalore city. From Hasiru Dala's long-term engagement with the community, we see that the informal waste sector incorporates diverse social groups with differing degrees of attachment to waste work. The people who primarily engaged in informal waste work in the city are long-term waste pickers, often from Scheduled Castes and Scheduled Tribes, with many having engaged in waste picking for generations. The majority of these long-term workers engaged in waste picking and informal waste work have been living and residing in Bangalore for generations and had initially migrated to the city from parts of North Karnataka and neighbouring states of Tamil Nadu, Andhra Pradesh, Telangana, and Maharashtra.

We have observed through our long-term engagement with the waste picking community that these workers are predominantly women, have seen little to no occupational mobility and have been entrenched in waste work for generations, often due to caste-based occupational segregation (Nanda et al., 2020).

In contrast, based on a preliminary internal study, we have observed that an influx of migrant workers, particularly from West Bengal and Assam, with no generational engagement with waste work, have entered the waste sector for the first time. These migrant waste workers migrate to cities like Bangalore as a temporary coping mechanism in response to underlying root-causes of economic, environmental, social and political pressures in those regions of the country (Michael et al., 2018).

These migrant waste pickers are primarily men who migrate to Bangalore either individually or with their families and are majorly informed about livelihood opportunities in the informal waste sector through their kin-based social networks. In most cases, migrant waste workers work around and live in informal settlements, community leaders or 'thekedars', who act as intermediaries between migrants and landowners, managing housing and rent payments. A detailed analysis of the kind of structural vulnerabilities these migrant waste pickers face is done by Michael et al. (2018). It is through these networks and the transactional relationship that these migrant waste workers share with the thekedars (ibid., 6), that they are able to access vehicles and tricycles for waste picking. These resources are not as readily available to their local counterparts, that is, predominantly generational female waste pickers due to entrenched patriarchal norms such as lack of safety in public spaces—especially at night, disproportionate caregiving and household responsibilities, as well as lack of financial independence amongst other issues. This directly impacts the extent to which they are able to undertake waste picking activities for their livelihood. Both groups—generational or migrant waste pickers, though distinct in their relationship to waste work, experience precarity in different ways, underscoring the need for a more inclusive approach to urban development.

Methodology

In the context of the changing nature of waste work(er)s in Bengaluru, this study aims to probe the changing nature of the labour workforce in the informal waste sector in the city to map the changing nature of informal waste work itself. Employing a predominantly qualitative approach to examine the lived experiences of generational waste pickers and migrant waste pickers, especially from Assam and West Bengal, the study will shed light on the relationship between waste pickers and waste work, the challenges they face, and the nature of their engagement with waste work. Through this, the study aims to examine the impact of this shift in the labour workforce on existing and evolving labour dynamics within Bangalore's informal waste ecosystem. Life story analysis will be employed to understand how these workers, who frequently come from rural, non-waste work backgrounds, adapt to their new roles in the city. This will include in-depth, semi-structured interviews with 10–15 waste pickers—both generational and migrant—as well as stakeholders interviews from the Dry Waste Collection Centers (DWCC), representatives from the Thyajya Shramika Sangha (TSS)—the waste pickers union in Karnataka, as well as relevant stakeholders from waste picker collectives like the Alliance of Indian Waste Pickers (AIW), International Alliance for Waste Pickers (IAWP) and local governance bodies to gain insights into the changing nature of waste work in Bengaluru. This will help us gain insights for critical evaluation of existing attempts at 'professionalisation'¹⁵ of waste work that has been ongoing in the city. In the context of Bengaluru, it has resulted in the local municipal body, the BBMP issuing Occupational Identification Cards for waste workers and the setting up of Dry Waste Collection Centres at the ward level (Chandran & Narayanan, 2016).

¹⁵ Professionalisation here refers to the advocacy efforts by waste pickers and advocacy groups leading to regulatory and legal attempts, such as the Solid Waste Management Rules 2016 (Karnataka State Pollution Control Board, 2020) and Plastic Waste Management Rules 2020 (Ministry of Forest, Environment and Climate Change, 2020) made in the waste sector that aims to improve the recognition and rights of waste workers.

Part 3: Importance of Just Transition for Waste Pickers

Understanding the evolving dynamics of waste work(ers) is important to conceptualise pathways that can contribute to achieving a just transition for waste workers. The concept of just transition was developed at the intersection of global labour and environmental justice movements, aiming to address challenges and ensure inclusivity in the pursuit of sustainability (Viles, 2017). Just transition serves as an essential framework to address these challenges, ensuring that no one is left behind in the pursuit of sustainability, and especially in the context of waste picking, as we move to a plastic-free economy (Shittu & Nygaard, 2023). Waste pickers are key actors in this discourse around just transition given their contribution towards climate mitigation and them being historically marginalised due to their social status, especially in the Indian context.

According to the International Alliance for Waste Pickers (2023), a just transition involves ending plastic pollution through inclusive and fair practices that create decent work opportunities and leaving no one behind. This approach requires acknowledging the historical contributions of waste pickers, recognising their rights, ensuring they receive the skills and training to keep pace with economic transitions, and fostering dialogue among all stakeholders. For waste workers in Bengaluru, this means that a just transition must take into account the lived realities of both generational and migrant waste pickers, ensuring that policy frameworks are tailored to their specific needs.

As migrant waste pickers emerge as one of the newer groups entering the informal labour workforce in the waste sector, our research will help problematise the concept of just transition. This will be done by understanding the impact of existing labour dynamics in the informal waste sector. Any shift or 'transition' towards a more just system must incorporate genuine representation, dialogue and engagement, which moves beyond mere tokenistic inclusion. This requires acknowledging historical injustices and fostering a shift in power dynamics, where diverse voices are heard and valued, particularly those of emerging and evolving stakeholders including the demographics of informal waste pickers.

Conclusion

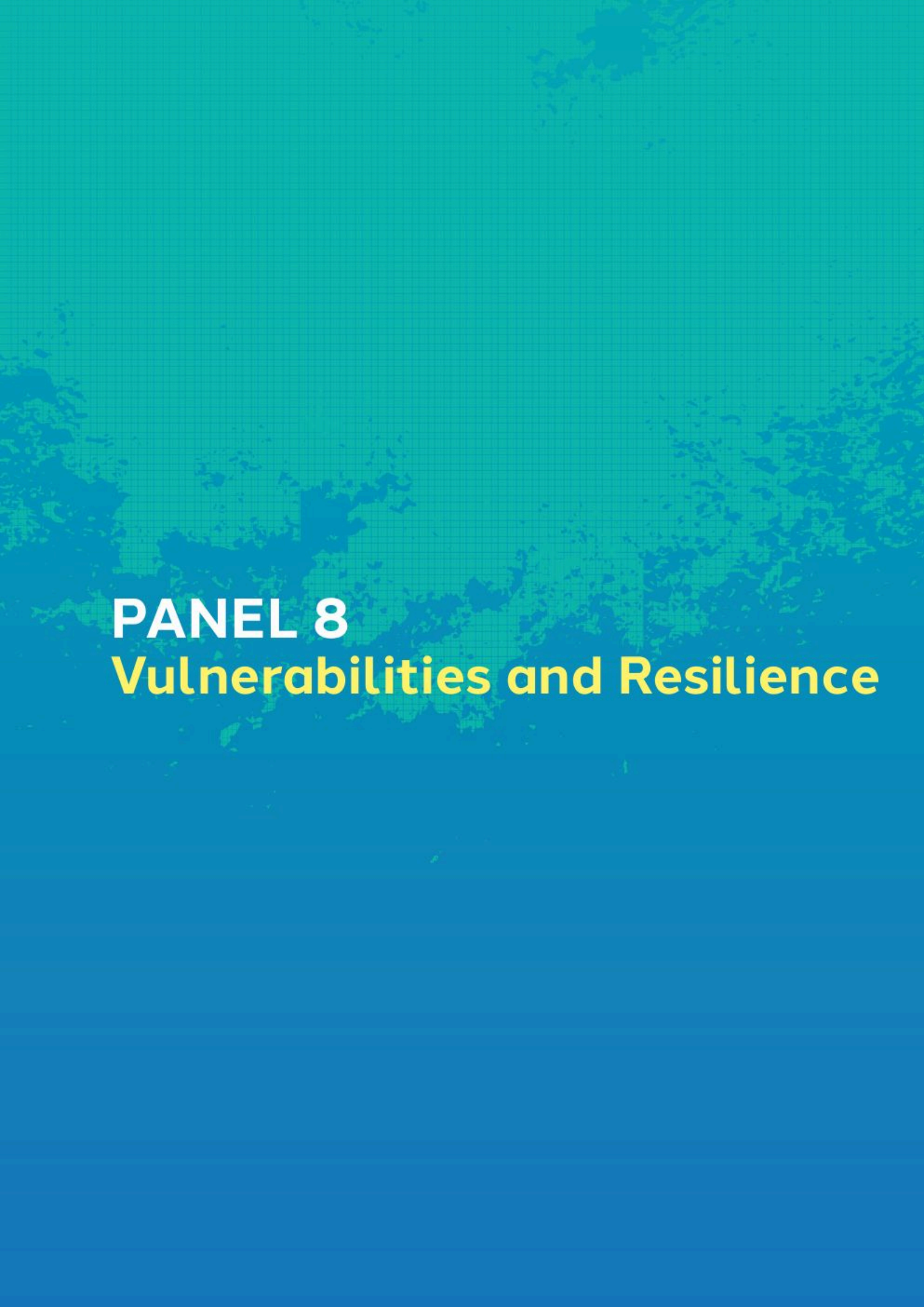
To sum it up, this study contributes to an evolving understanding of the labour dynamics within Bangalore's informal waste sector, particularly focusing on the growing presence of migrant waste pickers and their distinct experiences when compared to generational waste pickers. By examining the shifting dynamics of waste work in the city through a just transition lens, the research aims to uncover the nuanced interactions between social, economic, and environmental factors that shape the livelihoods of waste workers. This approach seeks to inform policy discourse and urban planning to ensure that the contributions of both migrant and generational waste pickers are recognised. The approach will also emphasise their inclusion in a more sustainable, equitable waste management framework which is essential for a broader goal of an inclusive and fair urban transitions. The study's findings will provide crucial insights for stakeholders engaged in shaping just transition pathways for informal workers in the waste management ecosystem, ensuring that waste pickers are rightfully acknowledged as key central actors in this critical juncture of urban development.

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PANEL 8

Vulnerabilities and Resilience

Counter Hegemonic Stories of Community Resilience and Gender Just Transitions: the Governmentality of Climate Justice Discourses among the Coastal Communities in Kerala.

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Keywords: Climate change, gendered vulnerability, subaltern knowledge and agency, governmentality of climate justice, community resilience and gender counter- maps

Climate change is a political problem, rooted in exploitative models of 'neocolonialism' (Ramanujan, 2021), 'neoliberalism' (Harvey, 2005) and global hierarchies, engrained in power asymmetries, which exacerbate the existing gender inequities owing to existing gender norms, social structures, gendered division of roles, and 'unequal power relations among different genders' (Asher & Ramamurthy, 2020). The imperative of addressing epistemic asymmetries in climate action is becoming increasingly obvious and, at the same time, obfuscated by experts, scientists, bureaucrats, and technocrats. Knowledge and the process of producing it have been reconfigured as conditioned, (Galbraith, 1983) hegemonic (Gramsci, 1971), and even disciplinary (Foucault, 1975), revealing their intertwinedness with power. In this context, how do we discursively explore, engage, and understand the local, communitarian, and traditional epistemologies in the praxis? What are creative ways to reinterpret subaltern knowledge and lived experiences? What is the positionality of community knowledge and community wisdom in the context of climate change?

Climate change, as a "threat multiplier" and as a poly-crisis issue, escalates social, political, and economic tensions leading to multiple forms of gender-based violence that are informed by normative, structural, capacity, and decision-making barriers. In contemporary times, it is important to cognize how gendered practices of environmental governance open to further contestations, negotiations, and subversions, especially as it has come to inform the claims to climate justice and gender rights, thus modulating critical questionings of prevailing institutions and practices of adaptation and mitigation of ecosystems and governance of climate change (Bharathy, 2024). The impacts of climate change are inequitable and gendered, with women in the Global South, especially those who are poor and disadvantaged due to different intersectional vulnerabilities bearing a disproportionate burden of the climate crisis.

Chancel et al. (2023) estimated that over 80 per cent of the tropical and subtropical countries will likely lose incomes because of climate change in the coming years, and present levels of poverty in the Global South are also due to climate change and models of appropriation that have contributed to it. It is estimated that in low and middle-income countries, compared to the average, climate change-induced hazards will result in 70 per cent more income losses for the bottom 40 per cent (Chancel et al., 2021). Even within these countries of the Global South, the socially marginalised and the poorest, like the coastal and tribal communities, and within them, women and girls, are worst hit by climate change, compared to those who are better off.

The archaeology of climate stories is rooted in their colonial histories, which established its rule on extractive relations and capitalism and introduced laws that impacted women, especially those from marginalised communities like coastal and indigenous women, further widening gender relations. While significant research and knowledge generation has happened and is ongoing in the domain of gender and climate change, the approach to the issue remains highly technocratic, patriarchal, western-centric, mechanistic, and scientific, removed from the lived experiences of the socially vulnerable and the marginalised, who are the first- affected, and the worst impacted by the climate crisis. The approaches to tackling climate change have largely been top-down, one-size-fits-all, overlooking the differential

realities, contexts, and vulnerabilities that demand approaches that are differentiated, embodied, bottom-up, and grounded.

The proposed paper aims to re-imagine alternatives for climate change based on intersectional feminist theories, feminist political ecology, and climate justice and to evolve gender transformative climate policies. This ongoing journey, informed through the lens of critical praxis, facilitates the reclaiming of the pedagogical practices to reframe the methodologies, redefine the very concept of data, and reimagine the body of knowledge. The objective of the paper is to share the field action interventions, experiences, and perspectives from the high tide affected coastal areas in Kerala; to build networks for future collaborations towards deepening discourse on gender and climate; and to provide a space for policy reconfigurations in the global south with a co-produced body of knowledge.

This paper is informed by intervention research that tried to co-create community resilience across the peri-urban areas of Puthenvelikkara, Kumbalangi, and Ezhikkara in Ernakulam district affected by aggravated high tide flooding, and by centring knowledge, justice, and action—as a sustained extension of Fraser’s theorisation surrounding subaltern counterpublics and the rights of the marginalised. However, from empirical evidence across the world, it is becoming increasingly apparent that any form of climate action, even the ones that emphasise localised action, is susceptible to the social reproduction of gendered vulnerabilities if not designed to be adequately cognizant of the gendered realities of the impact of climate change. This means that for this intervention, responding collectively to climate change had to be conceived in synergy with equipping women with the ability to be at the forefront of strategising community-wide resilience. Such a gender-just transition can only be made possible by the documentation of local and traditional knowledge/s—typically unacknowledged by technocratic and bureaucratic systems—through the empirical creation of counterfactual bodies (Loehwing & Motter 2009). To ensure women’s participation, alongside Kudumbashree networks in Kerala, (the largest community-based women collectives in the world) in tidal flood prevention activities, as barefoot community researchers, women learned ward-level flood mapping and documentary production in addition to guidelines to bring tidal flood prevention into the neighbourhood micro-plan. The counter-hegemonic process of counter-mapping also extended to revisiting and thereby localising hegemonic ‘visualscapes’ of tidal flooding. The motive has been to engage the public sphere more creatively in the face of mainstream media wilfully ignoring location-specific developmental issues; to initiate discourses on climate change gender-responsive and gender-sensitive climate action; to erect women leaders at the grassroots level; and to realise localised democratic praxis. This involves creating community counter maps that attempt to reinvigorate the sensory landscapes of memory of the local community of these affected areas to navigate hegemonic social consciousness using community knowledge/wisdom as the medium of SpectActor and counter hegemonic consciousness to change the normativity of the hegemonic patriarchal knowledge. While the other kinds of counterfactual bodies have been somewhat explored in ecofeminist studies, creative practice as a mode of dismantling power-knowledge ecosystems is fairly new.

Some prompts have guided this essay. We ask if and how imaginaries and imageries of climate change can be reworked through creative practice of the local community as a means of addressing asymmetrical power relations by mobilising subaltern agency and critically engaging with subaltern realities to conjure radical, alternate futures. We contend that such kinds of creative participatory research, especially ones that are arts-informed, present the possibility of radically unlocking bottom-up localised narratives, otherwise missing in non-creative traditional scholarship. In responding to these prompts, this paper connects subalternity, knowledge production, and epistemic resistance with a dotted line to decolonised, ecologically conscious creative practice and proposes creative means of centring subaltern ways of thinking, knowing, seeing, feeling, and dreaming in community knowledge that is truly bottom-up to negotiate the governmentality of climate justice through the counterhegemonic imaginations and discourses among the coastal communities of Ernakulam.

This paper aims to critically engage with the following questions:

- How to engage with the local communities, understand their wisdom stories, explore alternate narratives, and analyse their situated knowledge and day-to-day lives that would impact the climate change policies, mitigation, and adaptation interventions
- How to bring in insights from community-driven, bottom-up data sets that are counter-hegemonic to understand the gender differentiated impacts on climate change
- How to reframe methodologies, reposition critical social science stories, envisage a bottom-up praxis learning process, and reconfigure data analytics to reimagine the body of knowledge on climate change, gendered vulnerability, and local governance
- How to unravel historical marginalisations and current vulnerabilities that are place-based, historically informed, and gender-sensitive
- How to decolonise mainstream science/policy narratives that are techno-centric and mechanistic to tackle power relations in the policies and interventions on gender and climate justice
- How to envisage research frameworks that provide an alternative to the current policy paradigm on climate solutions, which is driven by patriarchy and neo-colonialism
- How to integrate women and marginalised groups in decision-making on climate change at all governance levels, leveraging feminist leadership that challenges patriarchal norms, envisions alternative economic systems, and prioritises care and social safety nets over perpetual economic growth
- How to capture the politics of counter-consciousness at various local levels to understand the micro-alliances of community resilience and resistances that could emerge as countermaps to the gender-blind climate policies and interventions
- How to subvert the hegemony of visual politics and the epistemology of the mainstream and popular visual narratives around discourses on gender and climate change

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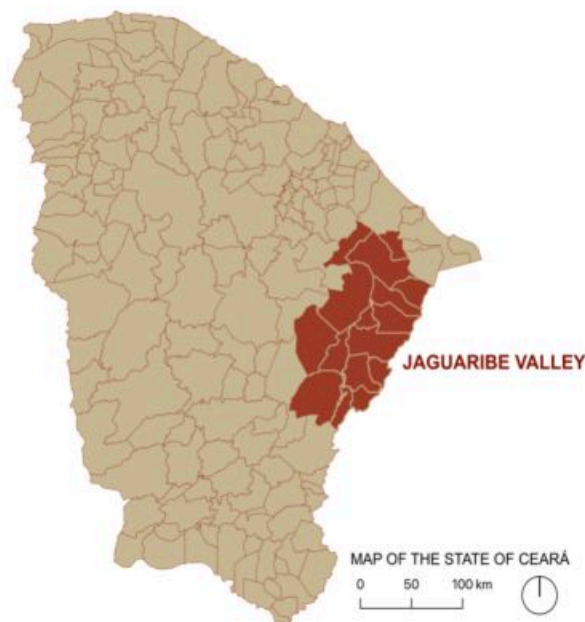
Observations on Drought in Ceará, Brazil: its Historical Existence, its Current Worsening Due to Climate Transition and the System's Priorities.

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Brief Introduction

In Ceará, a state in the northeast of Brazil, the last decade, especially from 2012 to 2017, was marked by severe drought. These years of drought impacted the provision of population needs, agricultural production, and animal husbandry, resulting in significant economic losses. Thus, some questions regarding the recurrence of drought and the actions of public authorities mobilised this work. Natural phenomena, historical and political contexts, and climate events are connected (Davis, 2001), so the aim here is to present general aspects of the drought in the region and its most recent impacts in Ceará. The following will be briefly contextualised: historical aspects and the relation with rural exodus (rural-to-urban migration) to the city of Fortaleza, capital of the state; the connection with El Niño; and the actions and priorities of the public authorities in their actions regarding environmental transitions.

*Figure 51: SEQ Figure * ARABIC 51: Jaguaribe Valley, in the state of Ceará*



About the Drought in Ceará

Drought is a phenomenon in the semi-arid region of Ceará, which seems to have become more frequent and has serious impacts on the social and economic spheres. Rainfall in this state varies greatly both in terms of location and time of year. According to Fundação Cearense de Meteorologia e Recursos Hídricos (FUNCEME), the Jaguaribe Valley in Ceará (Figure 51) has an average annual rainfall ranging from 600 mm to 700 mm. Rainfall there is most significant between January and May. And the local population has historically had to deal with the challenge of a lack of rain for long periods of the year.

Davis explains that in the current system, what we understand by drought is “the recurrent duel between natural rainfall variability and agriculture’s hydraulic defenses” (Davis, 2001, p.18). Davis also highlights that this is not a pure and simple environmental situation, it has a dimension of human responsibility. When we talk about drought in the Brazilian northeast, we are not referring to the expected months of scarce rain; we are addressing meteorological drought, with precipitation lower

than the expected annual average during the rainy season. In addition to this, there is also hydrological drought that occurs when natural and constructed water storage systems are unable to meet the needs. Davis (2001) explains that El Niño is associated with synchronised droughts in parts of the northeast of South America, Africa, and Asia, and that this occurs when the eastern tropical Pacific Ocean is warmer. Davis also points out that droughts “Indian droughts, as we shall see, tend to “lead” El Niño warmings of the tropical eastern Pacific by a season, while Brazilian secas “lag” by one, sometimes two seasons” (Davis, 2001, p.80). The relation between El Niño and drought is now more widespread. There is the understanding of the warming of the waters of the Pacific Ocean, which move, altering the shape of the Intertropical Convergence Zone.

In the second half of the 19th century and in the 20th century, we had significant droughts in Ceará. Drought became a problem for the state government due to hunger and intense migration to the capital Fortaleza, which was not prepared to receive so many people. In 1915, the drought was intense and one of its effects was precisely the large migration to other cities in search of some living conditions and escaping hunger. Davis (2001) makes important statements about the causality of hunger, placing it as an effect of the system in which we are inserted and emphasising that the scarcity of food that is very present for some does not mean that there is not enough food for everyone, it just means that the market priorities are others. Thinking about today, although hunger in the sertão occurs on a scale and intensity quite different from the droughts of the past, it “is part of a continuum with the silent violence of malnutrition that precedes and conditions it” (Davis, 2001, p.21).

The rural exodus in the 20th century, however, did not solve problems, nor was there any effort by the government to do so. The exodus only spread misery to places that were not experiencing the critical meteorological effects of the drought and brought issues to light.

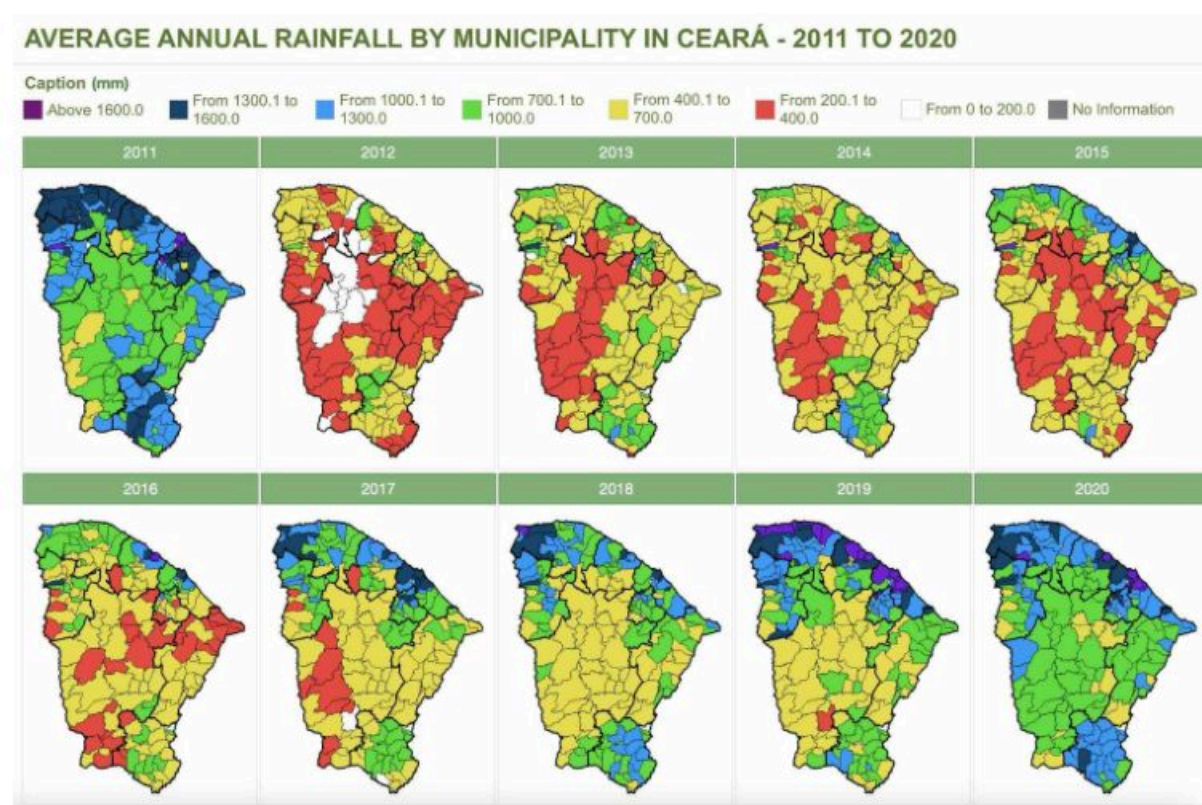
With hunger, overoccupation of public spaces in Fortaleza, malnutrition and greater immunological vulnerability, migrants were more susceptible to diseases. In addition to these aspects, Davis (2006) has a broader perception of urban expansion, which is that it is not necessarily driven by more job offers and growth in opportunities, but by the increase in poverty. In other words, many cities expand and grow not because they are developing economically, but because people migrate to them to survive in informality, difficulty, and poverty.

The 1958 drought was another very intense situation, also turning into a public calamity and remaining in the memories of farmers. And in the last decade, especially from 2012 to 2017, we had years of drought or poorly distributed rainfall. Thus, it was not favorable to agricultural production and animal husbandry, to the population's needs, or to the increase in water levels in storage systems. Talking to residents of the Jaguaribe Valley, it was clear that this last decade may have been one of the worst periods of water scarcity in the last 100 years, intensifying conflicts related to land and the use of water resources. FUNCEME data on average annual rainfall by municipality from 2012 to 2017 illustrates this variation (Figure 52).

The maps show how the average rainfall in the semi-arid region of Ceará is much lower than that of the coast. On the other hand, two regions with priority for water supply and few restrictions on water use were precisely the Metropolitan Region of Fortaleza and the Industrial and Port Complex of Pecém (CIPP), which are located on the coast. In this sense, small rural communities are the first to suffer the impacts of drought, with the lack of water resources, with restrictions on the use of water from storage and with direct dependence on water for their economic activities. The water supply to both urban and rural areas was gradually impaired as the storage was emptied, with the capital always being prioritised for supply. The Castanhão, a large reservoir built by the government in 2002, according to data from FUNCEME, was at 72 per cent of its capacity in 2012 and reached only 2 per cent in 2018. Today, Castanhão is at approximately 31per cent of its capacity. This emptying of the reservoirs has made the

situation more complex and required greater intervention by the state in terms of policies and actions, including in many cases the use of tanker trucks to supply small towns.

Figure 52: SEQ Figure * ARABIC 52: Average annual rainfall in Ceará by municipality, from 2011 to 202



Source: FUNCEME. Retrieved from <https://chuvas.funceme.br/diario/municipios/maxima/2024/10>.

Public Actions in Response to the Drought in Ceará

Long-lasting drought is a situation that has major economic, environmental, and social impacts, such as underemployment, lack of employment or difficult labor relations; loss of biodiversity; desertification; fires; migration; conflicts over access to water; among many others. Studying this phenomenon requires a historical perspective and understanding how this extreme water shortage affects different areas of the state in different ways. Today this goes beyond the natural aspects of these territories, relating to the type of attention, water resources, and investments that are directed. Therefore, government decisions on how to deal with drought have noticeable effects and the political approach to the phenomenon is decisive.

Observing the context of the sertão of Ceará, there has been a change in the way droughts are dealt with. Previously, there was an exclusive dependence on climate patterns and rainfall, but over time, there has been a shift towards more “independent” water management. It is put in quotation marks because it is known, obviously, that it is not possible to manage water and solve drought problems in a way that is dissociated from nature, as Davis (2001) rightly analyses and explains. However, investment in the construction of water storage and distribution structures—such as reservoirs, dams, and canals—has been significant in recent decades in Ceará, aiming to guarantee a continuous supply during times of scarcity.

Several agencies were created to mitigate the consequences of droughts, both at the national and state levels. One of the major public investments to deal with the consequences of drought in Ceará was the Castanhão Dam, built on the bed of the Jaguaribe River. The construction began in 1995 and was

completed in 2002, in a partnership between the Departamento Nacional de Obras Contra as Secas (DNOCS) and the Secretaria de Recursos Hídricos do Ceará (SRH-CE). The dam submerged the city of Jaguaribara, which was rebuilt in another area and had its population transferred. Castanhão is the largest reservoir in the state. With a storage capacity of 6.7 billion m³, it perennialises the Jaguaribe River and supplies the Metropolitan Region of Fortaleza (RMF) and the Industrial and Port Complex of Pecém (CIPP), some of the points of greatest water demand.

Another important investment was the Integration Canal, which constitutes a set of water-related projects that transpose the waters of the Castanhão to reinforce the supply of the RMF and the CIPP. The Canal is part of the Ceará Water Belt, which is the largest water infrastructure project in the history of the state, with canals, tunnels and siphons for water distribution. In Ceará, most of the municipal headquarters and irrigated cultivation areas established by the DNOCS are supplied by dams, either by direct capture of water from reservoirs, or using conduction canals connected to the dams or by rivers that have become perennial due to these damming structures (Cortez, Lima, & Sakamoto, 2017).

Since 2012, with the recurrence of drought in successive years and the decrease in reservoir levels, there has been a reduction in the flow of water released into the rivers and restrictions on water use, causing significant impacts on rural populations and small producers. This control was carried out, for example, by limiting the forms of irrigation, the type of agricultural crop and the size of the irrigation area. This began in 2012 and later also began to use technologies—satellite, for example—as monitoring tools. Some producers and residents of the Jaguaribe Valley who have experienced these restrictions on water use claim that there is a waste of water consumption in the RMF and that the CIPP supply is prioritised.

On the other hand, rural areas have suffered from limited irrigation, crop losses, economic consequences, and unemployment. Drought therefore remains a recurring problem for rural residents and residents of small and medium-sized cities in semi-arid regions. The drought in Ceará also remains a worsening issue of climate transition that requires attention, for which the public authorities have not presented satisfactory and permanent responses in terms of water supply.

Final Thoughts

Agreeing with Davis (2001) on the direct relationship between natural phenomena and human actions, it is understood that the elements that cause ecological imbalances are the economic and political mechanisms related to the spread of the capitalist system. Environmental problems are happening today: droughts, floods, landslides, tornadoes, hurricanes, etc. These are not issues for a future that is yet to come, these are issues of today's unequal, racialised, and capital-driven world. Political ecology brings the understanding that it is essential to perceive environmental transformations from their own political dynamics. Therefore, the relation between drought and El Niño is important. However, it is not responsible for prioritising the supply of the RMF and the CIPP at the expense of the sertão. Just as it is not responsible for the pricing of food to the point of preventing or hindering the population's access to food. Thus, continuing from the perspective of political ecology, it is possible to identify a certain class bias in government actions during the last droughts.

What is clear is that the droughts of recent years have been quite critical and limiting for the Ceará hinterland, however, there were no shortages or major restrictions on water use in the RMF, nor in the industrial complex. In Fortaleza, a contingency fee for a 10 per cent reduction in water use began in 2015, while the smaller cities in the semi-arid region of the state and rural communities had been facing the impacts of drought and major water limitations since 2012. So, the question remains as to who is a priority in terms of supply, which cities, and which activities. Miraftab (2023)—in the V International Meeting on Urban Planning Experiences in Context of Social Conflict that took place in 2023 in Rio de Janeiro—argued that the liberation of all is only possible through the liberation of the most subordinate

groups. This applies to the situations contained in the political, economic, and social system in which we are inserted. And the case of drought is yet another example that highlights the prioritisation of certain classes, activities, and interests over others.

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Rendering Floods Technical: Exploring the Politics of Disaster Management from a South African Town

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Introduction

This conference paper explores how disruptive climate events can catalyse a shift in local governance practices, and the implications of this shift for the relationship between the local state and residents. It does so using qualitative research on the responses to four disruptive floods between September 2023 and July 2024 in a small South African town. The paper tracks the transition of increasing adoption of formal disaster management practices by staff of the Cape Agulhas Local Municipality (CAM) and explores what this means for the politics of crisis and contestation between residents and the local government.

Most climate change projections point towards an increase in the frequency and intensity of disruptive events like floods across urban Africa (Dodman et al., 2022; Trisos et al., 2022). How these disruptions are responded to is therefore increasingly significant, both for the people who are most vulnerable to their impacts, and for the legitimacy of the governance systems that seek to respond. Disaster management, in this paper, refers to a set of organisational practices that involve planning and implementation of measures to prepare for, respond to, and recover from events that disrupt the functioning of a community or society (UNDRR, n.d.). Such measures address the actual occurrence of disasters as distinct events, in contrast to disaster risk reduction which includes measures taken to reduce the risk of possible events and prevent the creation of new risks. While this paper does not intend to diminish the importance and potential benefits of formal disaster management, in the spirit of critical scholarship it explores the political implications of framing the impacts of disruptive climate events as technical problems to be addressed through technical disaster management processes.

The concept of crisis has been used in multiple, contested ways to draw attention to adverse conditions in cities and the vulnerability of (especially Southern) urban dwellers to a range of shocks, hazards and adverse conditions. Enora Robin and colleagues define crises as “episodic moments of acute shocks which in turn contribute to render those endemic vulnerabilities visible and necessitate direct intervention” (2019, p. 244), highlighting how such moments often rupture taken-for-granted ways of understanding a situation. Similarly, Gayatri Spivak (1987) talks about bringing a situation to crisis as a hopeful strategy of popular resistance—a way revealing systemic injustices and forcing a response. However, “crisis-talk” is not a strategy limited to popular resistance, but a political move used across the political spectrum to draw attention towards or away from circumstances, distribute blame, or create momentum for change (Bayirbağ et al.; Weaver, 2017).

This paper combines this reading of the politics of crisis with the theoretical framework developed by Tania Murray Li in her book *The Will to Improve* (2007). Li critically explores the rationale and outcomes of what she calls improvement schemes: programmed efforts by government actors, development agencies and NGOs to rectify perceived deficits in a defined target population or community. Li identifies problematisation and rendering technical as two interlinked, routinised practices involved in turning ‘the will to improve’ into programmatic interventions (Li, 2007, pp. 7–10). These practices involve defining the deficiency or challenge to be addressed as well as the proposed solutions as being within a particular domain of expertise. Often, the process of rendering questions of improvement technical renders them nonpolitical, excluding considerations of power and control.

These technical framings are not fixed and can be subject to contestation by the intended beneficiaries of improvement schemes. Li (2007, pp. 22–27) explores the interface between the will to govern

through improvement schemes and the strategies of struggle used to contest them. Viewing CAM's efforts to implement disaster management as an improvement scheme, this paper argues that the transition to formal disaster management renders technical the process of responding to disruptive floods. It explores the implications of this transition for residents' political practices and the strategy of 'bringing to crisis' as a form of contestation.

Flooding in Cape Agulhas Municipality

The Cape Agulhas Local Municipality lies in the Overberg District on the south coast of the Western Cape Province in South Africa. It has a population of about 40,000 people, who are concentrated in five small urban centres, surrounded by commercial farmland (Stats SA, 2023). Bredasdorp is the largest of these urban areas and the seat of both the local and district municipalities. It is the meeting point of several regional roads, including the only paved access roads to nearby coastal towns Struisbaai and Arniston (Figure 53).

Figure 53: SEQ Figure \ * ARABIC 53: Map of Cape Agulhas Municipality showing urban centres and major roads



Source: Open Streets Maps 2024

On 24 and 25 September 2023, much of the Western Cape Province experienced heavy rainfall that led to widespread and severe flooding. These floods caused an estimated ZAR2 billion (USD100 million) in damages in the province (Cape Agulhas Municipality, 2024). In 48 hours, Bredasdorp received half its average annual rainfall (Johnston, 2023). The resulting floods displaced 180 people, damaged many additional homes and properties in the Cape Agulhas area, and damaged roads and other infrastructure (Cape Agulhas Municipality, 2023). Closure of several major roads from flood damage and inundation resulted in both Struisbaai and Arniston being cut off from Bredasdorp (and therefore the outside world) for several days. High rainfall events caused similar floods in April, June, and July 2024, further damaging homes and infrastructure and cutting off coastal communities from access to food, healthcare, education, and employment. This paper draws on primary data to explore the response of the local and district municipalities and others to the floods, how this changed from September 2023 to July 2024 and the implications of this process for the relationship between the municipality and its residents.

Methods

The data described in this paper were produced through ethnographic fieldwork in the Cape Agulhas area between April and August 2024 as part of my PhD. An institutional ethnography approach (Campbell, 2006; Smith, 2006) was taken to this fieldwork, where residents' experiences of the floods and flood responses were used as the entry point for exploring the social institutions and governance processes that influence these experiences. Viewing CAM's implementation of disaster management as an improvement scheme, this institutional ethnographic approach aligns well with Li's (2007) framework for bringing together both "analysis of governmental interventions... and what happens when those interventions become entangled with the processes they would regulate and improve" (Li, 2007, p. 27). The fieldwork included interviews and focus groups with local and district municipality staff, ward councillors, residents of Bredasdorp, Arniston, and Struisbaai, and other organisations broadly involved in the flood response, as well as observation of community meetings and municipal disaster management processes. Themes were developed by iteratively revisiting and coding the data following a thematic analysis approach (Braun & Clarke, 2019) and drawing on the theoretical framework to interpret themes that emerged. While data relating to other actors was produced, this paper focuses on the local municipality, residents and their interactions.

Findings

According to South Africa's Disaster Management Act (No. 57 of 2002), the legal mandate for responding to disasters and reducing disaster risk resides with the national and provincial governments, and district municipalities. As a local municipality, CAM's legal responsibilities in times of disaster were, until recently, limited to cooperating with the Overberg District's disaster management processes and adhering to requests, which formed a small part of one CAM staff member's job description. During the COVID-19 pandemic, CAM was required to participate more in district disaster management processes, and to enforce lockdown regulations. From this time, with provincial and district guidance, the local municipality started to develop its internal disaster management processes.

By the September 2023 flood, CAM had developed a disaster management process, including establishing a Joint Operations Centre (JOC) (cross-department call centre and internal communication platform) during the disaster (Cape Agulhas Municipality, 2023). However, in reflecting on their experiences of the September 2023 floods, several CAM staff members said that they were not well prepared and that the local disaster management processes were not well organised.

Between September 2023 and August 2024, a process of reflection and incremental change took place. This process was galvanised by the repeated floods and operationalisation of the disaster management process and used to identify and address shortcomings in the municipality's flood management strategy. Actions taken to improve the disaster management process included: appointing additional officials to the JOC, to ensure sufficient staff for its 24/7 operation during disasters; including the communications officer in meetings with the district and province to facilitate more accurate and efficient communication with the public; and shifting the focus of several staff members to include disaster management in their day-to-day jobs.

Through these changes, the municipality became more easily able to respond to a set of clearly defined problems caused by the floods through set technical processes. For example, CAM responded to homes being inundated with water by providing sandbags to affected households from the municipal stores. This was done through a standard procedure, requiring residents to contact the municipal call centre and provide their names and addresses, and then law enforcement officers to be dispatched to assess the situation and confirm that the home was inundated. This process rendered technical the problem of disruptive flooding and defined various municipal staff as having the expertise to assess the impacts of floods and determine the best course of action to address the impacts on residents. It also bounded

what the municipality considered to be effects of the floods and the range of possible actions to be taken to address them. In addition to providing sandbags and plastics sheets to flooded households, CAM's flood response included assessing infrastructure damage and where possible repairing it, mobilising relief aid, and liaising with other government institutions to restore basic services. However, addressing structural contributors to flood vulnerability, for example reforming control over municipal resource allocation and redressing the unequal legacies of segregationist spatial planning, were not considered as part of this process, effectively depoliticising the impacts of the floods.

As disaster management was formalised, several CAM staff members began to see themselves as contributing to the improvement of the residents' lives through this process. They also invested time in trying to improve the disaster management process, seeing themselves as having the relevant expertise and experience to do so. The narrative of CAM staff working to improve the lives of residents was used repeatedly in the municipality's public communications about their flood response work. The disaster management processes also shaped the actions of residents. By the fourth flood, in July 2024, some residents were implementing the same processes as the municipality in preparation for and response to the floods, with and without input from CAM.

As with many disruptive events, the Cape Agulhas floods made systemic vulnerabilities and inequalities—like food insecurity in Arniston and inequitable spatial planning in Bredasdorp—more clearly visible (Robin et al., 2019). Rather than building on the momentum these ruptures offer for change, the formalised disaster management process excludes such underlying problems from the domain of flood response, thereby contributing to rendering the floods nonpolitical. Contestation of this framing of the flood impacts and responses was expressed in conversations among residents and in community meetings. However, this was mostly among residents who had been badly affected by the floods and whose efforts and energy were focused on addressing the immediate flood impacts rather than contesting the municipal framing.

Residents and municipal staff in Cape Agulhas have increasingly adopted roles in disaster management, catalysed by their repeated experiences of flooding. This adoption, arguably, led to the improvement of immediate responses to the floods between September 2023 and July 2024. However, by rendering the floods technical, the disaster management processes of CAM contribute to foreclosing the political opportunity of acknowledging and responding to the floods as crises that reveals systemic vulnerability. In doing so, they place the burden of contesting this technical framing and bringing their challenges to crisis on the residents affected by the floods.

Conclusion

In addition to their service delivery mandates, local governments in South Africa and elsewhere are increasingly required to find ways to respond to disruptive climate events. Disaster management offers a focused and reactive way to do so, framing disruptions as technical problems to be addressed through technical expertise. However, this reactive and technical approach to disaster management can hinder the reduction of disaster risk by if it renders the impacts of disasters non-political and thereby forecloses consideration systemic vulnerabilities.

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Urban Flooding in Kochi: Navigating Transitions in a Vulnerable Landscape

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Keywords: Urban Pluvial Flooding, Stormwater Management, Flood Resilience, Development Strategies, Urban Flood Management

Kochi, a vibrant coastal city in India, faces escalating urban flooding challenges exacerbated by climate change, rapid urbanisation, and inadequate infrastructure. Situated in a low-lying terrain with an elevation of 0-3 metres above sea level, Kochi experiences recurrent urban pluvial flooding during the annual monsoon season. The city's drainage system, designed to channel stormwater, often becomes overwhelmed due to its gravitational flow into interconnected man-made canals, which struggle to discharge into the Vembanad Lake backwaters. This situation is compounded by tidal variations from the Arabian Sea, further heightening the risk of urban flooding.

This study examines the complex dynamics of urban flooding in Kochi through a multi-disciplinary lens, integrating spatial analysis, societal, and ecological influences. Utilising a mixed-methods approach, we analyse developmental and planning documents published by the local government concerning urban flood management. This analysis reveals identified flooding issues, evaluates suggested management strategies at both micro and macro levels, and critically assesses the comprehensiveness of these approaches regarding flood resilience.

We specifically explore the effectiveness of proposed strategies for controlling greywater and stormwater inflow into drainage channels and canal systems, as well as the current status of urban development initiatives outlined in these documents. Our findings indicate a significant gap in considering nature-based flood resilience methods, highlighting shortcomings when compared to the URDPFI 2014 guidelines for open space allocation. We advocate for the strategic use of urban open spaces to divert floodwaters, underscoring the necessity for adaptive urban planning.

This inquiry aims to contribute to the discourse on urban resilience planning, advocating for collaborative frameworks that empower local stakeholders, including community organisations, government agencies, and academic institutions, in mitigating flooding impacts. Ultimately, our study calls for a comprehensive flood-resilient strategic plan that incorporates diverse socio-political, environmental, and economic factors, fostering a more adaptable and equitable urban environment in Kochi and similar contexts

Introduction

The Central Business District (CBD) of Kochi has close proximity to the Vembanad Lake, which connects directly to the Arabian Sea. The city features a complex canal system that runs in both North-South and East-West directions, with 18 canals covering 90 sq. km of the Kochi Corporation area. Originally established for commercial navigation in the early 20th century, these canals now facilitate natural drainage into Vembanad Lake, making them vulnerable to tidal fluctuations that occur approximately every eight hours.

Due to the city's elevation, which is at or below mean sea level, these tidal changes can lead to backflow from the lake into the city during high tides. Combined with heavy monsoon rains, this can result in significant urban flooding.

The stormwater drainage system consists of both natural canals and manmade drains, categorized as primary canals, secondary canals, and area drains. Area drains channel water from neighbourhoods to secondary canals. However, these systems have not been exclusively designed for stormwater management, as they also receive greywater and are often subject to illegal dumping. Over the years, authorities have implemented various strategies to improve the management and maintenance of these drainage systems.

This study refers multiple documents or planning policies published by the local government and identifies the urban flooding issues identified by the authorities from the year 2008 to 2024 in the first level. The study then carries on to identify the multiple policies which were proposed under these documents addressed to tackle the urban flooding issues of the city of Kochi. The study also understands the completion level of these urban interventions and their possible effectiveness in tackling the issues of urban flooding in the city. The study evaluates the level of consideration given in these policies which addresses the possibility of achieving urban resilience in the city through the initiatives proposed.

Figure 54: Canals of Kochi CBD



Source: Derived by Author in ArcGIS

Study Findings

The city's low slope further complicates the effective drainage of water into Vembanad Lake. Although there is a network of interconnected canals designed for stormwater management, their functionality has been compromised by encroachments and blockages. The CBD's strategies focus on hard-engineering methods that examine drainage flows and land use, yet they may fall short in addressing recurring problems such as solid waste pollution, which exacerbates waterlogging.

The CSML project has modernised the drainage infrastructure by introducing prefabricated sections and utility ducts, all covered by pedestrian pathways throughout the Kochi Corporation area. Kochi's Master Plan 2040 aims for high-density transit-oriented development amidst the challenges of urban flooding, it is clear that narrow, single-target strategies are inadequate. The urban flooding issues are not limited to the size or availability of storm water drainages. The authorities are lacking the necessary understanding of urban resilience which can be effectively studied and planned using multi-dimensional models which may include ecological, societal, and environmental factors which will provide an inclusive yet effective urban flood management plan.

A comprehensive strategic plan is needed, embracing a multi-dimensional perspective that incorporates indigenous knowledge for effective stormwater management and flood resilience. Existing research highlights a gap in understanding the various factors influencing stormwater dynamics in Kochi.

By integrating the multi-dimensional elements, the strategic plan can serve as a foundation for a resilient city framework that addresses the complexities of urban flooding in Kochi. The research concludes by providing an open forum for discussion on the possibility of acceptance by authorities to include urban resilience plan in their future policies to effectively tackle the issues of urban flooding in the city of Kochi.

SPECIAL PLENARY
**Cities Rethought: a New
Urban Disposition**

Cities Rethought: a New Urban Disposition

In a world of disruptions and seemingly endless complexity, cities have become—perhaps more than ever—central to thinking about the future of humanity. Yet rarely has the study of cities been more fragmented among different silos of expertise, diverse genres of scholarship, and widening chasms between theory and practice. How can we do better?

The new book *Cities Rethought* (Polity 2025) suggests that we need to remake the way we see and know cities in order to rethink how we act and intervene within them. To this end, it offers the contours of a new urban disposition. This disposition, articulated through its normative, analytical, and operational elements, offers an opportunity for scholars, practitioners, and citizens alike to approach the complexity of cities anew, and find ways to rethink both scholarly analyses as well as modes of practice.

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He is widely published. Most recently, he is the author of *In the Public's Interest: Evictions, Citizenship and Inequality in Contemporary Delhi* (University of Georgia Press, 2017; Orient Blackswan, 2017) and co-editor (with Smita Srinivasan and Vanessa Watson) of the *Routledge Companion to Planning in the Global South* (Routledge 2018). His forthcoming book, with Edgar Pieterse, Susan Parnell, and Michael Keith is called *Cities Rethought: A New Urban Disposition* (Polity/Context Westland 2024).

Susan Parnell is Professor in the School of Geography at the University of Bristol and Emeritus Professor at the African Centre for Cities (ACC) at the University of Cape Town. She has held previous academic positions at Wits University and the University of London (SOAS). She was a Leverhulme Visiting Professor at UCL in 2011/2, Emeka Anyaoku Visiting Chair University College London in 2014/15 and Visiting Professor at LSE Cities in 2017/18.

She is the author of over 150 peer-reviewed publications that document how cities, past and present, respond to policy change. Her most recent books include the co-authored *Building a Capable State: Post Apartheid Service Delivery* (Zed, 2017) and the co-edited volumes *The Urban Planet* (Cambridge, 2018) and *Localising the SDGs in African Cities* (Springer, 2022).

Sue has been actively involved in local, national and global urban policy debates, most recently around the 2030 Sustainable Development Goals, leading the push for an urban goal. She is an advocate for better science policy engagement on cities. Additionally, Sue was a founding member of the ACC, she has long played an active role on the boards of NGOs and large research grant making bodies. She has served on and chaired various international Scientific Committees and regularly acts as a consultant and advisor on research, education and implementation projects related to urban transformation.

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His research focuses on migration related processes of urban change. His most recent work is the monograph China Constructing Capitalism: Economic Life and Urban Change (2014). His next, Urban transformations and public health in the emergent city, will be published in 2020 by Manchester University Press.

He has experience outside the academy working in the community and voluntary sector and as a politician for twenty years in the East End of London, leader of a London local authority and founder, chair and board member of a wide range of urban regeneration companies and public/private partnerships. He has also several decades experience in the voluntary sector, initially in organisations focusing on racism and the criminal justice system and more recently as the co-founder and chair of the Rich Mix Cultural Foundation, the largest multicultural arts centre in the UK.

PANEL 11
Urban Spaces and
Positionalities

From 'Hill-Station' to 'Hill-City': Negotiating Equitable Urban Transformations in 21st Century Shillong

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Introduction

This paper highlights how Shillong's transformation from a 'hill-station' into a 'hill-city' is being driven by multiple political, economic, and social transitions which are necessitating new forms of grassroots activism and community-centric policy interventions. The proposed paper explores how these progressive movements and grassroots initiatives might be contributing a measure of equity, inclusivity, and sustainability into this transition from a hill-station into a hill-city. The paper provides an account of a one such progressive movement that is mobilising the city's informal workforce to effectively secure their rights to the city. Furthermore, the paper also highlights how the state government is complementing these grassroots strategies through interventions in the fields of healthcare and community development. The aim here is to illustrate how these progressive and reformist actors might contribute a measure of significant (albeit ultimately limited) change into various the interrelated circuits and fields of urban transformation.

Conceptual Background

From a theoretical perspective, this paper seeks to extend the scholarly discussions on the colonial construction of hill-stations (Kennedy, 1996; King, 1976) to consider the post-colonial politics of space and development in Shillong in relation to debates around urban restructuring, urban commons, and the right to the city (Harvey, 2012). On the one hand, the paper highlights how the spatial segregation and institutional exclusions of the colonial hill-station (Kennedy, 1996) have mutated into a fractious post-colonial politics of space between tribal insiders and migrant outsiders (Dutta, 2013; 2018). Furthermore, it traces how the spatio-historical evolution of Shillong has been marked by disruptive economic, political, and social transitions which have created a uneven terrain of urban empowerment, exploitation, and exclusion which has become more pronounced in the 21st century (Xaxa, 2018). The paper explores if this process urban transformation might be made more sustainable through strategies of 'urban commoning' whereby various diverse reformist and progressive stakeholders can come together to reassert their right to the city (Harvey, 2012; Susser & Tonnelat, 2013). In doing so, it explores the extent to individuals and small communities might influence the seemingly impersonal and overwhelming market forces which drive the process of urban restructuring.

Objectives

Keeping in mind these themes, the proposed paper will engage the following objectives:

- (a) To provide a detailed overview of Shillong's transition from a hill-station into a hill-city in terms of various interconnected political, economic, social, and cultural transitions
- (b) To chronicle the progressive movement to organise the city's informal workers towards securing their rights to the livelihood and access to public space in the city.
- (c) To explore the extent to which the city administration is negotiating such progressive ideas and grassroots strategies in the fields of healthcare and community development.

Methodology

In terms of primary sources, the proposed paper will be based on interviews with grassroot activists and policy practitioners. These will be complemented with a variety of secondary sources including local print media articles, essays, photographs—in a manner that highlights the creative agency of diverse

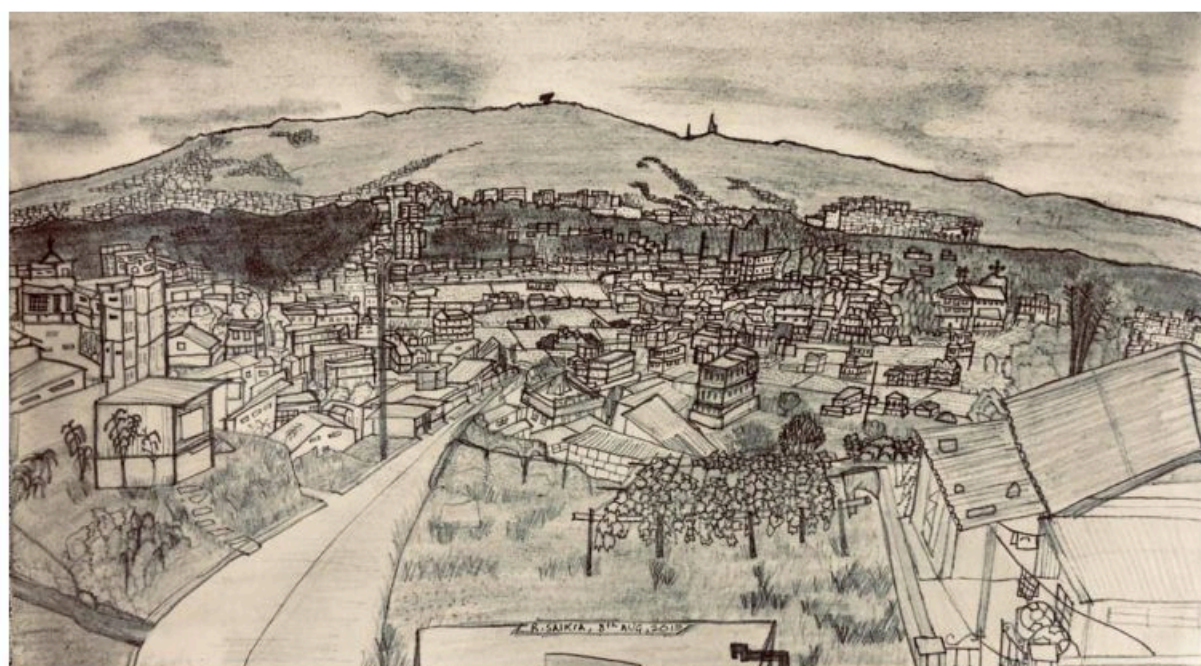
stakeholders on the ground. The resultant paper hopes to bring together theoretical arguments, activist accounts, and various forms of creative expression, to highlight Shillong's multi-faceted transition into a hill-city. In the following section, an attempt has been made to provide some preliminary observations in relation to the objectives of the proposed paper. The aim here is to provide the reader with a 'sample' based on secondary sources, even as the final paper would delve deeper into these themes on the basis on in-depth interviews.

Shillong: from Hill-Station to Hill-City

Established as a hill-station in 1864, Shillong initially served as a site for colonial administration and the reproduction of British values as articulated through a cultural landscape of churches, missionary schools, cottages, and artificial lakes (Kennedy, 1996). By the early 20th century however, Shillong emerged as a multifunctional administrative-military-and-economic hill-station which attracted various communities including the tribal Khasis (who were the original landholders), Marwari and Sindhi traders, Bengali and Assamese clerks, Gorkha soldiers, Bihari service workers, and Chinese artisans (Dutta, 2013; 2019). In post-colonial era however, the city's cosmopolitan ethos was splintered by a fractious politics of space between 'native-tribals' and 'migrant-settlers' culminating in recurring episodes of communal violence and riots (Dutta, 2013; 2019). Given this background of communal tensions, the proposed paper seeks to highlight the extent to which certain progressive initiatives have sought to negotiate an element of multicultural inclusivity into Shillong's contemporary transition into a tribalised hill-city.

In 1901 the hill-station was home to merely 9000 residents (Kennedy, 1996), but by 2011, the city's population had swelled to over 350,000 in the greater Shillong urban agglomeration area. For a section of older residents, the city's growth reflects a negative transformation once close-knit cosmopolitan hill-station into an increasingly corrupt and communal city (Karlson, 2018). On the one hand, this sense of historical nostalgia and contemporary despair fails to acknowledge how Shillong has always been a multifaceted site of both urban empowerment (in terms of employment, entrepreneurship, and education) and exclusions (along the lines of class and ethnicity) since the colonial era.

Figure 55: Pencil sketch of Shillong's Pynthorunkhrah locality by the Author. The sketch illustrates a process of urban sprawl over the previously agricultural outskirts of the city. The proposed paper explores how Shillong's transformation from a 'hil



Source: Author

That said, the proposed paper contends that the city's contemporary growth has not been met with a corresponding improvement in economic opportunities, social services, and urban infrastructure and governance capabilities. For instance, Shillong has been ranked at, or near, the bottom of successive urban governance reports (Prajā, 2018; MoHUA, 2021). The city was ranked last out of 60 cities in the Municipal Performance Index which noted how the city administration had neither carried out necessary internal audits nor published financial statements (MoHUA, 2021). In its study of urban governance in Meghalaya, the Praja Foundation noted how municipal elections have not been held in Shillong since 1968, even as the city's municipal board is empowered with few functions over a limited area of the city (Prajā, 2018). The limitations are a result of resistance from traditional tribal bodies—including the *dorbar shnongs* (or village councils) and the autonomous district councils—which have opposed the expansion of the municipal powers and functions (Prajā, 2018), especially into the tribalised outskirts and urban villages of the city. At the same time, critics have observed how these traditional bodies have failed to develop their own adequate capabilities and accountability systems in a manner that is equitable, inclusive, and sustainable (Rynga, 2015; Mukhim, 2014).

Beyond these 'urban factors', the proposed paper also considers how Shillong's contemporary problems relate to the larger problems of socio-economic development in the state of Meghalaya. According to NITI Aayog, Meghalaya is the third poorest state in the country in terms of multi-dimensional poverty, with 32.67 per cent of the people living below the poverty line (Niti Aayog, 2023). The state fares especially poorly in terms of asset ownership with the socio-economic caste census of 2011 reporting that 76 per cent of Meghalaya's population is landless (Chandran, 2022). In response, the state government has initiated some progressive interventions in the fields of education and healthcare, which if successful, could bring forth a more sustainable model of socio-economic development in the state. One such initiative is the State Capability Enhancement Programme (SECP), which has sought to make significant interventions in the fields of maternal and infant mortality, and community development¹⁶. The proposed paper will explore the extent to which these policies are being implemented with regard to the city's working-class communities. At the same time, the paper puts forth the argument these such interventions need to be complimented with local grassroots initiatives to ensure a transition towards a more egalitarian hill-city.

Such grassroots initiatives are invaluable for a state that continues to grapple with a situation of growing inequality where a small elite have managed to secure expansive landholdings, while large numbers of increasingly dispossessed rural families migrate to Shillong in search of sustenance and opportunity. For many of these local rural-to-urban migrants, Shillong provides a small hope of securing employment (in construction and hawking) (Raiot Collective, 2016), education (for their children), healthcare (in the city's hospitals), and housing (in the city's periphery). These working-class struggles stand in stark contrast to the rising fortunes of a small but powerful political and economic elite consisting of coal barons, politicians, and contractors, at the helm of transforming Shillong into a provincial version of a 'world class city' that caters to both rich locals and tourists. This in turn has led to a contentious politics of public space in Shillong, where the municipal administration sought the removal of hawkers from the city's streets and footpaths (Raiot Collective, 2016).

It is in this context that a group of progressive activists organised the city's hawkers to collectively bargain for their rights to livelihood and work. The proposed paper will draw on interviews with members of this progressive movement (called the Thma U Rangli Juki or TUR17) to understand how they helped to organise a street hawkers association (the Meghalaya & Greater Shillong Progressive Hawkers and Street Vendors Association) to collectively bargain for their rights to livelihood and access to public space in the city (Pinto Rodrigues, 2023). The paper will trace how this movement went secure

¹⁶ Official Website of the State Capability Enhancement Programme - <https://statecapability.org/>

¹⁷ TUR Manifesto 2013 - <https://drive.google.com/file/d/1QxLRiRRzLP2kUwllnj7IBmnHWSFgKwBI/view>

a favourable verdict from the Meghalaya High Court which called on the state government to recognise and regulate the livelihood rights of hawkers in keeping with the central government's Street Vendors (Protection of Livelihood and Regulation of Street Vending) Act, 2014 (Raiot Webzine 2016; Highland Post, 2022; Pinto Rodrigues, 2023). The paper will also explore how the members of this organisation have since expanded their organising activities to empower casual workers in the state's public sector to secure guarantees of 'equal pay for equal work' from the high court (The Shillong Times, 2024).

The aim of these interviews will seek out the activists' own narratives to understand both their organising strategies along with their political insights and views into the changing nature of the city. While some of these activist narratives will 'speak for themselves', an attempt will also be made to relate their organising strategies to larger debates into the role of civil and political society in urban India. In this regard, we will observe how this progressive movement for informal workers' rights embodies a particular brand of radical civil society which forges alliances with working class communities to secure the latter's 'rights' and 'demands' both within and outside the reformist framework of the development state. This in turn might illustrate the potentially productive relationships that might emerge between the seemingly separate categories of formal bourgeoisie civil society and the messy realm of political mobilisation which Partha Chatterjee had outlined in his influential reflections of politics and governance in urban India (Chatterjee, 2004).

Research Interests and the IIHS Conference

While my MA and MPhil research explored place-making strategies and urban restructuring in Delhi's migrant colonies and refugee settlements (Saikia, 2014), my recent policy experiences have focused on participatory budgeting and urban commons in Pune (Saikia et al., 2024). The IIHS conference provides an ideal opportunity for me to re-orient my academic-and-policy insights towards my research engagements in my hometown of Shillong. The proposed paper is an attempt to compliment my ongoing research into the spatio-cultural transformation of the hill-station (Saikia, 2016), with the important work that is already being carried out by various activists, artists, reformist administrators and community workers in the city. In doing so, my aim here is to highlight the complex strategies and connections through which urban research, policy-making, and grassroots activism seeks to critically assess, negotiate, and influence, the larger processes of urban transformation.

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Sports as an Arena for Understanding Urbanisation in Mumbai Region During Late 20th and Early 21st Century

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The shifting geographies of sports for development and business find themselves in a muddled terrain in India, where sport becomes an arena of accumulation and contemporary placemaking at the city level. The different forms of urbanism the Mumbai region finds itself amidst are captured in the intersection and interface of sports and urbanisation. The question of land and its transformation into a marketable item is central to creating sports histories and urban legacies in the Global South, which are marked by sports as a cultural driver that brings together aesthetic values, aspirations, and legacies. Sports, such as cricket, football, and kabaddi, have been a crucial part of Mumbai's urban histories and urban legacies. The study is an attempt to centre local socio-cultural realities and cultural histories of the Global South in world-class city-making attempts, using empirical insights from sports such as kabaddi and football. The formation of world-class cities often comes with its own hegemonic cultures and legacies (of which mega-events have become crucial). However, little focus has been paid to how local cultures and histories (with colonial ties or not) continue amidst structural change in urban settings. Here, focusing on understanding such continuities in sport, I focus on organisational, spatial, and political aspects that facilitate this continuity and offer a simultaneous presence alongside structural change. Using long-term archival data and insights from in-depth interviews done in Mumbai, this study presents a new way to interact with sport in urban studies.

Politics, specifically elections, are critical to kabaddi and football clubs. While football tournaments before constituencies go to polls are scattered, kabaddi is an important part of campaigns. After the formation of Shiv Sena in 1966, kabaddi, with a clear presence in the Marathi household, became important for the party to reach out to voters. Here, strongmen who ran illegal businesses and kabaddi players in the neighbourhood emerged as local leaders who would leverage the game for votes during polling. During the 20th century, voluntary contributions and financial support from a local *dada* or *bhai* sustained kabaddi clubs in Mumbai. With the emergence of Shiv Sena, kabaddi, due to its affinity to Marathi culture and identity in Mumbai over generations, received a great boost: an uptake in adoption of the game in various parts of the city, an increase in the number of tournaments organised, clubs formed and player participation. While at face value clubs organised kabaddi tournaments, the *shakas* of Shiv Sena and, subsequently, even the Bharatiya Janata Party provided the necessary funds and permissions to organise local kabaddi tournaments. The expansion in seats of the municipal corporation in Bombay/Mumbai from 170 in the mid-80s to around 227 in 2017 led to increased work and competition to organise bigger tournaments. For instance, during civic polls in the last decade, the BJP has emerged as a serious challenge to the Shiv Sena for the Hindu vote in the city. In 2017, the BJP secured 82/209 seats (votes secured = 27.14 per cent), with Sena securing 84/227 (votes secured = 28.70 per cent), with the former gaining a massive 51 seats (from 31 seats in 2012 to 82 seats in 2017).

The interviews note Shiv Sena's contribution to the spread and organisation of kabaddi in Mumbai. Historically, the spread of kabaddi clubs in Mumbai has aligned with a strong presence of the Marathi population and in the slum areas. In this way, political parties and their candidates have a strong presence in the game, whether it is support to organise tournaments, recommending players' names for state honours in sport (that come with financial aid), and even securing their berth as members in the district bodies. It is evident that the amount of money being spent by political parties and candidates in various elections, year-on-year, has always seen games such as kabaddi and football to garner votes and claim stakes in a diverse voting population. Further, newer organisations such as academies and private tournaments in football, follow a similar path in approaching local politicians, even celebrities and police

personnel, to private tournaments to gain 'ground' and 'secure' neighbourhoods. In this way, sport is a conduit where regular and competitive elections have become a centrepiece at the district level, allowing associations, clubs, academies and private tournaments to grow and, in turn, benefit the politicians, who increasingly find themselves in thick of crowds that sporting events attract. Land access and control to extract rents is crucial to the voluntary nature of sports organisations: associations and clubs. For this, sports organisations have always relied on politicians who would help them gain access, through de jure or de facto means, to land or a dedicated playing space in urban areas. With state-led provisioning of land for dedicated sports pitches being sparse and the multi-use nature of playgrounds along with the emergence of artificial turfs, dedicated grounds for football and kabaddi are limited, and those are inaccessible to most of the district-level clubs in football and kabaddi. Politicians have been regular figures in an association's attempt to get public land on lease and for kabaddi and football clubs (plus academies in football) to get permission to organise tournaments on public grounds.

Various events attract money into the game; the most notable is elections. This is primarily because of the ability of kabaddi and football to attract crowds, no matter the scale of the event (private tournaments, district-level leagues and championships). The evidence from interviews notes how politicians see sports tournaments as successful investments in their campaigns, with investments ranging upwards of 7 lakhs in a single kabaddi tournament, and anywhere between 1 lakh to 10 lakhs in a football tournament. In these local tournaments, crowds present an opportunity for the politicians to put themselves out there in a very targeted manner. Similar is the case with large tournaments that bring teams and spectators spread across the constituencies of a municipal councillor in one place, which is perhaps advantageous for an MLA or MP. This points towards the event economy prevalent and rampant in urban politics, of which sport is crucial.

In terms of organisation, the study focuses on 1.) organisations that organise the game and logic used to organise sport, 2.) the flow of money for organisations to perform functions and events to take place and 3.) the organisation of the political economy in Mumbai. In football, the organisation of the game for the Mumbai district remained with the Western India Football Association (WIFA), established in the colonial era (1911), with a provincial presence out of Bombay to administer select tournaments/trophies for mostly British teams. The organised setup for school sports started in the early 1890s (in 1893, the Bombay High Schools Athletic Association was established), but participation was limited to a few schools. Even until the early 1920s, interest from Indians in football was negligible. The game's organisation has been centralised with little control or access to resources such as grounds or revenues for the local clubs to function for a long time. The emergence of organised football and kabaddi in the first half of the 20th century was marked by organisations (WIFA and Bombay Physical Culture Association) that operated in a legal vacuum. Only with India's independence, colonial-era organisations emerged from provinces to a consolidated group under national federations. The vocabulary of sporting bodies explains the logic of organisation applied to football and kabaddi, i.e., associations representing clubs to the district and district bodies to the state bodies. The introduction of a national sports code in the mid-1970s led to the formation of the Bombay District Football Association (now Mumbai Football Association or MFA) in 1983. In Kabaddi, BPCA moved out in the decade post-independence of India, leading to the formation of the Mumbai Kabaddi Association. In the early 1980s, due to many kabaddi clubs being under one association, the association split into the Mumbai City Kabaddi Association and the Mumbai Suburban Kabaddi Association for effective game administration. With the strong presence of WIFA in Bombay, contestations between them and BDFA over rights (tournaments) went to the court of law. The organisation of football tournaments at the district level has always remained with the district body. In contrast, in the case of kabaddi, district-level tournaments are conducted by clubs themselves, requiring a sanction from the district body. This is a clear difference between football and kabaddi. Football's colonial past and hierarchical organisation contrast with kabaddi's indigenous roots and community-focused administration. This has shaped the participation and growth of teams, the

game's adoption in schools and neighbourhoods and the scale and size of tournaments. The flow of money in football and kabaddi organisations in Mumbai has evolved significantly from their early days to the present. Initially, the financial support for organised football came largely from British teams operating during the Bombay presidency, with limited club participation until the 1920s. School-level participation was also restricted to specific English-language schools, often with ties to the church, which had open grounds for football pitches.

Migration, particularly from the south and Goa, brought football-playing communities to Bombay, where local community leaders and strongmen supported clubs financially, as professional or commercial prospects were minimal. Post-independence, football clubs and associations relied heavily on charity and donations, with few sponsorship avenues for steady revenue streams. Both football and kabaddi benefited from political patronage for organising tournaments and accessing grounds. The industrial period saw mills, the public sector/services and others industries/corporate sectors in Mumbai forming teams and recruiting players with stipends, aiding local sports through regular recruitment and high salaries. However, this practice declined from the mid-90s as industrial support waned. Political involvement in football and kabaddi organisations has been prominent, with parties like Shiv Sena appointing politicians to association offices to leverage sport for votes and campaign support in exchange for patronage. Historically, local gangsters and (for instance) those in liquor and fisheries businesses funded tournaments and provided equipment, supporting their communities. Election years often see increased tournaments in kabaddi, as politicians use these events to enhance their visibility. While football attempts similar strategies, effective football-to-vote translation is limited to specific areas like Bandra, Kurla, and Madanpura. The rise of private football tournaments has created new revenue opportunities for academies and turf owners, unlike kabaddi clubs, which still rely on voluntary donations and political financing. This disparity underscores football and kabaddi's differing financial landscapes and growth trajectories in Mumbai. Further, with the map of Mumbai marked by big capital, big infrastructure and brands, sport has not remained immune to this landscape shift. This change has brought an appetite for large-scale professionalisation in services (public and private), creating a marketplace for products and services to be sold and using technology, especially in media and communication, to create customer demand. Football and kabaddi have interacted with these changes, too—often highlighting their amateur status and lack of capacity to accept them. While the political economy in Mumbai has been commented on from the standpoint of emerging political trends amidst capitalist development in the city, seeing it through sports provides a heterogeneous reality for people in Bombay's politics and economy. This heterogeneity or identities of different people (native, settled, or migrated) is evident in the (a) formation and growth of clubs (kabaddi and football) in neighbourhoods across Mumbai with (b) increasing presence of shakas as well as competition from other political parties and (c) dominance of capital (that seeded values of professionalisation, commercialisation-privatisation, and introduction of technology). While capital has been commented on amply in the context of Bombay's emergence into the financial capital of India, how capital creates its own hegemonic space (material and non-material) in the simultaneous presence of other hegemonic forms: caste, religion, political, media, and education, has not been discussed empirically at length. In this way, the heterogeneous nature of these clubs in kabaddi and football provides evidence of how language (schools, religion and demography), elections and expanding electoral college, and media technologies shape a heterogenous political economy.

In any sport, land access is crucial for economic rent and providing a dedicated space for play and tournaments. In Mumbai, football and kabaddi clubs face significant challenges in securing their own grounds due to high land prices and limited access to public spaces. Open spaces, such as playgrounds, are highly sought after by the Mumbai District Football Association (MDFA), as a dedicated football ground reduces the cost of organising tournaments and can be rented out when not in use, generating revenue instead of incurring costs. This often leads to the appointment of politicians to associations to

facilitate access to these spaces. In contrast, kabaddi associations typically rely on political support to organise limited tournaments, maintain office spaces, and cover lower affiliation fees. Public grounds remain a limited avenue for football due to clubs and academies seeking tenure over the land for future planning, which is difficult to obtain for a dedicated sport. As a result, artificial turfs have emerged as an alternative, providing a reliable playing space for academies and clubs without the hassle of securing public grounds. Despite being smaller in size, turfs offer a solution for academies that cater to parents wanting their children to play football, although they are not ideal for matches that require larger fields. This limitation becomes evident when academy players struggle during trials for Mumbai district teams. The rise of artificial turfs has enabled many academies to flourish, as schools with limited open space can install turfs and partner with private coaches or academies to offer football programmes. This shift significantly shapes the scope of sports offered in schools, as those without large grounds can only accommodate sports that fit within the confines of a turf. Consequently, sports like kabaddi, which cannot adapt to the turf model, face challenges in keeping up with this service shift. The proliferation of turfs as a common public reality has important implications for the accessibility and popularity of various sports, highlighting the ongoing struggle for dedicated land and resources in urban settings.

The involvement of political parties and politicians in supporting sports clubs and tournaments reflects a broader trend where political influence extends beyond governance into urban spatial planning. The financial flows within sports organisations illustrate economic interactions in urban settings. Funding from political patrons, corporate sponsorships, and the emergence of private tournaments highlight how sports become intertwined with urban economic activities, influencing local economies and community development. The competition for urban land, especially for sports grounds, underscores broader urban planning and governance challenges. High land prices and limited public space availability necessitate innovative solutions like artificial turfs but also pose barriers to traditional sports requiring larger, dedicated fields. The dominance of certain sports, influenced by political and economic factors, reflects broader cultural and political hegemonies in urban contexts. This hegemony shapes public discourse, community identity, and even electoral strategies, illustrating the intersection of sports with larger urban dynamics.

Sustaining Sites of Learning Beyond the University: Pedagogical Reflections from IIHS' Inclusive Housing Programme

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Discussions on the role of the university for public good place emphasis on the need for universities to engage in processes of knowledge co-production and co-learning, and to expand learning beyond the classroom. Other discussions draw attention to the need to unsettle the form of the university as the privileged site of knowledge production, and to engage beyond with other sites of learnings, with diverse learners that face systemic barriers to enter sites of higher education. In this paper we ask how such academic-community interventions sustain over time, where thinking about the sustenance of practice beyond the site of the university is also a question of equity and the public role of the university.

Since 2015, IIHS has been co-teaching and co-learning with housing rights activists across Indian cities, to build curricula, develop teaching tools and also co-produce research. This initiative seeks to expand the role of higher education to build capacity and learn from networks of community activists, researchers, and practitioners, who live and work within communities on housing and allied rights. This pedagogic experimentation has evolved incrementally over the years, and in its most recent form has been further structured to support the learning needs of cohorts of community activists who are working within their own communities on critical challenges of housing, planning, infrastructure and access to basic services.

This paper reflects from the recent-most iterations of this training initiative, as a series of workshops structured over 9 months with cohorts of community activists in Delhi (2023–24) and Indore (ongoing 2024–25) in India. We reflect from the recent iterations in both cities and from our own experience of designing, co-teaching and implementing this programme. We seek to share ways in which universities can meaningfully engage with diverse learners, who are engaged in critical practices to transform urban inequalities.

Urban Transitioners: the Emergence of the (Extra)Ordinary Modern Woman in India's Social Media Landscape

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Keywords: Urban transition, gendered performativity, small-town influencers, femininity, identity, social media, India.

This paper examines the concept of urban transition through the framework of gendered performativity, concentrating on female social media influencers such as Dolly Singh, Nancy Tyagi, Manisha Rani, Komal Pandey, and Kritika Khurana. These influencers exemplify the classic rural-to-urban transition as they navigate and embody modernity through their content in lifestyle, fashion, humour, and related domains on social media (Robinson, 2006). Their fashion, lifestyle, and aesthetic choices reflect the dynamics of urbanisation and modernity, seemingly embodying a liberating narrative within a neoliberal context that emphasizes empowerment and individual agency (Gill, 2007; McRobbie, 2009). However, these choices also underscore a highly performative aspect, adhering to the prevailing beauty standards and self-representation norms that define success for urbanised women (Bordo, 1993; Bartky, 1990).

This duality highlights the complex interplay between personal expression and societal expectations, particularly for women navigating the urban landscape. In light of the literature on urbanisation and modernity, this analysis employs content analysis to study how female influencers negotiate modernness (Harvey, 2012; Sassen, 1991; Lefebvre, 1974; Soja, 2000; Harvey, 2012). By analysing their content, this study reveals how these influencers navigate the binary of small-town simplicity and urban sophistication, engaging in performative acts that often reify conventional understandings of gender roles, rather than reshape them (Butler, 1990).

These creators utilise visual aesthetics and lifestyle choices to construct their identities, often blurring the lines between authenticity and performance. For instance, Nancy Tyagi's fashion-forward approach and Manisha Rani's relatable lifestyle vlogs highlight how influencers mimic urban aesthetics while projecting their small-town experiences. Furthermore, this paper examines the implications of these performances on societal perceptions of gender and beauty, emphasising how small-town influencers navigate the space of empowerment and representation in urban contexts. By negotiating their identities within the framework of urban transitions, these creators bolster understandings of femininity that contribute to the discourse on gendered performativity and urbanity, highlighting the role of social media in shaping contemporary cultural landscapes.

The emergence of social media has fundamentally transformed how individuals perceive and perform their identities, particularly for women navigating the complexities of urban transitions. As a response to the socio-cultural dynamics of urbanisation, female influencers have become central figures in representing the narrative of rural-to-urban migration and the broader experience of modernity in India. This paper investigates how influencers such as Dolly Singh, Nancy Tyagi, Manisha Rani, Komal Pandey, and Kritika Khurana serve as urban transitioners, embodying modern femininity while negotiating the expectations of both their small-town roots and urban sophistication.

Urban transition refers to the processes through which individuals and communities adapt to the complexities of urban life, often involving significant shifts in social, economic, and cultural dynamics (Harvey, 2012). Gendered performativity, as theorised by Judith Butler (1990), posits that gender is not an innate quality but rather a series of acts and performances shaped by societal norms. In the context of urban transition, female influencers navigate their identities through a performative lens, embodying both traditional gender roles and modern aspirations.

Influencers like Dolly Singh have cultivated their brand around a blend of humor and fashion, appealing to a diverse audience. Singh's content often oscillates between relatable anecdotes and aspirational lifestyle portrayals, illustrating the tension between authenticity and performance. Similarly, Nancy Tyagi's fashion-centric content presents an engaging narrative of personal transformation, reinforcing the belief that urban aesthetics can be accessed and adapted by individuals from smaller towns.

While the aesthetic choices of these influencers may appear liberating within a neoliberal context that promotes empowerment and individual agency, they often perpetuate established beauty standards. Influencers are expected to present curated lifestyles that adhere to specific norms of femininity, thereby reinforcing a narrow definition of success that is intertwined with appearance and desirability (Bordo, 1993; Bartky, 1990).

Komal Pandey and Kritika Khurana, for instance, have become icons of a particular brand of urban femininity that is heavily influenced by societal expectations regarding beauty and lifestyle. Their visual representations often draw from the aesthetics of mainstream fashion, which can obscure the authentic experiences of women from diverse backgrounds. The performances of these influencers, while seemingly empowering, often reflect an adherence to societal pressures rather than a challenge to them. This analysis employs content analysis to examine how these influencers negotiate their identities amidst the pressures of modernity. By analysing their social media presence, we can discern patterns in how they construct their narratives and the impact of these performances on broader societal perceptions of gender and beauty.

Influencers like Manisha Rani utilise relatable content to posit small-townness, that veers on periphery of urban aspirations. Her vlogs not only showcase her lifestyle but also evoke a sense of familiarity and relatability that is similar to the manic pixie trope in popular culture. This relatability is often juxtaposed with moments of aspiration for urban lifestyle, upward social mobility and urban sophistication, creating a complex narrative of what it means to be a modern woman in India today.

The phenomenon of urban transitioners highlights the nuanced interplay between gendered performativity and urban identity in India's social media landscape. While these influencers embody a narrative of ordinariness that is on the brink of modernity or have achieved modernity, their performances often reflect the constraints of societal expectations surrounding beauty and femininity. By navigating the delicate balance between small-town roots and urban aspirations, they contribute to the ongoing discourse on gender and identity, revealing the complexities of contemporary cultural landscapes in India.

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A world map is visible in the background, rendered in a lighter shade of blue than the main background color. It shows the outlines of continents and major landmasses.

PANEL 12

Health and Urban Transitions

From Fast Food to Fresh Choices: a Nutrition-Based Intervention for Maternal Health in Kolkata's Slums

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Introduction

India, like many developing nations, is undergoing rapid urbanisation. Between 1991 and 2001, the country's urban population surged by 31.2 per cent, far outpacing the rural growth rate of 17.9 per cent. As per the United Nations, Department of Economic and Social Affairs, Population Division (2018), India's urban population is projected to reach 607 million by 2030, with 40 per cent of the population residing in urban areas. This urban transition presents a critical challenge for India's health system, particularly in ensuring that urban slum dwellers have access to affordable and high-quality services.

Safe motherhood remains a key public health goal, but in the urban slums of Kolkata, numerous challenges hinder its achievement. The dense population and resource scarcity in these areas create obstacles to maternal health, such as high rates of obesity, anemia, and insufficient antenatal care access. Many women face inadequate nutrition, worsening the effects of anemia, which increases the risk of complications like preterm birth and maternal mortality. Access to antenatal care (ANC) is vital for preventing pregnancy complications, yet many women in these slums do not receive regular check-ups. Lack of nearby health facilities, long waiting times, and mistrust in government services deter women from seeking care. Cultural misconceptions further prevent women from accessing proper healthcare, as some believe hospitals are only necessary in emergencies. Home births attended by untrained individuals increase the risk of infections and complications. The unsanitary living conditions in slums heighten the vulnerability of pregnant women to infections, while limited awareness of government services means many do not benefit from available resources. Additionally, psychological and social barriers, including emotional stress and domestic violence, further complicate the pursuit of safe motherhood in Kolkata's slums. Addressing these multifaceted issues is crucial for improving maternal health outcomes.

Obesity among pregnant women in Kolkata's urban slums presents an emerging challenge. While undernutrition remains a concern, the rising consumption of junk food, due to its affordability and availability, has led to increased incidences of obesity. Obese pregnant women are more prone to complications such as gestational diabetes, hypertension, and difficult labour, which can endanger both mother and baby. In slums, where access to quality healthcare is already limited, managing these complications becomes even more difficult. Obesity can also contribute to poor foetal outcomes, including higher rates of caesarean deliveries, premature births, and babies born with excessive birth weight, which predisposes them to lifelong health problems like diabetes and obesity. Additionally, awareness about the need for balanced nutrition is often low, leading to a lack of healthy eating habits during pregnancy. Addressing obesity in pregnant women in slums requires targeted interventions focusing on dietary education and awareness campaigns.

Methodology

The intervention geography covers slum population of three wards (28, 29, and 39) of Kolkata Municipal Corporation, encompassing a slum population of approximately 60,000 residents. In 2022, a health survey by the World Health Organization (WHO) designated these wards as high-priority areas due to their suboptimal health indicators. The initiative is being carried out in close collaboration with the Department of Health and Family Welfare, Department of Women and Child Development and Social Welfare, and the Kolkata Municipal Corporation, ensuring a coordinated effort to improve health outcomes.

The intervention by Child In Need Institute (CINI) for preventing and managing obesity among pregnant women in Kolkata's slums is designed around a community-participation model, ensuring that health education and behaviour change are deeply integrated within the local context. Collaboration with the government system, particularly with Honorary Health Workers (HHWs) and Integrated Child Development Services (ICDS) workers, forms the backbone of this initiative. Community mobilisers from CINI conduct one-to-one follow-ups through home visits, where pregnant women are educated about the risks of obesity and the importance of making healthier food choices. During these visits, women are encouraged to substitute junk food with fresh fruits, vegetables, whole grains, and homemade snacks. To further reinforce healthy dietary habits, Nutrition Demonstration Sessions are held at local ICDS centres. These sessions promote dietary diversity using the symbolic representation of the Indian tricolour to explain the importance of consuming a balanced diet, including protein-rich, energy-dense, and vitamin-packed foods. To enhance the acceptability of these healthier food options, cooking sessions are organised, where pregnant and lactating women prepare traditional recipes using local ingredients. These sessions not only build skills but also reinforce the message that nutritious, affordable food can be found within their immediate environment.

An innovative aspect of the programme is the inclusion of mother-to-mother counselling sessions. In these peer-support groups, mothers who have successfully reduced their junk food intake and delivered healthy babies share their experiences. This peer-driven approach makes the messages more relatable and motivational for other pregnant women. Vocal and active women from the community are trained to advise pregnant women on proper nutrition and reducing junk food consumption. These women, recognised as community volunteers are paired with pregnant women in their neighbourhoods and rewarded when these women achieve appropriate gestational weight gain and deliver babies with normal birth weights.

Recognising the role of fathers in household decision-making, Father's Groups have been formed. In these groups, men are educated on the significance of purchasing healthier ingredients, thus empowering them to make informed food choices when shopping for their families.

To address environmental influences, local food vendors are oriented to offer healthier alternatives, such as sesame seed laddus and spinach pakodas, instead of popular junk foods. These small but significant changes in the local food environment create opportunities for healthier eating within the community.

Throughout the intervention, monthly records of antenatal care, diet, and weight are meticulously maintained. Body Mass Index (BMI) is calculated at the time of registration, and gestational weight gain is monitored. These records are analysed to track progress and adjust the intervention as needed.

Findings

The intervention examined junk food consumption and dietary patterns among 636 pregnant women. From the first to the third trimester, 94 per cent of the participants significantly reduced their junk food intake, shifting towards healthier diets. Furthermore, 86 per cent of the women reported consuming at least four essential food groups daily, reflecting improved dietary diversity.

Among the 636 pregnant women, 151 (24 per cent) were obese or overweight. Of these, 30 per cent achieved appropriate weight gain based on their BMI, with obese women gaining 5 to 7 kilograms and overweight women gaining 7 to 10 kilograms, in line with national health standards (ICMR, NIN, Poshan Abhiyan). These positive outcomes were attributed to personalised nutritional counselling, regular home visits, cooking demonstrations, peer support, and close monitoring. The intervention also boosted participation in nutrition camps, particularly through engaging in cooking demonstrations. These sessions improved the women's nutritional knowledge and actively involved their families, especially

their husbands, in supporting healthier eating habits. Despite challenges such as the easy availability of junk food and gaps in local ICDS services, the intervention significantly improved maternal nutrition and improved pregnancy outcomes.

Conclusion

The intervention in Kolkata's urban slums addressed obesity among pregnant women through a community-driven, locally-tailored approach. By reducing junk food consumption, promoting dietary diversity, and encouraging healthy gestational weight gain, the intervention significantly improved maternal health outcomes. Key strategies included personalised nutritional counselling, peer support, cooking demonstrations, and collaboration with local government health services. Engaging fathers in household food choices and orienting local vendors to offer healthier options also played a critical role.

The success of the intervention highlights the potential for replicating this model in other urban slum areas across India and similar developing countries. The key features that make this intervention replicable include its community-based approach, partnership with government health services, and adaptability to local environments. First, the community-driven aspect of the intervention can easily be applied in other urban slum settings. The involvement of HHWs and ICDS workers, who are already embedded within communities, can ensure that the programme is tailored to local needs. The incorporation of community mobilisers who conduct home visits and follow-up sessions ensures regular engagement with pregnant women, building trust and enabling sustained behaviour change. This model of frequent, personalised contact with at-risk women can be replicated in other regions where access to health services is limited. Collaboration with government services, as seen in this intervention, enhances the replicability of the model. By working closely with the Department of Health and Family Welfare, as well as ICDS, the intervention ensured that it was aligned with existing national health policies and standards. In particular, tracking maternal BMI and gestational weight gain allowed the programme to remain within national health guidelines. Similar partnerships could be established in other regions, facilitating the integration of locally tailored health interventions with national health infrastructure. The peer support model, including mother-to-mother counselling and Father's Groups, is another replicable aspect of the intervention. Peer counselling has been proven effective in diverse settings, as it leverages the shared experiences of individuals to motivate and guide others. Establishing peer groups in other urban slums can provide pregnant women with relatable and accessible sources of support, while also reducing the stigma around discussing maternal health issues. The community volunteer approach is built on existing community structures and is sustainable. By empowering active women to serve as community volunteers, the model encourages sustainability and can be easily adapted to similar settings. Additionally, the programme's focus on education through culturally relevant methods, such as cooking demonstrations and the use of the Indian tricolour flag, offers a template for creating educational materials that resonate with local populations. These methods can be adapted for use in other areas by incorporating regional food preferences and local customs, thus making the intervention more relatable and impactful. The urban slum environment in Kolkata presents specific challenges, such as high rates of junk food consumption, and the intervention's structure is flexible enough to address other forms of malnutrition or health issues in different urban settings.

The intervention offers a promising model for improving maternal health outcomes through a locally tailored, community-based approach. With its emphasis on peer support, education, and collaboration with government services, the intervention has the potential to be successfully replicated in other urban slums, both in India and globally. The model's adaptability, peer-driven support groups, and integration with government services make it a viable approach for addressing maternal obesity in low-resource areas. Sustained efforts are needed to overcome structural barriers and ensure long-term improvements.

How Has Climate Migration Influenced Health in Urban South Asia? A Systematic Review and Narrative Synthesis

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Background

In the Anthropocene, cities are constantly transformed by the multifold social, political, economic, and demographic interlinkages with climate change. Cities are destinations that promise security and stability for those migrating from rural regions due to agrarian distress, loss of viable livelihoods, and numerous other drivers. Agricultural workers of every nature, from fry catchers in Bangladesh to rice farmers in Sri Lanka, are compelled to migrate to cities after rural or coastal life is rendered untenable by recurring climate events (Bellampalli & Yadava, 2023). Many rebuild livelihoods with their families while dwelling in low-lying, densely populated urban settlements that loom under the risk of water scarcity, flood damage, and extreme heat (Singh & Basu, 2020).

In South Asian cities, development over the past few decades has spurred rapid transformations in land use, which, coupled with extreme weather hazards, have left migrants bereft of essential infrastructure and susceptible to climate-induced health risks (Brand, 2007; Michael, 2015). These populations experience “environmental unfreedoms” along imbricating axes of caste, class, and gender discrimination, settle into precarious housing in peripheries of cities or areas at the precipice of neoliberal urbanisation, and work in an informal sector under exploitative conditions (Ranganathan, 2022). While informal work and more affordable rent may yield some relief from a former rural livelihood, concomitant and compounding vulnerabilities related to environmental and occupational risk have deleterious health impacts (Michael et al., 2019). Thus, to many mobile populations, climate change is a pervasive phenomenon that follows them into the city and has cascading health implications at all stages of their journey (McMichael et al., 2012).

Urban and state climate action plans across the Global South have made limited progress in recognising the exposures of vulnerable populations in an increasingly unstable Anthropocene (Kashwan, 2023). Very few propose an intersectoral, coalition-wide collaboration with multiple levels of municipalities to address the health consequences of climate change. City municipalities are sometimes ill-equipped to act on adaptation measures due to inadequate infrastructure provision, and lack institutional capacity or stakeholder involvement to carry out programmes (Anguelovski et al., 2014). Decision-making for climate action plans omits the most marginalised in a community, neglecting the embodied and experiential knowledge of those for whom climate change is most palpable and consequential (Chu & Michael, 2019; Pradyumna et al., 2023).

While extant literature has largely focused on isolating either the health outcomes of climate change or the environmental drivers of rural-urban migration, limited attention has been given to the connections between cities, climate migration, and health (McMichael et al., 2012; Schwerdtle et al., 2020). Furthermore, scholarship on urban environmental justice focuses on inclusive, representative, and distributive processes that centre the urban poor (Chu & Michael, 2019). Such scholarship also identifies differential exposures and impacts to climate hazards along the lines of caste, gender, religion, geography, and class (Balabantaray, 2023). However, these knowledge streams don't specifically investigate the health dimension of climate migration towards the full spectrum of urban categories—from peri-urban communities to metropolitan centers—within South Asia. Literature that intersects urban public health and climate migration is nascent in the Global South and this review can offer perspectives on the subjectivities, affects, and health experiences that anyone, from city planners to healthcare workers, should consider in their interventions.

This systematic review seeks to investigate this nexus since 1994, evaluating and synthesising existing research on the dynamics of health in migrant and climate justice in South Asian cities. The PEO approach (Population-Exposure-Outcome) to literature reviews is an optimal fit for public health research questions that determine the exposures, risk factors, and outcomes of a given phenomenon (Munn et al., 2018). This study adds an additional dimension—environment—in an attempt to focus on any range of South Asian urban formations, to centre lived climate experiences from the Global South, and to orient our gaze towards non-dominant paradigms in urban climate research. The specific objectives of this assessment are as follows:

1. Synthesise evidence about the climate change-urban-migration-health continuum in South Asia
2. Determine the diverse methodologies, research questions, and frameworks used to interrogate climate migration and urban health
3. Identify study environments, population demographics, migration responses, climate drivers, and health outcomes
4. Determine the knowledge gaps and unmet needs
5. Explore the health impacts, both positive and negative, of climate migration to South Asian urban cities
6. Identify recommendations that weave together urban environmental and health justice and recognise opportunities for migrant-resilient climate action in South Asia

Methods

A systematic review with a narrative synthesis was chosen since it enables an extensive, interdisciplinary, and holistic exploration of existing scholarship and its gaps (Ayevard, 2016).

Table 12 outlines the search terms which are categorised according to a modified PEO approach. This approach includes an additional dimension of South Asian cities as the main environment (Population, Environment, Exposure, Outcome) (Munn et al., 2018). The search will be conducted across (AND) and down (OR) with synonyms of the key search terms: Migration, South Asian cities, Climate Change, and Health. This research will transect several domains, such as public health, policy, climatology, political ecology, and toxicology, and includes a range of different research methods that span epidemiology to case studies. To cover the full expanse of disciplines and methodologies, the research team will utilise Google Scholar and PubMed. For each search, the titles in the first 10 pages of search results will be scanned. Additionally, we will scan the reference lists of selected articles (snowballing). These searches will take place from October to December 2024.

This assessment employs the Mixed Method Appraisal Tool, which is a checklist of appraising and describing empirical studies that employ qualitative, quantitative, and mixed methods protocols (Hong et al., 2018). Non-empirical papers, such as review and theoretical papers, and gray literature will be excluded in the assessment. Peer-reviewed texts that are quantitative, qualitative, systematic reviews, mixed methods, and case studies will be included. The screener will evaluate studies for alignment with research objectives based on study setting, research questions, design, climate hazard, migration drivers, migration barriers, population of interest, health outcome, other outcomes, key recommendations, and considerations of other historically marginalised identifiers, including caste, religion, gender, class, and ethnicity.

Table 12: Search terms

Concept 1: Migration (Population)	Concept 2: South Asian cities (Environment)	Concept 3: Climate Change (Exposure)	Concept 4: Health (Outcome)
Migrant Mobility Migration Internal displacement Seasonal migration Permanent migration Refugee Asylum seeker	South Asia AND Urban City cities Peri-urban Informal settlement	Climate change Climate variability Natural disaster Climate hazard Climate Variability Global warming Greenhouse effect Extreme weather events	Mortality Morbidity Health Well-being Non-communicable disease Communicable disease Infectious disease Vector-borne disease Epidemiology Co-benefits Nutrition Malnutrition Undernutrition Dehydration Mental health

Source: Author

The following inclusion criteria will be used: linked full-text availability, published between 1994 and 2024, written in English, studies containing primary research from cities, published in an academic journal, specific to the four main themes (migration, health, climate change, and South Asian cities). Exclusion criteria are as follows: published before 1994, not written in English, secondary research and non-empirical evidence, and literature not covering all four themes.

An adapted thematic analysis method as described by Ayevard will be used to guide analysis of literature (Ayevard, 2016). Key concepts will be identified from individual studies, from which codes and themes will be extracted. Consistency of coding themes between the different studies will be determined and third-order interpretations will be generated from the full analysis. Subtopics and emerging themes will be cataloged, coded, and analysed in NVIVO and Microsoft Excel. As part of the analysis strategy, the experiences of climate migrants moving into highly populated cities (e.g., Dhaka, Lahore, Delhi), urban peripheries, and cities with rapid population growth (e.g., Hosur, Rupganj, Begusarai) will also be highlighted. These cities will be identified using data from United Nations Population Division's database, and will be defined according to the greatest population growth rate over the past 20 years and urban agglomerations with populations greater than 800,000 in 2024 (WUP, 2018). A screening process flowchart will be designed based on PRISMA guidelines (Moher et al., 2009).

Anticipated Results

The preliminary findings of this narrative synthesis will be available by January 2025. This narrative synthesis supports a larger study that examines how rural-urban migration from and into sites of climate vulnerability impacts the health of migrant women in Bengaluru. Integrating quantitative and qualitative methods, this larger study involves semi-structured interviews with migrant women residing in 3 informal settlements in Bengaluru as part of a Fulbright-Nehru Fellowship. This narrative synthesis provides a theoretical backing to the planned research with migrant women and will help us understand unanswered questions and gaps in climate justice research. Through this synthesis, I hope to learn from researchers and their studies' interlocutors—the knowledge keepers—whose lived realities can help us understand how, why, and who bears the brunt of climate “unfreedoms” (Ranganathan, 2022).

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Monitoring and Prevention of NCD using AI Powered Health in Urban India: Status and Challenges

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Keywords: mHealth; Preventive healthcare; Data Privacy; Artificial Intelligence; DPDPA; DISHA; logit regression.

Introduction

The integration of artificial intelligence (AI) into various aspects of human life has become increasingly inevitable, fundamentally transforming industries across the globe. Among these transformations, the healthcare sector stands out due to the profound impact on improving patient outcomes and revolutionising the delivery of health care. The rapid urbanisation coupled with advancements in technology have enabled the development of sophisticated data analytics and machine learning (ML) algorithms, which are now pivotal in the fields of digital healthcare and preventive medicine.

One of the most significant developments in this context is the rise of mobile health (mHealth), an evolving sector that leverages mobile technologies, such as wearable devices and mobile sensors, to detect serious health conditions early and facilitate preventive measures. This technological shift is particularly relevant in the preventive healthcare sector, where early detection and timely intervention can significantly reduce the burden of disease. Despite its potential, the adoption of mHealth in India remains in its infancy, with several challenges hindering its widespread use, particularly in the area of preventive healthcare.

The potential of mHealth to transform preventive healthcare in India is immense, especially given the country's vast population and the significant burden of non-communicable diseases (NCD). The mortality due to NCD has increased from 37.9 per cent in 1990 to staggering 61.8 per cent in 2016. This rise in deaths could be prevented with use of technology. However, the uptake of mHealth technologies is not uniform across the country, with urban areas showing higher adoption rates compared to rural regions. Additionally, the increasing concerns surrounding data privacy have emerged as a critical barrier to the widespread adoption of mHealth apps. Studies (Feinberg et al., 2017; Deniz-Garcia et al., 2023; Stein & Brooks, 2017; Berrouiget et al., 2019; El-Sherif et al., 2019; Meheli et al., 2017; Xiao et al., 2021; Kayyali et al., 2017) have indicated the relevance of mHealth in revolutionising the prevention health care sector especially in NCD. In this context, it is essential to explore the factors influencing the adoption of mHealth in the preventive healthcare sector in India, especially to urban area and to understand the data privacy concerns of users.

Research Objective

The present study aims to address these issues through a twofold research objective: first, to examine the adoption of mHealth in the preventive healthcare industry mainly in NCD prevention; and second, to investigate the data privacy concerns of mHealth app users within the Indian context.

Research Methodology

To address the research objectives, the study relied on both secondary data and conducted primary surveys. The secondary data is sourced for variables like number of mHealth users, internet users, cases of NCDs in the country from published reports of both government and non-government organisations like PwC, R&M (Research and Markets), National Institute of Health, WHO (World Health Organisation) etc. The qualitative data has been collected using structured questionnaire (after pilot survey). A total of 352 responses (based on Cochran (1977) sample size formula) are collected across different age groups

using random sampling method to reduce the selection bias by giving equal chance of selection to each respondent. The study is conducted in one of the major metropolitan cities of the country, Bengaluru. The selection of the city is based on the number of NCD cases registered in the country. It is observed that Karnataka stands top three in the number of NCD registered in the country for the year 2022 and majority are reported in the capital city of the state. The survey question captures a comprehensive view of mHealth adoption patterns, user awareness, perceptions of preventive healthcare, and concerns related to data privacy. The sample is collected using structured questionnaire circulated via emails and to cover the elderly group of respondents, direct interviews are conducted. The study also conducted focus group discussions with medical experts of the field to know the applicability and relevance of mHealth in prevention care sector, especially in NCD area.

The study utilised both descriptive statistics and econometric tools to analyse the data. Descriptive statistics were used to provide an overview of the demographic characteristics of the respondents, their usage patterns of mHealth apps, and their general attitudes towards preventive healthcare. To further investigate the factors influencing mHealth adoption, a binary logit regression model was employed. This econometric tool allowed the study to examine the relationship between various independent variables—such as user awareness, perceptions of mHealth’s preventive capabilities, and concerns about data privacy—and the likelihood of adopting mHealth technologies.

Results

The findings of the study indicate that mHealth has the potential to be a game-changer in India’s preventive healthcare industry. The study found that 66 per cent of respondents in urban India reported using mHealth apps, highlighting a relatively high level of adoption. In contrast, non-adoption was primarily linked to a lack of awareness about the benefits of mHealth and the absence of perceived need for such technologies. A key finding is related to the adoption of mHealth and the prevention of NCDs. This finding will have significant implications for the health care sector and adoption of mHealth in the prevention care sector.

The binary logit regression analysis provided further insights into the factors driving mHealth adoption. The results revealed that a positive perception of the preventive capabilities of mHealth apps significantly increases the probability of adoption. Users who recognised the potential of mHealth to detect and prevent serious health conditions were more likely to adopt these technologies. This finding underscores the importance of raising awareness about the benefits of mHealth, particularly in preventive healthcare, to drive higher adoption rates.

However, the study also identified significant barriers to mHealth adoption, with data privacy concerns emerging as a major impediment. A considerable number of respondents expressed a lack of trust in the security of their personal health data, which has discouraged them from using mHealth apps. Despite existing legal frameworks, such as the Data Protection and Digital Personal Data Protection Act (DPDPA) and the Digital Information Security in Healthcare Act (DISHA), users remain apprehensive about the potential misuse of their data. The lack of clear communication from app providers regarding data handling practices further exacerbates these concerns.

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Transitioning Healthcare: Locating Health in India's Emergent Urban Processes

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Over the last two decades, India, like many other countries of the developing world, has urbanised significantly. Rapid post-liberalisation processes of urbanisation are a result of economic growth, demographic transitions and a policy focus on urbanisation to sustain and fuel growth in the country. Data suggests that much of urbanisation in India, in the last decade, has happened as a result of the phenomenon of 'morphing places', or the change in the economic structure of existing settlements, many of which continue to be governed as rural areas (Mukhopadhyay, 2017). While academic attention has been primarily focused on the large and megacities, recent studies have expanded the gamut of urban studies to include small towns, peri urban areas (Gururani & Kennedy, 2021), census towns and other forms and processes of 'subaltern urbanisms' (Mukhopadhyay & Zerah, 2020). The emergent forms and scales of the urban and the processes of urbanisation have been the more recent subjects of academic inquiry and the performativity of the rural-urban divide (van Duijne & Nijman, 2019) and a constant blurring of this divide in the wake of rural-urban transitions is characteristic of contemporary urban processes across India.

However, these rural-urban transitions are not merely physical, social and economic transitions but mandate a paradigmatic shift in governance itself. The distinct conceptualisations and practices of rural and urban governance frameworks and the dynamic needs of a newly urbanising region create conundrums of governance which have few evidence-based policy prescriptions in existence. Barring a few exceptions, these shifts in processes of governing transitional urban forms, like Nagar Panchayats also called Town Panchayats, remain outpaced by research and academic engagement and evidence on urban governance remains fragmented and inadequate despite its centrality to making transitions to the urban just, sustainable, and equitable. (Mitra et al., 2024). The resultant unevenness of urban governance characterised by inadequate institutional capacity for infrastructural and service delivery increasingly makes the promise and experience of 'becoming' urban a poor bargain for communities in these transitional spaces, undermining development and enhanced quality of life (Jain & Korzhenevych, 2020).

This paper explores the evolving shifts in 'implementations' of healthcare governance across five newly established Nagar Panchayats in different parts of Uttar Pradesh. These Nagar Panchayats, as common practice, have been formed by combining a cluster of gram sabhas, being collectively notified as an urban area, transitioning from rural to urban, meeting the population requirement of 20,000 and above. Based on qualitative fieldwork in Uttar Pradesh, the paper draws from Focus Group Discussion and Key Informant Interviews with communities, ULB Officials and Health Department to understand how health is governed in these Nagar Panchayats. Healthcare posits itself as an interesting area of governance in these transitional spaces. Though far from perfect, the infrastructure, and governance of health and healthcare in rural India remains deep rooted with a dense network of Primary Health Centres (PHCs), Community Health Centres (CHCs) and community engagement through the Accredited Social Health Activist (ASHA) and the Auxiliary Nurse and Midwife (ANM). The transition, then to governing healthcare in a transitioning geography poses significant policy and practice challenges for local stakeholders and actors ranging from communities and frontline healthcare workers to the officials at the newly formed Urban Local Body and the well-established health department. It is within these everyday contestations over governing and delivering the critical service of healthcare that the paper locates rural-urban transitions in India's emerging urban regions, far away from the shadows of its metropolitan centres.

The paper is divided into five sections. Following the introduction, the first section sets the methodological contours of the research. The paper is based on the research team's experience of studying five ULBs in an ongoing project with the state government on enabling urban transitions across 100 cities in Uttar Pradesh, focusing on health and nutrition. The primary data collection involved actors and stakeholders across governance, line departments and communities in the Urban Local Bodies and the district and block level institutions, specifically in health. The authors of the paper were involved in the design, data collection and analysis of the data. The study location is described in the section, nuancing the local social, political and economic contexts within which these transitions are evolving.

In the second section, the paper examines the scale and form of urbanisation as it pans out in the five newly formed Nagar Panchayat areas, as erstwhile villages are notified as constituents of an urban area. While these Nagar Panchayat areas exhibit urban characteristics such as proximity to industries or peri-urban locations, they retain a strong agricultural base, which remains a primary source of livelihood. Consequently, these areas continue to experience substantial out-migration. How do these dynamic and transitional urban spaces speak to contemporary theories of urbanisation? Using the literature on urbanisation in India and the global south, focusing on processes of subaltern urbanism, the first section locates these emergent forms of city-making, sketching out contours of evolving social, economic and bureaucratic processes which aid and facilitate these rural- urban transitions.

In the third section, drawing from qualitative data, the paper illustrates the case of healthcare as it is governed across these five Nagar Panchayats. The urban classification and questions of governance of health and healthcare offer critical insights into the bureaucratic nuances of this transition while also delineating the transition of community aspirations and expectations towards an urban way of life, the linked benefits and costs of the newly achieved urban status. The section situates the various policy and implementation barriers and enablers which characterise the transition in urban governance of healthcare alongside community aspirations from urban health and the reservations which make these transitions limited to gazettes and government notifications.

In the fourth section, the paper reviews India's current urban health policy, primarily the National Urban Health Mission (NUHM) and the PM- Jan Arogya Yojana (PM - JAY), examining the 'big-city bias' across health policies and schemes which focus on the urban. Complemented with insights from the fieldwork in five Nagar Panchayats, the section maps the critical loopholes in policy which make these urban transitions a rather bumpy ride. How do these policies approach the emerging cities and towns of India, where both governance systems and local priorities in health and healthcare remain heavily leaning towards the rural as opposed to the urban? The paper posits that the evolving nature of urbanisation necessitates a reconsideration of the traditional binary distinction between urban and rural, in the case of critical policies, like health. As definitions and scope of urbanisation shift, a more nuanced approach that acknowledges the blurring of lines between these two categories is essential to govern critical services and ensure the benefits of becoming urban are realised by communities.

In the final section, the paper highlights its contributions to the emergent and growing literature on processes of urbanisation, reclaiming the diversity of the urban phenomenon beyond the global metropolitan cities and reflecting on the range of national and regional trajectories of urban forms. The exploration of healthcare as an area of governance in these transitional urban spaces adds to the discourse in the research on public health systems in low- and middle-income countries in general and India more specifically. The literature on urban health, though itself emergent in the context of India, has reiterated the need to approach urban health as distinct from rural health and in the dire need of a specific policy focus on achieving health equity and access in our cities. However, such duality in approaching the governance of healthcare is bound to ensure the falling between the cracks of urban

areas which are transitional, which the evidence presented in this paper adequately posits, emphasising the need for alternative policy prescriptions for critical urban services like health, or even a reimagination of policy demarcations of the urban and rural. The evidence from experiments in transition from the five urban local body areas studied during this research points to the incongruities in planning for these transitions, resulting in delayed governance responses, limited state and ULB capacities, and a rather makeshift arrangement of everyday governance. The conclusion also offers policy recommendations with a specific focus on health to strengthen governance in these transitional urban processes based on the findings of the study.

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Urbanisation and Health Transitions in Kerala: Analysing the Impact of Rapid Urban Growth on Public Health Systems and Non-Communicable Diseases

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Urbanisation is a significant global trend that has far-reaching implications for public health. In India, Kerala stands as a prime example of how rapid urbanisation has altered the health landscape, shifting the disease burden from infectious diseases to non-communicable diseases (NCDs). Kerala, long celebrated for its robust public health system, high literacy rates, and progressive social policies, is now facing new health challenges as nearly half of its population has transitioned to urban living. According to the 2011 Census, approximately 47.7 per cent of Kerala's population resides in urban areas (Government of India, 2011), a figure that has likely increased over the last decade due to rapid rural-to-urban migration, industrial growth, and infrastructural development. Urbanisation in Kerala has improved access to healthcare, education, and employment opportunities. However, it has also exacerbated public health challenges, particularly concerning the rise of NCDs like diabetes, cardiovascular diseases, hypertension, and mental health disorders. This paper delves into the complex relationship between urbanisation and health transitions in Kerala, relying on secondary data sources, including government surveys, health reports, and scholarly literature, to assess the evolving public health scenario.

Historically, Kerala has been recognised for its achievements in public health. Early investments in education, healthcare infrastructure, and social welfare helped the state control infectious diseases like malaria, tuberculosis, and diarrhoea, which were once common in the region (Zachariah et al., 2001). Over time, the state's epidemiological profile began to shift, reflecting a decrease in communicable diseases but a rising prevalence of NCDs. As Kerala became more urbanised, lifestyle changes associated with urban living, such as sedentary behaviour, unhealthy diets, and increased stress levels, became key drivers of NCDs (Baru, 1998). The Global Burden of Disease Study (2019) shows that NCDs now account for more than 60 per cent of Kerala's total disease burden, with cardiovascular diseases and diabetes being the most common contributors (IHME, 2019).

One of the most significant changes associated with urbanisation in Kerala is the shift in dietary habits. Traditionally, the state's diet consisted of nutrient-rich foods such as fruits, vegetables, whole grains, and fish. However, with the influence of urban living, there has been a marked shift toward the consumption of processed foods high in sugar, salt, and unhealthy fats. This dietary transition has contributed to rising obesity rates and, in turn, an increase in lifestyle-related diseases. According to the National Family Health Survey-5 (NFHS-5), approximately 30 per cent of Kerala's adult population is classified as overweight or obese, with the rates being significantly higher among women (IIPS, 2020). This increase in obesity has directly led to a rise in type 2 diabetes, hypertension, and heart disease, which are now among the leading causes of morbidity and mortality in the state. Popkin (2012) explains that this "nutrition transition," marked by a shift from traditional diets to energy-dense, processed foods, is a global phenomenon in urbanised regions and contributes to the rising burden of NCDs.

In addition to dietary changes, physical inactivity has become a major health concern in Kerala's urban areas. The reliance on motorised transportation, combined with the sedentary nature of many urban jobs, has contributed to a significant decline in physical activity. The World Health Organization (WHO) recommends that adults engage in at least 150 minutes of moderate-intensity physical activity per week (WHO, 2018). However, many residents in Kerala's urban centres fail to meet this target due to a lack of

time, space, and opportunities for exercise. The state's urban expansion has also led to a reduction in green spaces and public areas where physical activity can take place, further limiting opportunities for exercise (Yusuf et al., 2020). The growing reliance on technology, including increased screen time at work and home, has exacerbated this sedentary lifestyle. The combination of physical inactivity and unhealthy diets has contributed significantly to the rising rates of cardiovascular diseases, which now represent a leading cause of death in Kerala (Kanjilal et al., 2006).

Another critical issue linked to Kerala's urbanisation is the rise in mental health disorders. The pressures of urban living—such as job stress, social isolation, financial insecurity, and the erosion of traditional support networks—have contributed to a significant increase in mental health problems. The National Mental Health Survey (NMHS), conducted by NIMHANS, reports that nearly 10 per cent of Kerala's urban population suffers from common mental health disorders such as depression and anxiety (NIMHANS, 2016). Despite Kerala's progressive public health policies, the availability of mental health services remains inadequate. Stigma surrounding mental illness also prevents many individuals from seeking treatment, further exacerbating the crisis (Patel et al., 2018). The rapid pace of urbanisation has, in many ways, outstripped the state's ability to provide sufficient mental health resources. Without expanded access to mental health services and increased public awareness, the mental health burden in Kerala is likely to continue growing.

The rise in NCDs and mental health issues has placed immense pressure on Kerala's healthcare system. While Kerala's public healthcare system is one of the most developed in India, it is facing significant challenges in managing the growing burden of chronic diseases. Urban hospitals are often overcrowded, and healthcare facilities in rural areas face shortages of staff and resources (Sundararaman & Muraleedharan, 2015). As more healthcare professionals migrate to urban centres for better career opportunities, rural areas struggle to retain qualified staff, leading to disparities in healthcare access between urban and rural populations. Furthermore, the growing privatisation of healthcare services in Kerala has led to concerns about equitable access, as marginalised communities often lack the financial means to afford private care (Baru, 1998). This urban-rural healthcare divide, coupled with the rising costs of managing chronic conditions, has created significant health inequities across the state.

Environmental health risks associated with urbanisation also play a critical role in shaping public health outcomes in Kerala. The rapid expansion of cities has led to increased air pollution, inadequate waste management, and water contamination, all of which have direct and indirect effects on health. Vehicle emissions, industrial activities, and construction projects contribute to rising levels of particulate matter in the air, which is linked to respiratory diseases, cardiovascular conditions, and certain cancers (Kumar & Joseph, 2017). In low-income urban areas, inadequate sanitation and waste disposal systems exacerbate the spread of waterborne diseases, further complicating the state's health challenges (Bose, 2018). Addressing these environmental health risks will be crucial to improving public health outcomes in Kerala's urban centers.

In response to these growing public health challenges, the government of Kerala has launched several initiatives aimed at improving healthcare access and reducing the burden of NCDs. One of the key programmes is the **Aardram Mission**, which seeks to revamp primary healthcare centres to better manage chronic diseases and improve access to preventive care (Kerala Health Department, 2018). Additionally, public health campaigns have been launched to raise awareness about the importance of healthy eating, physical activity, and mental well-being. These campaigns aim to encourage behavioural changes that can help reduce the risk of NCDs and improve overall public health. However, despite these efforts, Kerala's healthcare system remains under significant strain, and more work is needed to ensure that it is equipped to handle the demands of an urbanising population.

In conclusion, urbanisation in Kerala has brought about both opportunities and challenges for public health. While the state has made significant progress in controlling infectious diseases and improving access to healthcare, the rise of non-communicable diseases and mental health disorders presents new and complex challenges. Addressing these challenges will require a multifaceted approach that includes strengthening healthcare infrastructure, promoting preventive health measures, and addressing the environmental and social determinants of health. Furthermore, there is an urgent need for the integration of mental health services into primary care and a concerted effort to reduce the stigma surrounding mental illness. By adopting a comprehensive approach to urban health, Kerala can continue to build on its strong public health foundations while adapting to the new realities of an increasingly urbanised population.

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PANEL 13
Shifting Urban Realities

“We Don’t Know, We Don’t Care”: the Production of Castelessness in Bengaluru’s Gated Communities

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The changing landscape of caste identity and relations in the neoliberal economy has been looked at from the lens of discursive markers such as ‘merit’ in higher education, and economic indicators such as engagement in the urban labour market (Mosse, 2018; Subramanian, 2019). The presence of the ‘general category’ comprising oppressor castes, while remarked upon, is not usually analysed or accounted for with sufficient thickness. This paper takes us through the site of an elite gated community designed to resemble an American suburb in the city of Bengaluru, to understand what the everyday lives of its residents look like and how that fits in with larger ideas of aspiration and progressivism that seem to characterise the drive to move into a gated community in the first place.

The four-month ethnographic study that the paper is based on was conducted in a gated community where the researcher has spent some of her childhood. This ‘anthropology at home’ therefore turns the gaze inwards onto an elite space, in a fresh approach to understanding urban inequality. It also draws on a long-term understanding of the site and benefits from personal connections and relationships that enabled nearly unrestricted access to residents and spaces. This facilitated observation and participation in a variety of interactions both formal and informal, ranging from religious ceremonies and big parties to intimate conversations over cups of tea and brief exchanges between residents on their evening walks. Often, the insights gathered in these moments served to triangulate the information and opinions shared during interviews; a passing comment about how there were fewer “locals” than “classy people” while recommending which of the city’s public spaces are comfortable to visit with pets, for example, served not only to highlight how a resident might conceptualise the ‘other’ beyond the physical boundaries of the community, but also contrasted sharply with their insistence during the interview that they don’t believe in identity-based difference. A similar kind of invisibilisation takes place when the physical space of the gated community is observed. With its red-tiled roofs, white stucco walls, and wide palm-lined streets, the architecture and layout of the community is meant to evoke an idealised American suburb, its attendant lifestyle serving as a major point of attraction to both existing and potential residents. This paper, however, walks us through some of the other spaces within the gates—the composting area that sits camouflaged behind a fence, the ‘service yard’ built into the architectural plan of each house, the security cabin at the gate—to which the labour of maintaining a luxurious lifestyle is outsourced. This delegation of labour, it is argued, not only enables residents to live in accordance with their aspirational lifestyle but also produces a kind of parallel-ness that separates labour and lifestyle, bestowing upon residents an entitlement to space and time that serves as another cornerstone of the governing logic at play in this gated community. Other contradictions and tensions emerged over the course of 18 in-depth semi-structured interviews with the wealthier residents and other actors, such as the people employed as security guards and domestic workers at the site, that pointed to an underlying logic of privilege that fundamentally shapes the lifeworlds of those who comprise the gated community. Their personal aspirations, values and ideals of community life, views on the nature of inequality, and how they engaged with space both inside and outside the gates—all indicate the relational quality of privilege as a category, and a complex interplay of ascribed and achieved status that confers a sense of worth upon the resident body that consists entirely of oppressor castes. At the heart of this logic is a central contradiction—the empirical fact that there are no Dalit or Adivasi residents in this gated community, contrasted against claims by oppressor-caste residents that the ‘problem of casteism’ does not enter the gates. What makes possible the claims to progressivism while continuing to exist in and move through bubbles that exclude certain castes? How do residents of this gated community navigate and justify differences between their elite lifestyles and the outside world?

Indeed, this gated community in cosmopolitan Bengaluru emerges as an ideal site to study how eliteness in urban India is not a matter of exclusively class or caste—usually associated with the economic and social realms of difference, respectively—but necessarily of a blend of the two. Specifically, this paper demonstrates how the ‘myth of a caste-free neoliberalism’, as Teltumbde (2018) puts it, is also produced within elite groups. A link is proposed between the emergent logic of privilege and the notion of ‘castelessness’ introduced by Deshpande (2013), which refers to the sense that someone has ‘transcended’ caste in some manner; specifically, how the logic of privilege is key to the production of castelessness that we see taking place at the site of an elite gated community. It is further argued that castelessness is key for understanding caste relations today by focusing on the construction of eliteness among the general category; caste is not a Dalit problem, but rather a problem of visibility—what are the relations that can be invisibilised, and which ones are rendered hypervisible? By redirecting our attention to specific instances in the production of castelessness, this paper attempts to make visible some of the relations that facilitate eliteness. Additionally, it is interesting to note that the proliferation of gated communities and other undemocratic, ‘exclusive’ spaces in a city like Bengaluru represents a kind of urban transition that invites higher income white-collar workers from other parts of the country to displace the more rural settlements that the city expands into. The cultural shift that accompanies such a transition is transformative as far as caste relations in urban areas are concerned, ensuring the perpetuation rather than annihilation of caste.

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Conflict-Induced Urban Transitions: Pemba, Cabo Delgado, Mozambique

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Urbanisation is a process of societal transformation through demographic, spatial, sociocultural, economic, and environmental changes: the movement of people from villages to cities; the shift from agrarian livelihoods to monetary economies of trade, services or industry; a wider gap between resource locations and consumption; the expansion of settlements and clustering of people and infrastructure; the transition from family-ethnic relations to cosmopolitan socialities. Such transformations express politically in the dynamics between civil society, governments, and private sector (Jenkins, 2013; Satterthwaite & Tacoli, 2006; United Nations [UN], 2022).

In Africa, urbanisation processes happened later and faster than elsewhere. While akin to cities worldwide, African urban centres display distinctive features stemming from colonial legacies, neoliberal practices of extractivism and limited industrialisation (Fay & Opal, 2000; Bello-Schühemann, 2018). Fast increasing urban populations, circular migration, economic informality, fragile municipal tax bases, insufficient housing and infrastructure, environmental vulnerability, deep interconnections with the hinterland, social relations imbued in rurality and hybrid forms of governance typify this “informal urbanisation” (Pieterse, 2017; Pieterse & Parnell, 2014). Such features are particularly significant in small and intermediate settlements under 500,000 inhabitants, where half of Africa’s urbanites live, most of whom are under 35. These cities are pivotal places for regional transformation, and their rapid urbanisation presents both challenges and opportunities for development in the continent, especially for the youth (UN, 2017; Agergaard et al., 2019).

Among the drivers of Africa’s urban transition are armed conflicts, reshaping cities as waves of displaced people seek protection and livelihoods (Barlett et al., 2012; Büscher, 2018). This is the case of Pemba, the capital of Cabo Delgado province in Mozambique. Since the onset of an armed insurgency in 2017, which spread throughout its hinterland, Pemba was the top destination for people fleeing the violence. In just five years its inhabitants doubled from 201,846 to over 420,000 (Instituto Nacional de Estatística de Moçambique [INEMZ], 2017; International Organization for Migrations [IOM], 2022). Such sudden demographic growth triggers urbanisation processes and contestation over land, resources, infrastructure, livelihoods, and governance. This can be even more noticeable in small cities in agrarian and late urbanised countries as Mozambique, where only 36 per cent of the population is considered urban and most are informal residents relying on subsistence farming and temporary work. Yet, if addressed in time by the relevant stakeholders, conflict-induced urban transitions can open opportunities for sustainable development (Büscher & Mathys, 2018a; Maloa, 2019; Pieterse, 2017).

Mozambican and international scholars posit the multiple origins of this insurgency in a centuries-old political economy of extractivism and forced labour in northern Mozambique, deepened by state neglect and structural underinvestment, elite nepotism and political alienation rooted in ethnicity and religion, unscrupulous removals and marginalisation of rural communities, widespread poverty, bleak prospects and mistrust towards state authorities, particularly among the large youthful population. Since the late 2000s these grievances have been exploited by local and foreign Islamic extremists in a “jihad” against the state, whose official rhetoric focuses on external destabilisation and terrorism (Bonate, 2022; Feijó & Orre, 2024; Mourier-Genoud, 2021). So far, it has caused the destruction of villages, infrastructure and farmland; the loss of thousands of lives; forced recruitment and kidnaps; physical and emotional trauma; and an estimated one million uprooted (almost half of the province’s population) of which 80 per cent are women and children, and 70 per cent are hosted in communities (Cabo Ligado, 24/01/2024; IOM, 2022). Mozambican security forces are carrying a counteroffensive supported internationally, with

limited progress and worsening the material destruction and human rights violations (Centro para Democracia e Desenvolvimento [CDD], 2022; Hanlon, 2021).

In this context, an inquiry was designed to study conflict-induced urban transitions in Pemba, through a comparative case study using a participatory visual methodology for data collection. An exploratory visit took place in 2022, ensued by another trip in 2023 for data collection and online sessions in 2024 for results validation and dissemination. Empirical data was analysed through content coding and grounded theory to establish their match with the literature, to systematise the impacts of armed conflicts in Pemba and to lay the ground for further research on urban sustainability and governance.

When conflict escalates in rural areas—a historical war locus in Africa—fleeing populations seek safety in cities protected by governmental and security institutions. Autonomy and access to social networks, services, infrastructure, and livelihoods pull most displaced persons to cities, away from resettlement camps (Beall & Goodfellow, 2014; ICRC, 2020; Muggah & Abdenur, 2018). This violent transition from rural to urban contexts, and its impacts on landscapes, infrastructure, environment, socialities, economies, and governance, is shaped by the agency of urbanites, authorities and stakeholders, constitutes conflict-induced urbanism, conflict-induced urbanisation or war-urbanisation (Barlett et al., 2012; Büscher, 2018; Büscher & Mathys, 2018a, 2018b; Oldenburg, 2018). It can reshape small and intermediate cities, where “rural” and “urban” merge in geographical gradients. Disruptions caused by armed conflict in rural regions reverberate deeply in provincial cities for their rural-urban linkages—the spatial, environmental, economic, social and political interconnection with their hinterland (Agergaard et al., 2019; UN, 2017).

Massive arrivals of displaced persons disrupt fragile balances between residents, authorities and institutions, between people and environment, due to higher demand for services and resources. Urban landscapes become contentious, especially if many urbanites live in informal settlements. Dynamics of spatial growth, land use change and ownership vary according to urban densification or expansion (Barlett et al., 2012; Beall & Goodfellow, 2014; International Committee of the Red Cross [ICRC], 2020; Pech, 2019). Sudden population increase strains urban infrastructure for housing, water and energy supply, sanitation, drainage, waste management, transport, telecommunications, education, health and leisure, aggravating existing challenges (Jenkins, 2013).

As armed conflict induces fast urbanisation, adjacent ecosystems are pressured by intensified resource consumption and unmanaged waste generation. The overuse of groundwater, arable land, and firewood instigates scarcity, sterility, and deforestation, triggering biodiversity loss. Uncontrolled sanitation and waste contaminate land and water, and escalating construction and fossil fuel-based transport increase air pollution. Urban environment degradation endangers human health and prompts vulnerability to erosion, landslides, floods, cyclones, and drought (Gbanie et al., 2018; Renner, 2000). Such impacts may unequally affect marginalised groups of poor residents and displaced persons and be more disruptive in secondary municipalities lacking technical, financial, and governance capacity. Yet small cities with close-knit communities and strong connections to their hinterland can also be fruitful grounds for education and engagement for climate resilience and sustainability (Bera et al., 2023; Brennan, 2000).

Protracted conflict reshapes urban socialities. Large population influxes, collective trauma and regional disruptions change social dynamics. Families and communities often bear the burden of providing for displaced relatives, especially if official aid is delayed; kinship, community and religious networks become vital in hardship (Büscher, 2018; ICRC, 2020; Jenkins, 2013; Oldenburg, 2018). Yet, solidarity and acceptance often coexist with suspicion and mistrust due to perceived threats to social cohesion; newcomers may suffer discrimination and exclusion. Concomitantly, war and displacement can foster social upward mobility for residents and displaced persons through new relations, education and job

opportunities (Beall & Goodfellow, 2014; Büscher & Mathys, 2018a; ICRC, 2020; Landau & Bakewell, 2018; Muggah & Abdenur, 2018). Often ethnically and culturally heterogeneous, urbanites share cosmopolitan lifestyles of openness, freedom, and secularity, yet in small and intermediate cities these identities coexist with rural qualities of kinship, ethnicity, religion, and collectivism; these can become fault lines for political association and resource distribution in wartime (Büscher, 2018; Landau & Freemantle, 2019; Oldenburg, 2018).

War alters urban economies, especially in small, provincial cities. As violence ravages the hinterland, interdependent rural production and urban consumption are disrupted: agriculture and fishery halt due to insecurity and displacement, commercial networks and supply routes are interrupted. Rural livelihoods become precarious and urban markets face higher demand, shortages, and inflation. Abruptly swollen urban populations may resort to subsistence farming and fishing to ensure food security and alleviate poverty and compensate for limited employment with informal activities (Jenkins, 2013; Satterthwaite & Tacoli, 2006). Concurrently, conflict-induced urbanisation can spur economic growth: new capital accumulation in emerging real estate markets, due to increased demand for land and housing; new business prospects; a developing aid industry brings external capital, creates jobs and demands property and services. These occurrences boost the local economy, create wealth, and enable social mobility among urbanites, increasing inequality (Barlett et al., 2012; Büscher, 2018; Büscher & Mathys, 2018a; Peyton, 2018).

City management is shaped by the interaction between municipal authorities, responsible for administration, planning and service delivery; the civil society, including citizens, private firms and community associations; and the central government, in charge of national policy. The varying degrees of formal and informal agency of these participants in daily life shape the dynamics of urban governance (Büscher, 2018; Büscher et al., 2018; Satterthwaite & Tacoli, 2006). In small and intermediate African cities, the (de)centralisation of decision and financial power from central governments significantly impacts the autonomy of municipal authorities. The alignment of political representation with ethnicity and religion often supersedes national identities in processes of state reproduction, especially if provincial cities are neglected by the central government—armed conflict can entrench these fault lines (Beall & Goodfellow, 2014; Büscher, 2018; Jenkins, 2013; Peyton, 2018). Moreover, war brings new actors to the urban arena, including the military, militias, aid agencies, and charities, often with clashing agendas. These add layers of complexity to already intricate relations of agency and authority, shaping urban landscapes, socialities, economies and governance. Humanitarianism becomes a feature of conflict-induced urbanisation (Büscher et al., 2018; Oldenburg, 2018).

In essence, war transforms the spatial, environmental, social, economic and political features of cities, particularly secondary ones, and their hinterland, accelerating urban transitions with both destructive and productive impacts. The potential to harness emergent opportunities for sustainable development lies in concerted efforts between civil society, municipal authorities and the state, emphasising the crucial role of political decentralisation.

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Disability, Poverty, and Urban Transition: Experiences from India

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Keywords: Human Development, Urban Transition, Poverty, Sustainable, Inclusive Policy

The concept of disability and development is complex and intertwined with broader definitions and measurement tools of progress. Typically, development refers to the structural transformation from a subsistence economy to an industrial one, marked by sustained rises in income and productivity. This transformation is evident across consumption, production, investment, trade, demographic trends, and institutions. Beyond economic growth, development has human and political dimensions, leading to the concept of human development—where improvements in education, health, and living standards become central.

This study argues that India's urban transition is slower than commonly perceived, with developed states and large cities absorbing most of the growth, while smaller towns and backward areas stagnate. This uneven growth exacerbates existing inequalities, particularly affecting marginalised groups like migrants and disabled people, whose needs are often overlooked in urban planning. While urban transition is seen as a path to economic well-being, it has failed to uplift many disabled individuals, further entrenching poverty. The study suggests that the slow and unbalanced nature of Indian urbanisation has contributed to persistent inequality.

Moreover, the challenges disabled people face during urban transitions are pronounced: housing shortages, lack of access to basic services, environmental degradation, social inequality, and limited job opportunities in the informal economy. These factors aggravate the twin-track relationship between disability and poverty, where disabled individuals are disproportionately poor, less educated, and highly dependent on society. Unplanned urban growth and the resulting strain on infrastructure deepen these inequalities, making life particularly difficult for disabled residents in overcrowded, underserved cities. Urban sprawl, public health crises, and vulnerability to climate change further exacerbate the plight of disabled persons. Addressing these issues requires coordinated urban planning, sustainable infrastructure, and inclusive policies. Without these measures, urban transition will continue to fuel inequality, leaving behind vulnerable groups like the disabled.

The study emphasises the need to integrate disability concerns into urban governance and policy, especially in rapidly growing cities like Dhaka and Kathmandu, where poor governance and lack of resources have resulted in weak planning and increased marginalisation. By drawing on empirical evidence, the research highlights the deep connection between disability and poverty in India, showing that malnutrition, limited education, and unsafe working conditions create a vicious cycle of disability and poverty.

The disability movement was launched in India to prevent exclusion and discrimination of disabled persons due to existing policies and provide strength to them for dignity. During five-year plans, a lot of steps have been taken by the government to strengthen the disability movement. The introduction of laws for disability protection in the social sector also enhanced the participation of disabled persons in other sectors. The government has also established disability-specific institutions in our country to promote and protect the rights of disabled persons. These advances have become landmarks of the disability rights movement's success story. However, these developments are not adequate for disabled persons in the realisation of their actual capability. The disability movement came to India in the form of a rights-based approach. Economic and social rights become the main wings of the disability movement. After the completion of 50 years of this movement, it is essential to evaluate the performance of policies related to disabled persons. This study is an attempt in this direction. This study also looks at the change

in performance and status of disabled persons in India since independence, particularly post-liberalisation. This study also tries to compare this performance at the global level. For the development of the economy, inclusive development is an important factor. Inclusive development in India implies giving adequate attention to the marginalised sections of society. It was a well-known fact that the condition of marginalised sections is not good in our country. The condition of the disabled persons among these weaker sections is worse. Scheduled Castes, Scheduled Tribes, women, and minorities constitute a major part of the marginalised section. But the condition of the disabled persons among this major part of the marginalised, which faces the double burden of discrimination, requires more attention than what is being historically given. The burden of discrimination becomes doubled due to the physical limitations of the disabled persons. In this context, the government needs to set up institutions and develop mechanisms for taking care of disabled persons.

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Invisible Agents: Mumbai's Transformation through the Lens of Waghri Community.

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Introduction

'*Chindi ka kaam*' i.e. working with secondhand clothes has been the occupation done by a service nomadic tribe called Waghri for more than 90 years from Western and Northern India and present-day Pakistan (Bapat, 2022). Over the years, the wanderers halted in the city, and the exchange eventually evolved from exchanging old clothes for mud pots, glass vessels and aluminium pots to the exchange of steel and plastic. Waghri now live in all cities, including but not limited to major cities like Ahmedabad, Hyderabad, Indore, Delhi, and Pune. In cities they are known as 'bartanwale' as they are mobile vendors carrying bartan (vessels) on their heads. The story of Waghri is not just of an urban poor group resorting to vending but about itinerancy being part of their identity. What occurs when a nomadic group enters an urban environment that is predominantly structured for sedentary populations? Furthermore, what factors contribute to the decision of a nomadic group to engage with and enter such a city?

Figure 56: Woman going home from Grant Road to Mahim after a day of Pheri



Source: Author

Research Objective and Methodology

This paper explores the various ways in which the Waghri have practiced their work in Mumbai, the impact of Mumbai's constant transformation on their practices, the influence of their identity as service nomads and denotified tribes on their work, and the effects of the Waghri community's labour on the city spaces. This paper traces different aspects of the Waghri community's livelihood and its entanglements with multitude of changes in Mumbai. Through the Follow Allow Participant Methodology, the study seeks to uncover the phenomenological experiences of individuals within the Waghri community, their trade, and how their identity shapes their lives in Mumbai. In this research 18 Waghri markets have been covered. By problematising the everyday negotiation and 'tactics' used to adapt to the transformation of the city, the agency of the community to change the city in adaptation is ascertained. It is within the realm of the everyday that the potential for transformative action and opposition resides. Ultimately, it is this resistance enacted through everyday practices that has enabled the survival of marginalised communities despite enduring numerous struggles.

Findings and Discussion

Mumbai has been going through transformation, specifically visual, for more than two decades. Efforts to modernise cities were now increasingly made, and a clear shift was towards 'Cities are the growth engine' starting with the report 'Vision Mumbai' produced by McKinsey and Company in 2003 that recommended making Mumbai 'world-class'. A push was made to develop a similar strategy used to develop Shanghai or Singapore for Mumbai city's future. In cities of the Global South, infrastructure is a dominant imaginary of progress. In the making of these infrastructures, displacement of several thousand households has been experienced. The other impacts of displacement include the displacement of livelihoods. Further, markers of a world-class city were said to be modern roads that have to be made by removing uses of the street considered unacceptable and subsequently, by criminalising any 'encroachment' on it. Over the past two decades, growth-oriented renewal and beautification projects have been associated with the broader project of "world-class" city-making, through which diverse municipalities are transformed into controlled spaces of mass consumption and leisure. Urban renewal and beautification endeavours aim to elevate the appeal of specific neighbourhoods or streets, thereby boosting property values and attracting investment from residents and consumers. Those with the financial means to participate in urban consumption are integrated into the fabric of the city, while individuals lacking such resources, often characterised as the "dirty or disorderly" (Sibley, 1997), are marginalised and excluded, pushed towards less desirable margins beyond the established boundaries of the city, neighbourhood, or community. The civil society that works with several sections of the urban marginalised groups such as domestic workers, street vendors, homeless, informal settlers, and tribals in cities consistently experiences that while the city extracts labour from these precariats and accommodates them to an extent, city-making processes are highly hostile and do not afford a secure and dignified existence to them (Pattaroni, L.; Bhide, A.; Lutringer, C., 2022).

Figure 57: Waghri woman carrying potlis



Source: Author

These ideals of world-class violently sanitise places that are occupied by the urban poor. The spaces that the urban poor can access for housing and livelihood are largely public spaces but the '[g]uardians of the [b]ourgeois [c]ity' (Anjaria, 2009) render street vendors and urban poor claims illegitimate by "speaking on behalf of the abstract 'citizen' of Mumbai", thus constructing an image of urban poor resource sucking 'parasites' that drain and eventually kill the city. These beliefs are rooted in caste and class but are articulated by the privileged under the guise of efficiency, legality, and aesthetics. For the Waghri, this prejudice is particularly detrimental, as they continue to be perceived as "criminal tribes" by both state authorities and the broader populace. The stigma of adhering to non-sedentary ways of

living led to the othering of them. As written by Manu, the ancient Hindu lawmaker, they were considered 'impure' robber tribes who "always wander[ed] from place to place" (Bühler, 1886, as cited in Piliavsky, 2015). Using this as a base to persecute nomadic tribes, the Criminal Tribe Act was implemented in 1871. This legislation's surveillance forced Waghri to depart from Gujarat in the late 19th and early 20th centuries seeking anonymity in the city and emerging as vendors and petty traders on the streets of Mumbai. It was not until 1952 that the CTA was repealed. Even with the law overturned and having been in Mumbai for many generations, they are yet to be ridden of the stigma of being called thieves. Their livelihood practice is still considered a decoy for stealing. With that as an impediment, changes in the city like increasing high rises, gated communities, police actions on markets and thrift shops coming up have also been a great challenge in practicing their livelihood. But a rapidly changing city, which tries very hard to push the poor out, is not completely able to erase certain practices of livelihood, even if it does manage to make it more challenging and precarious. This is because of the ingenuity and agency of the Waghri.

Studying the changes in the city and how the work of the Waghri community has adapted to them not just documents their adaptation techniques but their resistance to being 'pushed' to the periphery. Not only do they adapt but also speculate, co-ordinate, and consolidate information. This paper argues that the silent, protracted, but pervasive advancement of the ordinary people, in this case Waghri, on the propertied and powerful in order to survive and improve their lives (Bayat, 2000) for their livelihood and housing and simultaneously choosing to remain 'stateless' (Scott, 2009) is to evade persecution by state and state's surveillance. The 'passive network', which is established by a tacit recognition of their common identity and which is mediated through space, atomises as soon as a supposed threat is observed. The Waghri's unusual and unimaginable active use of public space challenges these ideas of 'order' of planners, municipalities and creates 'marginal spaces'. The politics of marginal spaces is, however, an unambiguous phenomenon.

Figure 58: Left side: Picture clicked at Ram Mandir market day; Right Side: Picture clicked of the same spot the next day



Source: Author

Conclusion

As urban surveillance intensifies and cityscapes undergo visual metamorphosis, it becomes imperative to scrutinise the invisibilisation of the Waghri community's contribution to the city and how the cloak of invisibility itself makes them potential agents of urban change. This study seeks to provide a distinct and nuanced perspective on the marginal spaces within urban environments, illuminating both the constraining and oppressive nature of cultural exclusion, as well as the creative possibilities inherent in rearticulating, revitalising, and reorganising the social categories that marginalise certain groups (Tsing, 1994). The concept of the periphery is typically understood in relation to the centre.

Figure 59: Makeshift cradle made by Waghri Woman at Goregaon Waghri Market



Source: Author

However, similar to how wildflowers demonstrate resilience by flourishing in unexpected and harsh conditions, this research aims to render the centre irrelevant to the lived experiences of those inhabiting heterotopic spaces within the periphery. By focusing on these heterotopias, the study emphasises the potential for alternative social structures and meanings that can arise in these marginalised contexts.

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- Figure 2: D. Bapat; A. Joshi(2015), 'Chindhiwalli' women, People's Archive of Rural India, <https://ruralindiaonline.org/en/albums/chindhiwalli-women/>

Koliwadas between Land and Sea: Transitioning Lives of Coastal Urban Villages in Mumbai

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Keywords: Coastal urban village, urban village, koliwada, transition, sea-ward and land-ward perspective

The metropolitan city of Mumbai, originally made up of seven islands, is essentially a coastal city. The coastal area of this megacity is a host to the largest urban conglomerates and infrastructural projects as the financial capital of India. The city is home to multiple identities including indigenous communities such as the “Koli” i.e., the fishers community. The community inhabits the coast of the city in old hamlets called koliwadas. Traditionally, their identity is closely tied to the sea, which serves as their primary source of livelihood, while land is mainly a utilitarian space, used for community settlements and as a shared resource. The adjacent sea and the land are both part of coastal commons, used and preserved by the community for centuries.

In the case of Mumbai’s Koliwadas, administrative decisions such as planning documents designated these coastal fishing villages as urban villages. While they pass as urban villages, being the “villages within the urban” as per the existing literature, this outlook borrowed from landlocked urban villages brings a new set of challenges for the seaward facing koliwadas. While they maintain a strong cultural cohesion and can be identified as villages due to their shared language, culture, and extended community kinship, they are distinct from urban villages in terms of location and occupation i.e., the spatial characteristic of coast, and sea-based fishing, inhabiting in a city like. In this paper researchers have used the lens of sea-wards location and occupation to establish the distinction between the existing urban villages and the Koliwada. Additionally, it attempts to establish Coastal Urban Villages as a separate category for settlements such as koliwadas to study ongoing urban transition in the cities located on coast.

The existing literature on urban villages covers a wide range of issues, including transitions, development policy concerns, and community perspectives. Researchers often refer to urban villages as an oxymoron, especially in the case of farmlands acquired for the construction of planned colonies in metropolitan cities like Mumbai, Pune, Delhi, and Kolkata. They also agree that an ‘urban village’ is a former rural village that has been enveloped by the formal city while still retaining distinct social and morphological characteristics (van Oostrum, 2021). Urban villages are not merely remnants of old village cores but represent a complex assemblage of uses that emerge as villages transform both their built and unbuilt land. The literature examines the economic, social, and policy consequences of this unique urbanisation process in cities like Delhi, Gurgaon, Chennai, and Mumbai (Chaddopadhyay et al., 2024; Cowan, 2018). Additionally, some literature accounts for how many villages inducted into metropolitan plans have transformed into slums. It also reviews the changes taking place in urban villages in India as a consequence of urbanisation policy (see Harrison & Sharma, 2023; Van Oostrum, 2022; Mehra, 2005). In short, the literature is centred around transformation of rural lands on account of urbanisation.

Considering the characteristics of ‘urban villages’ mentioned in the literature, we must accept the fact that most urban villages are agrarian in nature, where land acquisition initiated the process of agrarian transformation and socio-cultural changes to landowning communities. In contrast, in the case of koliwadas in Mumbai, they are primarily coastal villages that depend on the sea for their livelihood; hence, their ‘coastal’ aspect must be central to our understanding of these settlements. In the case of Mumbai, the transition of koliwada is visible through their assertion to practice their

livelihood and right to their location within the city's coast. This pits them against the modern imagination of the coast envisioned and actively implemented by the state apparatus. The process of making and remaking of the city heavily relied on the reclamation of the coastal boundaries, which greatly altered its ecology over the years. This resulted in the shrinking of Koliwadadas and also affected their occupation negatively due to human interference in the coastal ecology.

The Coastal Zone Management Plan aimed to demarcate the coastal land with the inherent intent to safeguard the ecology. This further led to the zoning of coastal areas, which were earlier coastal commons and predominantly free access areas for the coastal communities. Furthermore, the land-based development planning of the city, delegated the redevelopment of the koliwadadas to the Slum Rehabilitation Authority which essentially meant classification of koliwadadas as slums. Along with these factors, due to the coastal infrastructure projects, pollution and modern exploitative fishing practices, fishing as an occupation has come under threat, especially for traditional fishers. The Kolis often refer to the sea as 'their own' asserting their possession over the sea as a fishing ground with customary rights. Since the customary rights of fishers in the sea are undocumented and the transition had brought their land possession also under question, the koliwadadas are asserting individual land rights on the common coastal lands based on their indigenous identity to avoid getting uprooted completely from the land if not sea.

The commonalities between urban villages and koliwadadas, such as socio-cultural cohesion, extended kinship, and language and cultural similarities among various koliwadadas scattered along the coast of Mumbai highlights village construct of the koliwada. Terms such as "Gaon" and "Gaathan" (Madhgaon/Gaathan) used in vernacular vocabulary of Mumbai also indicate shared memories around koliwadadas as villages. But unlike peripheral urban villages, the koliwadadas are situated at the heart of Mumbai, preserved by many generations despite Mumbai's fast-paced global urbanisation. Koliwadadas are the native settlements and the original inhabitants of this city. Moreover, they have managed to retain their main occupation based on and inseparable from coast and sea which is different from land-based occupations of conventional urban villages. Distinction between the koliwadadas and urban villages in terms of coastal occupation and location gets lost when the term is loosely used for planning and administrative purposes. Therefore, the idea of 'urban villages' in the context of Mumbai is ambivalent as a theoretical idea and is more of an administrative construct borrowed from agrarian transition of land in villages, which is different from fishing coastal villages.

Additionally, the existing literature on 'urban villages' reproduces the bureaucratic terms emerged from land-ward planning leading to a gap between the academic discourse and the 'lived realities' of these seaward koliwadadas. In short, the seaward perspective means looking at the sea from the land by the fishers. And therefore, the classification of koliwadadas as Coastal Urban Villages is necessary during this time of transition.

Exploring the oral narratives of fisherfolk, this paper highlights the spatial lived experiences of inhabiting the fuzzy boundaries of sea and land amid shifting urban dynamics. Using qualitative methods such as oral histories, memories, and the lived experiences of the Koli fisherfolk, the study aims to offer insights into the much-needed sea-ward view of Koliwadadas as Coastal Urban Villages in terms of location and occupation. This paper showcases the transition of these Koliwadadas using multi sited ethnography to distinguish them from land-based Urban villages and classifying them as Coastal Urban villages to inculcate the sea-ward perspective of these fisher communities. Thus, contributing to the current discourse of urban transition this paper formulates the concept of 'Coastal Urban Village' as new vocabulary to capture empirical insights from marginal geographies. This work will further the research to broaden understanding of transition as a phenomenon and process in the context of the urban coast of the Global South.

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PANEL 14

Communities, Mobility, and Migration

Creation of the 'Other' in Urban Discourse: the Case Study of Kochi City, Kerala

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Cities have emerged as significant growth centers in most economies of the developing countries. Recent evidence records that 31.14 per cent of the population lives in cities and towns, up from 25.73 per cent in 1991 (MoHUA, 2019). The top 100 largest cities already contribute about 43 per cent of India's GDP (IIHS, 2011). The emergence of cities as major growth centres in India is in sync with similar trends noted worldwide, with around two-thirds of the world's population expected to live in urban areas by the year 2050 (UN, 2018). Oxford Economics Global cities report estimates that 17 of the 20 fastest-growing cities in the world between 2019 and 2035 will be from India. With the number of people coming to cities for employment opportunities and in search of better livelihoods, cities therefore have emerged as centers for materialising contemporary development. High rise buildings, technological advancements, and higher standards of living have become the major markers for growth being centered on cities.

With the emergence of cities as growth centres, the question that naturally arises is whether they have really emerged as a space for inclusive development. Do all urban citizens have equal access to basic amenities or do some of them face discrimination and lead a life as 'the other' in the urban settlement? If so, who are the 'others'? This study is an attempt to explore this question in the context of contemporary urban development in India.

The process of gentrification brought about a demographic and economic shift to cities. It is an urban condition where wealthier newcomers and real estate developers dominate the larger urban space by sidelining urban poor and the working class. The metropolitan capital governs the cities today and the same is deeply entrenched in the contours of place-making and identity formations. The case of Kochi is a classic example to be delved upon in such a global context.

This study therefore takes place-making and identity formation as key determinants in order to understand the very creation of the 'other' in an urban space through taking the case of Kochi city in Kerala. Drawing on qualitative studies documented in the city of Kochi, Kerala, the study attempts to complement the economic aspect of othering with other related dimensions.

The study conceptualises othering through placemaking and identity formation by underpinning the difference between "space" and "place". While "space" refers to the functional "physical space," "place" forms a concept of "space" in a relational sense as the location of social practices of different stakeholders (Healey, 2001). Spaces become places because they are recognised by the people who live and do activities there (Franz et al., 2008). Sanyal observes in urban discourse that there is a capitalist at one end and a 'non-capitalist other' at the other end. He terms this non-capitalist space the 'need-economy' which is differentiated from the 'accumulation-economy' through the economic logic of self-sustenance as opposed to profit-maximisation. This space is inhabited by non-accumulating petty commodity producers, self-employed and others working with their own means of production.

Kochi is a place that was under colonial rule for a long time. Today the post-colonial rule has its own colonial fetters and the very translation of jobs that are mostly informal in nature is seen as menial and less dignified. Such an underpinning stems largely out of the colonial hangover that the city imparts and sustains. In other words, the non-capitalist other in a post-colonial economy, who are largely the informal workers are sustained in order to exercise capitalists' hegemony. If the colonisers of Kochi used

different social groups to satiate their needs, today post-colonial capitalism creates its own clusters that are socially and informally scattered and fragmented as the 'others' of urban space.

The case of Kochi is interesting because the larger setting of Kochi from what it was earlier to what it is today, to what it will be tomorrow calls for a larger roadmap especially in the context of cities and its transition through creating the 'other'. Kochi City under the district of Ernakulam, popularly known as the commercial capital of the state Kerala is geographically divided into 3 forms: eastern parts comprising the hills; plateau (even landscape) in the centre; and the seashore in the west (Valath, 2006). Ruled by the Portuguese (1503-1663) followed by the Dutch (1663-1773) and finally the British, Kochi and its colonial rule spans the time period between 1814 to 1947. Colonial rule and the settlements related to the rule not only changed the topography of the city but also brought about a radical change in how urban space is looked upon.

Today, with capitalism focusing more on metropolitan regions, the very arising of the metropolitan capital has become characteristic of cities and their contribution to the nation's GDP. Patnaik (2017) finds the metropolitan capital created a squeeze on the petty producers and it takes control of their resources. In such a context, where Kochi is heading becomes a case in point because Kochi today as a post-colonial metropolis runs precisely through the play of its metropolitan capital. With IT Parks, multinational companies, petty production, gig and platform works, small-scale enterprises, and different manufacturing and service industries defining the labour trajectory of Kochi, such a duality of labour has become a part and parcel of the city discourse. This is where the role of the metropolitan capital can be understood and seen as largely othered too. Today the city has expanded to urban fringes, and the presence of IT hubs and spaces of agglomeration economies has brought in its wake ancillary employments that are mostly informal. Such a duality interspersed with colonial settlements mark the labour pattern of Kochi.

Such a dualistic labour pattern reproduces Kochi into not just a hub of wealth extremities but also a space to abject a deeply fragmented urban imaginary of what this study calls the very creation of the 'other'. Such a discourse of creating the 'other' continues even today and manifests through different forms. Hence the largest question at hand is where cities are heading in the process of creating the 'other'.

Sassen (1991) suggests that cities in today's globalised economy serve as command-and-control centres increasing the social and spatial polarisation. The social and spatial polarisation takes shape in urban spaces mostly with place-making and identity formation strategies and configurations. The concept of place-making has its origin in urban design that focuses on physical transformation and end product of places (Akbar & Edelenbos, 2021). The current notion of place-making argues that urban places are embedded in the built environment and come into being through the reiterative social practices, meanings that are made and remade on a daily basis (Cresswell, 2004). Place, hence, is nothing but the product of user's activities and therefore, remaking a place is a social activity that involves people (Arefi, 2014; Lombard, 2014).

Since it involves people, this study also looks into how identities of these people translate in an urban space. For the same the study, 80 respondents who were dispersed across different labour market were interviewed. The details of the sample size are provided in Table 13.

Table 13: Distribution of sample respondents

Participants	Numbers
Gig and Platform Workers	10
Autorickshaw Drivers	10
Petty Producers	10
Migrant informal workers	15
Small & Medium Scale enterprises /agencies	15
IT Employees	10
Field Experts / Planners / Academicians	10
Total	80

Source: Author

Our findings based on the narratives gathered suggest that othering in urban spaces is closely attributed to the economics of the urban spaces that has become hugely dependent on a capital centric development that transforms different places within the cities through creating the 'other'. We notice that though othering exists and continues in urban spaces, the processes of othering is different across sample groups. The emergence of Kochi, the commercial capital of the state of Kerala, hence also needs to be seen in such a context where the very making of the working class is carried through unmaking a lot of other working class. Such a making of an urban space is evident also with the increasing number of gated communities that slowly started defining the elite urban credo. McGuigan (1999) in his discussion of globalisation draws attention to the ways in which academic theorising has inadvertently become implicated in supporting forms of global domination. He points out that universal positions have been criticised because they endorse the imposition on non-western cultures of western values and political ideals, including equality, individualism, and democracy (McGuigan, 1999:88). Similarly, the champions of 'otherness' and difference are accused of focusing on a 'we' and a set of values that are essentially western which configures the entire urban setting according to a set of stipulated and standardised norms that are subtle and largely othered. Instances like building parks and bus stops where one cannot sleep on the constructed benches and is thereby shooed away due to increased surveillance and policing are best instances to understand how much othering as a process is ensured to be intact across urban spaces from quite some time. Our narratives well founded in the empirics of place-making and identity embedding unpacks the reality of othering in urban spaces through taking the commercial capital and the largest urban agglomeration in Kerala, Kochi.

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Engagement with Land: A Renewed Reading of Agrarian Change in India, through a Study of the Wedding-Real Estate Nexus in Gujarat

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Gujarat recently hosted one of the largest pre-wedding celebrations in history: the Ambani pre-wedding in Jamnagar, attended by the world's wealthiest and most influential figures. In stark contrast, rural Gujarat continues to grapple with dire economic realities, where farmers resort to so-called "mass kisan marriages" to circumvent the burden of debt (Parmar, 2009). This juxtaposition between the extravagant Ambani celebration and the struggles faced by farmers illustrates the two extremes of India's neoliberal landscape, highlighting disparities that define contemporary India. The need for mass kisan marriages may be understood as a symptom of the larger 'agrarian crisis in India' (Sainath, 2010). A crisis partly produced as a consequence of the economic restructuring that followed the economic liberalisation in the early 1990s, which ushered in an era of fiscal austerity marked by significant reductions in public spending. This shift towards neoliberal policies exacerbated inequalities, as the tightening of fiscal resources undermined state-led welfare programmes and social safety nets, making agriculture unfeasible for many. The rise of Ambani has often been described as a consequence of the same economic restructuring along with the state's neoliberal policies, which have enabled capital to circulate and concentrate in other circuits.

Our site of study is Ahmedabad, a city located in Gujarat, one of India's most industrialised states in terms of industrial output (Sivarajah, 2024). In Gujarat, the neoliberal development paradigm, often termed the 'Gujarat model of development,' has prioritised rapid urbanisation, providing the agrarian elite with opportunities for 'capital switching' (Goodfellow, 2017), whereby surplus capital is redirected into speculative real estate ventures. This real estate turn (Harvey, 1982) intersects in complex ways with seasonal and largely unregulated industries, such as the wedding industry. In Ahmedabad, this convergence underscores the fluidity of land, labour, and capital across industries and highlights the role of informal, yet economically significant industries in shaping patterns of urbanisation.

We are working alongside the many scholars in the Global South who are revisiting questions of agrarian change and narratives of transition, with an emphasis on the speculative nature of the agrarian transformation. Gururani in her writings on agrarian urbanisation looks at the ecological impact of the agrarian transformation (Gururani, 2019). Balakrishnan highlights how institutional arrangements such as co-operatives which have often been viewed in older literature as sites of resistance may instead be weaponised by agrarian landed property and hence need to be relooked at as a part of the specific political economy within which they operate (Balakrishnan, 2019). In the same way we are looking at the transitional land monetising strategies (transitional uses of land) that are employed by agrarian landed property to diversify their capital, land, and labour where instead of temporary and ephemeral urbanisms that represent sites of contestation and reclamation, are instead appropriated by agrarian landed property to reproduce caste and class relations in the process of agrarian change.

This study engages with the intricate relationship between the wedding industry and speculative real estate in Ahmedabad, by focusing on the wedding landscape of affluent Hindus. The Big Fat Indian Wedding, now globally emblematic of "Indian culture," functions as a powerful vehicle for advancing an ethno-nationalist vision of India. These extravagant ceremonies not only reinforce a singular, idealised version of Indian identity but also conflate Hindu weddings with Indian weddings, perpetuating a homogenised and exclusionary narrative. This cultural commodification, exported internationally, strategically promotes a vision of India that aligns with Hindu majoritarianism, marginalising the nation's

rich diversity. While Hindu weddings do not represent the entirety of Indian culture, they dominate the wedding industry in terms of visibility and expenditure.

Marriage in India, with its patriarchal roots, is commonly seen as an economic arrangement in which land is used as a form of payment, such as in the case of dowry. Land acts as social currency, informing practices of endogamy, and helping retain wealth within social groupings, defined along the lines of caste and class (Sud, 2007). The wedding industry by some estimates is the fourth largest in the country (Das, 2022). With every fourth wedding in the world taking place in India (Madhukalya, 2024), the wedding industry hence represents a significant part of the Indian economy, facilitating the circulation of surplus capital and reinforcing economic, cultural, and social hierarchies. It holds such economic significance that the Prime Minister recently launched the 'Wed in India' initiative, aimed at curbing the financial outflow caused by destination weddings abroad (Das & Seal, 2023). Acknowledging the vast economic potential of the wedding industry, the Ministry of Housing has even initiated a campaign to promote India as a premier destination wedding hub, leveraging tourism revenue (Pallavi, 2023).

While numerous studies examine the institution of marriage and its connection with the political economy of land, there is a relative paucity of research exploring the specific relationship between the wedding industry and issues of land and labour. The wedding industry, much like the institution of marriage, functions as a crucial site of social reproduction, reinforcing class- and caste-based hierarchies of power. It also plays a pivotal role in facilitating agro-urban linkages, shaped by peculiar forms of land use and labour mobilisation, that further entrench socio-economic disparities.

We investigate how agrarian elites manage their land and labour interests dispersed along the urban-rural continuum. Specifically, we examine how these elites leverage their acute understanding of the agrarian context and their location of dominance in both urban and rural settings, to forge nexuses that facilitate a more profitable deployment of their land and labour resources. Furthermore, we wish to explore the concept of agrarian urbanisation by analysing the types of nexuses that are forged as capital, land, and labour lay in transit.

Contrary to earlier theories of classical transition that framed urbanisation as a unidirectional subordination of the rural by the urban, this study demonstrates that temporal rationalities—such as conceptions of time—as well as broader socio-economic logics, flow bidirectionally between urban and agrarian spheres. Rather than reducing the rural and the informal economy to a mere 'shadow economy' subordinate to the formal urban economy, this analysis reveals a more complex interaction. Urban temporal frameworks, while shaping agrarian practices, are equally shaped by agrarian logics, particularly those rooted in agricultural cycles like sowing, harvesting, and land use. This dynamic highlights the deep entanglement of agrarian and urban processes within the broader context of urbanisation. Rather than agrarian life being solely disciplined by industrial and urban notions of time, agricultural practices also exert influence on urban temporal rhythms (Gururani & Kennedy, 2021), particularly in sectors that depend heavily on migrant labour, such as the wedding industry.

The Hindu wedding industry in Ahmedabad is largely seasonal, aligning with the rabi winter cropping season when chickpeas, a less labour-intensive cash-crop, are grown. This allows the agrarian elite to, at times, redeploy their labour force for wedding-related activities. The temporal rhythms of agricultural cycles and wedding seasons interweave, challenging traditional dichotomies between urban and rural spheres. This co-evolution reveals a more complex relationship, where power differentials from both urban and rural contexts find common ground, demonstrating their mutual influence and shared temporal logic.

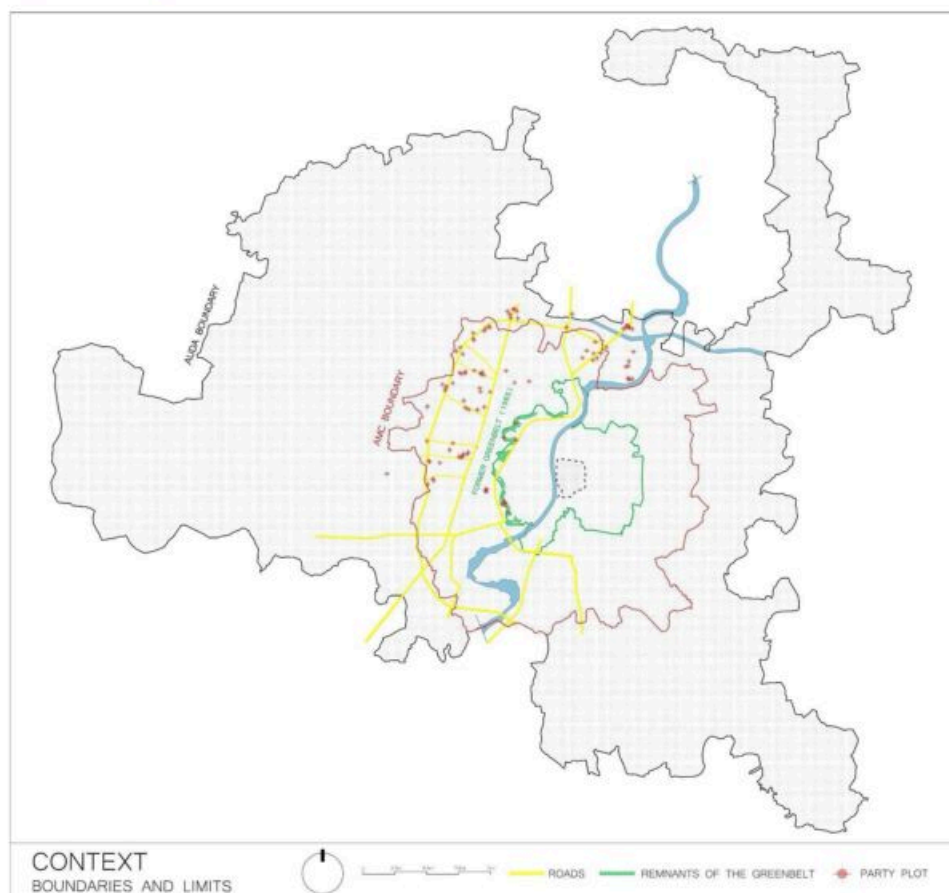
Scholarship on the informal economy often lays focus on the predicament of the seasonal migrant workers, as a tale of partial proletarianisation and an unfulfilled classical transition. with the migrant workers having one foot in agriculture and one in the informal economy. However, this study shifts the focus toward the agrarian elite, who also exist liminally between the urban and rural, except in both realms holding positions of power.

By straddling both agrarian livelihoods and urban informal economies, these actors effectively leverage their entrenched social power, local knowledge, and caste privileges to shepherd the urbanisation process in ways that reinforce their dominance. This dual positionality allows them to exploit the intersections of rural and urban dynamics, shaping development to their advantage. As Ren notes, “the balance of power clearly tilts toward the propertied class, who possess the social, political, and cultural capital necessary to forge connections with state bureaucracies and private investors, allowing them to benefit from land speculation on the urban periphery.”

This reinforces how those with access to capital—both material and symbolic—wield disproportionate influence in peripheral urbanisation. The fluid nature of the transitioning peripheries (refer to Figure 60).

We are expanding the imagination of speculative frontiers as more than empty apartments, agrarian fields, and half-built construction sites, to unconventional nexuses and linkages between people, industries, and cultural institutions. This reimagination reveals where urban and agrarian processes intersect, allowing us to examine narratives of agrarian transition by positioning the urban-rural continuum as a pivotal site of speculation and transformation.

Figure 60: SEQ Figure * ARABIC 60: Context and boundary limits



Source: Google Earth Inc., Town Planning Scheme 1965, Bimal Patel et al., Draft Town Planning Scheme 2021, Ahmedabad Urban Development Authority

Peasantry belonging to the dominant castes plays a critical role in this process, engaging in speculation by mobilising local insights, and caste privileges, and consequently manages the entire value chain of land commodification (Gidwani & Upadhyay, 2022) to transform their land into an incrementally lucrative commodity. Examining peri-urban dynamics through the lens of speculation reveals the interplay of economic, cultural, and caste-based forces that drive land transactions.

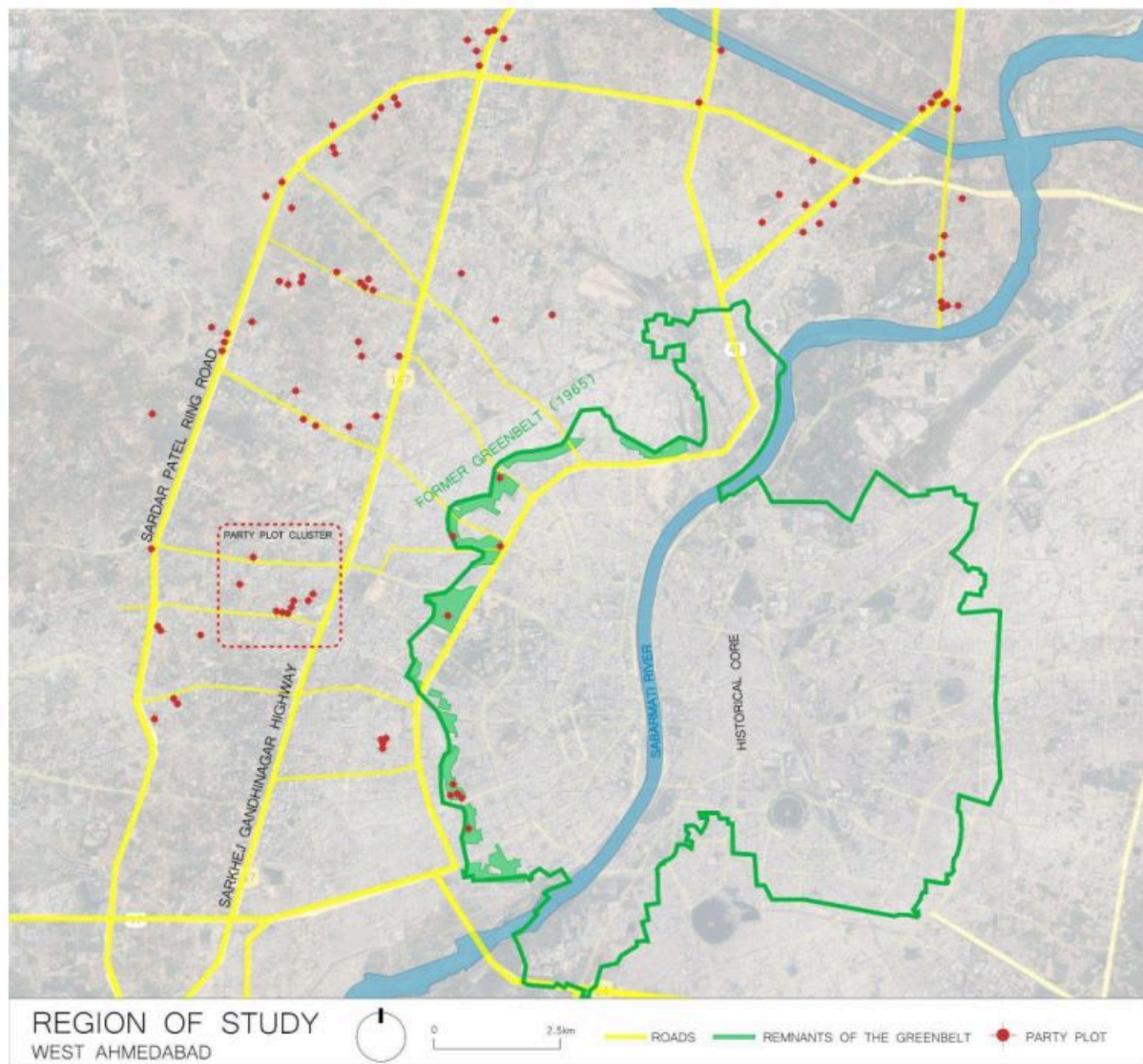
These uses proliferate the peri-urban frontier in the form of—cricket fields, pickleball courts, go-karting tracks, garba grounds, warehousing facilities, food courts, nurseries, and party plots to name a few. These transitional uses of idle land enable the agrarian elites to capture increasing ground rent, diverging from the imaginary of the Temporary City described by Bishop and Williams (2012) or the Ephemeral City by Mehrotra et al. (2017), which sees these sorts of uses of land as embodying a postmodern approach to land use that looks at ideas of planning beyond fixity. To engage with the ephemeral, we ask whose labour enables it, who owns the lands where this kind of urbanism flourishes, and why from a political economic perspective. We see these transitional uses as market-driven mechanisms designed to manage leakages in the process of capitalist accumulation.

If permanence holds little significance, then so does the temporary; both forms serve as instruments for capital accumulation, revealing the speculative logics embedded within urban land dynamics. These transitional uses form a part of the asset management strategy employed by agrarian elites to address their issue of 'underutilisation'. Our focus is on party plots—open grounds populating the peri-urban frontier, designated for agricultural use but strategically repurposed for wedding events.

These transitional uses represent tactics to circumvent land use regulations by the state, often arising in zones with restrictions on construction. Landowning proprietors utilise party plots to capture ground rent without significant infrastructure investment. This trend is particularly evident in the urban fringes, where zoning restrictions have in the past limited development. For instance, the green belt around Ahmedabad, established in 1965 (Refer to Figure 61) to control 'urban sprawl', was one of the first sites where party plots emerged in a major way. The appropriation of green zones into party plots highlights how such transitional uses allow the agrarian elite to act transversely with respect to state planning.

Figure 61 illustrates our region of study, which focuses on the western side of Ahmedabad, specifically to the west of the Sabarmati River. This region has experienced significant real estate development in recent years, as wealthier residents have increasingly invested in properties further west. Notably, the emergence of party plots within this landscape maps onto various historical boundaries and fringes. Initially, party plots appeared in the greenbelt area, followed by their expansion along the Sarkhej-Gandhinagar highway. Subsequently, these developments spread to connecting roads between the highway and have now reached, and at times extended beyond, the Sardar Patel Ring Road.

Figure 61: SEQ Figure * ARABIC 61: Region of study: West Ahmedabad



Source: Adapted from Google Earth Inc., Town Planning Scheme 1965, Bimal Patel et al., Draft Town Planning Scheme 2021, Ahmedabad Urban Development Authority

Ashima Sood's research on transitional governance in Noida highlights how ambiguous governance structures create accountability gaps that powerful actors exploit, undermining regulatory oversight and equitable land distribution. In a similar vein, we argue that land transitions are not merely from agrarian to urban but involve prolonged speculative holding through temporary, low-capital uses termed "transitional uses." These transitional uses allow the agrarian elite to offset the costs associated with holding land.

**CLUSTER OF PARTY PLOTS
WEST AHMEDABAD**

VRUNDAVAN PARTY PLOT

BODAKDEV PARTY PLOT

MERRIMENT PARTY PLOT

RADHIKA PARTY PLOT

KRISHNA FARM

0 0.25km

STATE OWNERSHIP

PRIVATE OWNERSHIP

**CLUSTER OF PARTY PLOTS
WEST AHMEDABAD**

SALE FOR RESIDENTIAL

0.25km

LEGEND

1	STATE OWNERSHIP
2	PRIVATE OWNERSHIP
3	STATE OWNERSHIP
4	PRIVATE OWNERSHIP
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Our analysis reveals that the state, through its reliance on land-based financing, occasionally engages in land speculation, aligning with Shatkin's concept of the "real estate turn" (Shatkin, 2017). This speculation is evident when the state expropriates land as part of its financing strategy, anticipating that the land can later be sold to recover infrastructure costs. However, our findings indicate that instead of promptly selling the expropriated land, the state often retains it for extended periods, typically leasing it as wedding venues or party plots (refer to Figure 62). Furthermore, the leasing or selling of party plots is increasingly integrated into various suburbanisation processes. For instance, golf courses located within golf course-themed residential enclaves are frequently repurposed as wedding venues. These practices complicate the dynamics of urbanisation illustrating how state actions not only influence land markets but also socio-spatial relationships in the process of transition.

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industry and the political economy of land, necessitating further academic inquiry. In this paper, we conduct an ethno-spatial analysis of urban party plots in peri-urban Ahmedabad to critically assess the shortcomings of the failed agrarian land reforms in the region and their broader socio-economic implications. Our adoption of ethnospatial analysis is informed by the foundational work of geographers such as W. E. B. Du Bois, serving as a methodological framework to examine the role of social stratification in the processes of urbanisation and industrialisation. By leveraging this analytical approach, we aim to elucidate the complex interactions between spatial dynamics and social hierarchies.

This ethno-spatial analysis traces land ownership by caste, supplemented by fieldwork in Ahmedabad, and informal interviews. This reveals the intersecting dynamics of the wedding and real estate industries as they operate through similar circuits of land, labour, and capital. Through this approach, we excavate and expose the centrality of caste as a critical axis of power, offering a deeper understanding of the agrarian question and its broader socio-economic implications (Jodhka, 2022; Lerche & Shah, 2018).

Our findings in Gujarat, where a highly differentiated peasantry exists, reveal that dominant caste elites, having circumvented agrarian land reforms, constitute the majority of party plot owners. We argue the wedding industry reproduces urbanised versions of the landlord-tiller relationship, facilitates the flow of black money, and contributes to the speculative economy surrounding agrarian land. Ultimately, this study seeks to enhance our understanding of agrarian urbanisation by revealing the transient yet critical rural-urban linkages that make the urban-rural continuum a hotspot for speculation.

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Pedalling for a Clean Environment: Mapping the Impact of Transition to E-rickshaws on Cycle Rickshaw Communities

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Cycle rickshaws have had a ubiquitous presence in Delhi. From catching a train at the Old Delhi railway station to accessing the paranthewali galis of Chandani Chowk, cycle rickshaws have become essential nodes in last-mile connectivity. Most importantly, cycle rickshaws have been integral to Delhi's public transport system for decades. These human-powered vehicles are affordable and highly manoeuvrable, making them ideal for navigating the city's congested streets. Cycle rickshaws can alleviate traffic congestion. As more people opt for this non-motorised transport, the number of cars and motorcycles on the roads can decrease. According to a survey, 600,000 rickshaws in the early 2000s used to dot Delhi's streets and roads (Kishwar, 2006). Today, the number has shrunk far more distressingly. One reason is the spurt in E-rickshaws due to an emphasis on net-zero emission targets

Countries worldwide are adopting E-rickshaws, particularly in Asian countries such as China and Vietnam. Thailand, where rickshaws are known as "tuk-tuks," is pushing to electrify its fleet to reduce air pollution in Bangkok and Chiang Mai. Africa is also warming up to this trend, as in Khartoum, Sudan, where the electricity grid is unreliable, and some three-wheelers are being charged with solar panels.

India is significant because it is one of the biggest markets for E-rickshaws. It houses 15 lakh e-rickshaws, increasing with additional sales of around 11,000 new ones monthly, comprising 83 per cent of the Indian electric vehicle market (Das & Mohanty, 2023). The interest in EVs has increased due to a transition to low-carbon and zero-emission transport. The interest is understandable since the transport sector in India contributes to more than 13 per cent of the country's overall emissions.

The transition to E-ricks from cycle rickshaws has disparately impacted the communities of cycle rickshawallas. This study maps those impacts on the communities and highlights the elements that have impacted these communities, including challenges of equity, dignified living and minimum wages are addressed. Traffic regulations, competition from motorised rickshaws and taxis, and inadequate infrastructure often hinder their operation.

In doing so, the study uses the just transition framework as a lens to gather experiences of cycle rickshaws. Just transition is a people-centric approach towards decarbonisation that accounts for harm to communities and the environment associated with decarbonisation and seeks to render wages and welfare. The environmental harms could include impacts on water bodies, air, soil, biodiversity, and genetic resources. Not to mention the economic impacts on and through value chains, trade, and financing, and serious health impacts, including malnutrition with over- and undernourishment, non-communicable diseases, and mental health impairments. These impacts are also invariably linked with injustices on various socio-economic (caste) and spatial scales. Therefore, the question arises, and hence the rationale of this study is: who bears the costs and enjoys the benefits of the transitions? Can transitions be inclusive, leaving no one behind?

The study, therefore, uses a qualitative longitudinal research strategy that involves repeat qualitative interviews with research participants. The study brings together evidence that captures social changes and shifts in people's life course, thoughts, and feelings. The strategy includes interviewing and re-interviewing cycle rickshawallas on several occasions to gather ethnographic vignettes of the real problems plaguing the communities due to net zero transition. This involves ethnographic research over a long period, qualitative interviewing on multiple occasions, or qualitative content analysis of documents relating to different periods. Ethnographic interviews were employed to capture the lived

experiences of E-rickshaw and pedal rickshaw operators, as survey data alone cannot fully capture such experiences. The study encompasses passenger-oriented E-rickshaws and cycle rickshaws—the nodes of Delhi's first and last-mile connectivity. The study will map the history and intensification of the transition to date. The study will also include case studies of local social and institutional structures in place for both the transport systems and transitions.

The study area includes Chandani Chowk and Lajpat Nagar, high-density areas with zoning protections for cycle rickshaws. Amidst the transition to E-ricks from cycle rickshaws, numerous impacts on the communities can be identified. A preliminary ethnography showed that most of the communities involved in the pedal rickshaw are primarily migrants who have vanished or adopted the E-rickshaws. Particularly in Delhi, E-rickshaw ownership requires financing from banks and the e-ricks, leaving many communities in debt. For instance, since most rickshaw pullers do not have a steady income, it becomes difficult for them to repay loans. This is a problem that is common among e-rickshaw operators, too. In this sense, the transition towards net zero-emission has affected communities adversely.

Interviews with cycle rickshaw operators in Chandani Chowk and Lajpat Nagar reveal that the emission level of cycle rickshaws is far lower than that of E-rickshaws. The operating and maintenance costs of the pedal rickshaws are also meagre compared to E-rickshaws. Most importantly, the communities involved in the cycle rickshaw pulling, primarily migrants, have vanished or adopted the E-rickshaws. With no state support, the cycle rickshaws and communities live precarious lives. Delhi's regulatory ambiguity, such as the Delhi Cycle Rickshaw Bye-Laws of 1960 that capped the number of rickshaws plying in Delhi, further accentuated the precarity of the cycle rickshaws and the operators (Sood, 2012).

Furthermore, the zoning protection helps cycle ricksha wallas from the ever-burgeoning E-rickshaws. Respondents in Lajpat Nagar said that the restriction on E-rickshaws has helped them to continue working in the sector. However, wages have remained the same for a long time, and rickshaw pullers struggle to make ends meet. Respondents added that the incomes are steady during the festivals, which brings in a large number of customers.

The study findings have important implications for our policy understanding about the place of cycle rickshaws in a rapidly increasing urban transport network. The study also highlights that zoning regulations help cycle rickshaw pullers' wages and recommends cycle rickshaw ways for last-mile transport. Creating designated lanes for non-motorised vehicles can improve safety and efficiency for rickshaw drivers. In this way, it encourages the integration of cycles and e-rickshaws into the broader urban transportation framework—through improved infrastructure, supportive policies, and public awareness—which will enhance mobility for millions of residents and contribute to a cleaner, greener future for Delhi.

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Decolonising ‘De-Nationalism’: A Methodological Approach to Decentering South-South Migration

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Nation-states are considered to be the natural organising principle of political modernity, produced and reinforced in “banal” everyday ways (Billig, 1995; Chernilo, 2006). Methodological nationalism is the epistemological framework which naturalises the nation-states as a primary unit of any sociological inquiry. An uncritical adoption of this framework demarcates people into “insider” and “outsider” and imposes conditions of mobility through visa regimes—the primary disciplinary inquiry of migration studies (Wimmer & Schiller, 2003; Wimmer & Schiller, 2002). Wimmer & Schiller (2002) explain the 3 types of methodological nationalism informing migration research: **ignorance** (nation-states are understood as an invisible background), **naturalisation** (no examination or problematisation of the nation-state as a boundary), and **territorial limitation** (removal of transborder processes and connections through imposition of definitions and boundaries using processes of demographic and economic data collection).

Methodological nationalism, however, has been challenged within migration research time and again. For instance, transnational and diaspora studies examine the interconnectedness of people beyond borders, through media, culture, remittances, and global labour regime (de Genova, 2013; Rots, 2023). Despite this, the deeper epistemological critique of nationality escapes enquiry, especially in the context of South-South migration, where colonial cartographies impose national identities on ethnically continuous populations, and almost 80 per cent of migration takes place along contiguous borders (Ratha & Shaw, 2007).

“Methodological de-nationalism”, proposed by Anderson (2019), problematises the migrant-citizen divide. The concept looks at the formation of differences within citizens through current and historical processes of ethnicisation and otherisation, visible in the case of the Roma people in central European states of France and Spain, who are denied citizenship privileges, despite being legal citizens of the states they reside in (Anderson, 2020). However, methodological de-nationalism overlooks processes which create unequal relationships among co-ethnics, when nationality gains precedence over ethnicity. This is especially important as residents at the hems of modern, post-colonial nation-states are thought to reject the legacy of colonial cartography through the ideas of shared identity, memory, and belonging. But how does an ethnicity spread across two nations with longstanding open borders, become racialised in migration despite shared histories of movement and settlement?

The paper takes the case of the Khas people who inhabit the Himalayan borderland states of Sudurpashchim (Nepal), and Uttarakhand (India). The Khas is a dominant ethno-linguistic group in the Central Himalayas, assimilated into caste hierarchies and national identities of both nations (Pande, 2014; Sharma, 2021). The assimilation of the Khas in colonial Garhwal-Kumaon and Sudurpashchim was a continuous practice re-emphasised through cultural assimilation, administrative categorisations, and intentional geographical marginalisation (Bista, 1995; Joshi, 1929; Pande, 2013, 2017; Sharma, 2021). In the post-colonial context, the Khas is an ethnicity subsumed within the larger national identity of both Indian and Nepalese.

More than 80 per cent of the international migrants from Sudurpashchim (Nepal) are to India, and those from the poorest quintiles migrate to Uttarakhand, most from the Khas ethnic group of Bahun, Chhetri, Thakuri, and Dami castes (Bhattarai et al., 2024; Bruslé, 2007). As India and Nepal maintain an open border since 1950, migrants to Uttarakhand from Sudurpashchim form a critical part of the region’s informal economy, working as porters and coolies, especially in the hill towns—namely, Pithoragarh,

Pauri, Almora, Mussoorie, and Kedarnath (Bruslé, 2007, 2008). Without access to resources that facilitate upward social and economic mobility in the hill towns, migrants often find themselves trapped in a generational cycle of informal occupations. Many begin working as young as 15, and by the age of 50, they are frequently forced to retire from these labour-intensive occupations (Sharma, 2007, 2009, 2013).

The “otherisation” of migrant workers from Sudurpashchim in Uttarakhand is mired with class-associated and caste-associated connotations in the absence of distinct topographical or phenotypical differences (Bruslé, 2007). “Coolie-work” is considered a mark of servanthip, hence a lowly profession within caste hierarchy (Bruslé, 2007, 2008). Caste-class otherisation, taken alongside the informal nature of work and the regional power imbalances between India and Nepal, positions workers from Sudurpashchim at a lower social position despite sharing the same ethnicity (Khas).

Hough (2022) investigates the dynamics of racialisation among groups that lack phenotypical distinctions and share a common ethnic identity. She argues that North Koreans migrating to South Korea are inferiorised based on linguistic differences, shaping the perception of the former as lacking skills. Since skills are influenced by the socio-cultural and political context at destinations to shape migrants’ social standing and mobility as Liu-Farrer, Yeoh and Baas (2021) show, this linguistic inferiority and perception of skills contributes to the employment of North Koreans in cheap, low-skilled labour in South Korea, resulting in “ethnic racialisation” (Hough, 2022).

While Hough (2022) examines racialisation by acknowledging ethnic continuities between North Koreans and South Koreans, migration in Uttarakhand from Sudurpashchim is constrained by methodological nationalism (Wimmer & Schiller, 2002; 2003). “Nepali” workers on “Indian” land are still the overbearing signifiers used to describe the migration corridor. Terms like “Dotiyal”, (literally - a person from Doti district of Sudurpashchim), prevalent in hill towns of Uttarakhand is used as an everyday expletive to denote a migrant worker from Sudurpashchim, and highlights the nuances of everyday racialisation that are regionally specific rather than nationally uniform. Abiding by the framework of nation-states overlooks hyperlocal otherisation of workers, and further discourages one from looking at how the Khas have been framed into these categories, at the face of socio-cultural, linguistic, and historical interconnectedness of Sudurpashchim and Uttarakhand, especially in the latter’s hill towns.

The discursive elements of Indo-Nepal migration research naturalise the border and make it nearly impossible to incorporate any framework of analysis apart from nation-states. The 1950 Indo-Nepal Treaty of Peace and Friendship, one of the oldest still-standing open border agreements in the world, uses the historicity of cross-border relationships but maintains the territorialisation of populations of India’s and Nepal’s Himalayan borderlands.

Neglecting Khas ethnic continuity limits us from understanding how imposition of nationality can create differences among co-ethnics, which not only leads to racialisation of labour, but also impedes healthcare, education, and employment protection for migrants in the hill towns. To prevent naturalisation of border, the case study highlights how methodological decolonisation achieved by questioning nationality, as against methodological de-nationalism can help understand the complexities of ethnicity, nationality, and cross-border labour regimes in the Global South. The study of Uttarakhand and Sudurpashchim, then, serves as a note of caution to critically examine the everyday territorialisation of identities, which imposes immobilities on migrants, even in the absence of a visa regime and presence of ethnic similarities. As the world increasingly moves towards open borders (Rwanda, Kenya, among others) to address colonial legacies, how must we understand migration better, beyond nation-states?

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The Right to a City: Rethinking Welfare Capitalism through Urban Rights

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Introduction

How are labour unions in Indian small towns articulating their opposition to the privatisation of public firms? In this paper, I investigate the contestations engendered by state attempts at public-sector privatisation through the perspective of urban rights. I begin with July 2017 bandh opposing the privatisation of Bharat Earth Movers Limited (BEML), which paralysed much of the Kolar region. I argue that the protests within Kolar are not unusual or unique to the region. Instead, it represents one instance of a more significant battle being waged across the subcontinent over the future of public firms. Overall, the liberalisation of the Indian public sector continues to face fierce opposition. Scholars such as Chatterjee (2023) have highlighted that the institutional restructuring of state-owned enterprises (SOEs) has primarily been aimed at enhancing managerial efficiency and market discipline, with the most robust firms being transformed into 'state-market hybrids' to align with the current paradigms of neoliberal economic policy. However, in some instances, the drive for disinvestment and the lack of serious interest from private investors have led to loss-making SOEs being phased out. Regardless of the specific circumstances, restructuring has invariably had a detrimental effect on jobs, with formalised employment being replaced by an increased contractualisation of labour. These reforms have coincided with a period of profound and structural unemployment across India's hinterlands. State employment has emerged as one of the last bastions of secure jobs in an uncertain employment market, especially in small towns and non-metropolitan regions, where service-sector jobs are scarce. Despite the rapid expansion of the private sector, which offers housing, pensions, and health benefits, state employment, particularly in public firms, continues to be viewed as highly desirable. Despite the recent shift in regional development policy from the direct allocation of industry towards speculative development through private investment, planners cannot overlook the significant influence public firms continue to wield within rural districts which have borne the brunt of liberalisation and a shrinking labour market.

Methods

This paper is an outcome of my ongoing dissertation, which relies on extended case-study research combining ethnographic methods and geospatial analysis and focusing on understanding Kolar Gold fields within the broader processes of state restructuring. Based on multi-year fieldwork in southern Karnataka, I use the extended case method to examine worker actions within the contiguous townships of BEML Nagar (hosting BEML) and Robertsonpet [hosting Bharat Gold Mines Limited (BGML)] in Kolar Gold Fields Taluk. These townships are direct outcomes of the state-led industrial allocation. Through semi-structured interviews with worker unions and theory-building process tracing (PT), I connect worker actions around state employment and subaltern emplacement to the commonly invoked 'right to the city'.

Data Collection

This paper draws from data gathered for my dissertation. The paper examines industrial reports of CPSEs and later municipal documents to study the shifts in planning and governance alongside industrial restructuring. Further, the study will use semi-structured interviews with municipal officials, real estate brokers, policy experts, civil society organisations, key individuals in political parties and labour unions, farmer unions, and village leaders to understand and operationalise marginality. Lastly, the study will use the Socioeconomic High-resolution Rural-Urban Geographic Platform for India (SHRUG) provided by the Development Data Lab to trace redistricting efforts.

Findings

I examine how industry closure, disinvestment and restructuring of public firms have caused worker unions to take the state to court, where they have experienced moderate legal success by articulating public sector employment and housing as constitutional rights and reaffirming SOEs as statist benefactors. Existing scholarship has extensively documented the emergence of an Indian proletariat from a caste-conscious agrarian society under state-led development. However, little has been written about how more recent reforms of public sector firms have been complicated by the outcomes of previous planning interventions. I argue that SOEs are still symbolically seen as extensions of the welfare state, especially in monocultural regional economies. This stems from, among other factors, the historically inverted urban policies of the public sector, where SOEs were allocated to underdeveloped regions, in direct contrast to the metro-centricity of private firms. Public enterprises were tasked with proletarianisation, governance, and place development, transforming their rural surroundings into modern, planned company towns. This immutability in public enterprises' locational, governmental, and material aspects continues to interfere with its current reformist trajectory. At KGF, workers and residents use arguments centred around urban rights and subaltern emplacement to argue for state employment. In short, the immutability in public enterprises' locational, governmental, and material aspects continues to interfere with state attempts at divestment.

Significance

By centring the question around urban rights and city-building outside the northern metropolis, this paper (1) attempts to extend the conversation around rights to other urban formations that fall outside the ambit of normative planning theory; (2) reasserts the linkages between labour and urbanisation, at a time when contemporary scholarship on globalisation and capital focuses on the increasing separation between the two; and (3) focuses on the role of secondary Indian cities on Dalit political subjectivity.

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PANEL 15

Navigating Urbanisation: Transforming Health Systems in Transition

Navigating Urban Health Transitions: how our cities can respond?

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Introduction

Cities around the globe are rapidly urbanizing, driven by economic growth and migration, leading to significant transformations in its cities. These transformations, encompassing social, demographic, epidemiological, political, and governance dimensions, have profound implications for urban health systems. This panel explores the multifaceted challenges and opportunities arising from these transitions, focusing on the Indian contexts as proxy for global south and advocating for intersectoral solutions.

Demographic and Social Transitions

The demographic landscape of India's cities has undergone significant changes in recent decades. Migration from rural areas, coupled with declining fertility rates and increased life expectancy, has led to a surge in urbanization. This demographic shift has resulted in a diverse population with varying socioeconomic characteristics, cultural backgrounds, and health needs. Moreover, the traditional family structure has evolved, with a growing number of single-person households, dual-income families, and elderly individuals living alone. These changes have implications for social support networks, caregiving arrangements, and access to healthcare services.

Urban health systems in low- and middle-income countries (LMICs) face significant challenges due to the demographic transition and rise in aging population. The increasing prevalence of chronic non-communicable diseases, such as cardiovascular disease, diabetes, and cancer, among older adults places a substantial strain on healthcare resources. Limited infrastructure, inadequate staffing, and insufficient funding often hinder the ability of these systems to provide effective care for the growing number of elderly individuals. Additionally, the cultural and social norms in many LMICs may not adequately support the needs of older adults, leading to gaps in care and increased vulnerability to social isolation and neglect. These challenges necessitate innovative approaches and increased investment in geriatric care to ensure that the health needs of older populations in LMICs are met.

Epidemiological Transition

India is experiencing a significant epidemiological transition, characterized by a shift from infectious diseases to non-communicable diseases (NCDs). This transition is primarily driven by urbanization-related factors, such as unhealthy lifestyles, environmental pollution, and increased access to processed foods. NCDs, including heart disease, diabetes, stroke, and cancer, are now the leading causes of death in India's urban areas. The burden of these diseases is disproportionately borne by marginalized and vulnerable populations, who often lack access to adequate healthcare and preventive services.

Food Systems and Nutrition

The rapid urbanization of India has led to significant changes in food systems and dietary habits. The increased availability of processed foods, fast food, and sugary drinks has contributed to a rise in unhealthy eating patterns. This, coupled with reduced physical activity, has led to a growing prevalence

of obesity and related health problems. Addressing the issue of malnutrition in urban areas requires a holistic approach that considers factors such as food affordability, access to nutritious foods, and food literacy. Public health interventions can promote healthy eating habits, encourage the consumption of local, seasonal produce, and support the development of sustainable food systems.

Governance and Healthcare Systems

The governance of urban health systems in India faces several challenges. The traditional three-tiered public health system, designed primarily for rural areas, may not be well-suited to the complex needs of urban populations. The increasing prevalence of NCDs demands more resources and service delivery models capable of providing sustained and long-term care. Moreover, the coordination between different government agencies involved in health, housing, education, and social welfare is often inadequate. This can lead to fragmented services, duplication of efforts, and gaps in care. Strengthening intersectoral collaboration is essential to address the complex determinants of health in urban areas.

Possibilities and Way forward

While there have been classic urban advantages – be it availability and efficiency gains in healthcare provision, conducive environment for economic growth, social innovations – they seem to have been optimised largely by private, profit-making healthcare sector benefiting those with capacity to pay for services. The very nature of vulnerabilities in urban areas (invisible poverty, stress, fragmented family/community support, precarious livelihoods) and evermore complex governance challenges (need to coordinate across several local/state/central government agencies providing some degree of healthcare, poor political and budgetary representation within state resources) meant the classic model of rural primary healthcare dominated three-tiered public health system has never been a fit for the urban(ising) settings.

Intersectoral Solutions

To address the multifaceted challenges of urban health in India, intersectoral collaboration is essential. This involves coordinated action across various government departments, civil society organizations, and private sector entities. Cities are centres for developing policies, technology, discourses and discussions and how these multi-layered transitions impacting urban health systems necessitates ‘well thought out’ transitions for the urban health systems and how to navigate the journey towards achieving sustainable urban health systems is the need of the hour.

Strengthening Primary Healthcare: Investing in urban primary health centers and health and wellness centers is crucial to providing comprehensive care, including preventive services, early detection, and management of chronic diseases. These facilities should be equipped with adequate infrastructure, staffed with qualified healthcare professionals, and integrated with community-based health services.

Promoting Healthy Lifestyles: Public health interventions can play a vital role in promoting healthy lifestyles and preventing NCDs. These interventions should focus on encouraging healthy eating habits, physical activity, tobacco and alcohol control, and mental health well-being. Schools, workplaces, and community centers can be leveraged to implement health promotion programs.

Addressing Social Determinants of Health: Inequalities in income, education, housing, and access to healthcare significantly impact health outcomes in urban areas. Addressing these social determinants of health requires a multi-faceted approach, including poverty reduction, social protection programs, and investments in education and housing.

Environmental Health: Environmental pollution, including air pollution, water contamination, and poor sanitation, poses significant health risks for urban populations. Improving environmental conditions

requires effective waste management, pollution control measures, and access to clean water and sanitation facilities.

Governance and Policy: Strengthening governance mechanisms and developing policies that support urban health is essential. This includes establishing clear lines of accountability, allocating adequate resources to health services, and promoting intersectoral coordination.

Conclusion

India's rapid urbanization presents significant challenges and opportunities for urban health. By adopting an intersectoral approach and investing in primary healthcare, promoting healthy lifestyles, addressing social determinants of health, and improving environmental conditions, India can build resilient and equitable urban health systems that meet the needs of its growing population.

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