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Urban Environmental Governance: Historical and Political Ecological Perspectives from South Asia

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I. Introduction

In the context of environmental crises and rapid urbanization (in South Asia and elsewhere), the issue of urban environmental governance has come to the fore in regional and global forums. Cities, the environment, sustainability, and governance, are increasingly discussed in their intersections, as exemplified in Sustainable Development Goal 11 (Sustainable Cities and Communities). According to Mahfuzu Haque (2017: 1) environmental governance "…comprises of rules, practices, policies, and institutions that shape how humans interact with the environment. It is a process that links and harmonizes policies, institutions, procedures, tools, and information to allow participants (public and private sector, NGOs, local communities) to manage conflicts, seek points of consensus, make fundamental decisions, and be accountable for their actions". (Urban) environmental governance gives importance to all levels of government – national, regional, state, and local (municipal) –, as well as to non-governmental social and political actors, in managing the environment.

But what does this imply on the ground? Mike Hulme (2017: xii) argues that effective environmental governance requires "governing the full range of human activities, technologies and institutions – *and the imaginations which give rise to them*…" (own emphasis). We believe that it is within this context that history and historical analyses matter as they provide a holistic perspective on the (re)making of urban environments across complex and dynamic interactions between city, nature, technologies, and institutions along long-term temporal scales and wider spatial conjectures that go 'beyond the urban' (Mukherjee 2015). Consulting a wide range of archival sources, including correspondences, gazetteers, proceedings, administrative and revenue reports, and diary entries, historians investigate and show the evolution of the urban (environment). They reveal when technological apparatuses, social arrangements and governance mechanisms bring about (un)intended expectations and consequences and lay out path-dependent trajectories that determine larger questions of sustainability.

However, historical analyses risk to fall short in scientifically exploring "the full range of human activities" that shape, and are shaped by, (urban environmental) governance scenarios. The renowned political ecologist Michael Watts (2013) warned about the subjective bias in historical interpretations and cautioned against "the distorted optic provided by a wholesale dependence on archival sources" as these are essentially class products. This is where political ethnography and research fields drawing heavily on ethnography, such as recent approaches in political ecology, can complement historical investigations on environmental governance by advancing nuanced interpretations of diverse actors as well as their positions, lobbying capacities and power relations that are imbricated in infrastructural planning and implementation.

This chapter maps the emergence and development of urban environmental history (UEH) in South Asia and the lessons it offers to understand and analyze pertinent questions of urban environmental governance in recent times. However, it acknowledges the limits of historical research (especially due to its reliance on the archival methodology) and points to need to complement UEH with other critical social sciences. Towards this end, we present a detailed overview of urban political ecology (UPE), particularly recent poststructuralist approaches, which use an array of qualitative research methods to analyze governance scenarios in situated contexts. With South Asia as the empirical context, [1] we finally establish

[1] This chapter draws mainly on UEH and UPE studies from India because of their relative abundance. However, we refer to South Asia at times because colonial India included today's Pakistan, India and Bangladesh before Partition (1947).

our argument regarding the significance of integrating and cross-fertilizing historical and political ecological perspectives to convey larger and deeper narratives of urban environmental governance.

II. Colonial Urban Ecologies: Infrastructures for 'Improvements'

After a long tradition of an assumed antithetical relationship between the 'city' and 'nature' in both urban and ecological literatures, UEH emerged in the Global West during the 1990s to challenge this view. Critically engaging with the work of Donald Worster (1990), William Cronon (1991) and Martin Melosi (1993) showed how American cities are interconnected with the 'natural' world. They have conceptualized and advanced UEH as an interdisciplinary domain that combines "the study of the natural history of the city with the history of city building and their possible intersections" (Melosi 1993: 2). These ideas gradually percolated to South Asia, where historians have investigated overlaps, synergies and trade-offs between the 'urban' and the 'environment', addressing larger questions on urban sustainability.

A large gamut of South Asian UEH scholarship[2] entails the study of urban infrastructure (i.e., water provision and waste disposal) and its evolution within the specific historical context of (British) colonialism. South Asian historians have analysed the transfer and imposition of Western technologies and epidemiological discourses and traced the trajectories of the creation of colonial cities through the manipulation of environments. This scholarship examines intersections between the city, nature, and technology with scattered descriptions of social antipathies and resistances against the colonial state. The thick narratives – carved out from colonial records on the construction of utilities related to water provisions and waste disposal – depict complex relationships between religion, race, power, and politics that propelled colonial town planning and urban governance anchored in the principles of social exclusion and capitalist profit.

Several South Asian UEH studies describe the epidemiological context that led to the emergence of the 'sanitary city' in Europe and discuss the transplantation of its rationales and techniques to the colonies. For example, John Broich (2007) investigates the British water supply systems and its transfer to colonial cities such as Bombay, Karachi, Colombo, Hong Kong, and Singapore. He reveals the inherent interconnection between urban governance and infrastructure, and between Europe and Asia. Influenced by sanitary debates in Britain from the 1840s onwards, physical and moral 'improvement' went hand in hand through urban planning and infrastructure schemes. The (colonial) state – both in Britain and in Asia – attempted to ameliorate urban society by reconfiguring the environment and the relationship between cities and their hinterland (through damming rivers, installing piped water networks, etc.). Broich demonstrates how municipal reform and heavily funded, modern utilities marked a departure from "decentralized" to "more centralized" water systems (347). The modern centralized governance structures, however, caused resentment among the locals who showed concerns and protested against new financial reconfigurations or the taxation system for projects over which they lacked control. Finally, Broich argues that in both places, Great Britain and the empire, the ultimate effect of the water system was the consolidation of the authority of the modern state. "Thus, Bombay and Manchester were 'colonized' in the same way" (365).

[2] We refer to South Asian UEH (and UPE) scholarship and researchers when the studies are situated in South Asia and regardless of the whether the authors are affiliated at an institution in South Asia or elsewhere.

In a similar vein, Michael Mann's (2007) work on water management, sewage, and excreta in Delhi reveals the politics of sanitation in colonial India during the nineteenth century. In addition to the technological and moral dimension of the analysis, Mann captures the political setting of the post-1857 period. The uprising of 1857[3] motivated colonial officials to add the principle of security (to the one of sanitation) in the reconstruction of cities in British India. To ensure military security, parts of the central wards in Lucknow, Kanpur, and Delhi, for example, were dismantled and transformed into a *cordon de sécurité* ('cantonment') and a *cordon sanitaire* ('civil lines'). The latter formed European and local elite residential areas, dotted with spacious houses, greenery, and having well-connected water and sanitation facilities. By contrast, the 'native' quarters suffered from inadequate amenities. Consulting records from the Delhi public works department, Mann (2007) shows how racial segregation was embedded in urban planning and governance of municipal Delhi, for example. Colonial water supply projects inscribed unequal access to utilities as provincial government made deliberate plans to give preference in the form of providing piped water supply in the Cantonment and the Civil Lines. Some communities such as *chamars*[4] were not even provided with the right to fetch water from public standposts – constructed with the official objective to cater to the needs of the majority population. Furthermore, as the city wall that separated Old Delhi (native habitat) from the Civil Lines (the British and *rais*[5] residency) was not demolished in the early 20th century, the old walled city became "the metaphor for the subjugated Indian people" (Mann 2007: 11), and "Europe's "Oriental 'Other'" (Mann 2007: 10).

Mann's research also reveals the tensions between the central and provincial governments and the municipal bodies that manifested themselves through urban infrastructure projects. After the inordinate increase of the 'India Debt' in the post-1857 period, the fiscal system was decentralized, and municipal committees were formed. While the Delhi Municipal Committee (DMC), established in 1863, could formally initiate independent public expenditure, it had to constantly negotiate with provincial and central authorities for financial aid. Lord Ripon's legislation of 1892 liberalized urban administration facilitating legal and fiscal competences of local municipalities, but public funding remained a problem during the entire colonial period.

Urban environmental governance in British India was further shaped by 'Improvement Trusts' that were bestowed with the task of controlling disease outbreaks (cholera and plague) and mortality, as well as of ameliorating ventilation, buying and selling land on urban fringes, developing residential areas and rehabilitating the poor (Meller 1979). However, the Trusts often failed to improve the sanitary situation due to colonial racial ideologies. In Bombay, for example, urban land was redistributed to the elite classes at the costs of the poor and of migrants: between 1904 and 1912, 40% of impoverished people inhabited only 4% of the urban space in Bombay (Kidambi 2001).

Similar to Broich and Mann, Awadhendra Sharan (2011: 426) argues that "Colonial governmentality was a careful calibration of distancing and intervention…". Especially during the post-1857 period, North Indian cities, such as Delhi, Lucknow and Kanpur that were physically ruined by the war, emerged as important sites for realizing utility projects through which , "… their spatial organisation and everyday routines refashioned in a bid to assure health, safety and security" (426). The making of modern Delhi

[3] Variously described as the Indian Mutiny, the Revolt of 1857, or the First War of Independence.
[4] *Chamars* represent the dalit community. Classified as a Scheduled Caste, they are widespread in North India, their hereditary occupation is tanning leather.
[5] *Rais* is an Urdu term which implies the nobility or the elite section of the society.

through the rhetoric of ‘progress’ and ‘improvement’ across public work construction projects, especially water supply and sewage treatment, consisted of governance concerns around the (im)purity of water and narratives of pollution along mediating authorities, actors and agencies. Sharan’s work is unique in terms of its focus on both quantity and quality of water, from source to mouth; i.e., the “simultaneous consideration of water as infrastructure and as environment, as much a network of pipes and drains as matters of pollution and well-being” (427). Sharan’s (2011) work also points to city-hinterland relations through the construction and management of water and sanitation infrastructure and to struggles, negations, and mediations between upstream and downstream municipal authorities regarding water distribution and sewage flows in the Ganges affecting northern Indian cities, such as Benares or Agra, and even the felt effects in Calcutta.

In his later work, Sharan (2017) builds upon his earlier argument to show connections between urban waste, river flows and upstream-downstream dynamics. For instance, when modern waterworks and sewerage scheme for Benares were delayed by the Municipal Board, community organizations petitioned before the Viceroy, “bemoaning the unsanitary condition of the city” and suggested the construction of a large subsoil canal to drain urban filth and discharge at a designated spot to the river. When the municipality did not take up the project on grounds of huge costs, the local *Maharaj* and an association of the local gentry embarked on a crowd-funding initiative. The municipal authorities finally considered the proposal given its multiple benefits for health, hygiene, and the protection of sacrality for the River Goddess Ganges. However, communities downstream, the Sanitary Commissioner of Bengal, and officials of the Public Health Society of Calcutta opposed this project leading to a long and intense debate between the governments of the Northern Provinces and that of the Bengal Regency. Sharan shows how official negotiations around public works had to consider colonial municipal governance, technology, and Hindu religion. Governing infrastructure on rivers (especially the Ganges) in colonial India was delicate and had to accommodate and navigate between “two distinct senses of purity and pollution, one drawing upon sacred texts and ritual performances and the other on the science of sanitation” (Sharan 2017: 214).

Ranjan Chakrabarti (2015) further elaborates on the contestations between the colonial episteme on and the Hindu ritualistic ideas of purity. Reflecting on the transplantation of western technologies and associated sanitation governance in Calcutta, he describes the modernist-capitalist production of urban space. The article depicts apathy of the Hindu ‘natives’ towards the combined sewage and drainage system that was built to discharge both rainfall and sewage from Calcutta to the saltwater wetlands while there was apprehension for the purification of the Hooghly River, a distributary of the Ganges. Chakrabarty (2015: 193) explains this disjuncture with the fact that “Within the traditional Hindu worldview, words such as pollution and purity had sacred and ritualistic connotations, while to the sanitarian regime, these had secular, physical and moral meanings”.

More specifically addressing environmental policy formulation, Janine Wilhelm’s (2016) book on sewerage technologies along the sacred Ganges traces the origins of contemporary river pollution to the late nineteenth and early twentieth centuries. Investigating the introduction of sewerage systems in Kanpur, Allahabad, Benares, Lucknow, Agra, and Calcutta, she analyses different debates around the discharge of (un)treated sewage into the Ganges, involving officials at different administrative levels and the Indian public, including different interest groups such as industrial and agricultural lobbies, and Hindu religious groups. Based on the colonial-capitalist calculus of rule, officials sought the cheapest available sewerage technologies that caused extensive river pollution. They constructed waterborne sewerage

systems and discharged untreated sewage into rivers without investing in purification facilities such as sewage farms. Wilhelm not only “offers the first extensive historical study on the evolution of colonial river pollution policy and its impact on the future of India’s rivers” but also “clearly shows that individual debates around sewage disposal and river pollution in cities…must not be treated as isolated discourses, but as components within an overarching process of policy formation” (30).

Moving beyond the focus on urban environmental governance through infrastructure provision, Debjani Bhattacharyya (2018) provides a nuanced, politicized analysis of the reclamation of colonial Calcutta from the tidal swamp between the second half of the eighteenth century and early twentieth century. She describes how dynamic geographies of fluvial land(water)scapes shaped colonial legal machinations and, in turn, got shaped by these. Her book *Empire and Ecology* is the story of governing and fixing the ‘fluidscape’ (Mukherjee et al 2021) through the implementation of infrastructural schemes carried out by various urban bodies, such as the Mayor’s Court, the Privy Council, the Justices of Peace, the Lottery Committee, and private individuals in the eighteenth century, and by the emerging town-planning and municipal bodies in the nineteenth century. In the fixed and consolidated landscape of the twentieth century, when memories of the soaking ecology of Calcutta had eclipsed, new actors including hoarders, planners and land developers flourished in an increasingly financialized and intrusive urban property market “muddying the lines between older and newer authorities and modes of governance” (Bhattacharyya 2018: 40).

In sum, the above-cited UEH studies provide important insights on the role of central and local institutions in decision-making regarding the construction and management of urban infrastructure and land, but they largely fail to provide nuanced interpretations of the choreographies of power and conflict, collaborations, and negotiations between plural actors that also play out in operational dynamics and the everyday impacts of urban utilities. This can be considered as a limitation of UEH research, the major reason being its dependence on archival sources. Furthermore, with very few exceptions such as Broich’s research, environmental historians have not been able to establish links between the local governance of colonial cities in South Asia and the global economy and polity. Therefore, we argue that deeper and thicker narratives of urban environmental governance can be produced when historical analyses are informed by and complemented with critical social-science approaches, such as (urban) political ecology, that use and apply an array of ethnographic methods and thus allow archival data to be triangulated.

III. Urban Political Ecologies: Power, Politics and Place

Similar to South Asian UEH, UPE scholarship has emphasized urban networks and utilities, particularly piped water infrastructures. Like its Western counterpart, South Asian UPE scholarship has studied contestations surrounding uneven urban geographies – bringing to the limelight social hierarchies and power asymmetries that underlie environmental governance in cities and beyond (Anand 2011, 2017; Gandy 2008; Ranganathan 2014).

In South Asian scholarship, first traces of UPE thinking were evident in critical urban studies disapproving of urban ecological visions promoted by neoliberal policy in India during the early 1990s that adhered to the Sustainable City Programme. Researchers critiqued the conservationist-beautification ethic for urban India, as it was “set against the backdrop of an increasingly globalised world in which the North dominates the South in economic terms” (Mahadevia, 2001: 243). While Darshini Mahadevia (2001) denounces the

concept of ‘sustainable city’ and considered its application to India as part of a larger ‘green’-capitalist scheme, Arabindoo (2005) and Baviskar (2003) introduce a class critique of urban environmental governance in India, revealing an alliance between the urban middle classes and the state for the protection of the environment against the urban poor and at the cost of excluding their needs, voices and aspirations. Amita Baviskar’s work on Delhi (2003) exposes these practices of the middle and upper classes as ‘bourgeois environmentalism’ and shows how these classes use Public Interest Litigations (PIL) to impose their urban ecological imaginaries.

However, more recent work has challenged the view of the urban poor as hapless victims who are entirely excluded from governing urban environments by pointing to South Asia’s diverse, complex and multifaceted urban natures. Poststructuralist UPE researchers, in particular, have probed into complex processes of interactions and mediations among actors and thus challenged linear expositions of power hierarchies between the state and local communities. For example, Alex Follmann (2016) studies multiple challenges of governing the Yamuna River in Delhi and explores the role of non-state actors, especially environmental non-governmental organizations (ENGOs). Acknowledging their critical responsibilities as watchdogs and exploring their day-to-day practices, actions, discursive strategies, and networks, Follmann reveals complex their interactions with different tiers of government, political parties, and international agencies that represent “formal and informal negotiation processes between state and non-state actors that take place beyond the arenas of representative democracy” (2). In these processes, he sees the emergence of a new, expanded form of urban environmental governance in India in the 1990s and early 2000s. The author concludes that though ENGOs are significant actors in terms of “collecting, disseminating, (re)interpreting and (re)producing environmental knowledge” (15) and fostering democratic control over contested riverscapes, they find it difficult to negotiate with urban planners and policy circles outside the spheres of the media and the judiciary. Nevertheless, Follmann’s case study challenges the notion of ‘bourgeois environmentalism’ (Baviskar 2003) by showing the possibility and reality of environmental activism across social classes in Indian metropolitan cities. Anchored in concern for long-term ecological viability and social justice, ENGO-induced activism around riverscapes also unveils the limits of sectoral approaches in governing urban nature and questions land-water, urban-rural, city dweller-farmer dichotomies.

In similar vein, Amit Jain’s (2018) case study on the Kudasiya Ghat at the banks of the Yamuna in Delhi complicates the dualisms between domination and resistance, and between the state and the ‘urban poor’ or commoners. Beyond challenges caused by state-led encroachments on the ghat, Jain studies everyday forms of negotiations between the ‘legal’ and ‘illegal’ via acts of bribing, formations of temporary houses and performance of rituals, indicating (re)generation of the bank during the immediate post-demolition-displacement period.

Follmann’s and Jain’s studies exemplify that South Asian UPE has progressed and expanded from an overarching emphasis on networked infrastructures (most specifically piped water) to non-networked or “other urban waters” (Cornea et al. 2016). Furthermore, it expanded to explorations of wastewater (Karpouzoglou and Zimmer 2016), solid waste (Cornea 2017; Sharma and Parthasaraty 2018), air pollution (Véron 2006), urban parks (Sen and Pattanaik 2018, Zimmer et al. 2017), and beautification (Follmann 2015; Bose 2013, 2015). The most important contribution of recent UPE is its focus on micro-politics; it unveils pluriversal possibilities in the world of governance, exposing us to both challenges and opportunities in governing large, diverse, complex and multi-layered South Asian urban environments.

The poststructuralist turn has implied UPE's orientation toward ethnographies of everyday governance, that is, "the plurality of governance actors, their practices, rationales, normative orientations, interests and imaginaries as well as their relative and contextual power that shape local (urban) spaces and environments as well as access to (urban) resources, amenities, and services" (Cornea et al. 2017: 2). Breaking with the state versus civil society/local community binary and the view of power in the frame of simple domination and subordination, UPE unpacks how multiple actors negotiate, adapt, bargain, hybridize and formulate norms and regulations that are not (always) thrust upon them but evolve across complex (and sometimes lengthy) processes of mediation. In this way, UPE enables the analysis of the myriad ways through which rules and policies are framed, debated, modified, managed, and controlled. It even pays attention to how a plurality of norms is (re)produced as "…negotiations between actors are not only about means and ends but also about the imaginaries, set of norms, or normative registers, to apply in a given situation" (Cornea et al. 2017: 4).

Unlike UEH, South Asian UPE scholarship has used governance as an analytic concept for the study of the relationship between state and other non-state actors in the era of the neoliberalization of the political economy and of nature in India. For example, Cornea et al. (2016) shows how the everyday governance of the 'pondscape' in the small town of Bardhaman in West Bengal is largely controlled by neighbourhood clubs and local political party cadres while formal property rights hardly matter. These actors apply registers of social values, but also unspecified threats of violence, in structuring access to particular ponds. By shedding light on public-private partnerships for water supply in Bangalore, Gopakumar (2014) examines the "networks of counter-experimentation" and argues that these alternative utility provisions "simultaneously forward the marketization of water-supply services while inadvertently providing opportunities for residents, local associations and activists," poignantly exposing "governance failures" in meeting drinking water needs of expanding cities in the neoliberal era (393). Ranganathan's (2014) specific focus on 'water mafias' as informal sovereigns and its collusive connection with local state agents in supplying drinking water (from illegally tapped aquifers) to non-networked informal urban settlement unfurls the world of everyday governance and public authority "conjugated with the idiom of the state" (102).

South Asian UPE studies on everyday governance often have often referred to the framework of 'situated urban political ecology' (SUPE) (Lawhon et al. 2014) SUPE points to the need for a highly contextualized analysis of power relations and urban environments and is critical of the unreflective application of theories and concepts from the Global North to the Global South. Indeed, Indian case studies unpack specific trajectories of urban nature and provide place-based descriptions and political specificities (see the articles in the special issue of the *South Asia Multidisciplinary Academic Journal* edited by Zimmer and Cornea (2016)). For example, using the Lefebvrian concept of space production, Rao Dhanaka (2016) reveals the conflict between heterogenous slum communities and other actors in the context of Bangalore's urban housing (resettlement) projects for lower income groups. She demonstrates how the constant manipulations and negotiations around these projects lead to complex layers and fractures in governmentality. Along similar lines, Hagn (2016) discusses the roles played by political leaders and 'fixers' in mobilizing community participation in the city of Puri in Orissa. The study shows how vote banks are created and consolidated around the central government 'Basic Services to the Urban Poor' programme through an array of tactics.

Apart from SUPE's attention to place-specific political actors, power constellation and micropolitics, UPE has a long tradition to consider the influence of specific biophysical dynamics on environmental

governance, a factor that is hardly recognized by UEH. The different resource characteristics of water and air, for example, can shape interest, interest groups, imaginaries, and thus politics (Véron 2006, Zimmer et al. 2020). More radically, post-humanist UPE considers non-humans, including animals, infrastructure, or algorithms, as actors (Gabriel 2014). Blurring the boundaries between people and infrastructure, for example, Yaffa Truelove portrays hybrid state arrangements in water provisions in Delhi, where lower-class women having to fetch water from afar replace piped water infrastructure. While exploring intra-settlement differences in governance and practice, she examines the "micropolitics of water governance in unevenly shaping [gendered] bodies, spaces and incongruent urban environments" (Truelove 2016: 19). Apart from extending UPE to accommodate embodiments, her analysis overcomes the binaries between formal and informal water governance in historically evolved 'legal' and 'illegal' settlements. For instance, even formal middle and affluent classes depend on non-formal 'extractive' technologies to access water due to erratic access and unreliable functioning of piped networks.

A further addition to South Asian UEH, which focuses on metropolitan areas, is South Asian UPE's increased attention to small towns. For example, Véron (2010) lays out a research programme on India's small cities that face distinct challenges of environmental governance enhanced by limited political clout, technical and financial capacities. The ensuing research in Gujarat and West Bengal finds complex relations between municipal authorities and the state government and a generally stronger role of clubs, political parties, and business association as compared to the importance of ENGOs in India's metropoles (Cornea et al. 2016; Zimmer et al. 2020). Furthermore, Müller and Dame's (2016) explorations of the small city of Leh (Ladakh) tease out an "arena of negotiations" (11) among a web of actors, including state officials, the Hill Council, NGOs, religious groups, and local communities. Using a historical perspective, the authors examine the debate of tradition (cultural heritage) versus modernity (market-oriented development) in the context of an urban beautification scheme that unveils clashing aspirations and agendas between national and local leaders. The authors situate these debates within the larger context of the struggle for Ladakh's autonomy for which 'beautification' adds a layer to the already recalcitrant relationship between the centre and regional governing bodies. The article also depicts how the socio-natural (re)production of urban environment and governance frameworks are shaped by strong imaginaries evolved across temporal, political and local religious-cultural dynamics.

To sum up, UPE scholarship has pointed to links between local environmental governance and global processes (of neoliberalization). More recent UPE scholarship in South Asia has examined urban environmental governance through ethnographic methods and unveiled complex processes of everyday politics and nonlinear power relations between multiple actors in situated contexts. It moved beyond the study of metropolitan areas and challenges mainstream governance concepts by pointing to the role of resource characteristics and non-human agents.

IV. Historical Urban Political Ecology (HUPE): A Cross-Fertilized Framework to Study Urban Environmental Governance

In critical South Asian urban ecological social science, there's an emerging realization of the importance to integrate methods and methodological approaches to develop more comprehensive and nuanced understandings of the (un)makings of urban nature across shifting political trajectories. This is not an altogether new venture in the global urban political ecological scholarship. The importance of complementing ethnography-based empirical investigations with archival knowledge was recognized in earlier traditions in political ecology where scholars have warned about the limits of historical research

on one hand (Watts 2013), and on the other, attested how historical investigations remain imperative in guarding against 'apolitical' analyses (Davis 2015).

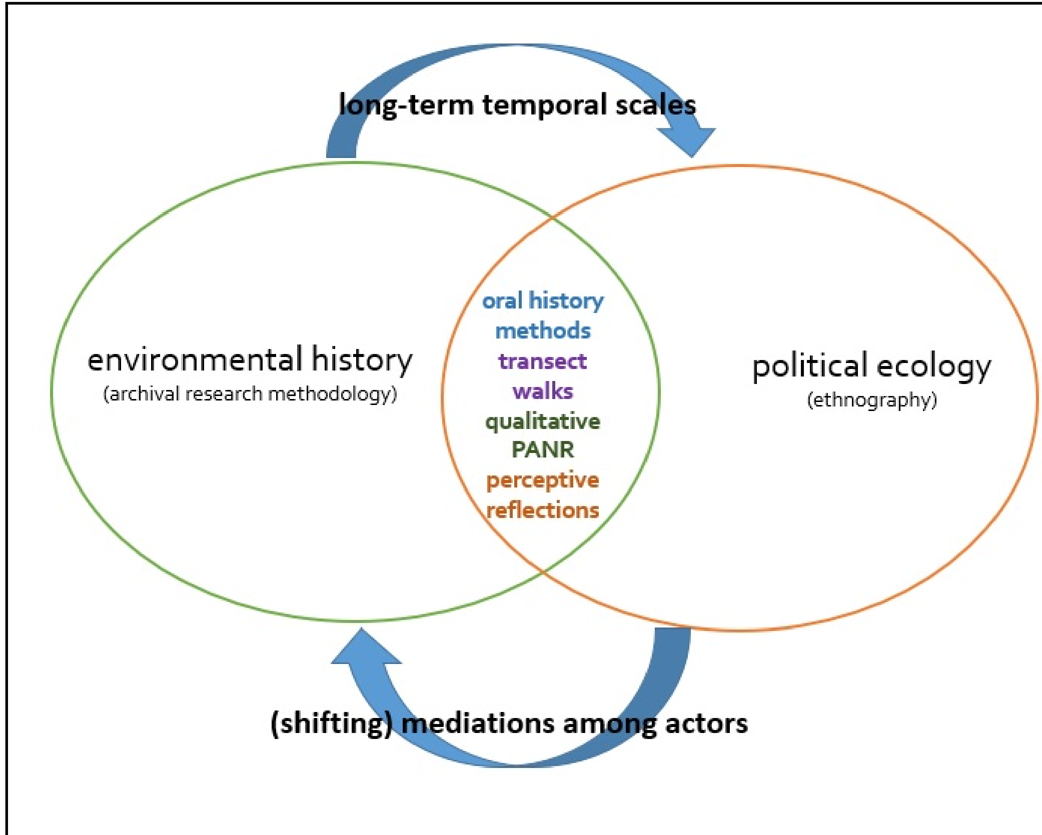
In classic UPE, which conceptualizes cities as socio-nature, the relational politics of environmental infrastructure has been historicized, particularly along the colonial and the neoliberal era (Gandy 2008; Ranganathan 2015). More poststructuralist UPE also makes the case for a "more temporally oriented UPE" (Zimmer and Cornea 2016: 9). For example, Truelove (2016) recognizes urban environmental assemblages as dynamic and fluid, thus also situated in time. Similarly, Müller and Dame (2016) pay attention to the temporal shifts in cultural imaginaries that have influenced conservation and beautification in Leh, which through time has transformed from an international commercial centre to a national periphery and where romantic-eulogistic imaginaries of former life in the mountainous landscape are reproduced.

South Asian UEH, too, has boldly asserted the colonial-contemporary connect through case studies, showing how post-Independence pollution, sewage and scarcity in accessing drinking water need to be contextualized within colonial policies of urban ecological infrastructural governance during the nineteenth and twentieth centuries (Mann 2007; Sharan 2011, 2017; Wilhelm 2016).

Through the formulation of a 'historical urban political ecology' (HUPE) framework, Jenia Mukherjee (2020) foregrounds the importance of the application of a historical lens in political ecological analyses and vice-versa. By coupling UEH and UPE approaches invisible 'storylines' (Moore 2007) [6] in the manipulation of urban nature along long-term and across large spatio-temporal scales can be made visible. In HUPE, history provides long-term temporality to ecological processes and governance scenarios in (micro)political settings involving multiple (more-than-human) actors and mediations among them. The historical research enables explorations of shifting priorities and choices among multiple stakeholders determining urban environmental trajectories across dynamic political-economic imperatives in different eras. HUPE is nuanced, comprehensive and robust as it allows comprehending "urban ecological transitions by triangulating information from multiple sources and stories narrated by multiple actors at different points in history" (Mukherjee 2022: 34-35). It exposes researchers to competing claims and narratives shaping environmental governance, unpacking the relationship between cities, their environmental infrastructures and multiple institutional mechanisms and arrangements, transforming across changing temporal scales (Illustration 1).

[6] "There are dominant, counter, and even suppressed story lines in each city that demand our attention" (Moore 2007, p. 23).

Illustration 1: The HUPE Framework



Source: Mukherjee 2022: 36

Box 1: The Kolkata Case Study on 'Blue Infrastructures'

While exploring contemporary challenges faced by Kolkata's canal and wetland systems caused by rapid urbanization and associated real estate speculation, Mukherjee (2020) used the backcasting methodology of looking into archives. Through this case study, she formulated, empirically informed and applied the HUPE framework to address the debate among scientific communities regarding risks and resilience encountered by, and predicted for, the delta city of Kolkata, located on the northern part of the vast and expansive Sundarbans. Is Kolkata environmentally vulnerable or ecologically subsidized? While historian Bhattacharyya (2018) exposes colonial property-making initiatives through the reclamation of the city from the marshes and connect the climate vulnerability of present-day Kolkata to the colonial-capitalist efforts of reclamation, for the sanitation engineer Dhrubajyoti Ghosh, Kolkata is an exemplary example of an ecologically subsidized cityscape that benefits from the optimal use of its ecosystem base and traditional knowledge inherited from its origins. Although these opinions strongly diverge, Bhattacharyya and Ghosh converge by opposing the state (colonial and contemporary) to local communities, including farmers and fishers drawing livelihoods from agrarian lands and wetlands in the eastern periphery of Kolkata.

Using HUPE, i.e., by triangulating information and inputs from multiple sources and stories narrated by multiple actors at different points and nodes in history, Mukherjee (2020) maps interests and aspirations among different agencies and stakeholders, including government actors (Municipal Corporation, Departments of Fisheries, Irrigation and Waterways), NGOs, local organizations (such as Fish Producers' Association, Wastewater User Committees), and local communities. In her research over more than 15 years, she finds collaborating interests and aspirations that are pivotal in ensuring the functioning and survival of the city with no separate constructed sewage treatment plant till date. The East Kolkata Wetlands recycle 750 million litres of waste and produce 22 tonnes of fish, and 150 tonnes of vegetables per day. The entire system evolved as a planned network across collaborations between different sectors and agencies, optimizing upon the possibilities of municipal wastewater governance, connecting the city with her eastern marshes through manipulations of natural ecologies along intricate network of primary and inlet canals. Clashes among governing lobbies and institutions have been common as evident from colonial gazettes, reports and correspondence, and contemporary key informant interviews conducted with municipal officials, engineers, and executives. The distribution of wastewater has been one of the major bones of contention between the Kolkata Municipal Corporation, I&WD, and the local fishers in recent times. Yet, HUPE investigations of the institutional mechanism in the evolution and functioning of Kolkata's organic effluent treatment design demonstrate strong attributes of municipal-local interactive governance that can be harnessed at its best towards effective urban infrastructural and governance pathways. Beyond "linear choreographies of power equations…HUPE conveys the 'plural' by exemplifying collaborations, compulsions and contingencies that mediate urban ecologies" (Mukherjee 2022: 32).

V. Conclusion

In this chapter, we have discussed the significance of engaging with long-term urban ecological trajectories for the search of sustainability in South Asian cities and their hinterland. UEH usefully goes beyond the dominant discourses separating the urban from the rural, and the city from nature. It explores historical layers of environmental governance by revealing the context, time and culture that operated in specific periods. By reading and deciphering the urban (environmental) palimpsests across large time-space scales, as well as considering plural imaginaries of the urban environment, UEH contributes to contemporary and future theorisations and creation of possibilities of environmental governance.

However, UEH is imbricated with some limits, primarily emanating from an overarching reliance on archival sources. Although there is scope for triangulation within historical research (e.g., comparing and contrasting different archives), the complex and multifaceted processes of South Asian urban environmental governance involving plural actors seem to require ethnographic study, too, for example from UPE. Therefore, this chapter has provided a detailed overview of the South Asian literature of both UEH and UPE, demonstrating how these two fields can complement and inform each other. The combination of UEH and UPE usefully reveals the role of religion, caste, class, ethnicity, as well as the choreographies of power and embodiments, in managing and governing urban ecologies of diverse and plural urban landscapes in South Asia.

Finally, we have presented the HUPE framework, a cross between UEH and UPE, to unravel complex relationships among multiple actors across state and non-state agencies that shape, and get shaped, by urban environments evolving along dynamic political-economic conjectures. HUPE unpacks the politics and politicization of environmental governance, an element often missed or sidestepped in conventional climate change and urban sustainability research and discourse. HUPE allows to capture the diverse meaning and significance of the 'urban', 'infrastructure', 'environment', 'governance', as well as their encounters, in specific contexts that might be unique or resonate across spaces and times. For example, our comparative HUPE study of the urban 'deltascapes' of Arles (in the French Rhone Delta) and of Kolkata (in the Indian Ganges Delta) points to connected global processes in particular historical periods that influence river and flood management (Mukherjee et al. 2021). While South Asian UEH and UPE have been inspired significantly by research in the Global West, we argue that historians and political ecologists everywhere can learn key lessons from cross-fertilized approaches like HUPE that have the potential to blur North-South binaries and to contribute to more comprehensive, temporally-dynamic and politicized understandings of global urban environmental governance that is sensitive to local specificities and complexities.

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