Hixon Center for Urban Ecology Fellowship 2020

Final Report (April 2021)

being a dissertation research grant application drawing

extensively on pre-dissertation work carried out in previous summers

with generous support from the Hixon Center for Urban Ecology at Yale University

Lav Kanoi

Dissertation Advisor(s): Michael R. Dove, K. Sivaramakrishnan

_____

Lav Kanoi, Research Fellow

_____

Professor Michael R. Dove, Faculty Advisor

Background and Introduction

Delhi, an expanding megacity,[1] is amongst the world's largest urban agglomerations with a population of about 20 million in 2011 projected to be 40 million by 2030. Yet, even presently, the Delhi government struggles to address an estimated deficit of 200 million gallons a day in the current water needs of the region. Further, a much-publicized Composite Water Management Index, prepared by India's national-level policy commission (NITI 2018), had declared that Delhi, amongst twenty-one Indian cities, would run out of groundwater by 2020. Moreover, On August 15th, 2019, the Prime Minister of India issued a clarion call from the historic premises of the Red Fort in Delhi: to take measures against the impending water crisis, the Jal Jeevan (or 'water life') Mission, as it is called, was announced signalling renewed efforts at water harvesting and waterbody revival). Water (or the imminent lack of it) was suddenly in the news, with cities such as Bengaluru, Chennai or Delhi in India, and Cape Town, abroad, apparently discovering that this taken-for-granted element could not be taken for granted much longer. Water was now not merely a problem in distant villages that required the developmentalist state to make interventions, it was now a burgeoning threat within the serviced city as well. Against this background of the burgeoning 'water crisis', itself related to discourses of environmental crises and their mobilizations in urban contexts (cf. Masco 2017; Santa Cruz 2014; Swyngedouw 2004), my project seeks to study the changing waterscape of India's thirsty capital city.

For my dissertation research, combining urban ethnography with perspectives from the environmental humanities and sciences, I will ask: how are water and waterbodies in Delhi managed, or not, to service the city's biophysical needs as well as to nourish its cultural aspirations? My research will examine Delhi's changing 'waterscape', by which I mean the waterbodies and water systems, natural and built, that are entangled in contemporary struggles over water resources, and embedded in the ecological, cultural and historical landscape of settlement and rule in India's capital city. I will explore how people relate to water, waterbodies, and water systems, as resource and heritage, through an ethnographic study of waterbody rejuvenation and other water-access innovations being made by the Delhi

---

[1] As per the United Nations (2019) World Urbanization Prospects Report for the year 2018, a megacity is defined as a city with more than 10 million inhabitants. It may also be clarified that the National Capital Region (NCR) of Delhi has an even larger population than 20 million

Government, NGOs, and individuals, as well as resident associations and urban conservationists. The project will therefore investigate how the city's pragmatic concerns of water availability and distribution are entangled with its natural-cultural heritage, and attempt to reveal and understand water as ecological relations, cultural politics, and contested natural resource in the making of urban places and lives in India.

Water, however, is about more than just water. To meet the aforementioned challenges in water resources, the Delhi government has begun to formulate waterbody 'rejuvenation' initiatives such as the resuscitation of the dried-up Satpula lake. The Satpula ('seven-arched bridge'), after which the lake-area around it is named, is itself a 700-year-old historical structure. Consequently, the rejuvenation of the lake entails a reworking of the contemporary landscape and of the historical structure embedded in it. In conversation with senior Delhi government officials, I learnt that over two-hundred such state-driven waterbody-rejuvenation initiatives have been planned for the city. Simultaneously, I witnessed new devices, such as payment-based 'water ATMs' (drinking-water vending machines)-- expressions of modern technocratic visions-- also seeking to address the city's contemporary water needs. These devices contend with older, perhaps continuing, visions and practices of water management that are embodied in the historical built environment and heritage of the city. My project will, thus, investigate the emerging interplay between these forces and so combine the study of the physical and managerial dimensions of water resources with the historical-cultural and lived dimensions of the waterscape.

Here, it is important to emphasize that Delhi offers a privileged case for study as much due to reasons of geography as history. Delhi is both a riverbank city and an arid city. While much of the city is bordered by the Yamuna river on its east, the very end of the Aravalli hills also cuts through the city, running from south-west to north-east. Consequently, while the eastern parts of the city slip into the floodplains of the river, the western fringes of the city fall into an arid zone where the influences of the deserts of Rajasthan are palpable. This varied landscape ecology reveals specific historical signatures over the last thousand years. Different polities located themselves across the city's expanse, from floodplain to arid zone, creating waterbodies, water management systems, and legacies of urban water leading to socio-cultural and economic flourishing or contestation.

View from the top of the Satpula, overlooking the dry lake bed.
Photograph taken by author.

Thus, a project that seeks to understand Delhi's changing waterscape--and the varied meanings that a variety of Delhi residents make of water and waterbodies--requires studying a wide range of representative sites and actors. Accordingly, my research-sites are spread across the cityscape and bring together different geographic features, demographic patterns, economic disparities, and historical endowments of the city. The project centers different kinds of Delhi's waterbodies that are the focus of rejuvenation efforts by the state and NGOs, as well as resident welfare associations and individuals. These waterbodies include: the Satpula lake (a dry designated lake area), the Hauz-i-Shamsi (a formerly rejuvenated mediaeval water-tank) and the Hauz Khas (a successfully rejuvenated lake), the Agrasen ki Baoli (a dry ancient stepwell), and the Barapullah drain (an under-repair drain system). Other actors on the scene include water ATMs, perched at the blurred boundary between public and private enterprises that are struggling to slake the thirst of the growing city.

Picture of the front of the Satpula from an elevated 'viewpoint' with water buffaloes and a small rain puddle in the foreground. Photograph taken by author.

Therefore, in order to answer my leading research question articulated above, I ask: (a) How is water managed, and for whom, in and through waterbody rejuvenation projects? (b) How, through questions of sustainability, equity, and heritage do these projects engage with environmental conservation, distributive justice, and historical legacies in the city? (c) What visions of the city are articulated by different policy makers, citizen-activists, and local residents to justify or resist water-management initiatives at the sites of these waterbodies? (d) How do smaller water initiatives (payment-based water ATMs and free waterpots) work with or against these larger state-driven efforts?

To address these questions, my research on urban waterscapes, which may contain but are not limited to water-delivery systems or contestations over access that occupy studies of canals, pipes and leakages (cf. Anand 2017; Björkman 2015), will draw on environmental and urban anthropology and offer a contribution to the anthropology of water. It will focus on large (lakes, tanks, stepwells, and drains) and small (water ATMs, free waterpots) interventions currently being carried out by different groups and combinations of institutional

and individual actors as they attempt to nourish and remake, in various ways and to different degrees, India's thirsty capital city and its water-related needs.

Literature Review

Urban Anthropology: While the organization of cities has been an ancient concern (e.g. Kautilya 1992), onwards from Marxist critiques of urban spatial form (Harvey 2009; Lefebvre 1991), cities have been studied from the point of view of hubs (Siu et al. 2015; Castells 1993) that link together worlds in the past (Chaffee 2008; Chaudhuri 1985) and present (Hannerz 1996; Sassen 1991). The world city hypothesis (Roy and Ong 2011) talks about cities as spaces of flow (Appadurai 1996), which are being linked with other worlds through sports (Kelly 2019; Horne and Manzenreiter 2012), colonization (Mehrotra 2008), and varied forms of culture including prostitution (Hershatter 1989) and aesthetics (Ghertner 2011). Delhi is an aspiring world city with many different claimants, bourgeois or otherwise, to its varied spaces (cf. Baviskar 2020). The modern city is among other things, an intensely contested site of displacement (Siu 2007), waste and inequality (Gidwani 2013) and state power and its failures (Schwenkel 2015). Moreover, the city as modernist space has been examined in context of emerging economies (Holston 1989), such that modernization becomes synonymous with westernization (Kaika 2005). Unfortunately, this bias persists in urban discourses today (Ghertner 2011). However, some studies of South Asian cities have highlighted the religious and sacred dimensions of the urban (Taneja 2018; Levy 1990), where religiosity and consumerism, past and present, and rich and poor are all entangled together (Srinivas 2018; Srivastava 2014). As state and citizens work with water in Delhi, this project draws on such studies in urban anthropology to ask how an aspirational world-city envisions and enacts its developmentalist priorities while contending with, or incorporating, its eco-cultural or built heritage (cf. Herzfeld 2016), and explore how policymakers, citizen-activists, and local residents justify or resist water-related initiatives by appealing to different visions of their city.

Environmental Anthropology & Urban Nature: Although the city is no longer undertheorized in anthropology (cf. Low 1996) and its role in shaping the landscape surrounding it has been studied (Cronon 1991; Williams 1973), new approaches in environmental anthropology have moved the field towards seeing the city itself as a site for

socio-ecological critique (Baviskar 2020) with its own distinctive 'ecologies of urbanism' (Rademacher and Sivaramakrishnan 2017; 2013). Drawing from earlier studies (Blaikie 1985), scholars have written about urban political ecology (Rademacher 2015; Heynen 2014) and its intersections with climate change (Bulkeley 2010), feminism (Heynen 2018), and posthumanism (Barua and Sinha 2017), and attended to the 'friction' of global idioms of environmentalisms in urban contexts (Choy 2011; Tsing 2005). From the point of view of water, some have written about the infrastructural failures and leakages (Anand 2017; Björkman 2015), and foregrounded urban water systems as a form of socio-nature (Swyngedouw 2004; Latour 1993). My project, inspired by scholarship on the multiple forms of nature in the city -- biophysical, cultural, and political (Rademacher and Sivaramakrishnan 2017) -- will draw from this emerging literature by looking at the social dimensions of ecological interventions in urban contexts in Delhi.

Further, while political economy and environment scholars have written about how new waterworks, tube-wells and water tankers attempt to meet the city's current water needs (Narain 2012; Singh 2006), this project will also draw from historians of Delhi who have written about water management considerations in the building and rebuilding of the city during the Mughal (Blake 1992; Naqvi 1992) and colonial periods (Sharan 2014; Mann 2007 I will therefore draw attention to the lives and afterlives of Delhi's heritage waterbodies to explore how modern state-driven waterbody rejuvenation schemes are enacted in spite or perhaps because of historical, environmental, and societal entanglements within the cityscape, and answer how water is managed, and for whom, in this thirsty city.

Anthropology of Water: While water has become an urgent theme in current anthropology (Orlove and Caton 2010), much of the existing literature is oriented towards politics and infrastructure (Anand 2017; Björkman 2015; Ioris 2015; Mehta 2005). These include studies on the privatization of water (Bakker 2005; Swyngedouw 2004), and its commodification and trade across the globe in packaged form (Kaplan 2007). Scholars have examined the everyday politics of water and the production of power at the level of the nation-state (Barnes 2014) as well as at the level of the city municipality (Anand 2015; Kaika 2005). Others have shown how irrigation is linked to an articulation of local authority and state power (Mosse 2003), while some have sought to elaborate on the role of community management of water resources as an alternate form of social power (Lansing 2007). Water, then, is a site for state and social power (cf. Li 2007; Escobar 1995), and where there is

power there is also resistance (Orlove 2002). My research will draw from, and build on, these approaches to water, while also drawing inspiration from the work of scholars who have explored the varied cultural meanings of water (Strang 2004), tracing its abstract form (Linton 2010) and material urban configurations (Gandy 2014), as well as the 'devices' that bureaucratic institutions use to do their work (Ballestero 2019). Recent scholarly treatment of the contemporary waterscape of Delhi have dealt with inequality and access to water in slums and irregular colonies (Truelove 2016). Recent graphic fiction in English has also explored neighborhood politics of water (Banerjee 2016), although other modern fiction and popular non-fiction on Delhi in Hindi and English seem to barely acknowledge this essential element (व्यास 2016; Chatterjee 2013). This project will bring together these different bodies of writing, while also taking inspiration from Baviskar's cultural politics of waterscapes (Baviskar 2007) and from the aesthetic dimensions of representational waterscapes (Ray and Maddipati 2020).

Further, by examining how meanings and materiality change (Wescoat 2020; Manning 2012) in larger (state-driven waterbody rejuvenation) and smaller (free waterpots or payment-based water ATMs) initiatives, and what ontologies they embody (cf. Kockelman 2013), this project will explore how different ideas about urban ecology, social justice, and cultural heritage are presumed, preferred, or performed in relation to water, and so innovate a distinctive approach to the study of water in the city.

Research Methods (Plan A)

To address my primary and secondary research questions in the best-case scenario, I will carry out ethnographic research with government officials, NGOs and citizen-scientists, resident welfare associations and individuals, and complement it with archival work on Delhi's rich water histories, and analyses of media and literary representations of select water initiatives being undertaken by the government, NGOs and individuals.

My research design is premised on a careful selection of representative sites (listed in Q1 above) from across Delhi. Taking some inspiration from Marcus's multi-sited ethnography (Marcus 1998), albeit in a bounded region, my site-selection takes into account both the ecological specificities of these waterbodies, and their different historical trajectories, as well as present social-stratification that might highlight "chains, paths, threads, conjunctions..."

(Marcus 1998:90) in the experience of water across Delhi's varied cityscape. For example, Khirki village adjacent to the dry Satpula lake represents one kind of poor neighborhood, the residences around Hauz-i-Shamsi in Mehrauli represent a recently regularized settlement, the settlement around Hauz-Khas lake represents a prosperous market-district, the residential Defence Colony around Barapullah drain represents an elite neighborhood, and so on. Further, different combinations of institutional and individual actors interact with these sites, and my project seeks to take into account these various permutations in its research design to understand Delhi's changing waterscape.

To explore how water is managed and for whom through waterbody rejuvenation intervention, I will carry out participant-observation and semi-structured interviews with government officials at the Delhi Jal Board, the NITI Ayog and Delhi Urban Arts Commission over a period of 3-4 months. I have already made contact with officials here, and I hope to participate in meetings as an observer, travel to urban waterbodies they are in charge of maintaining (such as Agrasen ki Baoli or the Barapullah Drain), witness tendering and bidding processes, and attend review and monitoring discussions. I expect this to bring into view how government offices differentially manage, assess, represent, and value waterbodies and water systems and their environmental and historical entanglements at a regional level. In addition, I will hope to ask them questions such as what constitutes an urban lake (for which there is no adequate legal definition at present), what they think rejuvenation entails, and what they envision the role of such (dry or filled, new or ancient) waterbodies to be.

Secondly, I will participate-observe NGOs and thinktanks such as FORCE, the Centre for Science and Environment, and INTACH as they variously implement (such as at the Hauz Khas lake rejuvenation program) or assess rejuvenation projects over another period of 3-4 months. I will observe how their preferences and presumptions are different from government actors, and how their working-relations with their partners may change over time. I will also follow them on heritage walks and nature walks, attend conferences with them, sit into their review meetings, attend to their interactions in government offices and at the sites of the urban waterbodies, and volunteer with them to conceptualize and visualize their projects. My research with them will counterpoint the government's vision(s) of who is served by and responsible for, water and waterbodies, and by extension the city itself.

Thirdly, I will also participate-observe and interview residents of housing settlements around these waterbodies and others who visit them such as tourists, watchmen, journalists and architects, as they go about their daily routines and also during moments of rupture such as citizen-demonstrations or religious-festivals (such as at the Hauz-i-Shamsi) over a third period of 3-4 months. I will carefully observe how they interact with water and waterbodies through state and non-state infrastructure, some produced by themselves (such as free waterpots) and some produced by private companies (such as water ATMs). I will ask them about their views on the heritage and histories of the historical waterbodies around them, and what value they may or may not see in such structures, and equally observe if their behaviors corroborate their beliefs. I will also interview private companies (Swajal and Janajal) who make available water ATMs in these locations to ask them about their presumptions and purposes behind their initiatives.

My interview questions will draw on my experiences as a participant-observer with government officials, NGO representatives, urban planners, scientists, citizen activists, security guards etc. as they interact with each other at and through these key sites as well as at other locations, whether they be seats of bureaucratic power (cf. Pierce 1995; Nader 1972), centers of calculation (cf. Latour 1986), national conferences (cf. Barnes 2014), or even social media (cf. Danley 2018; Postill and Pink 2012).

This ethnographic work will be supplemented by analyses of historical material in archives and personal collections over a period of 3 months. In addition to government institutions in India (such as the Delhi State Archives or the National Archives) and abroad (in particular, the British Library in the UK), I also hope to review special collections in private libraries, NGOs, and historical newspaper repositories to trace documentation such as government records, travelogues, cartographic representations, maps and so on, on my select waterbodies. Such work is important as it will allow me to understand the social and spatial legacies of the presence of water and water provision in this city.

Finally, over an additional period of 3 months, I will review key policy documents in relation to these sites such as the National Water Policies, the AMRUT policy and the URDPFI Guidelines. Further, I will keep an eye on the contemporary mediascape to see how water in Delhi is represented in mainstream Hindi and English media. In a similar vein, I will draw on literary works on Delhi (in Hindi and in English) to trace in these imaginative spaces, how

water functions in the social imagination as people engage with water both as resource and as heritage in their city (Banerjee 2016; Chatterjee 2013). For a project that seeks to explore the social life of water, such affective and expressive social representations represent important data, reflecting and refracting the changing waterscape of India's thirsty capital city.

Research Methods (Plan B)

In the event that I am not able to travel to meet in-person with research participants, partners, or collaborators, and carry out face-to-face participant-observation with them, I will take advantage of remote-working tools in order to interact with, interview, and even collaborate remotely with some of my research partners. Therefore, my plan B incorporates remote methods of participant-observation and places a greater emphasis on archival work, newspaper/media research, and analyses of select policy documents and literary texts.

Many of my research collaborators will be familiar with digital and computing tools and use them in their work. A lot of administrative work continues to be carried out remotely as the government cannot stop functioning. After all, the city cannot survive without water, which is seen to be an 'essential service'. Therefore, I will engage with government officers as they conduct remote or online meetings, and help them with data analysis and visualization, strategic planning, and even cartographic representations. Thus, I will still be able to bear witness to, and even participate as an actor in, the processes by which they carry out their work to manage water and waterbodies. For example, as the government formulates 'terms of reference' or 'standard operating procedures' for the rejuvenation of an urban lake, I will hope to work with them remotely, helping them prepare such documents. In this way, I will still hope to glean something of how water is managed and for whom through waterbody rejuvenation intervention by government agents and actors even when in-person interactions will not be possible.

Similarly, many amongst my second set of interlocutors, viz. at NGOs and thinktanks, also continue their work remotely. I will interact with them digitally, helping them formulate their studies, write their reports, plan their interventions, carry out structured data analysis, data visualization, and so on. While I have not highlighted Geographical Information System (GIS) as method or analytic in plan A (I may add I am familiar with software such as QGIS), I will explore the presumptions built into, quite literally, such views from above. I will also

track how my interlocutors (researchers, architects, heritage conservationists) engage with the presumptions of GIS-based knowledge to formulate their own views, politics and visions of who the city and its waters should serve and be served by, and how such service(s) might be rendered.

It is with my third-set of interlocutors, the residents of housing settlements, that I will postpone my participant-observation until the very end of my research (say, September 2022), if it becomes possible at all. However, I will remotely interview some residents and chairpersons of residential welfare associations, especially of prosperous neighborhoods (e.g. Defence Colony, or Hauz Khas Market), whom I can reasonably expect to be familiar with basic digital tools. I also expect to be able to interview, and possibly collaborate remotely with, officials at private companies (Swajal and Janajal) who make water ATMs, which represent an important element in my study of Delhi's changing waterscape. All this will help counterpoint the visions of the city--and its waters--that are advanced by the government, NGOs and so on, and also how such visions may have changed during the long year(s) of the Covid-19 pandemic.

Further, as in case of plan A, I will explore archives, policy documents, newspaper media and literary representations in plan B. I expect to spend an overall 2-3 months extra on such work if I am unable to carry out any in-person immersive fieldwork. I recount these briefly below.

I will explore archives (extending this phase of my research period by a month) and historical material (travelogues, maps, photographs and so on) stored in state and private records, and additionally, newspaper houses. Such work will continue to be important as it will allow me to understand the social and spatial legacies of the presence of water and water provision in this city. Moreover, especially w.r.t. maps and cadastral representations, I will overlay layers of historical representation with new GIS-based representations to also visually track the life, death, and rejuvenation of my selected waterbodies.

I will also review key policy documents and trace how policy is implemented or not in relation to these sites such as the National Water and AMRUT Policies, and the URDFPI guidelines. Moreover, I will study the contemporary mediascape to see how water in Delhi is represented in mainstream Hindi and English media. The websites (or media houses) I have identified on the basis of preliminary work include Dainik Jagaran, NDTV India, Dainik Bhaskar, and the Navbharat Times (in Hindi), and The Times of India, Hindustan Times, The Hindu, and the Indian Express (in English) among others. Such journalistic writings can not

only help the ethnographer identify the flows and movements or processes (s)he wishes to describe but cannot directly witness all at once, they also represent a mode of experience and are indeed part of the discursive waterscape of the city. I will also further interview the journalists who produce these pieces to understand how they formulate their representations of city's waterscape.

Finally, as with plan A I will also read literary works on Delhi (in Hindi and in English) to trace how water functions in the social imagination (e.g. Banerjee 2016; व्यास 2016; Chatterjee 2013) as people engage with water both as resource and as heritage in their city. In addition, I will also shortlist and study commercial and art films about Delhi or otherwise set in Delhi to see how water and my select waterbodies appear, or not, as site, subject, and actor in such representations. I will then see how they may or may not compare with the experience of water that I am able to distil from my interactions with my interlocutors and through historical archives.

In this way, through a combination of new anthropological methods, incorporating remote (and even asynchronous) methods of participant-observation, and drawing generously on historical records and the environmental humanities, I will continue my study on Delhi's changing waterscape even if the pandemic worsens.

Research Preparation

Pre-Dissertation Research: From June to August 2018, and December 2019 to January 2020, I spent over four months in Delhi for preliminary fieldwork refining this project, and building connections with prospective research partners, the government, and NGOs. I have already made contact with officials and representatives across most of the institutions I have listed above in Question 1. These institutions include but are not limited to INTACH, the Delhi Jal Board, NITI Ayog, FORCE, and the Centre for Science and Environment. Initially, I had planned to explore rainwater harvesting and sewage management, or municipal drinking water supply and water services within the city. However, during my pre-dissertation research it became clear from my interactions with government officials and representatives that the 'rejuvenation' of urban waterbodies was a distinctive analytic in the Delhi waterscape. I learnt in conversation that approximately 250 waterbodies have been identified for rejuvenation, and are in different stages of being

rejuvenated (from drafting tender notices to preparing detailed project reports). Moreover, these waterbodies included urban lakes, but also tanks, stepwells and drains. For each of these structures, key objects in Delhi's varied waterscape, the valences of rejuvenation change slightly, speaking to debates in ecological sustainability, heritage conservation and urban renewal, and appeal to themes such as the place of nature in the city and social justice.

In addition to identifying this distinctive theme, I was also able to locate key research subjects or partners (government departments, NGOs, and individuals) who are working around waterbody rejuvenation initiatives. I intend to build on these existing institutional relations to take my research to the next stage of execution. Equally importantly, during my pre-dissertation explorations, I was able to visit each of the urban waterbodies that I identified earlier and that are the focus of this study, viz. Agrasen ki Baoli (a stepwell); Hauz-i-Shamsi and Hauz Khas (tanks), and the Satpula (lake); and the Barapullah Nala (a drain). As a result, I am well-acquainted with my physical research sites as well as the variety of individual and institutional actors that interact with and through them.

Further, in an additional two months in Summer 2020, I participated in several online programs (such as online training courses on water management by the Centre for Science and Environment), virtual conferences and online fora around development and city-life (e.g. Charcha 2020 organised by the Nudge Foundation, or 'Tomorrow's Liveable Cities' organized by Arthan) to continue to grow and nurture these connections. During this period, I have also been tracking and developing an archive of contemporary news coverage of water management in the city, while also developing a database of water-related initiatives, practitioners, policies, and projects operating in Delhi. I may add that I have also written a paper, drawing primarily on secondary literature and some archival material available here at Yale on Delhi's water histories up to modern times, which has made me familiar with the historical specificities of this city. Further, as Research Assistant to Professor Sivaramakrishnan, I prepared a detailed annotated bibliography through secondary research and literature reviews for two different projects on urban nature and environmental anthropology respectively. All of this demonstrates that having carried out substantial pre-dissertation research, I have identified a set of robust and rich themes for further study, developed a network of local contacts and research partners, and also advanced a provisional, albeit grounded, theoretical and historical apparatus for me to carry out my work.

Disciplinary Training: At Yale, I have taken courses on environmental anthropology with Professor Dove and Dr. Carpenter, water resources with Professors Saiers & Raymond

and Professor Anisfeld, and on urban studies with Professor Siu. I have also participated in the Environmental Humanities Seminar, which augments my substantial previous training in literature and languages (for five years at Jadavpur University's Department of English). My training has been strengthened by the opportunities I have had as Teaching Fellow with Professor Kockelman (for a course on linguistic anthropology), and with Professor Dove (for a course on environmental anthropology). Further, my research proposals and preliminary pre-dissertation research findings have been presented and workshopped in three Research Groups (South Asia Research Group, and Environmental Anthropology Collective, convened by my advisor, Professor Sivaramakrishnan; and the Dove Lab convened by Professor Dove), where I remain a regular participant even as they continue to meet remotely since March 2020. All of this has given me the theoretical apparatus to develop my work and locate it within larger contexts in the anthropological scholarship of cities and of water, undergirded by foundational scholarship in social and semiotic theory.

Language Preparation: I have the necessary language skills (Hindi is one of my native languages, and I am a published translator) to carry out this work. Hindi and English are the two official languages of India. Besides, I am fluent in a number of other Indian languages and have also received training in classical languages, particularly Sanskrit, all of which enable me to participate in the polyphonic soundscape of a city such as Delhi.

Ethical Considerations: This project has already received approval from Yale University's Institutional Review Board. I will take particular care to not risk the health and safety of its subjects not least during (and, eventually, after) the Covid-19 pandemic.

There are of course many uncertainties given the methods of anthropological research and the fact that a lot of such work depends on the kindness of strangers. Nevertheless, I hope and believe that with all my research preparation, disciplinary training and academic experience, institutional support and affiliations, and the guidance and nurture of my advisors, this project is feasible and ripe for execution.

Contribution

My proposed research is situated at the intersections of environmental and urban anthropology and focusses on the social life of water in the city. Hence, it draws also on the anthropology of water, while taking impulses from a variety of social theory including

linguistic anthropology. My work will offer a contribution to anthropological research on urban ecology, and specifically on water (an important expanding subfield in India and, indeed, around the world), through a historically-informed ethnography that will bring together the strengths of the social sciences and the environmental humanities (cf. Randle 2018).

Scholars of urbanism and urban political ecology have emphasized the importance of integrating historical approaches in anthropological work (cf. Rademacher 2015). Further, geographers have engaged with the historical inheritances in the making of cities (cf. Gandy 2014). However, other scholars have noted that as a larger field urban studies continues to privilege Eurocentric assumptions that are insensitive to the unique historical inheritances of much of the rest of the world, and particularly cities in south and east Asia (cf. Roy 2009). I hope to explore how both historical processes, as well as 'historicity' and perceptions of the past (Stewart 2016) influence the expression of power and agency through different kinds of claim-making within a contested cityscape (Hayden 1995) and through the afterlife of ruins and rubble (cf. Gordillo 2014) in relation to eco-cultural heritage (cf. Ray and Maddipati 2020) in my study of the urban waterscape. In this way, I offer to advance debates in urban and environmental anthropology and enlarge conversations around the anthropology of water through connections with human geography, environmental humanities, and discussions on water governance.

Moreover, while some recent scholarship has brought political ecology into conversation with semiotics (Cortesi 2018), current studies of urban water have centered on pipes, leakages, and dams (cf. Anand 2017; Björkman 2015; Wittfogel 1957). Taking inspiration from, but in contrast to, these writings, I draw attention to other kinds of waters and waterbodies (lakes, tanks, stepwells, and drains), many of which are centuries old, as well as to new techniques of water arrangements (particularly water ATMs) in an urban context. In this way, my research on Delhi's waterscape will analyze the politics of struggle over vital resources while keeping wider socio-ecological relations in view, and trace the way in which these relations are meaningful over time and space to actors engaged in the management and conservation of water and its built environment. Therefore, my work also aspires to advance studies in urban ecology, the environmental humanities (through an ethnographic approach), and water policy, by bringing semiosis (cf. Peirce 1992; Kockelman 2007; Gibson 2015) and politics into the same frame of analysis, and foregrounding hitherto unexamined ways in which people make

and contest meaning of and through water, waterbodies, and water systems in a thirsty and expanding Asian megacity.

Finally, I hope this project will help restore some sense of wonder at how things function (or not) in the hot, dense cities in which many of us live.

-------x-------

BIBLIOGRAPHY

Anand, Nikhil
 2015   Leaky States: Water Audits, Ignorance and the Politics of Infrastructure. Public Culture 27(2): 305–330.
 2017   Hydraulic City: Water and the Infrastructures of Citizenship in Mumbai. Durham: Duke University Press.

Appadurai, Arjun
 1996   Modernity at Large: Cultural Dimensions of Globalization. Minneapolis: University of Minnesota Press.

Bakker, Karen
 2005   Neoliberalizing Nature? Market Environmentalism in Water Supply in England and Wales. Annals of the Association of American Geographers 95(3): 542–565.

Ballestero, Andrea
 2019   A Future History of Water. USA: Duke University Press.

Banerjee, Sarnath
 2016   All Quiet in Vikaspuri. India: Harper Collins.

Barnes, Jessica
 2014   Cultivating the Nile: The Everyday Politics of Water in Egypt. Duke University Press.

Barua, Mann, and Anindya Sinha
 2017   Animating the Urban: An Ethological and Geographical Conversation. Social & Cultural Geography 20(8): 1160–1180.

Baviskar, Amita
 2007   Introduction. *In* Waterscapes: The Cultural Politics of a Natural Resource. Amita Baviskar, ed. Pp. 1–8. New Delhi: Permanent Black.
 2020   Uncivil City: Ecology, Equity and the Commons in Delhi. New Delhi: Sage Publications and Yoda Press.

Björkman, Lisa
 2015   Pipe Politics, Contested Waters: Embedded Infrastructures of Millennial Mumbai. Durham and London: Duke University Press.

Blaikie, Piers
 1985   The Political Economy of Soil Erosion in Developing Countries. USA: Longman.

Blake, Stephen P.
 1992   "Cityscape of an Imperial Capital: Shahjahanabad in 1739". In R.E. Frykenberg (Ed.), Delhi Through the Ages: Selected Essays in Urban History, Culture and Society (Pp. 66-105). *In* The Delhi Omnibus. New Delhi: Oxford University Press, 2006.

Bulkeley, Harriet
 2010   Cities and the Governing of Climate Change. Annual Review of Environment and Resources 35: 229–253.

Castells, Manuel
 1993   Cities, the Information Society and the Global Economy. Tijdschrift Voor Economische En Sociale Geografie [Journal of Economic and Social Geogrpahy] 84(4): 247–57.

Chaffee, John
 2008   At the Intersection of Empire and World Trade: The Chinese Port City of Quanzhou (Zaitun), Eleventh-Fifteen Centuries. *In* Secondary Cities and Urban Networking in the Indian Ocean Realm C. 1400-1800. Kenneth Hall, ed. Pp. 99–122. Lexington Books.

Chatterjee, Elizabeth
 2013   Delhi Mostly Harmless: One Woman's Vision of the City. India: Random House.

Chaudhuri, K.N.
 1985   Emporia Trade and the Great Port-Towns in the Indian Ocean. *In* Trade and Civilization in the Indian Ocean Pp. 98–118. UK: Cambridge University Press.

Choy, Timothy
 2011   Ecologies of Comparison: At Ethnography of Endangerment in Hong Kong. USA: Duke University Press.

Cortesi, Luisa
 2018   The Muddy Semiotics of Mud. Journal of Political Ecology 25: 617–637.

Cronon, William
 1991   Nature's Metropolis: Chicago and the Great West. New York & London: W.W. Norton.

Danley, Stephen
 2018   An Activist in the Field: Social Media, Ethnography, and Community. Journal of Urban Affairs: 1–17.

Escobar, Arturo
 1995   Encountering Development: The Making and Unmaking of the Third World. USA: Princeton University Press.

Gandy, Matthew
 2014   The Fabric of Space: Water, Modernity, and the Urban Imagination. MIT Press.

Ghertner, Asher
 2011   Rule by Aesthetics: World Class City Making in Delhi. *In* Worlding Cities: Asian Experiments and the Art of Being Global. Ananya Roy and Aihwa Ong, eds. Pp. 279–306. Blackwell Publishing.

Gibson, James J.
 2015   The Ecological Approach to Visual Perception. New York & London: Psychology Press.

Gidwani, Vinay

2013 Value Struggles: Waste Work and Urban Ecology in Delhi. *In* Ecologies of Urbanism in India: Metropolitan Civility and Sustainability. Anne Rademacher and Sivaramakrishnan, K., eds. Pp. 169–200. Hong Kong: Hong Kong University Press.

Gordillo, Gastón R.
 2014 Rubble: The Afterlife of Destruction. Durham and London: Duke University Press.

Hannerz, Ulf
 1996 The Cultural Role of World Cities. *In* Transnational Connections: Culture, People, Places Pp. 127–139. London and New York: Routledge.

Harvey, David
 2009 Social Justice and the City. Revised Edition. Athens & London: The University of Georgia Press.

Hayden, Dolores
 1995 The Power of Place: Urban Landscapes as Public History. Cambridge, MA: The MIT Press.

Hershatter, Gail
 1989 The Hierarchy of Shanghai Prostitution. Modern China 15(4): 463–498.

Herzfeld, Michael
 2016 Siege of the Spirits: Community and Polity in Bangkok. Chicago and London: University of Chicago Press.

Heynen, Nik
 2014 Urban Political Ecology I: The Urban Century. Progress in Human Geography 38(4): 598–604.
 2018 Urban Political Ecology III: The Feminist and Queer Century. Progress in Human Geography 42(3): 446–452.

Holston, James
 1989 The Modernist City: An Anthropological Critique of Brasília. Chicago and London: The University of Chicago Press.

Horne, John, and Wolfram Manzenreiter
 2012 Olympic Tales from the East: Tokyo 1964, Seoul 1988 and Beijing 2008. *In* Palgrave Handbook of Olympic Studies. H.J. Lenskyj and S. Wagg, eds. Pp. 103–119. Palgrave MacMillan.

Ioris, Antonio A.R.
 2015 Water, State and the City. UK: Palgrave Macmillan.

Kaika, Maria
 2005 City of Flows: Modernity, Nature, and the City. New York: Routledge.

Kaplan, Martha
 2007 Fijian Water in Fiji and New York: Local Politics and a Global Commodity. Cultural Anthropology 22(4): 685–706.

Kautilya
 1992   The Arthashastra. L.N. Rangarajan, ed. India: Penguin Books.

Kelly, William
 2019   The Asian Sportscape: Hubs of Play and Flows of Contention. *In* Asia Inside Out:
Itinerant People. Eric Tagliacozzo, Helen F. Siu, and Peter C. Perdue, eds. Pp. 293–314.
USA: Harvard University Press.

Kockelman, Paul
 2007   Agency: The Relation between Meaning, Power, and Knowledge. Current
Anthropology 48(3): 375–401.
 2013   The Anthropology of an Equation: Sieves, Spam Filters, Agentive Algorithms, and
Ontologies of Transformation. HAU: Journal of Ethnographic Theory 3(3): 33–61.

Lansing, J. Stephen
 2007   Priests and Programmers: Technologies of Power in the Engineered Landscape of
Bali. Princeton: Princeton University Press.

Latour, Bruno
 1986   Visualisation and Cognition: Drawing Things Together. H. Kuklick, ed.
Www.Bruno.Latour.Fr 21: 1–32.
 1993   We Have Never Been Modern. Catherine Porter, tran. Cambridge, MA: Harvard
University Press.

Lefebvre, Henri
 1991   The Production of Space. Donald Nicholson-Smith, tran. Oxford: Blackwell.

Levy, Robert
 1990   Mesocosm: Hinduism and the Organization of a Traditional Newar City in Nepal with
the Collaboration of Kedar Raj Rajopadhyaya. University of California Press.

Li, Tania M.
 2007   The Will to Improve: Governmentality, Development, and the Practice of Politics.
Duke University Press.

Linton, Jamie
 2010   What Is Water? The History of a Modern Abstraction. Canada: UBC Press.

Low, Setha M.
 1996   The Anthropology of Cities: Imagining and Theorizing the City. Annual Review of
Anthropology 25(1): 383–409.

Manning, Paul
 2012   The Semiotics of Drink and Drinking. London and New York: Continuum Books.

Marcus, George
 1998   Ethnography in/of the World System: The Emergence of Multi-Sited Ethnography. *In*
Ethnography through Thick and Thin Pp. 79–104. Princeton University Press.

Masco, Joseph
 2017   The Crisis in Crisis. Current Anthropology 58(15): 565–576.

Mehrotra, Rahul
 2008   Negotiating the Static and Kinetic Cities: The Emergent Urbanism of Mumbai. *In* Other Cities, Other Worlds: Urban Imaginaries in a Globalizing Age. Andreas Huyssen, ed. Pp. 205–218. Duke University Press.

Mehta, Lyla
 2005   The Politics and Poetics of Water: Naturalising Scarcity in Western India. Orient Blackswan.

Mosse, David
 2003   The Rule of Water: Statecraft, Ecology, and Collective Action in South India. New Delhi: Oxford University Press.

Nader, Laura
 1972   Up the Anthropologist: Perspectives Gained from Studying Up. *In* Reinventing Anthropology. Dell Hymes, ed. Pp. 284–311. New York: Pantheon.

Naqvi, Hamida Khatoon
 1992   "Shahjahanabad, The Mughal Delhi, 1638-1803: An Introduction". In R.E. Frykenberg (Ed.), Delhi Through the Ages: Selected Essays in Urban History, Culture and Society (Pp. 57-65). *In* The Delhi Omnibus. New Delhi: Oxford University Press, 2006.

Narain, Sunita
 2012   Excreta Matters (Vol. II): 71 Cities. New Delhi: Centre for Science and Environment.

NITI, Ayog
 2018   Composite Water Management Index: A Tool for Water Management. New Delhi.

Orlove, Ben
 2002   Lines in the Water: Nature and Culture at Lake Titicaca. California: University of California Press.

Orlove, Ben, and Steven C. Caton
 2010   Water Sustainability: Anthropological Approaches and Prospects. Annual Review of Anthropology 39: 401–15.

Peirce, Charles Sanders
 1992   Nomenclature and Divisions of Triadic Relations, as Far as They Are Determined. *In* The Essential Peirce: Selected Philosophical Writings, Volume 2 Pp. 289–299. Indiana University Press.

Pierce, Jennifer L.
 1995   Reflections on Fieldwork in a Complex Organization: Lawyers, Ethnographic Authority, and Lethal Weapons. *In* Studying Elites Using Qualitative Methods. Rosanna Hertz and Jonathan B. Imber, eds. Pp. 94–110. Thousand Oaks: Sage Publications.

Postill, John, and Sarah Pink
 2012   Social Media Ethnography: The Digital Researcher in a Messy Web. Media
International Australia 145(1): 123–134.

Rademacher, Anne
 2015   Urban Political Ecology. Annual Review of Anthropology 44: 137–52.

Rademacher, Anne, and K. Sivaramakrishnan, eds.
 2013   Ecologies of Urbanism in India: Metropolitan Civility and Sustainability. Hong Kong:
Hong Kong University Press.
,
 eds.
 2017   Places of Nature in Ecologies of Urbanism. Hong Kong: Hong Kong University Press.

Randle, Sarah Priscilla
 2018   Replumbing the City: Water and Space in Los Angeles. Yale University.

Ray, Sugata, and Venugopal Maddipati, eds.
 2020   Water Histories of South Asia: The Materiality of Liquescence. New York:
Routledge.

Roy, Ananya
 2009   The 21st-Century Metropolis: New Geographies of Theory. Regional Studies 43(6):
819–830.

Roy, Ananya, and Aihwa Ong, eds.
 2011   Worlding Cities: Asian Experiments and the Art of Being Global. UK: Blackwell.

Santa Cruz Declaration
 2014   Santa Cruz Declaration on the Global Water Crisis. Water International 39(2): 246–
61.

Sassen, Saskia
 1991   The Global City: New York, London, Tokyo. Princeton, New Jersey: Princeton
University Press.

Schwenkel, Christina
 2015   Spectacular Infrastructure and Its Breakdown in Socialist Vietnam. American
Ethnologist 42(3): 520–534.

Sharan, Awadhendra
 2014   In the City, Out of Place: Nuisance, Pollution, and Dwelling in Delhi, c. 1850-2000.
New Delhi: Oxford University Press.

Singh, Arun Kumar
 2006   Delhi's Watery Woes: A Cross-Sectoral Analysis of the Water Crisis in Delhi. New
Delhi: Centre for Trade & Development (Centad).

Siu, Helen

2007   Grounding Displacement: Uncivil Urban Spaces in Post-Reform South China. American Ethnologist 34(2): 329–350.

Siu, Helen, Eric Tagliacozzo, and Peter Perdue
 2015   Introduction: Spatial Assemblages. *In* Asia Inside Out: Connected Places Pp. 1–30. USA: Harvard University Press.

Srinivas, Tulasi
 2018   The Cow in the Elevator: An Anthropology of Wonder. Durham: Duke University Press.

Srivastava, Sanjay
 2014   Entangled Urbanism: Slum, Gated Community, and Shopping Mall in Delhi and Gurgaon. New Delhi: Oxford University Press.

Stewart, Charles
 2016   Historicity and Anthropology. Annual Review of Anthropology 45: 79–94.

Strang, Veronica
 2004   The Meaning of Water. New York: Berg.

Swyngedouw, Erik
 2004   Social Power and the Urbanization of Water: Flows of Power. USA: Oxford University Press.

Taneja, Anand
 2018   Jinnealogy: Time, Islam, and Ecological Thought in the Medieval Ruins of Delhi. California: Stanford University Press.

Truelove, Yaffa
 2016   Incongruent Waterworlds: Situating the Everyday Practices and Power of Water in Delhi. South Asia Multidisciplinary Academic Journal 14.

Tsing, Anna
 2005   Friction: An Ethnography of Global Connection. New Jersey: Princeton University Press.

United Nations
2019 Department of Economic and Social Affairs, Population Division, United Nations. 2019. 'World Urbanization Prospects 2018: Highlights'. New York: United Nations.

Wescoat Jr., James L.
 2020   From "Nallah" to "Nadi", Stream to Sewer to Stream: Urban Waterscape Research in India and the United States. *In* Water Histories of South Asia: The Materiality of Liquescence. Sugata Ray and Venugopal Maddipati, eds. Pp. 135–57. New York: Routledge.

Williams, Raymond
 1973   The Country and the City. New York: Oxford University Press.

Wittfogel, Karl A.

1957   Oriental Despotism: A Comparative Study of Total Power. New Haven and London: Yale University Press.

व्यास, सत्य [Vyas, Satya]

2016   दिल्ली दरबार [dilli darbaar]. Chennai: Hind Yugm and Westland Publications Ltd.