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Abstract

The historical water catchments of India's capital city were foundational to the flourishing of settlements that spanned centuries. Today, those water features are held up as 'wise' models of water stewardship for the people who criticise the Indian government's water management shortcomings. This article investigates historical imaginations of infrastructures past with attention to how their example leads to demands for 'smart(er)' water management regimes. It also shows how efforts to revive past water catchments can make meaningful contributions to water stewardship, but that they still risk perpetuating the water access inequalities and middle-class priorities that are identified in a growing body of scholarship on India's water politics. Since the existing scholarship predominantly focuses on exploitative rural-to-urban and inter-urban water flows, this text argues that water politics—including political ecologies of water—are also poignantly revealed in the study of seemingly proactive solutions such as the expansion of urban water catchments.

Keywords

Urban catchments, 'smart cities', urban political ecology, water capture, New Delhi, India

“...it is easy to build a new city but it is very difficult to improve an old one.”

—New Delhi Chief Commissioner (1934),
(in Legg 2007: 161)

In mid-October of 2016, I found myself leaning over a large map of New Delhi’s hydrological past in a historian’s living room. Pointing to a series of reservoirs and lakes, the historian emphasised how the city’s early flourishing was due to the efforts of previous rulers who captured and stored water for the benefit of residents.¹ The result was that, ‘despite generally having a semi-arid climate, despite not having too much vegetation, despite not having too much rain—there was (previously) plenty of water.’ In his comments to me, he lamented that these reservoirs and lakes are either falling into disrepair or are being paved over in the name of development. The loss of ‘wisdom’ for how to capture and store water, he declared, is why the city is having such a huge water problem today.

The historian’s lamentations underscore how past efforts to capture and store water are neglected to the detriment of Delhi’s water balance.² As more buildings go up to accommodate a rapidly growing population, groundwater levels continue to drop due to a high rate of daily extraction and a lack of recharge (Dash, Sarangi, and Singh 2010). At the same time, the city continues to rely more and more on inter-state water transfers to meet the

¹ Although the map was a sketch from 1807, it included hydrological features built up to five centuries earlier.

² I henceforth call the city ‘Delhi’ in keeping with common parlance.

demands of its multiplying residents.³ The declining groundwater levels and the variability of inter-state water transfers are reasons why the headline ‘Water crisis in Delhi’ has become commonplace. To safeguard the city’s future, several public commentaries now suggest that Delhi must try to recharge groundwater by increasing urban water catchments and harvesting rainwater.⁴ Many of these commentators argue that this would echo the prudence of past settlements responsible for building longstanding water catchments. The resulting discussions often include an argument that the revitalisation of urban water catchments would make for a ‘smart(er)’ city. What is unclear, however, is if these measures would make for a more ‘ethical’ city when it comes to water distribution (Doshi and Ranganathan 2017)

Through an investigation of efforts to improve past and present water catchments, this article considers the infrastructural possibilities, conceptual implications, and resource equity implications of a push for the expansion of urban water capture practices. Delhi is the location of focus due to its past reliance on urban water catchments as well as its standing as one of 100 cities in which urban water catchments and rainwater harvesting are now touted as technologies to be expanded under the Government of India’s ‘smart city’ initiative. The discussion is based on more than twelve years of field visits to Delhi with an emphasis on site visits, walking interviews and ethnographic observations documented in late 2016. Particularly the walking interviews capture my interlocutors ‘connections to their surrounding environments’ (Evans and Jones 2011: 857) and solicit reactions about specific water features from people who interact with them on a regular basis.

To address the equity implications of catchment revival and improved water stewardship, I trace the challenge of urban water capture through the study of two catchments

³ Delhi’s water supply gap exceeds 200 million gallons per day (Prashar and Shaw 2012: 10).

⁴ See: ‘New Delhi is Running Out of Water’ (11 July 2017) by Asit K. Biswas, Cecilia Tortajada, and Udisha Saklani. See: <https://theconversation.com/new-delhi-is-running-out-of-water-80402> (accessed 15 April 2018).

to highlight how residents are impacted both by the decline and the revival of water catchments. I discuss in particular how an example of catchment renewal has reinvigorated the landscape in ways that invoke appreciation as well as suspicion that such projects tend to benefit higher income residents rather than lower income residents. The concerns I express about the uneven benefits of catchment revival coincide with scholarly observations pointing out that the well-to-do have long been the principal beneficiaries of India's municipal water system, and that given current priorities this trend will continue (Gandy 2003).

Said differently, my investigation of urban water catchments complements social studies of water in India by demonstrating the middle-class priorities that can emerge in the provision and overhaul of urban water management (Chaplin 1999). As a result, this study of water capture makes critical contributions to existing scholarship because the opportunities associated with urban water catchments highlight disparate social and political responses to pressing hydrological challenges in India (Anand 2011, 2012, 2017; Björkman 2015; Gandy 2003; Mehta 2005; O'Leary 2016; Walters 2016; Truelove 2011, 2017), while providing insight into the challenges of improving urban water stewardship. In addition to advancing work on urban water management and urban water politics, the data provided is used to demonstrate how political ecologies of water emerge in the study of seemingly proactive water management solutions. Political ecology is useful for exploring urban water capture because it illuminates how transformations in the hydrological cycle at local and regional levels are linked with power struggles that span multiple cultural, social, and economic domains (Swyngedouw 2009: 56).

Thinking with Urban Water Catchments

Urban catchments are significant to study because they have the potential to supplement a centralised water supply that can be erratic, uneven, and unruly (Acciavatti

2017; Kumar 2014, Truelove 2018). The effort to mitigate unreliable water supplies is important because ordinary life for the residents of Delhi is characterised by the “uncertain and diverse infrastructural configurations and politics” that increase the precariousness of everyday existence for city dwellers (McFarlane, Silver, and Truelove 2017: 1402). Urban water catchments are seen as useful technologies for reducing this resource uncertainty because, in a hypothetical scenario involving the harvest of every drop of Delhi’s annual precipitation, the city could catch nearly 907 billion litres of rainfall (Centre for Science and Environment 2003: 4).⁵ When this estimate was made at the turn of the twenty-first century, the amount calculated was nearly 270 days of the entire city’s water requirement. Even though the population has since doubled (Cox 2018), the estimated harvest could still significantly bolster the city’s water security if sufficient catchments were installed.

The potential for upscaling urban water catchments is robust in cities such as Delhi given the presence of the pre-colonial water management infrastructures that have allowed the landscape’s denizens to survive in an arid landscape since at least the 12th century (Kumar 2014). Built by a lineage of rulers who helped develop the seven cities that existed in the topography prior to the arrival of the British, these infrastructures include artfully designed step wells along with the water reservoirs and lakes that are the focus of this article. Notably, the people who promote the revival of urban water catchments comment fondly upon the heritage of water management stewardship that they see reflected in these old infrastructures. As one commentator put it: ‘The modern people of Delhi should learn a few values from the rulers of the past, who were more sensitive to their environment and clear headed about the importance of local water sources’ (Kalia 1997: 78). In the absence of proactive efforts to revive these water features, other critics have argued that Delhi’s historical water catchments

⁵ One of India’s most renowned environmental organisations, the Centre for Science and Environment actively promotes urban catchments with publications such as *Dying Wisdom* (1997) and *A Water Harvesting Manual* (2003).

will remain ‘orphans of a wiser age’ with ‘few champions to their cause’ (CSE 1997: 12). These comments collectively demonstrate how infrastructures past, present, and future are evocative of ‘desire’ as well as of historical imagination (Larkin 2013: 337). Such arguments also convey an assertion that there is *already existing potential* to enact self-sustaining water management regimes that are regionally appropriate.

Despite the promise of past infrastructures to offset urban resource uncertainty, the effort to study their significance is primarily centred in architecture and environmental studies (Kumar 2014; Said 2014; Westcoat 2014). This means that there is significant scope to look at them anew with an anthropological lens attuned to how urban catchments can fit within the complex hydraulic landscapes of contemporary cities. This includes the effort to critically evaluate whether or not projects of infrastructural revival lead to improved water access for a range of residents (Arabindoo 2011).

The value of examining urban water catchments past and present is further underscored by the observation that much of the anthropological literature on urban water management tends to focus on contests over *water flows* within the contemporary city rather than the opportunities associated with urban *water capture*. One reason is that most municipally managed urban water supplies flow through piped infrastructures in ways that are socially significant and politically revealing. The emphasis on water flows is particularly prominent in research on urban zones in India. Emerging scholarship, for instance, sheds light on the ways in which ‘pipe politics’ are constitutive of the postcolonial Indian city’s many water shortfalls (Anand 2011, 2012; Björkman 2015; Truelove 2011). In addition to the inequitable distributive politics of water and the inconsistency of urban water supplies (Gandy 2003, 2008; O’Leary 2016), the poignant intermittency of water flows leads some scholars to speak of the specific hours in which the water flows through pipes as ‘water time’ (Anand 2017: 98). The narrow schedules of this temporal limitation ‘produces a particular

arrangement of time and tempo in the city, and particularly in the settlements' (Ibid.). Flow is so notable—both for its frequent absence and its infrequent presence—that less emphasis is placed on how cities could provide a consistent supply of water that is internally self-sufficient and not contingent on the intermittent waters piped from faraway places.

However, social scientists have not overlooked the critical role played by water catchments *upstream* of urban zones. Indeed, many scholars have sought to itemise watershed systems from catchment point to end use, including the contestations involved in the management of such water systems. Notable efforts include Matthew Gandy's (2003) work on Manhattan's upstream hydrological histories, Ashley Carse's (2012, 2014) work on the hydraulic piracy of the Panama Canal's freshwater locks, and Nikhil Anand's (2017) work on the rural catchments upon which Mumbai's water supplies depend. In addition to these and other important contributions, there is further scope to investigate the politics and potentials of water catchments within the city. Indeed, more work is needed to understand how urban water bodies act as 'composite resource(s)' with overlapping and complex power dynamics (Cornea et al.: 407). These efforts can help to interrogate how measures to improve urban water stewardship are entangled with institutional practices perpetuating water conflict and inequity (Arabindoo 2011; Bakker 2012; Johnston 2003; Kaika 2005; Robbins 2004; Swyngedouw 2004, 2009), which is also a central concern in the political ecology of water.

The Political Ecology of Urban Water Catchments

Broadly speaking, political ecology emphasises how environmental management efforts by 'outside authorities' (as opposed to 'stakeholders') become enmeshed in 'local' and regional struggles (Robbins 2004: 175-176). Whereas political ecologists once predominantly focused on rural resource contestations, their work increasingly examines resource conflict within densely populated cities (Cornea et al. 2016; Rademacher 2015).

Urban water struggles are particularly ripe for political ecology analyses because as water flows to some recipients and not to others, it reveals the 'contested relationships of power and authority' associated with water resource management (Bakker 2012: 616). Also known as an 'urban political ecology' of water (Cornea et al. 2016), such conceptual approaches have special utility for the ways that they illuminate how the fragmented nature of water in many post-colonial cities is pervasive and persistent by design rather than mistake (Gandy 2008).

The recognition and criticism of power-infused practices of uneven water distribution systems is also part of an 'emancipatory project' within the urban political ecology of water to ensure that all humans are able to live in environments free of resource deprivation (Loftus 2009: 953). Or, as Alex Loftus (Ibid.) exclaims, 'Firmly opposed to environmental injustice, a political ecology approach (to water) commits us to helping bring about a better world' by contesting the resource inequities that humans have produced and perpetuated' (954). For scholars choosing to study urban water catchments, then, political ecology can be a valuable framework to pair with anthropologically acquired data because it further highlights how asymmetrical structures inform resource management across multiple socio-economic and geographical scales of influence (Blaikie 1985; Bryant 1997; Peet and Watts 1996). It does this while avoiding the trap of thinking that resource management—including 'smart' water management—is somehow benign or apolitical (Robbins 2004).

My examination of Delhi's urban water catchments reveals that they are part of an urban political ecology that entails the uneven distribution of water. While Delhi's complex 'waterscape' (Budd and Sultana 2013) provides many examples of valuable water catchments, several notable catchments are located in the enclave of Mehrauli in one of the city's most southern neighbourhoods. This enclave's past flourishing was supported by the water catchments that a Muslim nobility known as the 'Sultanate' instituted in the 12th Century. The result was a veritable oasis in an otherwise parched landscape. Today, however,

these water features are subject to encroachment and degradation. For instance, a lake known as Hauz-e-Shamsi is now surrounded by small parks, residential complexes and the ruins of the former city, which bears testament to the fragility of today's urban water catchments.

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The value of lakes such as Hauz-e-Shamsi was underscored on an October day in 2016 when I toured the water body with Sohail Hashmi, a historian and public intellectual. While walking around the lake, Hashmi told me about his frustration at the decline of such historically rich water features. He led me to a small triangulated park across the street from what remains of the lake. 'Where we are standing,' he said to dramatic effect, 'this was water... not too many years ago.' Directing my attention to a covered platform at a side of the lake, he added: 'Originally that (structure) was in the middle of the lake.' Pointing to the ground beneath us, he stressed, 'So all of this was water.' As Hashmi further explained, the past presence of a large lake recharged nearby wells and groundwater supplies making the location ideal for a flourishing settlement. The model of water capture would be replicated in all of the subsequent cities prior to British rule.

Pointing back to the lake that was in front of us, Hashmi stressed that the loss of such water features can take place quickly. 'The best method for this,' he said sarcastically, 'is that you begin nibbling away at the edges.' When you walk down closer to the lake, he added, you will see a community centre and a marriage hall. Opposite that, there is a private parking lot, owned by the marriage hall. 'This (area)', he lamented in an increasingly disapproving tone, 'was (once) all lake. Those houses, those multi-storey houses, they were (once) all lake. This has all been encroached upon in post-independence India.'

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Hashmi often expressed his worries for the neglect of Delhi's urban water catchments. Speaking of the Hauz-e-Shamsi in an online oral history project, he declared that the lake, 'long considered sacred by previous generations', is nowadays a 'receptacle of trash' for the residents living in adjacent houses.⁶ What is more, he observed, the households now set alongside the lake are more likely to survive off of tap water brought from far away rural areas than they are to benefit from the self-renewing groundwater that the lake could once provide. The neglect of such important historical structures demonstrates what Hashmi considers to be poor levels of urban planning. As he stated (with original emphasis): 'This kind of *absolutely unthinking* planning—I don't think that any major city in the world has gone through that'.⁷

The decline of historical water structures has similarly been impressed upon me by others during tours and walking interviews in places such as Mehrauli. On an earlier visit to the Hauz-e-Shamsi, for instance, a rainwater harvesting expert informed me that the surrounding area used to have over 700 water catchments that represented a variety of water capture technologies. According to his documentation, they had dropped to a mere 150 today. Shaking his head, he shared his fears that the number would continue to shrink due to the encroachments of a growing population. As we walked around the area's lower income settlements, such concerns were augmented by a worry for groundwater access among the families with whom we spoke. Several of these residents lamented that the hand pumps used to supplement inadequate municipal supplies regularly ran dry. They complained of the endless 'waiting' for water that scholars of Delhi's 'slum' settlements have itemised in heart rendering detail (O'Leary 2016; Truelove 2011). Reflecting on their situation, the expert

⁶ Amanbhai. 2016. Sohail Hashmi: Oral History on Delhi's Water Supply. *Soundcloud* <https://soundcloud.com/amanbhai-301153112/sohail-hashmi-oral-history-on-delhis-water-supply> (Accessed 25 September 2017).

⁷ Ibid.

again stressed the need to protect and revive water catchments in order to alleviate the suffering of people who receive insufficient piped water supplies.

The neglect of urban water catchments and the inadequacy of piped water supplies was something that I witnessed firsthand over many years as a frequent resident of an enclave of Hauz Khas Village, which is roughly eight kilometres north of Mehrauli. In my first year living in Hauz Khas Village, back in 2004, I shared an apartment at the rear of Hauz Khas Village, which is a relatively secluded and lightly inhabited section of southern Delhi. Surrounded by several ruins of the Sultanate and Mughal periods, Hauz Khas Village is populated by high-end shops, restaurants, and bars. It also has a small residential neighbourhood hidden behind the commercial district, which is where I lived.

I remember my old apartment with fondness, though at the time it was not an inviting space due to the lack of ventilation and a consistent supply of water. Like many apartment units in Delhi, our building only received water at select moments in the day and for some parts of the year the supply was every other day at best. When our ‘water time’ arrived (Anand 2017), someone or something would flip a switch that pumped the municipally-supplied water to the tanks on the rooftop. These black plastic containers supplied residents with water for the hours and days until the next round of municipal supplies began coursing through the pipes underground. The problem was that those rooftop tanks would inevitably be dry within hours of filling as eager residents would open the taps in their units to sequester their own supplies in containers large and small. Needing to compete for resources, our bathroom housed a 20-gallon garbage can which we hurriedly filled with water whenever the municipal supply filled our pipes. This water we rationed meticulously.

Not more than 300 yards from our apartment was the edge of an empty reservoir known as the Hauz Khas lake. There, in the exposed concrete contours, the possibilities for water capture, and promise of improved water stewardship, was on tantalising display. In lieu

of being used for water storage, the hollowed structure offered a venue for impromptu cricket matches among the neighbourhood youth, and it served as the barren backdrop for the walkers and joggers moving around its periphery in the mornings and early evenings. This tank, however, was not always empty; in the 14th century, the reservoir supplied residents with freshwater that percolated through the ground after being fed by redirected river water from the Aravalli hills and seasonally replenished by rainwater. These waters supported the livelihoods of nearby residents who benefitted from the reservoir's water capture and recharge activities. As a resident of this enclave, it felt as if past administrators knew better how to manage water locally than the contemporary government. This sentiment was shared by historians and architects who lamented to me that these past water features were allowed to fall into disrepair due to the allure of 'modern' infrastructures.

Catchment Histories and the Pull of the 'Modern'

It has been said of infrastructures that they 'do diverse things' while 'remaking landscapes, defining novel forms of politics, reorienting agency, and reconfiguring subjects and objects' (Jensen and Morita 2016: 620). The ongoing legacy of the Hauz Khas lake seems to substantiate these claims as across the many centuries of its existence it has gone into disrepair and rejuvenation alongside the rise of various social and political forces. Originally called Hauz-e-Alai, the lake was built in 1295/1296 to supply water to the second city of what is now Delhi. As an organiser of heritage walks around the lake stated, this tank was important to its builders because, 'Delhi, even in the thirteenth century, had a major water problem.' Despite its initial significance, however, it fell into disrepair after the political dynasty that commissioned the structure was defeated. Roughly six to seven decades later, another ascendant Muslim ruler re-excavated and de-silted the tank while raising several buildings along with a madrasa (an Islamic theological college). He also established

harsh punishments for anyone found contaminating the water body, which he renamed ‘royal tank’ or Hauz Khas. In interviews, my interlocutors shared versions of this shortened history to underscore the value that was erstwhile placed on water storage and capture.

There are numerous factors leading to the lake’s contemporary decline. At least one report claims that the lake dried up in the late twentieth century because the drains that fed it were diverted to nearby construction work (Roy 2016: 74). Urban development added to the lake’s ‘misery’ such that it was no longer able to ‘hold water for long’ after the fall of the annual monsoon rains (Ibid.). Back when the lake’s reservoir was empty, the lack of water retention was a problem mentioned in my interviews because after the rains there was not enough water for mosquito-eating fish but there was enough shallow standing water to allow mosquito larvae to flourish. The months of August through to October were particularly irksome as the mosquito population thrived. While the rate of malaria was relatively contained at the time, newspaper reports spoke of a dengue epidemic that municipal officials were hoping to keep quiet in order to not alarm Delhi residents or the influx of tourists. As standing water in the post-monsoon season is often seen as the culprit for the spread of such diseases, the municipality regularly attempts to dry out untrusted pockets of water and fumigate the areas with high mosquito populations.

Histories of the lake’s treatment by pre-colonial and British rulers also help to explain some of the reasons for the decline of Delhi’s historical water catchments. These reasons include the ‘technopolitics’ that shape how infrastructures come into being as well as the biases and ideologies of Enlightenment-era modernity that influence their maintenance, or the lack thereof (Larkin 2013: 330-332). Notably, the British were highly suspicious of the many above-ground water stores that they encountered after their arrival and were alert to the constant threat of mosquito-borne illnesses such as malaria. When they shifted the capital of India from Calcutta (Kolkata) to Delhi, they chose to fill in marshy land and even some small

reservoirs. In their place, the British dug temporary trenches and laid pipes for running water through the mediating materials of 'stone, brick, and iron' thought to be the 'only guardians to which the purity of water could be entrusted' (Sharan 2014: 34).⁸ Under this water management approach, 'Piped water was a harbinger of modernity, with new centralised waterworks providing an alternative to publicly and privately-owned cisterns, wells, and pipes...' (Ibid.:22). Collectively, these projects slowly refashioned space in the colonial image by prioritising colonial knowledge and science above pre-colonial resource and landscape management practices (Legg 2007; Prakash 1999; Gilmartin 1995).

The emphasis on building large centralised infrastructures that achieve 'modern' standards continues into the post-colonial present.⁹ To illustrate this, a former employee of a prominent environmental NGO spoke to me of the biases and political priorities of Delhi's elected officials—people who he blamed for letting urban water catchments fall into decline. To provide an example, he spoke of witnessing a politician making empty promises to several youths who publicly implored that his government install sustainable technologies. The politician later expressed his feelings over a shared cup of tea by saying, 'These kids, they don't understand politics.' As the politician explained to my interlocutor, if elected officials do not oversee what he termed 'icons of development'—such as new water canals, water lines, and water treatment plants—they fear that people will not vote for them in the next election. The result of this thinking is that long-term solutions are overturned in favour of short-term political calculi. In the process, proactive measures, such as the revitalisation and expansion urban water catchments, are overlooked because they are not 'modern' enough

⁸ Many of these pipe-laying efforts were done under the umbrella of the 'Anti-malaria Works' program (Legg 2007: 170).

⁹ As Larkin (2013) has also explained, many of today's infrastructure projects are 'copies' that are 'funded and constructed so that cities or nations can take part in a contemporaneous modernity by repeating infrastructural projects from elsewhere to participate in a common visual and conceptual paradigm of what it means to be modern' (333).

to make citizens feel that 'development' is being achieved. When such decisions happen writ large, they further contribute to the political ecology of water's management because, as Farhana Sultanta (2013) explains, 'Water technologies are developed, rolled out, reformed, dismantled, and redesigned in various ways through the social histories of place, networks of power, and discourses of development' (343).

(Re)Imagining Urban Catchments for the 'Smart City'

Despite the antecedents leading to infrastructural decline and the frequent prioritisation of 'modern' development projects, recent debates in public, political and scholarly sectors are adding momentum to the revival of pre-colonial water infrastructures. The utility of reviving older water catchments, for instance, is now recognised by the Government of India in several policy documents. This recognition has been incorporated into numerous programs such as the Smart Cities Mission, which runs from 2015-2019. While the government's framing of a 'smart city' acknowledges that definitions vary, they contend that, for their purposes, the Smart Cities Mission's objective is to 'promote cities that provide core infrastructure and give a decent quality of life' while providing a 'clean and sustainable environment' (Government of India 2015: 5).¹⁰ The government document further states that the promotion of 'adequate' water supplies is the first criteria for their 'smart city' initiatives. The call to expand urban catchments in order to promote more sustainable means of urban water management complements suggestions in India's National Water Policy (Government of India 2012: 10). Yet, even as these policy gestures appear proactive, they obscure the significant challenge of implementation. As critics of India's smart city mandate have discussed, the nice sounding efforts made by governments are often not

¹⁰ The United Nations Economic and Social Council (2016) contends that a smart city is an 'innovative city' that provides adequate urban infrastructure that meets the increasing pace of urbanisation while responding to the 'sustainable development needs of society' (3-4).

accompanied by clear roadmaps for ‘how to build and maintain smart infrastructure’ in ways that also address the pre-existing problems that have contributed to inequitable resource provision (Kumar 2017: 35). They do not, in other words, necessarily serve as a corrective for inequitable water distribution, which is a key political ecology concern.

It is because of the currently unmet potential to ‘upscale’ urban water catchments for the ‘smart city’ that an architect living in South Delhi now spends much of his time instructing others on the need to harness the engineering and architectural feats of past urban water catchments for the revitalisation of urban water management. As we poured over books filled with colourful images of northern India’s many water features while conversing at his home, he argued that these older structures showed ingenuity that worked in ‘harmony’ with readily available resources. If you look at what was built hundreds of years ago, he explained, the structures and technologies were designed with the ‘specific topography’ and the ‘specific climate’ of the region in mind. In his estimation, the brilliance of the earlier interventions was that they tried to maximise ‘whatever tools and materials were available around this space’. He took the example of the Hauz Khas lake and the madrasa to state: ‘They needed stone to make the madrasa. But they (also) needed water for the madrasa. So, they dug a hole and whatever stones they got from that hole they used to make the madrasa. And that became the lake. So, there was a lot of symbiotic relationships... things like what sustainability (and) “new age science” is trying to talk about these days—things like “closed loop systems” or “local renewable resources” or “low energy footprint”—these things were really inherent in these technologies.’ It is in this way, he clarified, that these historical structures offer a model for Delhi’s efforts to build a smarter infrastructure for the aspirational ‘smart city’.

For the architect, who studies and teaches about water catchments past and present, there is a need for an integration of ‘traditional practice’ and ‘new technologies’. Instead, he sees a polarisation because the contemporary popular opinion was that ‘either you are

“orthodox” or you are “modern””. He qualified that ‘Obviously, lifestyles have completely changed’ and to just revive the old structures ‘would be an incorrect thing’ to do. All the same, he said, we need to learn from the past in order to see what is useful in today’s context. To achieve this, the municipality should avoid putting in ‘very universal global technologies’ that are ‘just supplanted into different areas without looking at the local issues’. If the government were to think more specifically about what is needed for the urban topography of Delhi, he argued there would be a lot of potential to improve water access, supply, and sustainability in ways that align with the ‘smart city’ mandate. ‘Unfortunately,’ he remarked, ‘it is not being looked at like that. The traditional aspects are going in a different way and the smart city aspects are going in a different way.’

Many commentators agreed that not enough is being done to maximise urban water catchments and the potential for improved water stewardship that it holds. The head of a non-governmental organisation, who is a longstanding critic of Delhi’s water policies, strongly criticised many of the existing water management protocols while arguing that the government is not doing enough to make sure that urban water catchments are upscaled in ways that would fulfil the ‘smart city’ mandate. If they were serious about refashioning the municipal and centralised approach to urban water management, he argued they would already have done more to overhaul the existing infrastructure. An additional water expert I interviewed labelled the policy documents promoting urban rainwater harvesting and the revival of urban water catchments ‘a bunch of hot air’. He claimed that the ‘smart’ water provisions listed in policy documents amounted to little more than a bureaucratic paper trail. This insight parallels Mathur’s (2016) detailed criticisms about the failings of an Indian bureaucracy that through toothless written dictates perpetuates itself as a ‘paper tiger’.

The Return of Water to Hauz Khas Lake

The lament that the Delhi municipality has done next to nothing to implement water catchments and rainwater harvesting may be a bit overstated. The Hauz Khas lake, for instance, is a key example of where this has taken place. Nowadays, a notable change greets my senses on every return to my old neighbourhood: the Hauz Khas lake is refilled. The recharged reservoir is a balm for the senses on Delhi's hotter days, despite the greenish hue of the algae-filled waters. The lake also balances the visuals of the historical landscape because its waters run close to the base of tourist-packed ruins.

<Insert Figure 3 Around Here>

At first it was unclear how, or why, the lake was returned to a semblance of its former glory. The residents I spoke with seemed vague on the details and some said outright that they knew nothing about it. Most official accounts point to the success of a program known as the Hauz Khas Lake Restoration Project. Executed by the Natural Heritage Division of the Indian National Trust for Art and Cultural Heritage (INTACH) and the Delhi Development Authority (DDA), the project used recycled water from a neighbouring sewage treatment plant to fill up the 700-year old lake, which Deya Roy estimates lay dry for forty years (2016: 73). In her assessment of the project, which she describes as 'combining history and nature', she discovered that groundwater levels in the surrounding settlement went up by 10 to 15 feet within a few years of the lake's revival (Ibid.: 78). Others note that previously dry borewells even started to function to the extent that several hand pumps in neighbouring areas regained functionality (Singh and Bhatnagar 2012: 10).

Beyond the benefits of groundwater recharge and the 'smart' reuse of 750 million litres of greywater, the lake also was estimated to have caught nearly 1,000 million litres of rainwater from 2008-2014 (Roy 2016: 76). The amount is roughly equivalent to a day's water

supply demand for the estimated 17 to 22 million residents of Delhi (Vinayak and Sewak 2016: iii). This is a striking feat when one considers the small size of the catchment area (.058 square kilometres) relative to the expanse of the metropolis (1,484 square kilometres). It is also remarkable that the recharged groundwater eliminated residents' need to purchase supplies from water tankers. This reversal of water woes underscores how, even when confronted with development, pre-existing urban catchments 'can retain an impressive amount of integrity' as well as functionality (Singh and Bhatnagar 2012: 12). The data additionally supports an assertion that 'water crises' do not have to characterise life in Indian cities; through proactive efforts, at least some of the water stress experienced as a result of extractive practices can be amended (Johnston 2005; Mehta 2005; Wutich 2011; Wutich and Brewis 2014).

Alongside an improved groundwater balance, the Hauz Khas Lake Restoration Project has reportedly improved the biodiversity and utility of the landscape. Now that the lake is restored, observers have spotted previously unseen creatures such as bill ducks, pochards, mallards, shovelers, grebes, gadwall goose, and black-winged stilts and pintail ducks (Roy 2016; Singh and Bhatnagar 2012). The presence of these birds has added further appeal to the park surrounding the lake, resulting in a rise of visitors who can be seen walking, jogging, socialising, and even doing yoga (Roy 2016: 76). When I spoke with these recreationalists, interlocutors stressed how the addition of water to the landscape had turned a barren concrete bowl into a 'calm' and 'serene place', one in which visitors could find 'refuge' from the stressors of the city. Their commentary recalled the insights of Strang, who observed that our engagements with water combine 'direct consumption... along with sensory experiences that are immediate and intense' (Strang 2009: 31). These sensory experiences have the power to 'enable affective relationships between people and places' (Ibid.), leading to renewed revisions of how water can and should be treated.

<Insert Figure 3 Around Here>

The return of waters to the Hauz Khas lake has also had economic implications. The upswing in activity around the lake overlapped with a change in the middle- and upper-class fortunes that contributed to this enclave becoming a ‘monster of mass consumerism’ (Bernroider 2015: 5). One sign of this was that in 2016 the American Chief Executive Officer (CEO) of a prominent ‘share economy’ business known for revolutionising the accommodations sector spent several nights in the neighbourhood to promote the company by using a hand-picked sublet. Coincidentally, my landlord was the lucky owner of the featured sublet. Grinning with pride, he informed me that it was the ‘heritage’ finishes of the unit, the ‘quaint’ setting alongside Sultanate ruins, and the added bonus of a picturesque lake that gave the apartment the ‘charm’ that the company sought to highlight as a means to promoting their business in India. That an American CEO with a net worth of several billion USD chose to stay in a repurposed apartment in what had once been a modestly equipped and water-scarce settlement spoke to the possibilities for the revitalisation of historically significant urban infrastructures, and of contemporary urban ‘nature’. The public relations campaign associated with the CEO’s visit also highlighted to dramatic effect how much the neighbourhood had changed from when residents struggled to keep full buckets of water.¹¹

Despite the positive evaluations and affectively rich statements that interlocutors provided in their comments about the revival of Haus Khas lake, the evidence indicates that the project has served to bolster the kinds of middle-class and bourgeoisie environmentalism that scholars have cautioned against prioritising in projects of urban revival (Baviskar 2003;

¹¹ Commenting on the transformation, an interlocutor described the revitalised Haus Khas lake as an ‘oasis in the middle of Delhi’ and an ‘eye opener’ for the beauty that can be found within one of the world’s largest (and most polluted) cities.

Mawdsley 2004; Dupont 2011). In the case of the Hauz Khas lake's revival, it is telling that the project of catchment revitalisation was executed in a predominantly high-income area, especially when there was little evidence of public demand for the project. This is striking when we consider that few, if any, projects of the same size and scale have been undertaken in the lower-income areas of South Delhi, such as Mehrauli, even when there have been sharply worded conservation demands from a range of historians, architects, and water experts.¹² It is also revealing, as a resident shared while asking for anonymity, that several restaurants and bars located near to the lake were illegally depleting the replenished groundwater to make up for an inconsistent municipal supply that still only flows to the enclave for four hours a day. This disclosure adds further evidence to indicate that the benefits of enhanced water stewardship were not evenly shared.

Upon reflection, the revitalisation of the Haus Khas Lake demonstrates that water capture practices are influenced by the similar kinds of power relations and imbalances that we see in the management of urban water flows (as per Loftus 2009; Swyngedouw 2004). Even in the case of catchment revival, water and politics intersect to shape differential access and outcomes among diverse social groups, leading to the production of 'uneven waterscapes' (Budd and Sultana 2013: 275). Such observations situate urban catchments within the broader scope of India's water politics. In the process, these uneven waterscapes also illuminate the political ecology of water management solutions.

The Promise and Politics of Urban Water Capture Revisited

¹² As Sohail Hashmi commented, many of the water bodies located in lower-income areas have 'been quietly erased from existence and from memory, filled up and built over, without leaving a single trace that might betray the fact that they ever existed' (Hashmi 2013: 1).

Even though social scientists have skilfully examined the appropriation and extraction of upstream water catchments to satiate voracious urban water demands, I suggest that we can learn a good deal about the prospects for creating better cities by exploring the opportunities and challenges involved in the effort to expand urban water catchments. This involves a move from ‘pipe politics’ to what we might term ‘catchment politics’ or the ‘politics of water capture’. The scope to explore such politics is especially ripe in regions where past water management infrastructures are upheld as ‘wiser’ ways of using resources.

In looking at the impact of particular projects within Delhi, I have been particularly attentive to class-based interests in order to demonstrate why urban water catchments cannot be praised as ‘silver bullet’ solutions to the water woes that cities experience unless there is enough political will to champion them evenly and equitably. Although I have used the Hauz Khas lake to demonstrate how the revitalisation of past infrastructures can make meaningful improvements to the water balance and biodiversity of an Indian city, I have also uncovered the political-economic rationales and uneven outcomes of such a seemingly proactive project. These insights I have set in contrast with the decline of other similarly ‘wise’ water features that have not received the same attention. The relative neglect or rejuvenation of historical infrastructures demonstrates how the effort to improve ‘inclusive’ water management and access can retain an ‘elusive’ character (Walters 2016: 173).

To conclude, the efforts to expand urban water capture can shed important light on the challenges of promoting water stewardship because their study helps identify the socio-economic motivations and political calculi that can allow for site-specific interventions without necessarily leading to the prolific augmentation of solutions that would require infrastructural overhauls across the city. This work allows us to critically evaluate why measures upheld as ‘smart’ are not easily implemented in the contemporary urban landscape. Such interrogations also lend themselves to urban political ecology analyses that highlight

how the contested waterscapes of the post-colonial city are linked with ‘power-infused’ struggles that span multiple cultural, social, economic, and temporal domains (Cornea et al. 2016: 406; Swyngedouw 2009: 56). When complemented by data attained in anthropological studies of water, the invocation of political ecology further underlines the reproduction of uneven patterns of access, distribution, and benefit that are evident even in efforts to improve urban water capture and urban water stewardship.

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