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'Chasing for Water': Everyday Practices of Water Access in Peri-Urban Ashaiman, Ghana

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ABSTRACT: Despite recent reports suggesting that access to improved sources of drinking water is rising in Ghana, water access remains a daily concern for many of those living in the capital region. Throughout the Greater Accra Metropolitan Area (GAMA), the urban poor manage uncertainty and establish themselves in the city by leveraging a patchwork system of basic services that draws importantly from informal systems and supplies. This paper takes a case study approach, using evidence gathered from two-months of fieldwork in a peri-urban informal settlement on the fringe of Accra, to explore everyday practices involved in procuring water for daily needs that routinely lead residents outside of the official water supply system. Findings from this case study demonstrate that respondents make use of informal water services to supplement or 'patch up' gaps left by the sporadic water flow of the official service provider, currently Ghana Water Company Ltd. (GWCL). Basic water access is thus constructed through an assemblage of coping strategies and infrastructures. This analysis contributes to understandings of heterogeneity in water access by attending to the everyday practices by which informality is operationalised to meet the needs of the urban poor, in ways that may have previously been overshadowed. This research suggests, for example, that although water priced outside of the official service provider is generally higher per unit, greater security may be obtained from smaller repetitive transactions as well as having the flexibility to pursue multiple sources of water on a day-to-day basis.

KEYWORDS: Water supply, urbanisation, informality, everyday practice, urban poor, Ghana

INTRODUCTION

In the absence of affordable and reliable state services, alternative strategy making is commonplace amongst the urban poor, and many are able to meet basic daily needs through a patchwork system of informal activities and networks. To earn a living, urban dwellers in the Greater Accra Metropolitan Area (GAMA) are likely to engage in multiple forms of informal employment to supplement their income (Hart, 1973; GSS, 2008). Similarly, uncertainty is at the forefront of daily water access in urban and peri-urban Ghana. Responsible for the provision, distribution and management of urban water supply in Ghana, The Ghana Water Company Limited (GWCL) meets only about 60% of the total water demands (Nyarko et al., 2008; WaterAid, 2008; Ghana Government Portal, 2013; JMP, 2013). As such, maintaining several access points to water sources is one practice through which the urban poor

generate security.[1] In the words of Jacob Songsore, a Geography professor from the University of Ghana-Legon, Ghanaians access water through a 'labyrinth' of strategies (personal communication, 29 May 2012). Songsore explained that even though pipes are many things: sturdy, visible, traceable, they are only somewhat reliable and accountable, and to be sure they are not suitable to every environment, especially illegal or haphazardly built settlements in the urban or peri-urban areas of the country (ibid).

Theories of everyday practice are drawn upon to examine the actions that people take to improve their water security, by utilising and resisting different features of the water network. By everyday practices, we mean the 'multiple', 'repetitive' actions that people engage in that enable water access to be managed and extended to those otherwise cut off from a secure supply (Yeung, 2005; Jones and Murphy, 2010). It is worth emphasising that water access and security are not experienced equally nor can they be considered synonymous with either informal or formal water services. In the course of highlighting the practical ways in which people draw on informality for their water supply, we do not wish to overlook that "inequitable social relations ensure that some individuals, by virtue of their class, gender, ethnicity, and so on, are better placed than others to deploy resources, to shape rules, and to exercise power and rights" (Cleaver, 2009: 131). In the context of this case study for example, the magnitude of water insecurity is greater for those who cannot afford to store water when flows are interrupted for several days. In response to a question posed regarding water availability, a 26-year-old man living in the Zenu District of Ashaiman told us that he had to "chase for water" (Interview, 29 June 2012). The word *chase* highlights the limits of everyday practice by evoking the haste, wit and toil involved in securing water in the absence of connections to the official water network. We understand this chase as an example of everyday practice, both because water is a daily basic need, and because each day, many parts of the urban metropolis can be cut off from the municipal system.

This paper investigates some of the ways that water access is ensured in Ashaiman. It does this by showcasing the necessity of being able to connect to multiple sources of water at any given time, a possibility enabled by informal vendors whose customer base is anonymous and free to go to other providers. Furthermore, it emphasises the interplay between formal and informal networks that are crucial to water access. In taking an actor-oriented approach, it is also our aim to contribute to a clearer understanding of how urban residents perceive, experience and describe water access, to consider both the advantages and disadvantages in regard to obtaining water through the water utility and informal water services. With these objectives in mind, we engage with two main research questions in the context of Ashaiman:

1. How are people managing, under circumstances of unreliable formal services, to establish access to water?
2. What lessons can be learned by looking at everyday practices of water access in terms of how people experience and perceive various types of water services?

METHODS

This case study analysis derives in-depth explanations of water access dynamics from the standpoint of residents in Ashaiman, Ghana using interviews, observations and surveys. In-depth interviews and observations were used to probe the experiences and perspectives of residents themselves, ultimately to uncover qualities of the informal water network that permit access and service where the formal system does not. Interviewees were asked a suite of questions about their uses of water and their perspectives on water quality, affordability, access and management. Interviews also sought to elicit descriptions of existing relations with GWCL or any other actors who could be seen as having authority

[1] Water security is understood as the procuring of water of sufficient quantity and quality to satisfy one's household needs. For a discussion of different perspectives and conceptualisations of water security, see Cook and Bakker (2012).

over water delivery in their area. The total sample size[2] is 40 and includes mainly residents and community leaders from Ashaiman, as well as representatives of non-governmental organisations, and two public officials employed by GWCL. Second, unstructured observations were carried out throughout the eight-week fieldwork period, paying close attention to the everyday practices through which residents of Ashaiman secured water for drinking and other personal or household uses. Very little data currently exist on the case study site specifically and, hence, basic information on demography, housing and water access is supplemented by a comparative survey implemented prior to fieldwork in 2011-2012. The survey was distributed to 500 households in Accra, Ghana and Cape Town, South Africa.[3] A total of 243 residents were surveyed across two peri-urban informal settlements in Greater Accra: Teshie (120 survey respondents) and Ashaiman (123 survey respondents). Results mobilised here include both aggregated data for Ghana and data disaggregated between the two sites. When discussing the results of the survey, we specify whether they represent the sample from Ashaiman only or the total aggregated population across both sites.

There are a few limitations to the research methodology and approach that bear mentioning. This research was conducted during the rainy season in Ghana and as such water availability and access may have appeared differently in seasons where water is scarcer. Furthermore, rigorous quantitative data are not available detailing the percentage of the population relying on particular sources of water in Ashaiman. The intent of the qualitative data presented here is not to provide a complete picture of water access, but to outline thoughts and perspectives of water access that were articulated by interviewees. As such, this research paper should not be mistaken for an empirically conclusive account of the advantages or disadvantages of informal or formal water services. Rather, it is our aim to highlight under-theorised practices and experiences of informal water access that may have important resonance with water planning and policy goals in peri-urban informal sites.

THEORETICAL FOUNDATIONS

Informality

> *[On the fringes of developing cities…] water and sanitation needs of the peri-urban water poor are not being met either by conventional approaches such as the expansion of networked public utilities nor through formal large-scale private sector companies. Instead, much of their needs are met through a dizzying array of non-conventional and often officially unrecognized means such as informal operators, privately operated wells, gifts from neighbours, rainwater harvesting and clandestine connections (Allen et al., 2006: 334).*

Informality is arguably becoming less of an exception and more of a "central idiom of urbanization" (McFarlane and Vasudevan, forthcoming; see also Roy, 2009). Recent policy and academic research is pushing for a greater recognition of informality as a means through which the urban poor can eke out a living while facing resource insecurity and having little disposable income (see for example UN-Habitat, 2012). Notwithstanding a growing interest in the study of informality in recent years, the concept continues to suffer from ambiguity and inconsistency (Roy and AlSayyad, 2004; Roy, 2005; McFarlane and Waibel, 2012). In relation to water access specifically, there remains a lack of clarity in scholarship

[2] The first author conducted interviews in Ashaiman. Both authors were on-site throughout the two-month fieldwork period with the second author conducting primary research in others communities of GAMA.

[3] This survey was implemented as part of the Comparative Water Governance in Africa Research Project (CWGAR), which operates out of the Institute for Resources, Environment and Sustainability, and is directed by Leila Harris and the EDGES Research Collaborative (Environment and Development: Gender, Equity and Sustainability) at UBC.

as to what constitutes informal water services, how these are operationalised by the urban poor, and what is the nature of their relationship to formal networked supplies (Allen et al., 2006). Furthermore, the negation of informality as a potential linchpin to water access and urban development signals persistence in Western planning ideals that "[suppress] the subaltern conceptualization of cities and of planning" (Miraftab, 2009: 45). Contrary to the connotation of the informal as unstructured, water accessed externally from pipelines and taps can also constitute highly organised strategies, albeit through a range of different networks and arrangements (Bayat, 1997; Bakker, 2003; Myers, 2011).[4] As the importance of informal water provision systems gains recognition both in terms of the proportion of population they serve (Collignon and Vézina, 2000) and the role they play for supplementing water access (Kjellén and McGranahan, 2006), the deficiency of insights into the actual experiences of the urban poor who are served by these services has become manifest. The operations of informal water services are especially key in unregulated peri-urban settlements, where per capita service standards are relatively lower than in formal areas of the city (Allen et al., 2006) and where density, heterogeneity and anonymity create challenges for conventional approaches of networked public utilities (Roy and AlSayyad, 2004).

Although this paper makes use of the term informal, it is our aim to unravel this narrowed view by showcasing the multiple ways by which informal water services are operationalised and make daily life possible in Ashaiman, Ghana. Hence, the term 'informal' is used throughout this paper to refer to extensions of water services that cannot be fully accounted for by the GWCL municipal pipeline or private tanker trucks services, such as small-scale water vendors or the local plastic sachet water industry.[5] It is also used to draw attention to the fact that many of these services are not recognised or sanctioned by the state.[6] Following Roy (2005: 148), we theorise informality as a mode, or a "series of transactions that connect different economies and spaces to one another". Our approach is also in line with McFarlane and Vasudevan (forthcoming) who propose informality as a set of 'mobile planning processes' whereby the city is reassembled through the diverse capacities urban residents employ to cope with 'incessant insufficiency'. This paper takes as a given that formal and informal dynamics are interlaced within the same water network; and that this fluidity permits actors to simultaneously engage with a range of formal and informal water provisions. This approach signals a departure from the conventional view of informality as a sector either independent from, or necessarily emerging from a failure of, the formal sector.

Everyday practice and human infrastructures

> *[Many] African cities are characterized by incessantly flexible, mobile, and provisional intersections of residents that operate without clearly delineated notions of how the city is to be inhabited and used. These intersections, particularly in the last two decades, have depended on the ability of residents to engage complex combinations of objects, spaces, persons, and practices. These*

[4] Informality is not the only way to conceptualise alternatives to “formal' service provision, for example these have also been referred to as 'gray space' (Yiftachel, 2009) or 'aformality' (Kajri and Nayak, this issue), among others.

[5] Sachet water refers to locally produced bags of 500 ml of water. The water is generally treated before packaging in polypropylene sleeves heat-sealed at both ends. Sachets are available for immediate consumption or in bulk packages for home-consumption throughout the capital and other major cities, offering an alternative to limited supply or to untreated water. For a complete discussion see Morinville (2012); Stoler et al. (2012a); Stoler et al. (2012b).

[6] Informality is a nebulous, contested concept that can take various shapes and is thus highly open to interpretation. For an alternative approach to informality, see Hossain (2011) on the informalisation of the formal public utlility. Roy’s works (2005, 2009) also provide a thorough critique of informality as a theoretical construct.

> *conjunctions become an infrastructure – a platform providing for and reproducing life in the city (Simone, 2004: 407-408).*

For Scott (2009: 545), everyday informal practices "are central to understanding the workings of the contemporary urban hydraulic system" especially as they confront and compromise the authority of engineers or technocrats to control the water system. To this, we would add that analyses of everyday practice can be linked more effectively with recent theories of urban water networks and political ecology discourses, towards considering alternative hydro-infrastructures or pressures through which people connect to water sources on a daily basis. A useful example can be found in a study by Anand (2011) of water supply in Mumbai, where he demonstrates how water is amenable to multiple pressures, and that access to the technologies that make water flow (i.e. create pressure) is mediated by social connections as much as by pumps. Simone (2004: 408) studies these social connections using the framework *people as infrastructure*, defined as a process of conjunction whereby infrastructure is generated by combining various objects, spaces, persons and practices to create "a platform providing for and reproducing life in the city". Similarly, Bayat (2009: 35) argues that it is the shared practices of large numbers of non-collective actors that trigger much social change. He calls this "social nonmovement" *the quiet encroachment of the ordinary*, akin to a form of subaltern agency.

A conceptualisation of the ways in which water flows are redirected or extended through individual strategy-making and human infrastructures requires an acknowledgement of unequal power dynamics and draws on debates around agency and structure theory. Important headway has been made, particularly in the field of political ecology, to show how water management is neither apolitical nor objective, but is rather imbued with powerful political agendas that have far-reaching implications for shaping networks of access (Bakker, 2004; Swyngedouw, 2004; Kaika, 2005; Gandy, 2008; Harris, 2009). Swyngedouw (2004) points out, for instance, that human agencies endowed by water infrastructures and management institutions are laden with differences of power. This important recognition often leads to an emphasis on the role of public and private water companies in governing (and often failing to address) water access and needs of the urban poor. Following seminal work by Giddens (1976, 1979, 1981, 1984) and more recently Sewell (1992: 20), we take the position that to have an agency, or to be an agent, is to be "capable of exerting some degree of control over the social relations in which one is enmeshed". From this perspective, the practice of drawing on a diverse set of water sources can be seen as evidence of a (limited) scope of manoeuvrability and of agency. In other words, our approach starts from the hypothesis that the urban poor are capable of "putting their structurally formed capacities to work in creative and innovative ways" to negotiate access to water services (Sewell, 1992: 4). Both intended and unintended practices influence, constitute and reproduce structures, such that "agency and structure come together reflexively" (Jones and Murphy, 2010: 369). In this vein, the structure of the urban water network can be understood as fluid and changing, and as having the capacity to expand, contract, bend and reconfigure over time.

Understanding the deficiencies of water infrastructures in reaching vulnerable populations requires that we also undertake an analysis of the ways that people improvise, strategise and make decisions in the face of such water insecurity and structural imbalances of power. Wilshusen (2009: 141) suggests that a practice-based understanding of power relationships is important because "it suggests that micro-political interactions simultaneously produce subtle, incremental tensions and reactions (both material and symbolic) *and* contribute to the perpetuation of certain broader social structural relationships" (emphasis in the original). Peering into the practices of everyday life makes it possible to derive a clearer sense of the realities of water access by bringing to light how and why people selectively make use of different services and social norms. Moreover, it leads to the question of whether everyday practices and the choices people make can collectively reinforce certain water flows

and diversions.[7] In the results and analysis section, we explore how residents of Ashaiman described their experience of water access, underscoring the references made to formal and informal services. In the concluding section, we look at what it may mean to consider informal services as part of a longer-term vision of sustainable water service provision in this context.

CONTEXT: WATER ACCESS IN URBAN GHANA

Recent reports show that access to safe drinking water is improving in Ghana. Notwithstanding progress, GWCL currently only meets the demands of about 60% of urban and peri-urban residents (Nyarko et al., 2008; WaterAid, 2008; Ghana Government Portal, 2013; JMP, 2013). According to a senior official at GWCL, the networked urban water system is affected by a daily supply deficit estimated at 60 million gallons (Interview, 6 July 2012).[8] Due to the inadequacy of water resources to allow for equal distribution throughout the urban region, GWCL has implemented a rationing schedule, which directs water flows to certain areas of the city on select days (Adank et al., 2011). Some areas are reported to receive water supplies once a week or not at all, while other areas may be serviced as often as seven days a week (Government of Ghana, 2007: 26; Stoler et al., 2012a; Stoler et al., 2012b; Morinville, 2012). Despite this rationing schedule, even scheduled water services are reported to be intermittent at best; water may run for a mere few hours or only through the night. Although both higher- and lower-income households are impacted by inconsistent water flow, the former can often afford the purchase and installation of polytanks[9] to store water, whereas the urban poor rely more heavily on informal vendors, community standpipes and surface water sources, storing in smaller containers and procuring water on a daily basis (Songsore, 2008; Ainuson, 2009). GWCL recognises this inequity and has implemented a lifeline tariff, which is designed to offer a basic amount of water at a lower cost to lower-income households through a two-block tariffs system.[10] Our case study site, Ashaiman, is an example of a peri-urban settlement where a large low-income population does not have direct access to the municipal water network. There is little statistical information documenting water access in Ashaiman to date. Outlined below is a basic characterisation, drawn from a collection of sources, including our household survey.

Ashaiman is located at the 'peri-urban interface'[11] of Accra, approximately 30 km northeast of the city centre (see Figure 1). It is estimated that the municipality houses approximately 290,000 residents (Interview, 18 June 2012; Interview, 26 June 2012) with population growth reportedly being among the highest in Ghana, set at a rate of about 4.6% annually (Ainuson, 2009), well within the population standards of a peri-urban metropolis (Government of Ghana, 2006). WaterAid (2008: 5, 13) designates Ashaiman as an 'informal settlement', which they define as "poor urban settlements such as slums, shanty-towns and peri-urban areas (…) characterized by high population densities, poor housing,

[7] For more analysis on subaltern politics and everyday claims-making for access to natural resources, see Scott (1990) on 'infrapolitics'; Bayat (1997) on 'quiet encroachment of the ordinary'; and for water access more specifically see Anand (2011) on the 'politechnics of water supply' in Mumbai.

[8] A percentage of this is attributable to unaccounted or unpaid water services.

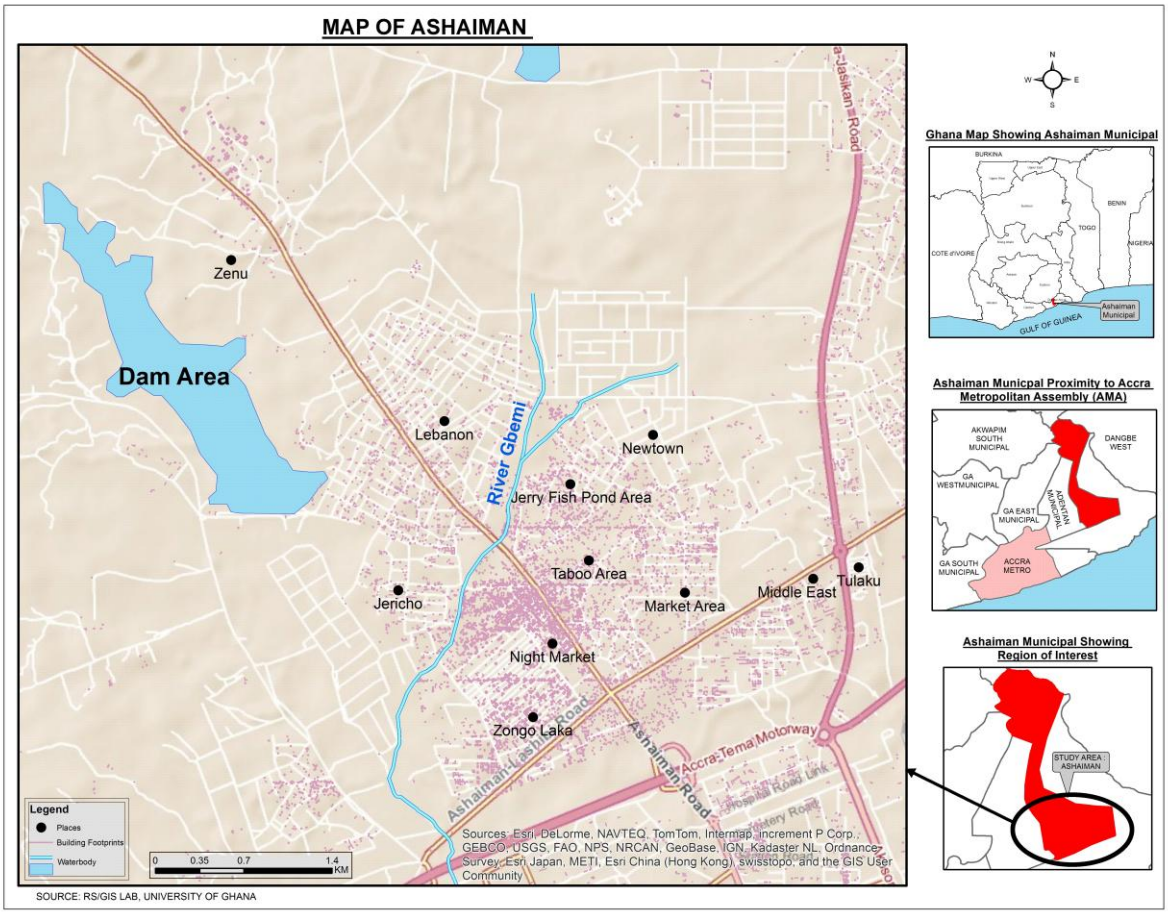
[9] In Ghana, water is often stored in large, black plastic overhead containers for household use, while larger sizes can also be used for re-selling. Poly Tanks Ltd is the oldest and largest distributor of these water storage containers; as a result Ghanaians simply refer to them as 'polytanks'.

[10] GWCL's tariffs structure was reviewed in 2013 and the Public Utility Regulatory Commission (PURC) approved a 52% price increase for water (detailed prices are provided in the discussion section below). This was accompanied by a 65-80% increase in electricity prices. Both increases are effective as of 1st October 2013. With the last major tariff adjustment dating from 1st June 2010, this new adjustment is meant to "assist the GWCL meet key operational costs…and operation and maintenance costs" (PURC, 2013).

[11] For more information on the definition and particularities of peri-urban settlements, see McGregor et al., (2005: 44-56) and Allen (2003).

sewerage and drainage facilities". According to our survey results, only 11% of our respondents in Ashaiman owned the house they were living in, and most residents were renting rooms in compound housing units (Harris et al., 2012). Almost half of the sample from both Ghanaian sites bought their water from a vendor (47%) and only 4% responded that they had an in-house connection. Other common sources included communal standpipes, in-yard connections and public water tanks. Figure 1 offers a map depicting Ashaiman; the black points represent neighbourhoods in which fieldwork was conducted.

Figure 1. Map of Ashaiman.



'CHASING FOR WATER' IN ASHAIMAN: ANALYSIS OF EVERYDAY PRACTICES

The vast majority of residents we spoke with lacked direct, in-house access to pipe-borne water. During fieldwork, we found that the lack of connection could not be solely explained by the absence of technological infrastructures (i.e. pipes or taps), but that water access mirrored more complex issues involved in the conduct of coping strategies necessary for everyday life in peri-urban Ashaiman. By exploring the practices through which residents negotiated and secured access to networked water, the importance of establishing water security by forging a diversity of flexible, informal connections with re-sellers was underscored. The data presented below are organised thematically to address some of the recurrent themes and tensions raised by interviewees, including expectations and let-downs of the tap, housing arrangements, billing and transactions, and mobility. Finally, in the discussion section that follows, we explore the connections between informal and formal water services, and the everyday

dynamic practices of generating water security in peri-urban settlements that serve to complicate notions of universal water access and the technologies of provision.

Talk of the tap

Middle and higher-income households in Ashaiman might have in-house connections to tapped water as well as polytanks for storing water (Adank et al., 2011). In contrast, those who did not have ready access to these conveniences invoked them as symbols of affluence, linking tap water with ideas of dignity and freedom. A 23-year old youth was sitting at an MTN phone credit booth with his friends, sporting sunglasses and stylish clothes when we approached him for an interview. When we asked him to describe the situation with regard to water in Ashaiman, he emphasised the labour required to walk down the road with his bucket to a neighbourhood seller. Shaking his head, he said:

> I just want to live my life like an... American. I want the freedom like they have the freedom. Like America when it comes to something like the water, we have been watching the politics on the television… so we know what is going on… as for water you don't have to suffer to get it. Am I lying? (Interview, 15 June 2012)

Another respondent expressed an adamant preference for government-managed water services. When asked whether she would prefer water sourced from a direct connection or that which is sold from polytanks by her neighbour just two doors down, one middle-aged woman living in a newer area of Ashaiman called Zenu said "We prefer that one, the government one" adding that she wanted the pipe to come to her district "so we will be free" (Interview, 29 June 2012). When we asked her when she thought the pipe would be installed in the Zenu area, she responded that she had been told there would be pipes, but that it would just take time (ibid). These examples show how people expressed a desire for tap water in their homes, while others described experiences where the tap, whether in the home or a communal standpipe, could also be experienced or perceived as a hindrance to water security.

Disruptions to piped water services were referred to fairly regularly in interviews. It was rare however, for these interruptions to be explained through a reference to the GWCL rationing schedule. Respondents indicated a lack of coherence and an element of unpredictability in water supply that seemed to aggravate the experience of water insecurity. For example, it was common to hear words like 'cut-off' or 'closed' or 'locked' used to describe unyielding pipes and interruptions in flow. There was minimal awareness or knowledge conveyed that this water was being purposefully redirected or that it would be reconnected in any timely fashion. To illustrate, two young sisters selling vegetables outside of their home in Night Market explained that although there was a shared standpipe in the courtyard of their compound, "it can go off anytime" in which case water could cease flowing for up to three days (Interview, 5 July 2012). During this period they collected water from neighbouring vendors by the bucket or used water stored in advance. Most other interviewees were engaged in similar practices of obtaining water access. When it was not accessible in the immediate surrounding area, they would simply go farther, in extreme cases taking a car to a neighbouring municipality called Tema, for example, where water was said to be more reliable (Interview, 20 June 2012; Interview, 29 June 2012).

It was in part due to this failure of piped services that there was a perception that exclusive dependence on formal water provision would be disadvantageous. A woman approximately 35 years old living next to the market explained that if you relied on the piped water, you might find yourself in a position where you would have to wake up in the middle of the night to fill your barrels (Interview, 15 June 2012). Even those with a higher or more regular income experienced difficulties planning their water use around piped services. For instance, a retired professor living in the Newtown area where he owns his family home and a fish farm recalled that when he went to bathe that same morning he found that he could not get water (Interview, 8 July 2013). However, he was also able to afford to purchase

sachet water or store large quantities to supplement his water security: "We have water sachets ... which are helping a lot of us too. If you don't like this (tap) water you buy a sachet and put it in your room" (ibid). Another woman who sold alcoholic drinks in Lebanon District similarly said, "We have a pipe but there's no water in it" (Interview, 27 June 2012). At this time, she was supplementing her water access by collecting rainwater for washing and cooking, strategically placing large metal pans around the courtyard of her compound (ibid).

As previously mentioned, the utility implements a rationing schedule by which water flow is directed to certain neighbourhoods on certain days. According to a senior representative of GWCL, the rationing schedule was designed with the purpose of promoting equal distribution of limited water resources across a highly populated area (Interview, 6 July 2012). Despite this complex scheme, the schedule is far from allowing every area of urban Accra to receive an equal amount of water. Certain areas are serviced continually (i.e. their mains are opened to the municipal flows at all time, but the neighbourhood might still suffer from pressure issues and general shortages affecting the system as a whole) while other areas might be scheduled to receive water only one day a week or not at all. Although it has allegedly been operational for over 15 years (Adank et al., 2011),[12] the rationing schedule is still not made public and most people did not seem to be given advanced notice of water flows. People may rely on occasional radio announcements indicating where water is flowing on a certain day, but when respondents described their experiences with piped services, it appeared that distribution was highly inconsistent.

Though the water utility asserts much control over the flows of water in Greater Accra, through the pipeline and the rationing schedule, these infrastructures can be inaccessible, unintelligible and unpredictable. What is perceived as the 'closing of water' is experienced on a regular basis, leading residents of Ashaiman to draw on other means and services by going out and fetching or 'chasing' for water. Many people are ultimately dependent upon their own scouting abilities, communications with one another, as well as live radio announcements, to know when and where they can access water services. In these senses, residents make use of their situated knowledge to reassess water security each day, relying importantly on a capacity to adapt and manoeuvre a landscape of sporadic distribution from GWCL.

Price

When asked whether the price charged by the vendors was good or fair, respondents generally felt it to be manageable, but were also clear that they had to accept whatever price it was since there was nothing they could do about it; the price of water was up to the discretion of the vendor (Interview, 29 June 2012). The Public Utility Regulatory Commission (PURC) manages tariffs for formal water supply in the region. Although informal vendors are expected to charge the same rate for water as the utility, an interview with PURC officials suggested that neither GWCL nor PURC currently had the authority, capacity or the resolve to regulate tariffs charged by informal water vendors (Interview, 9 July 2012). A representative from GWCL similarly suggested that there was no systematic protocol in place for the company to verify the implementation of a given rate (Interview, 6 July 2012).[13] Reviews of water prices show that GWCL offers the lowest per-unit rate for water, charged on a monthly basis, while water purchased from informal vendors, or procured from sachet and bottle water, is sold at a premium (see Table 1) (Morinville 2012; see also Pangare and Pangare, 2008 for a case study of Uganda).

[12] Stoler et al. (2012b) report that the rationing schedule began as early as the 1980s.

[13] The informant explained that he would occasionally go 'undercover' into neighbourhoods to check what informal water vendors were charging. However, he also indicated that even if a water vendor is found to be overcharging for water, there was no 'penalty' or means of enforcing a change in their behaviour.

Table 1. Tariffs for water in Ashaiman from June to August 2012.

Tariffs in Ashaiman (June-August 2012)	Unit volume (litres)	Unit price (GHp)[14]	Unit volume Comparison (GHp/m^3)
GWCL residential			
0-20m^3	1000	85.3	85.3
20m^3+	1000	127.8	127.8
Jerrycan			
Bucket	5-10	10-20	1000-2000
Kufuor gallon	20	20-50	1000-2500
Sachet			
Unit	0.5	10	20,000
bulk (x30)	15	120-150	8000-10,000
Bottled water (large)	1.5	150.00	100,000
'New' GWCL tariffs*			
0-20 m^3	1000	129.6	129.6
20 m^3+	1000	194.3	194.3

*Effective 1st October 2013

This premium is also known to fluctuate with availability of water resources. Interview participants in Ashaiman reported paying between 10 and 20 pesewas (5¢ and 10¢ USD) per bucket containing 5-10 litres and up to 50 pesewas (25¢ USD) per 20-litre jerrycan locally known as a Kufuor gallon (Interview, 29 June 2012). Respondents also indicated that water was generally less expensive where piped water flowed more frequently (Interview, 29 June 2012):

Interviewer: *And the price you pay for water is how much?*

Respondent: *50 pesewas per gallon. Compared to Tema it's ten pesewas per gallon.*

I: *Oh? Why do you think the price is lower? Just because there is a pipe?*

R: *Yes. Everywhere it flows.*

I: *Ok. I see. So when the water doesn't flow the price is higher?*

R: *Oh. In Tema if it doesn't flow for about three days, the price goes up.*

While the price charged by informal vendors was higher and subject to fluctuations, the range of cost appeared to be fairly knowable and manageable. Indeed, interviewees generally indicated that the price they were charged by informal vendors was reasonable and standard (Interview, 6 June 2012). Some also mentioned that, if or when the price was too high, they could also choose to use less water or wait (to a certain extent) for the price to come down before they do their washing, or engage in more water-intensive activities. Arguably, the time taken to 'chase for water' is an important cost to consider as well, but is rarely factored in.

Transaction

Other elements of the payment process were also depicted as instrumental to securing water access, such as avoiding large bills or accruing debt. Some of the ways that respondents described payments

[14] At the time of conducting fieldwork, GHS 1.00 Ghana Cedi (100 GHp) was equivalent to USD$0.52.

for water help to explain the tenuous grasp on formal water services held by the urban poor, despite a smaller price point per unit of water offered by GWCL. By transaction, we refer to the relationships between seller and buyer and the technologies of accountability that are implicit in accessing water from both formal and informal sources.

Informal water services are charged for at the time of exchange and both parties agree to the amount paid for the water at the time of transaction. In contrast, paying for GWCL services occurs on a monthly basis and fluctuates depending on the cumulative amount used.[15] Some respondents admitted that it might be better to source their water directly from GWCL, but the possibility of this was made less plausible by the processes of connecting to infrastructure and water meters, for which there were long queues and where it was imperative to save disposable income for monthly payments. Indeed, several participants described uneasiness, anxiety or uncertainty around owing payment and accruing debt to GWCL, which discouraged them from relying on formal water provision (Interview, 15 June 2012). In some cases, participants had had their connection interrupted for non-payment and depended on local water vendors either as a temporary solution until they paid their dues and their service was reconnected. Others resolved to use the informal water system instead of paying their arrears because the bills became too expensive (Interview, 7 July 2012). Furthermore, it was indicated that a post-use payment for water could be confusing and misleading. A young man explained that there was a general tendency to 'misuse' water when it was delivered unencumbered (Interview, 7 July 2012). For instance, if a person is using water from a bucket to bathe, they will use the water they have for this task efficiently, whereas if water is flowing continuously, they are apt to use more (ibid). This example demonstrates the perception that the mode of payment can also directly affect the ability of the water user to manage their consumption of water in terms of quantity and spending.

Surrendering to billing technology of water meters also requires a great deal of trust as it entails voluntary exclusion from certain communications or negotiations. In the words of a 72-year-old man: "…If you have a meter, you cannot 'talk anything about that'… as in, if there is measurement, the assessment is done, your bill is given to you and you pay" (Interview, 30 June 2012). The perception expressed here is that the receipt of a bill implies that decision-making has already taken place, the results of which are presented with authority as an accurate depiction of water use, complete with a set cost (see also Loftus, 2006 for a discussion on water meters in South Africa). It thus becomes difficult to monitor, track, or correlate household water usage with the amount and expense outlined in writing. The discomfort generated by the technology of meters may in turn further aggravate the dearth of trust and communication between residents of Ashaiman and GWCL.[16]

Trust and communication

One's capacity to generate water security in Ashaiman was also tied to prompt communication of information and accurate knowledge of multiple sources of water. When we asked to whom they would go with water problems, respondents told us that when it came to water, they had to look after themselves (Interview, 6 June 2012). More often than not, respondents did not seem to know how or where to reach GWCL officials should the need to contact the utility arise. Others indicated that when they had tried to communicate with GWCL, representatives were unresponsive to their concerns. One interviewee explained that although she had gone to the offices to report problems with water flow, she received no guidance and saw no improvement (Interview, 27 June 2012). Furthermore, residents reported waiting anywhere between a few months to a year for the company to connect them to the grid after the full connection fees (or arrears) had been paid (see also Morinville and Harris, 2013).

[15] This does not apply to households with unmetered connections, which are charged a flat monthly rate.

[16] A prevalent lack of trust in public entities was similarly indicated by our survey results, where 54% of the sample responded that they did not trust government officials (Harris et al., 2012).

Upon visiting the small GWCL billing office located in the Lebanon District of Ashaiman, the clerk informed us that she usually directed clients with complaints or concerns to the regional office located across the motorway in Tema. She explained that she worked solely in the capacity of taking payments and could not provide answers regarding how piped service connections are applied for or accepted (Interview, 27 June 2012). GWCL's lack of presence and responsiveness in the community, as well as complications with billing and metering, seemed to be strongly linked to a waning trust in the service provider. The overall disconnect between the formal water company and the community at large seemed to chronically undermine the perception that GWCL can address water concerns, especially as they can arise on a daily basis.

Housing and mobility

The streets in Ashaiman are lively, housing is eclectic and both are in ceaseless transformation. Districts that are closer to the central markets, like Night Market or Zongo Laka, are more densely packed with smaller housing structures, while areas like Newtown or Jericho are more spacious. At the time of this research, many of the interviewed participants who lived in denser locations were renting one-room units within a compound of multiple households and did not own a home. This finding is congruent with our survey results where 89% of respondents in Ashaiman indicated they did not own the house in which they lived, as well as the most recent statistics generated by the Ghana Living Standard Survey and several other accounts regarding housing in Ghana, and Accra more specifically (Grant and Yankson, 2003; GSS, 2008; Gough and Yankson, 2011; Arku et al., 2012, 2013). Shared housing arrangements represent one way that migrants are able to manage the costs of moving to the peri-urban area in search of urban prosperity and employment in the capital city. When asked how many people inhabited the structures in which they were living, respondents offered estimates of between 15 and 25 persons (Interview, 29 June 2012) while others seemed not to know or explained that there were too many to count (Interview, 15 June 2012). Since GWCL charges are based on an increasing block tariff structure (again, see Table 1; Nyarko et al., 2008), multiple-occupancy houses where several households draw from a single meter are often penalised with a higher bill, while single-family homes, generally owned by wealthier families, are subsidised by this arrangement. Therefore, the official tariff is not beneficial to the lowest income households who live in compound houses, often sharing a connection, or those who normally do not access piped water directly from the utility (Bathsheba, 2011).

The rapid growth of Accra has also meant that the housing market has not been able to keep up with demands, despite explicit government policies seeking to increase housing for the poor (Grant and Yankson, 2003; Gough and Yankson, 2011). As a result, rent charges are particularly high and cumbersome, and there are few incentives for landlords to improve and maintain their properties. A recent study reports that approximately 60% of residents live in "overcrowded, deteriorated and low-income rentals accommodations" lacking proper amenities (Arku et al., 2012: 3178). The sustained demand on the housing market in Accra has led to increased settlement on the fringes of the city, where services are not always available, but where new comers arrive in the hopes of gaining access to water, drainage, electricity, roads, etc.; in the near future (Gough and Yankson, 2011). As other studies have shown, without formal property ownership, it is not only difficult to obtain approval to install pipes, but landlords in charge of shared housing units are also less likely to bear costs of installation and maintenance (e.g. see Bakker et al., 2008 for a study of similar issues in Jakarta).

In conjunction with this, the mobility of people throughout Accra and especially in Ashaiman may similarly discourage renters from investing in housing and assuming the cost of a formal connection to

piped water services. In the following conversation, an engineer from the TREND Group[17] (Training, Research and Networking for Development Group) underscored the fluidity of the population while referring to the challenge of maintaining connections crucial for nurturing local decision-making processes:

> The lifestyle and the nature of living in Ashaiman is such that it's difficult to organize people under a particular arrangement… They come there today, they move tomorrow, another person joins the next time, and so… you have to virtually repeat issues every day because new people keep coming in (Interview, 22 June 2012).

Indeed, several respondents indicated having lived in other places before Ashaiman, and others, especially young people, were keen to move elsewhere in search of work. For example, when asked whether he had specific concerns about living in Ashaiman, a 23-year-old man from Zenu answered: "There is no work for the youth. There is no company here… not even one" (Interview, 29 June 2012). With difficulties finding reliable jobs inside the municipal area, residents are forced to travel, joining traffic on the motorway to and from Accra each day. Commuter populations may not have as grave a concern for formal water services as they themselves will not be utilising them throughout the day but may place higher priority on having access to informal, mobile water services, provided, for example, through sachet vendors. On the other hand, this circumstance of mobility may also leave commuters in a situation of requiring that water flow at very specific times when they are home (unless they have the means to store it in advance). This phenomenon would certainly benefit from further study, as it may be worth considering that a high degree of transience, such as is characteristic of peri-urban settlements like Ashaiman, may be associated with a parallel need for greater resource mobility.

DISCUSSION: INFORMAL WATER, EVERYDAY PRACTICE AND HUMAN INFRASTRUCTURE

In this case study, accessing water services involves a complex assemblage of connections and disconnections, which are negotiated everyday through practices embodied in the 'chase for water'. Respondents drew on a variety of water sources (sachet, buckets, rainwater) and networks (vendors, neighbours, GWCL). Both those who had a direct connection to the official water network as well as those who did not reported inconsistent water flows. Yet, as respondents conveyed the obscurities in flow, communication and payment they experienced in relations with GWCL, they simultaneously highlighted the small spaces in which they could ameliorate these deficiencies. In many ways, reliability was constructed by what Simone (2004) calls conjunction: the forging of plural infrastructures of people and artefacts, the collection of which authorises life in the city. In this case, conjunctions of water access require residents of Ashaiman to amass water flow information and knowledge, and to maintain a degree of financial security by collecting water in smaller amounts. These capacities to act "in creative and innovative ways" and "to exert some degree of control over [these] social relations" (Sewell, 1992: 4, 20) are crucial for the urban poor who are unlikely to have savings or storage tanks, and cannot afford to buy bottled or sachet water for household needs.

The desire for tap water in the home is founded on the notion that taps provide universal, reliable services – an ideal not attainable for most in the current context of Ashaiman. The tap thus served ultimately to symbolise a standard of living and right to freedom linked with modern urbanity. This aspiration also signals a normalisation of dominant development discourses that uphold the critical nature of piped water infrastructures in urban spaces, and tends to neglect or miscalculate the role

[17] TREND Group was established in 1989, conceived within the framework of the International Training Network (ITN) for Water and Waste Management Programme. This programme was promoted by the World Bank and TREND was one of four centres established in Africa under the Programme (TREND, 2012).

played by informal services in securing water access for local residents. Ultimately, the promises normally offered by the tap were outweighed by the realities of a fractured distribution system.

In this framework, the everyday practices residents engage in to repair the 'closing of water' can be considered acts of navigating the constraints of a fractured infrastructure in Ashaiman. The ability to be opportunistic, in other words to collect water on the go from various sources, may be crucial to generating water security as defined by the water needs of that day. Ultimately, the data serve to show that attaining water security in the context of frequent interruptions in water flow involves enrolling diverse capacities to improvise, to connect to multiple sources and places, and to negotiate water needs each day through self-initiated transactions.

Thus, residents themselves become key forms of infrastructure (Simone, 2004; Anand, 2011). Informal water services are made appendages to the formal network through infrastructures enabled by the residents and informal water providers. Though these relationships are not necessarily built on trust or longevity, they are made reliable collectively. Residents have learned and adapted to the reality that one single provider cannot be expected to be dependable. Purchasing water through multiple small-scale intermediaries might thus offer a way in which residents can hastily repair gaps in formal delivery and self-manage water access on a day-to-day basis, given their experiences of reliability, transparency, trust and mobility.

In this sense, we follow Wilshusen's (2009) assertion that everyday practices both subtlety challenge the structure and contribute to its perpetuation. In relying heavily on informal water flows and often actively sidestepping the formal water network, or at least a reliance on it, residents also support the demand for a flexible and incremental system of access to water. Yet, these daily interactions and the endurance of an informal water sector also work to undermine the authority of the municipal utility as "the sole urban water provider"[18] as well as its ability to control the flows in urban Accra by drawing water elsewhere or contributing to unaccounted for water (see also Morinville, 2012).

CONCLUSIONS

> *A critical challenge for development is how to simultaneously address the complex needs of people living in extreme poverty, and how to not close down these spaces for agency... we can see that locally driven actions, often generated in informal spaces, can be vibrant engines for social transformation (Burns et al., 2013: 27).*

This case study underscores the co-dependency of formal and informal water networks as well as the importance of recognising complex, daily experiences of water access. Not unlike other contexts, where official utilities have been unable to meet the service demands of a bourgeoning population, the peri-urban landscape and water network in Ashaiman exemplify a heterogeneous system of provision and access that draws on a plurality of technologies and infrastructures. Moreover, this research demonstrates the influential role of services that extend water access in Ashaiman beyond the scope of the official municipal provider. Informal services and everyday practices collectively generate a working human infrastructure, which moves and flexes in ways that exceed more stationary, rigid distribution technologies of conventional piped water systems. These infrastructures, for example, sachet vendors, polytanks and neighbourhood re-sellers, are effectively adaptations that accommodate a need for basic amounts of water, and entail certain measures of flexibility and self-management that are not found in water services provided through GWCL. Paying attention to everyday practices of water access in Ashaiman makes legible the ways that residents may rely on characteristics of informality, while

[18] "The sole urban water provider" is GWCL's official slogan and can be found on their website (GWCL, 2013).

simultaneously adhering to the conviction that ultimate water security is to be found at the end of the pipe so to speak.

In essence, informality allows residents to make strategic use of limited resources as per the needs of each day. These services can be leveraged to provide an added measure of water security by permitting residents who do not have the means to store large quantities of water, or to save money to pay monthly bills, to draw on several sources in a somewhat flexible fashion day-to-day. This is what was fittingly referred to as a 'labyrinth' of strategies by one of our contacts. Furthermore, face-to-face interactions and 'people as infrastructure' provide some leniency and consistency where piped infrastructure and billing can be highly structured, unpredictable and unforgiving. Operationalising informal appendages to the water network also requires that residents mobilise knowledge resources, initiate connections and move about in times of scarcity. This is what one informant characterised as a 'chase for water'. By enlisting a patchwork system of informal and formal water services, residents of Ashaiman routinely find ways to improve their water security through everyday practices, suggesting that although fluid and mobile, informal water services are indeed comprehensible. Our findings are analogous with others who have challenged the notion that urban informality within the African city is irrelevant or lawless (Mbembe and Nuttall, 2004; Simone, 2004; Miraftab, 2009) and scholars who have highlighted the capacity of the urban poor to access water through everyday pressures and political networks (See for example Anand, 2011).

The intent here is not to present the informal water network as a panacea or long-term sustainable solution to a fragmented urban water delivery system. There are important issues with regard to cost, safety and regulation that come into play when intermediaries provide access to water sources. By making the case that informal water service providers play a fundamental role in connecting otherwise excluded populations to a minimum amount of water, our aim is not to understate the importance of these concerns. Rather, we suggest that there is opportunity for problems to be properly addressed and significantly improved only if and when policy-makers and planners take seriously the accessibility of these alternative services. The utility would benefit from a better understanding of experiences and perceptions of the urban poor in regard to networked water, as well as the coping strategies they enlist to make the most of uncertain water access. In fact, a company official from GWCL clearly expressed a desire to do so:

> We want to know people's attitudes towards the water industry. Why they want to pay their bills, why they don't want to pay their bills. Whether they're okay with the water they get from the system…I think we will be happy to know more of the social psychology of people when it comes to water and management of water in their homes…We want to know how they're managing the little water that they have. (Interview, 6 July 2012)

There is an important disjuncture between realities of heterogeneous water access and urban planning designs that hinge on tap water infrastructures and standardised systems of provision. If an atmosphere of greater consultation is fostered, whereby the official utility engages actors who are directly involved in the chase for water in Ashaiman, namely informal service providers and residents, then planning for improved water access might begin to accommodate the interests of low-income peri-urban populations more concretely and strategically. There are a few approaches that could be taken to accomplish this. For one, it may be possible to incorporate elements of informality into formal supply systems; for example, allowing that customers pay on a per-bucket system (pilot efforts along these lines are already underway in certain neighbourhoods; see Morinville and Harris, 2013). Moreover, the Government of Ghana, GWCL and PURC might also facilitate informal access more explicitly by monitoring and ensuring water vendors are serving areas that may be more marginalised by the rationing schedule. In tandem with the everyday practices of the urban poor to maintain security in a rapidly changing environment, informal water services provide possibilities of access that should not be overlooked.

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