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Hydraulic standby: Anticipating water in Mexico City

Anke Schwarz

abstract

Even in cities where taps are installed in virtually all homes, this is no guarantee of water. The transient character of hydrological landscapes is evident in Mexico City, where water provision is non-permanent in one third of all dwellings. This article investigates hydraulic standby as a form of organizing, exploring modes of standby for water through the lens of anticipation. Sensing and buffering – terms borrowed from cybernetics – are identified as key practices and modes of hydraulic standby that are guided by a logic of precaution and preparedness. While sensing organizes the relation between sensory input and response, buffering refers to the collection of water in anticipation of future shortages. The article draws on 53 individual interviews and other empirical fieldwork conducted in two boroughs of Mexico City. It argues that futures are rendered present in a disparate manner across diverse urban settings, with standby taking on a classed and gendered character.

Introduction

It was a Tuesday when Mexico City's water supply system first came to directly influence my own research agenda. Looking for interview partners in one of the older, self-built and long-since formalized settlements in the southeastern part of the city in the spring of 2008, I found that none of the women I spoke to were available on Tuesdays. It emerged that this was the day 'when water comes'. Census data showed that the entire neighborhood

was connected to the water network, so I became curious. What were people doing 'when water comes', and how did it alter the rhythm of their everyday life? In this article, I use the term 'hydraulic standby' to close in on a range of social practices involved in the anticipation of water in Mexico City. Standby certainly seems to be a time-consuming activity, with Merriam Webster's dictionary defining it as 'to be or to get ready to act'. This mode is not induced by a lack of hard infrastructure, or piping – most homes in Mexico's Federal District[1] are connected to the water network, and taps are omnipresent. Yet in many places, water is pumped through municipal pipes only on certain days or during certain hours of the day, with domestic water taps falling dry in the interim. Intermittence is documented through multiple sources, from activist and academic field work to census-based statistics and official statements by the Federal District's public water utility *Sistemas de Agua de la Ciudad de México* (SACMEX, 2013). Generally speaking, tap water supply is non-permanent in about one third of all dwellings in Mexico City's Federal District, and in a larger share of the surrounding parts of the metropolis (INEGI, 2010). As a result, taps, tanks and people stand by in anticipation of water. The way in which this hydraulic standby is organized involves a vast and at times ruptured infrastructural network, a host of specialized devices, and multiple human actors. SACMEX' engineers, vendors of rooftop tanks and bottled water, and drivers of off-grid water tankers are all working to mobilize water while residents employ a range of more or less sophisticated domestic devices to ensure water availability despite intermittence.

Hydraulic standby: Concepts and methods

This paper focuses on the structuring of residents' everyday life by in/active water taps, taking my earlier work on domestic water use in Mexico City as a point of departure (Schwarz, 2017). I draw on Ben Anderson's writing on

[1] Housing roughly half of the Mexican capital's 21 million inhabitants and the more centrally located boroughs, the *Distrito Federal* was recently renamed. Confusingly, it now runs under the official title Ciudad de México (CDMX). In effect, this created two overlapping yet distinct entities with regard to governance and law – both of which are known as Mexico City.

affective materialism and anticipation (2004, 2010) to reach beyond a policy-oriented framing of individual and collective practices as coping strategies[2]. With Anderson, I will argue that hydraulic standby is guided by a logic of anticipatory action, something he conceptualizes as 'acting in the present on the basis of the future' (2010: 778). Thinking through anticipatory action deliberately breaks with a logic of risk by abandoning any attempt at precisely calculating future uncertainties, instead moving into the realm of imagining and performing futures (*ibid.:* 790). Approaching the notion of standby through a lens of anticipation seems particularly useful to reflect on the processes set in motion by the in/activity of water taps, and urban infrastructures more generally. As such, standby is not passive or effortless but actively performed; it is a manner of ordering people, water and technology in a way that renders a more desirable future present. Anderson outlines three forms of anticipatory logic: precaution, preemption and preparedness (2010: 788 ff.). Put simply, precaution is based on preventative action before an identified threat (or event) in process has become irreversible (*ibid.*: 789). Climate change mitigation with its language of tipping points is a prominent example. Preemption enters a different time frame, as it 'acts over threats that have not yet emerged as determinate' (*ibid.*: 790). Both precautionary and preemptive logics are thus focused on an actual (precaution) or potential (preemption) future threat. Preparedness moves to an entirely different plane, as it refers to 'the development of capabilities and resiliences that will enable response after an event has occurred' (*ibid.*: 792). Rooted in non-representational theories (Thrift, 2008), this conceptualization is inspired by debates about preparedness (Lakoff, 2007; Collier and Lakoff, 2015) which are ongoing in the context of critical security studies. Here, the concept of stockpiling in particular has been framed as a 'technique of preparedness' (Keck, 2017; Folkers, 2019). Both a logic of precaution and of preparedness play a central role in Mexico City's hydraulic standby, as will be discussed in this paper.

Hydraulic standby unfolds against the backdrop of a solid body of literature on the geographies of infrastructure. On urban water, the debate is framed,

[2] As is common in the context of environmental risk, vulnerability, and resilience studies (e.g. Blaikie et al., 2004; Cutter, 2012).

for example, in terms of an urbanization of nature and its links to ideas of development, modernity, space, and technology (Swyngedouw, 2004; Kaika, 2005), in terms of citizenship, recognition and social struggle (Castro, 2006), and in terms of water governance, privatization and financialization (Bakker, 2007; Furlong, 2016). Hydraulic infrastructures have been widely discussed in the urban studies, economic and political geography fields ever since Stephen Graham and Simon Marvin's seminal *Splintering urbanism* came out in 2001. At the heart of their book is the idea that infrastructures are not only reflective of social relations but also shape and reinforce disparate dispensations of power. This is where the present paper contributes to the debate, adding insight on the affective dimensions of infrastructural experience, and heeding Jessica Budds' call to 'move away from thinking of water as a resource that is external to social relations, towards one in which social relations are embedded' (Budds, 2009: 420). To grasp the ephemeral, fleeting, unstable nature of sociotechnical systems such as a metropolitan water supply network, research on urban infrastructures often draws on STS and assemblage thinking (e.g. Graham and McFarlane, 2014). Nikhil Anand combines these perspectives in his work on Mumbai (2017), investigating the ways in which water services act as a site where urban inequality is produced and reproduced. Following the idea that urban water networks are fragile and in constant change, subject to gradual expansion and contraction, he argues that infrastructures 'are not smooth surfaces that perform as planned; instead they are flaky, falling-apart forms that constantly call out for projects of management, maintenance, and repair' (Anand, 2015). Hydraulic standby falls squarely into that realm of water maintenance and management, extending the sociotechnical network beyond the tap and into the home.

I conducted the empirical fieldwork underpinning this paper between 2012 and 2014 in two boroughs of Mexico City (Schwarz, 2017). Densely populated Iztapalapa, to the Southeast of the CDMX, is the product of a swift process of mid-20th century industrialization and popular urbanization (e.g. Azuela de la Cueva, 1991; Salazar Cruz, 2012). Along with former villages, public housing estates, prisons and major thoroughfares, it features a large housing stock in *colonias populares*, famously documented in Larissa Lomnitz' 1976 book. Iztapalapa is considered one of the poorest boroughs in the Federal District, and is infamous throughout the city for its supply disruptions and low tap

water quality. Cuauhtémoc, in contrast, constitutes the historic city center and its surroundings, and is made up of buildings dating back to the colonial period, as well as governmental offices and other public institutions, specialized retail, and pre-modern as well as modernist housing estates of all shades and qualities from run-down to solidly middle-class. Both areas, home to roughly half a million (Cuauhtémoc) and two million inhabitants (Iztapalapa) respectively, are of interest from a comparative point of view. They could be assumed to represent the urban center and semi-periphery – though Iztapalapa is by far not as peripheral as other, unserviced parts of the metropolis sprawling out into the adjacent Estado de México. In any case, Iztapalapa is often described as the literal 'Other' to the downtown area, which is – supposedly – well-serviced, formal, and at the center of governmental attention.

The fieldwork sought to trace these urban representations, imaginations and materializations with respect to water and water uses in six neighborhoods per borough. The research design consisted of 53 semi-structured individual interviews covering material, perceptional and imaginary dimensions of domestic water use, and four focus group discussions with a total of 46 participants. Additional methods such as habitat biographies covering past and present housing conditions, and photo documentation of water-related devices in each household were also applied (Schwarz, 2017: 53 ff.).

Drawing on this research, the present paper focuses on the ways in which Mexico City's in/active water taps order everyday life. The focus is on sensing and buffering as forms of organizing. Which forms do these dimensions of hydraulic standby take? What is the nature of their ingrained anticipatory logic? How do they render possible futures present across diverse urban and social settings? I will pursue these questions in the following five sections. The two main sections address sensing (3) and buffering (4) of water as two characteristic modes of standby, followed by a reflection on the findings (5), and a short conclusion (6).

Modes of standby: Sensing

The following sections trace two modes of hydraulic standby in Mexico City. I employ the terms sensing/sensors and buffering/buffers, borrowed from cybernetics, to highlight the sociotechnical character of the respective practices. Before we turn to definitions, a quick contextualization. Why is there any need for anticipatory action as regards water in Mexico City? Hydraulic standby seems to be motivated, first and foremost, by regulated intermittence, or water rationing, which is a widespread form of non-permanent supply. In contrast to spontaneous supply disruptions – which have been tied to multiple causes, including damage to water mains, leakage, variations of pressure, and sabotage – rationing is formally presented as a highly regulated form of water time. There are official rationing schemes called *Programa de Tandeo*, set up by SACMEX in collaboration with the city government (SACMEX, 2013). Much like a timetable for public transport, the 2013 spreadsheets, for instance, neatly list all 278 officially affected neighborhoods, each with their respective service hours. Take ID 74, San Miguel Teotongo Sección Acorralado: Three times a week, there should be 18 hours of water provision followed by a six-hour break. On the ground however, this formal impression quickly unravels. The official program turns into a façade, as service schedules often do not translate into actual supply rhythms at the point of use. My interview partners report that in the listed neighborhoods and many other areas, people and devices stand by for water several times a week. Yet only local experience would provide a hint as to which days of the week that might be. Rationing therefore quickly gains a more spontaneous quality then these orderly spreadsheets seem to indicate. It would seem that such intermittence – or 'nonperformativity of the water system' (Schwenkel, 2015a: 528) – reflects the incremental and ephemeral character of infrastructure itself.

Spectacular infrastructure, Christina Schwenkel argues in her work on a modernist housing complex erected in the late 1970s in Vinh City (Vietnam), is the site where modernity and state power are visibly performed. Yet this spectacular infrastructural performance ultimately fails when residents are no longer 'able to see and hear material betterment' (*ibid.*: 527). A sensory dimension is central to this experience, as the absent sound of water flushing through the pipes turns into a symbol of a breakdown of the 'utopian ideal of

universal access' (*ibid.*). Standby appears to be at the heart of the stuttering performance of fragmented modernity that is intermittent water supply:

> Twice a day (…), the abrupt sound of water racing through the pipes signals to residents to open their valves and shut them off. (…) a good ear can tell when a tank is near-full, when the distant echo of water filling an empty vessel begins to fade, before it spills over and inundates the unit. (Schwenkel, 2015b)

Such human expertise and acquired skills are central to sensing as a mode of standby. In cybernetics, sensors are defined as 'any element or subsystem in a system which picks up some kind of information' and is typically 'attuned to some specific kinds of inputs' (François, 2011: 528). Sensing as a mode of standby is relevant to the management of complex systems as it organizes the relation between sensory input and response. With respect to hydraulic standby, this 'reformulation of attention and distraction into interactivity' (Halpern, 2015: 17) relates to the ways in which flows are detected and water is collected as a way of administrating water beyond the tap. The link between sensory input and response not only appears as 'a bodily reaction to lived reality' (Larkin, 2013: 336), infrastructures also 'create a sensing of modernity' (*ibid.*: 337). This act of sensing – and making sense of – infrastructural conditions is integrated into everyday life, and orders it in certain ways.

Sensors stand by until water starts flowing from the tap, which then trigger a set of buffering actions. This converts sensors into buffer managers. Whether in Vietnam or Mexico, sensing seems to imply that residents are caught in a limbo of in/activity while paying attention to multiple sensory indicators. Taste, smell and sound were commonly mobilized as indicators by the people I spoke to in Mexico City. Olfactory and gustatory sensations serve as indicators of the (non)potability of tap water, and water quality in general. Water that smells, tastes or looks 'off' was generally interpreted to indicate low quality – the expectation being transparency, odor- and tastelessness. As Fabiola, a writer and tenant living in the city center had it, taste is a matter of equality as well as of quality:

> [Tap water] has a strange taste, like, I don't know if it is of chlorine? Anyway, it's not a pleasant taste. Therefore we prefer to buy purified water (…). That's

> a problem, because everyone should have access to potable water without having to pay for it all the time. (Fabiola, E37: 38-40, Cuauhtémoc)[3]

As relevant as taste is for gauging water quality, sound is the key to water flows, and consequently for most sensing techniques. Acoustic sensing is the principal element in keeping track of water flows and topping up tanks, as one of my interviewees made clear. Berta, an accountant and tenant from Iztapalapa, described this acoustic monitoring mode in the following manner:

> Those black roof-top tanks are above (…) my bedroom, you can hear when water starts to flow. (…) At dawn, I keep listening, listening, I wake up, that's how I am at daybreak. (…) I recognize when the tank is about half-full; I then get up, open the water tap and begin to set water aside. (Berta, E29: 78, Iztapalapa)

This account reveals the idling, energy-sapping nature of acoustic sensing. As sensor, Berta displays a degree of inner tension, alertness, even uneasiness during hydraulic standby – alluding to an emotional state somewhere between hopeful expectation and something more reminiscent of resignation. Prominent Mexican writer (and civil engineer) Vicente Leñero provides an impressive sensory record of such tense moments of standing by in his 1983 autobiographic novel *La gota de agua*:

> During the droughts of '79, of '80, of '81, the roof-top tanks (…) were empty by mid-morning, and water did not resume ascending to them for the entire afternoon. But when night fell, at about twelve or one in the morning, the characteristic thunder in the ducts, the noise of hammer strokes, categorically announced the resumption of supply. Sometimes I woke up hearing the stream as it filled the toilet's water tank and sometimes I couldn't fall asleep until I heard it. (…) my insomnia had the length of the waiting: My God, when will the pressure increase? When will water come? (1983: 13)

This standby labor – efforts being made to anticipate the arrival of water – is a learned technique, sharpened by experience over a period of time. Even bottled water vendors can be traced through such acoustic indicators, calling out *el aguaaaaa* in characteristic intonation while passing through Mexico City's neighborhoods. Acoustic markers of different street vending activities

[3] All translations from Spanish to English are by the author. Material from interviews conducted by the author is marked as E1, E2 etc.; interviewees' names have been fully anonymized.

can be traced back to pre-colonial times and are kept alive through everyday performance as well as preservation, to the point that the Mexican National Sound Archive keeps an audio library[4] of 'endangered sounds'. It could be of interest to study this phenomenon more in depth elsewhere, as this would indicate that standby could indeed have pre-modern roots, predating the modern infrastructural ideal and its (non)performativity.

While human sensors lie awake, listening intently for any sign of water flow, automatic float valve mechanisms that are installed in cisterns and roof-top tanks, do a similar job. Monitoring predefined water levels, they trigger the opening of valves and/or the activation of electric pumps. Once a sensor triggers, announcing a potential water flow, storing of water – or buffering, as I call it here – is implemented. Along with acoustic indicators, hydraulic standby can also include a frequent monitoring of faucets, or as Guadalupe, a domestic worker and homeowner had it, 'checking the tap to see at which hour' water supply might resume (E3: 359, Iztapalapa). Monitoring techniques allow people to start filling tanks once water begins to flow and thus attempt to exploit limited provision periods to their full extent. In my interviews, it was typically the oldest woman in the household who was responsible for this strategic work of standby.

There is often another affective layer involved: A sense of abandonment strongly reminiscent of Anand's 2017 analysis of Mumbai, where water flows come to reinforce people's self-image as deserving/undeserving citizens. When asked about the logic of disparate patterns of water supply in Mexico City, Dolores, a 63-year-old domestic worker living in a small flat in an Iztapalapan housing complex with her two daughters and five grandchildren, told me with conviction: 'You should understand that we are the forgotten, and only filthy, yellow water gets here' (Dolores, E3: 113). Infrastructural shortcomings and absences are interpreted as symbols of classed and gendered rejection, of a lack of recognition, of low social status on an individual and collective level. Those who were subject to infrastructural absence or shortcomings read it as both a product and a condition of their marginalization. Others expressed feeling that they were treated unfairly,

[4] https://rva.fonotecanacional.gob.mx/fonoteca_itinerante/oficios.html, accessed November 10, 2019.

humiliated and even punished amidst severe, longstanding limitations in water supply in their neighborhoods.

> Why do they punish us so much? (…) It's all under control of the borough, you see. (…). People waste a lot, so I'm not so much against the rationing (…). The goal is less wastage (…), that's good, but the punishment is not very even. (David, E11: 73-77, Iztapalapa)

A retired engineer and homeowner from Iztapalapa, David seemed to interpret supply disruptions as a form of state control charged with unequal positions of power. Water rationing takes on an almost educational quality in his account, something that was also mirrored in other interviews. Here, sensing extends beyond the anticipation of the materialization of water flows to an exploration of meaning: 'making sense' of infrastructural absences.

Modes of standby: Buffering

Hydraulic standby moves on to the next stage once a flow of water is detected by a sensor. Buffering as a mode of hydraulic standby refers to the collection of water in anticipation of future shortages. In cybernetics, buffers are defined as 'stores which use either space (…) and/or time (…) to modulate the effects of variations in the flow of whatever it is the particular system handles (…) by smoothing out extreme behaviors' (Glanville, 2003: 171). The *International Encyclopedia of Systems and Cybernetics* adds that buffers are devices 'to allow asynchronous communication' (François, 2011: 72). Such asynchrony is the defining feature of the water buffer. It organizes water flows in way that buffers against expected and unexpected changes in volume and pressure, thus preventing the effects of shocks and decline, unexpected, sudden or incremental events. The literature distinguishes between storage and stockpiling: 'While storage traces bottlenecks in the past, as sites where intervention would have been possible (…), stockpiling projects it in the future, as a space for mitigation' (Keck, 2016: 4). Both techniques of preparedness tend to be present in hydraulic standby in the form of buffering, but with an emphasis on stockpiling. The future is made present in the buffer by way of anticipation, as the potential threat or event – a dry tap, a lack of water – is known; the only unknown is the timing or rhythm of the onset of said event. The stockpile, according to Andreas Folkers, 'creates a reservoir of

frozen time as a buffer and bridge against interruptions of time-critical circulations' (2019: 2).

Three types of buffering are briefly introduced here, all of which involve projections in time into the past and future, to differing degrees. In Mexico City, fresh water and bottled water mainly serve as buffers in the sense of stockpiling, whereas grey water is stored with a view to both the past (reuse) and the future.

Fresh water

Mexico City's water fresh buffers cushion against fluctuations in water pressure and typically take the shape of roof-top tanks, cisterns, and barrels. As pace-makers and resting places, specialized and repurposed devices provide rhythm and permanence to water within the home. The simplest way of buffering is to collect water in smaller, mobile devices such as buckets, barrels and tubs of all sizes and materials. A more complex way to manage intermittence is the installation of a more or less sophisticated interconnected system of internal piping, roof-top tanks, cisterns, pumps, and floaters, all of which stand by to manage any eventual water flow by capturing, storing, pressurizing, and distributing it to the point of use. Such systems can be fully automated (yet still require a degree of control and maintenance), or patchy and partial, requiring a higher amount of human intervention. Building up a reserve allows people to turn intermittent water provision into permanent water availability for domestic needs. Such permanency and stability is what Antonia, a middle-class tenant and tradeswoman longed for when campaigning for a large rooftop-tank to be installed in her apartment block in downtown Mexico City. Shocked by a previous disruption of water supply in her neighborhood that lasted several days, she was eager to avoid such unpleasant surprises in the future:

> I had never experienced a lack of water – and all of a sudden, there was not even water for the toilet. It was very traumatic (…) all the dirty dishes, and bathing yourself in any possible way. We even used bottled water to clean a bit. (Antonia, E20: 256, Cuauhtémoc)

Buffer installations literally make a difference, as tanks and cisterns not only serve as status symbols and signs of modernity. They have a very practical

meaning for those on standby, such as homeowner and housewife Alma who lives with her extended family in an unfinished self-built concrete building in Iztapalapa:

> Those who have a cistern don't need to be alert. But I don't have one, so I need to fill my tubs. (…) I get up; I almost don't sleep in order to fill them. (Alma, E9: 78-80, Iztapalapa)

With water supplied no more than once a week, and in absence of extensive, automated domestic storage systems, Alma also resorted to another technique of standby: the immediate use of water. Guided by the logic 'we run when water starts running' (E9: 299) – Alma and her daughter were in fact busy doing their weekly laundry by hand at two washstands in their courtyard during the interview. Others also did this in order to make the most of the limited provision period. Guadalupe, for instance, got up at six in the morning to do her laundry before leaving the house for her job as a domestic worker. The exhausting performance and effects of hydraulic standby including sensing and buffering are also illustrated by Dolores' report. She shared a memory from the late 1980s, at which time she was temporarily living at her mother's house in an underserviced neighborhood in southern Mexico City:

> They just had a little tap at the street corner, for everybody who lived in that block. (…) the [neighbor] who noticed that water started running – at twelve, one in the night – would inform all the others on the block. [… and] everybody lined up to fetch water (…). They worked all night gathering water, and instead of resting in the morning, everybody got ready and went to work. (…) The few times I got up to help my mother, my feet buckled as I fell asleep while on the bus in the morning, standing there, holding on to the handle bar. (Dolores, E8: 385-387, Iztapalapa)

Dolores' account is remarkable for its rare openness regarding the social impact reflected in residents' daily routines. The 'sensing' neighbor was at standby, surveying the tap overnight, alerting the others only once a flow materialized. It can only be assumed that this role was taken up in turns, in a rolling night-shift system of the neighborhood water sensor.

While water from the public tap was stored as a way of buffering water amidst intermittent supply frequencies, the strategy did not seem to make the women I talked to entirely independent of unpredictable supply patterns. Even where sensing and buffering are more or less automated within the building, things

may break or people act in unplanned ways, disrupting a smooth hydraulic performance. As water did not reach his building with sufficient pressure and needed to be pumped to the roof, Oscar, a retired porter, was 'on standby[5] so water won't spill' (E13: 34) from rooftop-tanks. Without an automated pumping system, he controlled the electric pump manually and was frustrated at the lack of care by the other neighbors. There appears to be a tension between the collective and the individual that comes to the fore when buffers are shared. Difficulties in obtaining enough water to fulfill domestic needs was mainly reported from households where women were the main income-earners and nobody was at home during the day. Both Dolores and Hilda, from two different modernist housing complexes in Iztapalapa, complained that neighbors were stockpiling during the day, depriving them of water from shared buffers:

> The average family in my building is (…) five or more people (…) water rises to the roof-top tanks and the families start to fill or launder or do things. That implies inequality: (…) those who come home later will not get the same pressure. (Hilda, E5: 228 and 336, Iztapalapa)

As an individual strategy, buffering hence sought to make flat dwellers less dependent on neighbors' rhythms of water use. Ironically, it also seemed to have a tendency to amplify this dependency by privatizing a bigger share of the common buffer. Others, such as Pablo, a middle-class resident in a newly built apartment block in the San Rafael neighborhood, appear to opt out from hydraulic standby altogether. He told me that he was considering moving house, weary of limitations in water availability. 'The city', he argued, 'is too complex to have these difficulties in your own home' (Pablo, E34: 304, Cuauhtémoc). Those who have a choice may thus seek to relocate to better-serviced areas rather than continuing to endure limitations or seek collective solutions.

Bottled water

According to recent industry reports, around 250 liters of bottled water are consumed in Mexico per capita per year – the highest average per capita

[5] The tension is clear in the Spanish 'estoy al pendiente', which could be translated as 'I am pending' or 'I am on the lookout'.

consumption worldwide (Rodwan, 2018: 20). Ubiquitous 20-liter-jugs known as *garrafones* are the most common source of drinking water in Mexico City. These reusable PET-containers are present in literally all kitchens, and bottled water is often employed not only for drinking but multiple other uses. It hence appears to serve not only as an alternative to tap water that is not considered to be of adequate quality for human consumption. Bottled water alsodoubles as a buffer when there is insufficient tap water for purposes such as food preparation and personal hygiene. Whether from local purification plants or transnational beverage companies, bottled water comes at a much higher absolute price when compared with tap water (Schwarz, 2017: 125 f.). A near universal mistrust of public authorities and by extension of tap water quality, seems to buoy this highly visible commodification of water (Hamlin, 2000). Stockpiling, with a view to possible futures, is quite evident in this case. Mexico City's garrafones effectively represent the smallest buffer unit of potable water, an essential part of everyday life. Even in households with permanent water supply, people tend to exclusively drink bottled water. In turn, not being able to afford bottled water at all times becomes a sign of precarity. Isabel's strategy for her family is a case in point:

> I have always accustomed my children to bottled water (…) and if we don't have any, well, then we drink from the tap. Their stomach has to adapt to both types of water – if your stomach gets used to only one type, it will suffer, with infections, with diarrhea. (Isabel, E21: 379, Cuauhtémoc)

A domestic worker, tenant and single caretaker in a low-income household from the downtown Paulino Navarro neighborhood, she stressed how important it is for people in her social position to condition their bodies to endure hardship. Conditioning her children's stomachs to endure (distrusted) tap water therefore follows not only a deeply classed logic, it also reveals how an anticipation of precarious future living conditions comes into play in current practices of water consumption.

Grey water

The gathering and reuse of grey water in the household represents a third type of buffering that is common in Mexico City. Tap water was captured by some of my interviewees after its first use in order to recycle (or rather downcyle) it for different purposes through a cascading scheme. This is, in Keck's sense, in

principle a form of storage, as it traces past bottlenecks and uses 'leftovers', expecting a repetition of water shortage in the near future. However, there are also elements of a logic of stockpiling, in the sense that the onset of a known threat (a future lack of running water) is mitigated by grey water reuse. Run-off from the shower, gathered in a tub in the bathroom to be used to flush toilets, or buckets full of laundry water, employed to wash floors, serve this purpose. Note how the required water quality decreases along the cascade as pictured in Figure 1, from more bodily to more technical uses.

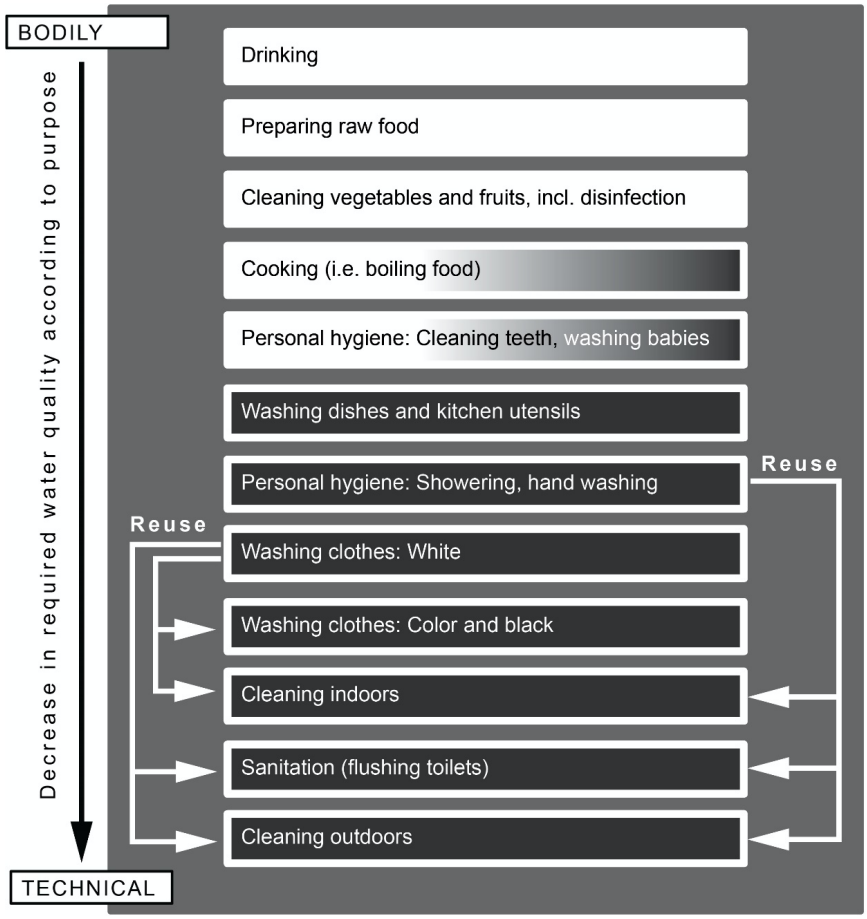

Figure 1: Cascade of domestic water use. Grey indicates predominant tap water use, white bottled water use. Source: Schwarz, 2017: 146

Reflection

As this paper has shown, sensing and buffering are common modes of hydraulic standby in Mexico City – yet how do they relate to future geographies? What is the exact nature of their ingrained anticipatory logic? With Ben Anderson, we can identify the ways in which hydraulic standby mobilizes anticipatory affects (2010: 783). The wait for water, in other words, involves anxieties, hope and despair related to making specific futures present while avoiding others. An anticipatory logic is defined by Anderson as 'a coherent way in which intervention in the here and now on the basis of the future is legitimized, guided and enacted' (*ibid.*: 788). Aiming to cushion fluctuations in volume and pressure, and alter the arrhythmia of water flows, sensing and buffering certainly extend into the realm of making futures present, aiming 'to prevent, mitigate, adapt to, prepare for or preempt specific futures' (*ibid.*: 779). Both a logic of precaution and of preparedness were found to inform practices of standby for water. Sensing as a mode of hydraulic standby follows an anticipatory logic of precaution, a 'decision to constrain or halt from outside a process and before that process becomes irreversible' (*ibid.*: 792). Sensing seeks to intervene in the process of running out of water, and it is done in order to start buffering at an adequate point in time, i.e. when water flows are sufficient. Buffering, in turn, follows an anticipatory logic of preparedness, enabling response after the onset of an event. In terms of hydraulic standby, that refers to accumulating water while it flows freely from the tap in order to build up a stock for those periods when the tap runs dry.

Despite the apparent passivity and stillness of standby, none of this is effortless. The exhausting and exhausted performance of standby points to an inherent tension, while also bearing glimpses of hope and despair. Again, it is Anderson who has explored the latent nature of boredom and found that it 'can be defined as a corporeal witness, felt through both the restlessness of a visceral sensibility and a stilling of our proprioceptive sense of movement, to a momentary suspension of, and in, the transitive autonomies of a banal, immanent, plane of intensity' (2004: 750). Such strain is certainly present in those standing by for water in Mexico City. As the effects of this forced-into-idling state are distributed unequally, possible futures are rendered present in disparate ways across diverse urban and social settings.

First and foremost, hydraulic standby orders everyday life differentially, reinforcing and materializing social and urban inequalities. As standby practices, both sensing and buffering have repercussions in other realms of everyday life, potentially disrupting ordinary rhythms and limiting personal autonomy. In the Federal District, this seemed to be a direct consequence of the absence of equitable distribution of water despite widespread connectivity to the water mains. Fluctuations in supply were mainly a matter of rationing imposed by the local water authority, displaying a spatial bias as centrally located boroughs were officially spared.

As in many other places around the globe, the modern infrastructural ideal – of advancing social progress through centralized and standardized networks including universal water supply (Graham and Marvin, 2001: 40 ff.) – has never been a reality for everyone. Yet, a binary center-periphery model does also not adequately capture Mexico City's fragmented infrastructural situation and disparate supply patterns. While Iztapalapa continued to be at a clear infrastructural disadvantage reflected in the experiences of its residents being at standby, the borough of Cuauhtémoc was not a haven of stability either. Effectively Mexico City's downtown, this heterogeneous assemblage of neighborhoods displayed a fine-grained differentiation of infrastructural conditions. Anticipatory logics of precaution and preparedness as well as the form of hydraulic standby were more a matter of social status than of geographical position within the city. At times, the conditions of hydraulic standby and other marginalizations were more similar between low-income residents of both boroughs than between neighbors. The domestic worker instructed to use water freely in her employer's flat in the inner city tended to face a wait for water in her Iztapalapan home at night. Meanwhile in an adjacent inner city neighborhood, others would be busy storing grey water for reuse to make ends meet. This adds to the literature which has shown how infrastructural breakdown reproduces classed and gendered inequalities as poorer women in particular bear the brunt of extra work (see González de la Rocha, 1994; and for water infrastructures in particular, Bennett, 1995; Sultana, 2007). An additional load of time and effort spent on securing water availability for the entire household is thus manifest not only in locations that are devoid of any type of piped water whatsoever but also in a fully connected, highly urbanized setting where hydraulic

standby is common. By imposing a certain timing of buffering activities, the arrhythmia of water provision in Mexico City collided with daily routines, depriving people of rest and recovery. The examples of Berta, Alma and Dolores are cases in point, shedding light on the ways in which infrastructural networks articulate social inequalities and relations of power. This was certainly evident during my field work, where mostly women with a relatively low social status took on sensing and buffering. Others were found to delegate standby work, either to domestic workers (again, predominantly female and of a lower social status than their employers), concierges and other administrators, and/or to complex, automatized systems involving cisterns, tanks and pumps. Standby for water is, in short, largely classed and gendered – and feminist methods such as water diaries (Lahiri-Dutt, 2015) seem particularly helpful for further research in the area.

Falling squarely into the realm of passive acceptance of the status quo as a strategy to improve access to water (Swyngedouw, 2004: 150), the exhausting and exhausted performance of standby through sensing and buffering hardly seems transformative. More often than not, the shift from public service to private task appears as a neoliberal act of responsibilization, where hydraulic standby is the product of 'structural systemic disruptions [that] have an essential effect on the everydayness of the society, targeting the more vulnerable classes in particular, [while] they do not interrupt the flows that are beneficial for neoliberal processes' (Dalakoglou and Kallianos, 2014: 531). Market-oriented, neoliberal regimes of water governance also tend to display a deeply gendered character (Harris, 2009). As this paper hopes to have shown, infrastructural breakdown and the anticipation of such ruptured futures are distributed unequally across urban space and the social landscape, creating differential geographies. Yet in the very same act of anticipation, there may also lay openings towards a radical otherwise future when 'to be durative, may be as emancipatory as to be transitive', as Elizabeth Povinelli (2011: 130) observes on the ambivalent affinities and temporalities of endurance in late liberalism. Practices of sensing and buffering are clearly involved in the making of everyday territories, generating ordinary sites and stakes of social struggle through hydraulic standby (Schwarz and Streule, 2020: 12). In addition to and extension of such individualized techniques, there are openings for alternative ways of collective organizing around water, such as

Mexico City's Right to the City charta (Zárate, 2010) and the 2015 movement pushing for a progressive reform of Mexico's federal water law.

Concluding remarks

In this paper, I have explored modes of hydraulic standby through the lens of anticipation. Standby for water, I argue, is an active everyday mode that is classed and gendered in specific way. Unpredictable rhythms of water supply clearly shape everyday lives in Mexico City, motivating hydraulic standby in the form of sensing and buffering. This arrhythmia orders the daily routine of poorer women in particular, revealing how social relations are embedded into water. The paper has conceptualized sensing and buffering as forms of organizing, and more specifically, as techniques of precaution and preparedness. It makes an empirically based contribution to the literature on anticipatory action, with hydraulic standby at its center. With a view to future research, I would like to propose expanding the temporal horizon of hydraulic standby as laid out in this paper. Zooming out from the everyday mode to other open futures, it could be argued that standing by for water may also turn into a biographical period of a person or entire community. For instance, decades may go by while dwellings or entire neighborhoods are supposedly on the brink of being connected to the water mains and receive running water. One could argue that Mexico City's self-built settlements are characterized by a form of standby that lasts years, decades, and potentially a lifetime. The empirical findings illustrate the underlying speculative logic: plots of land are typically sold unserviced, with the expectation that urban infrastructures such as electricity, water and sewers will be implemented at some undefined point in the future (Salazar Cruz, 2012). Habitat biographies, a qualitative method developed in Schwarz (2017: 177 ff.), trace a life span of such changing and often uncertain infrastructural and housing conditions. Rather than an exception, this is a basic tenet of what Teresa Caldeira (2017) has coined 'peripheral urbanization'. This particular form of temporality points to an inherent promise of gradual stabilization, highlighting the effort to bring different futures to life in present urban geographies. These futures seem to bear the hope, the expectation, if not the demand to be recognized as both different and equal. Which kinds of future are made present through anticipatory actions? Hydraulic standby, it could be argued, doubles as

standby for social and urban change, for partaking in the shaping of a right to the city for all. The disparate and unequal distribution of hydrological landscapes throughout Mexico City thus provides not only the backdrop but also the stage for an exhausting and exhausted performance of standby for water.

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the author

Anke Schwarz is a postdoctoral researcher and lecturer in Human Geography at Technische Universität Dresden's Institute of Geography. Her recent publications include the 2020 *Geographica Helvetica* special issue 'Contested urban territories: Decolonized perspectives' (co-edited with Monika Streule), and *Demanding water: A sociospatial approach to domestic water use in Mexico City* (Steiner, 2017).
Email: anke.schwarz@tu-dresden.de
Website: ankeschwarz.net