

Water Brokers: Exploring Urban Water Governance through the Practices of Tanker Water Supply in Accra

Rossella Alba ^{1,*}, Antje Bruns ¹, Lara Esther Bartels ¹ and Michelle Kooy ^{2,*}

¹ Governance and Sustainability Lab, Faculty of Regional and Environmental Sciences, Trier University, Behringstraße 21, 54296, Trier, Germany; brunsa@uni-trier.de (A.B.); bartelsl@uni-trier.de (L.E.B.)

² Integrated Water Systems & Governance, IHE-Delft Institute for Water Education, Westvest 7, Delft 2611 AX, The Netherlands; m.kooy@un-ihe.org (M.K.)

* Correspondence: alba@uni-trier.de; Tel.: +49 651 2014318

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Abstract: Accra, the capital city of Ghana, is characterized by limited networked supply, heterogeneous water providers, and various forms of provision. In this paper, we explore how the people delivering water through water tankers shape the distribution of water across the city. Drawing on empirical descriptions of water sourcing and distribution by truck drivers, we show that who gets what water at what price is shaped by the ability of tanker drivers to act as brokers, piecing together various social and material arrangements and resorting to different rationalities and expertise. We analyze how state actors deal with tanker supply seeking to reconcile their mandates with the realities of water supply. Analyzing urban water supply through the practices of water distribution, we show the messy and open-ended character of water governance processes. A practice-based approach makes the complex interrelations between different water providers across the city visible, and underscores the role of individual and collective identities, emotions, moral norms, and unequal interdependencies between actors in shaping urban water distributions.

Keywords: urban water governance; tanker water supply; practices; water quality; Accra

1. Introduction

Initially used as an emergency measure, tanker water supply has become a common practice of water provisioning in Accra since the late 1980s [1,2]. Tanker drivers supply water to those who can pay for it: domestic users who are not connected to networked infrastructure and to those residents who, despite living in areas served by the utility (Ghana Water Company Limited (GWCL)), experience water shortages [3]. Water tanker supply is important for retailers that buy water in bulk from drivers and then resell it to end-users (often neighbors) in buckets. Water tankers also supply to construction companies that need large amounts of water for building purposes.

Tanker water supply is only one of the many arrangements through which water is distributed in Accra and the growing metropolitan region extending beyond the city administrative boundaries, known as the Greater Accra Metropolitan Area (GAMA). As in many other Sub-Saharan African cities, water provisioning in the city involves different sources, a plurality of often overlapping infrastructural arrangements and forms of provision [4]. The water utility, which is the only legally recognized urban water provider in Ghana, supplies piped water to about half the urban population [5]. Piped water supply is spatially uneven across the city—connection rates are about 90% in high-income areas, while falling to 16% in low-income ones [6]. Where pipes are present, water is often rationed [7]. Depending on the local context, i.e., the topography of piped supply and of groundwater

abstraction, and household's socio-economic status, end-users meet their daily needs by combining a mix of infrastructural arrangements, strategies, and sources of water [8,9]. Beside piped water supply, these include installing water storage systems, installing wells, purchasing water from tankers and vendors, rainwater harvesting, and/or buying bottled and sachet water [2]. This heterogeneity of water sources and providers remains (mostly) outside policy and formal governance processes that prescribe how water in the city should be distributed [3].

This is also the case for tanker water supply. Tankers are referred to as filling a gap, they are tolerated by the utility and local administrations and national government agencies in areas and circumstances where the utility's network is not present or not able to meet the local demands. However, water delivery by tankers is rarely addressed in national water policies and is left out of urban water management policy and formal decision-making processes of water supply in the city. Accordingly, how tanker water supply operates remains largely anecdotal, or only partly mentioned in reports and the rich academic literature documenting the challenges and inequalities in access to water in Accra [9–14]. When acknowledging tanker water supply, policies and existing literature underscore the challenges in relation to the (poor) quality and (high) price of water that is delivered by tankers, as well as its temporary character [3].

Beyond the case of Accra, the presence of tanker water supply and its role in complementing pipe water supply is documented in cities from Italy to India [15–18]. Tanker water supply is explained as contributing to processes of water commodification and forms of endogenous privatization of urban water supply as compared with multinational companies [13,18]. Existing literature documents how tanker operators contribute to inequalities in access to water by quasi-monopolizing the flow of water in areas that were excluded by networked supply [16], and draws attention to the involvement of tanker operators in activities beyond delivering water, including social protection, the provision of welfare, electoral lobbying, as well as land sales [15]. However, beyond the limited empirical description of water provision by tankers, there has been even less analytical attention to the question of what they mean for urban water governance.

In this paper, we explore the governance of urban water supply in Accra through the practices of tanker water supply. The paper has two objectives. First, we seek to provide insights and make the role of water provisioning via tanker trucks in meeting urban water needs in Accra visible. We do this by attending to drivers' practices and by describing how state-related actors deal with tanker water supply, as they reconcile their mandates with the realities of water provisioning. Second, we use these insights to reflect on understandings of urban water governance. In particular, we show that what type of water—untreated groundwater and surface water, piped water—is distributed to whom across the city is (re)shaped by the actions and doings of those that are actually involved in distributing water, enabled and constrained by their individual identities, emotions, positionality, and the material infrastructure they use. Thereby, we underscore the open-ended character of governance processes.

Existing literature on urban water governance in Accra focuses on analyzing the historical and political economic processes that have shaped the development and management of piped networked supply and the current formalized governance set up [19,20]. Alternatively, literature focuses on the strategies and arrangements that residents use for accessing water [9]. The presence and role of forms of water supply other than utility-run systems is often mentioned, and some of them, like sachet water, have received a growing attention [21,22]. However, this literature does not engage with the practices that are related with supplying water. That is, it does not analyze how and why water vendors, tanker drivers, and water retailers do what they do and how they are involved in urban water governance processes: how they set prices, how they go about deciding the source of water they deliver and to whom they deliver it, and what motivates their work.

In recent years, the study of everyday practices has received growing attention among scholars seeking to deepen their understandings of how (southern) cities work and transform [23–26]. Examining the everyday practices of accessing and distributing water has been used as an analytical lens to build detailed and situated accounts of the production of urban (water) inequalities [27–31]. This literature has been a source of inspiration for our analysis. Yet, our primary objective in this

paper is not to analyze how Accra's uneven waterscape is produced through the daily practices of engineers, tanker drivers, vendors, and residents. However, we use a practice-based approach to understand what de Sardan [32] calls 'real governance'—that is how and by whom basic services, such as water supply, are really delivered in contrast to ideal models (i.e., a centrally run networked system offering a uniform service). We ask, how is water actually supplied in Accra?

A practice-based approach contributes to analyzing how urban water governance processes unfold. To look at governance as a process means to critically analyze how decision-making works, which decisions are made and by whom, and for whose benefit. This approach to governance underscores its analytical use as a concept to uncover how certain modes of water distribution are the result of practices "of coordination and decision making between different actors, which is invariably inflected with political culture and power" [33] (p.8). It involves asking questions about how water is abstracted, distributed, and accessed, by and for whom, where it flows, and where it does not [34]. Such an approach departs from understandings and uses of governance as a tool to achieve predefined 'good' outcomes that are centered on predefined normative principles, such as accountability, transparency, participation, inclusiveness, and legitimacy [35]. Rather, it stresses the need for empirically assessing how processes of governing water actually happen—and not how governance should happen—and what the distributional outcomes of such processes are [36].

In the following section, we introduce the approach and methodology guiding our research. Subsequently, present our findings. In Section 3, we describe the formal regulatory framework for the governance of water supply in Accra. In Section 4 and Section 5, we analyze the practices of water governance, first focusing on tanker drivers and then on state-related actors. In the conclusion, we reflect on the implications that a closer understanding of the practices of water provisioning has for the analysis of urban water governance in general and for the case of Accra in particular.

2. Research Approach: Understanding Governance through Practices

In recent years, urban (water) scholars, but also geographers and anthropologists, have engaged with the study of everyday practices in order to document the different and unequal ways through which basic services are provided and accessed [26,28,37–40]. Practice-oriented approaches have been particularly useful for gaining fine-grained understandings of how the distribution of water actually happens in face of policy requirements and ideal models [27,30,41–44]. Documenting the practices of planning, maintaining, repairing, and accessing water and water related infrastructure has illuminated how "consumers, providers, engineers, plumbers, politicians, policy-makers, and government authorities interact through a dynamic set of social and material relations to access, provide, and control water supply" [45] (p.32).

Approaching water governance through practices draws attention to how diverse forms of agency are mobilized by actors across different arenas, and how these actions are constrained and enabled by social and material relations [28,46]. We use this approach to explore how those involved in the distribution of water make sense of their actions and doings, how they articulate their interests, meet obligations and responsibilities, set prices and choose water sources, make use of technologies, and how these in turn shape actors' practices. Such an engagement contributes to unraveling how local actors, with "their practices, rationales, normative orientations, interests and imaginaries as well as their relative and contextual power" [37] (p.2), shape decision-making regarding the distribution of water and how they might "advance or inhibit equity in service provision or to advance it for some and not for others" [47] (p.4). This approach also helps to expose how material objects, i.e., pipes and trucks, play a role in shaping the governance of urban water distribution by constraining or enabling certain practices [48,49]. We define practices as mundane actions, daily activities that contribute to and/or contest existing procedures and rules. These actions are, at the same time, repetitive and dynamic, maintaining existing patterns and expressions of a continuous rearrangement of relations. Importantly, practices are not to be understood in isolation, but situated in specific contexts [27] and local histories [50] enacted by situated actors [25].

Following Cleaver [51], we understand agency as complex, "relational, and constituted by routine practices as well as purposive actions" (p.223). In seeking to understand the nature of human

agency in collective action (in the context of natural resource management), Cleaver [51] draws attention towards several factors that help to analyze how and why people act, and the outcomes of their actions. She underscores how agency is shaped by people's rich and complex social identities. The same person might have different identities at the same time more or less use them strategically. Similarly, moral views—"strongly gendered and socially stratified ideas about proper behavior and the rightful place of individuals of different social identities" [51] (p.231)—shape people's agency, but may be also consciously deployed. She warns scholars about the "myth that people following similar practices [...] may be equally placed to shape these practices" [51] (p.234). People, also within the same social group, are unequally interdependent "common interests are embedded in relations of unequal interdependence, often involving arrangements of patronage" [51] (p.234). Cleaver also draws attention towards the role of physical capabilities and emotionality in shaping people's ability to exercise agency. Drawing from social theorists, such as Bourdieu and Giddens, she argues that people do not only act in ways that are rational, but both conscious and unconscious emotions shape individual actions and decision-making.

To investigate the initiatives and practices linking different actors that are involved in the governance of water, we take inspiration from Lindell's [52] analysis of a marketplace in Maputo. Different actors, she argues, are variously involved in different although related 'sites of governance'—defined as "the various dispersed loci of power where practices of governance are exercised as well as contested" [52] (p.1885). She illustrates how the governance of the marketplace is influenced by the practices of individual actors, i.e. informal vendors and politicians, the relations between vendors' associations and the state, the relations between vendors belonging to one association, and rivalries and alliances between the associations and other civil groups. The usefulness of such an approach in examining urban water provision is illustrated by Schwartz et al.'s work [45]. Describing how vendors operating small-scale water systems in Maputo move between different sites of governance (i.e., banks, households, neighboring providers, associations, etc.) to sustain their business, the authors demonstrate how urban water provision is constituted by a meshwork of formal and informal relations.

2.1. Research Design

To gather an in-depth understanding of the practices of water governance in Accra, we combined ethnographic inspired research with a review of policy documents and in-depth interviews with local, city-wide, and national policy makers that are involved in urban water planning and policy making. Empirical data were collected between August and November 2015, as well as from August to September 2017. The first author worked with tanker truck drivers. This included driving around the city to fetch and deliver water, climbing trucks and holding hoses to fill tanks, writing receipts for customers, hanging out with drivers at their rest stops while waiting for customers to request water, and share meals with drivers. Documenting practices of provisioning offered entry points to explore how drivers make sense of their actions, their motives, preferences, challenges, and personal histories. Twelve days of participatory observation were combined with mapping exercises, semi-structured interviews, and informal conversations involving truck drivers, owners of the trucks, and so-called mates (helpers of the drivers).

We focused on tanker drivers that belonged to four organized associations, as well as a few individual tanker drivers (Table 1). We selected this sample according to three criteria, looking for differences between tankers in terms of source of bulk water supply (groundwater, pipe-born water, and surface water), size and design of trucks (tank trucks and polytank trucks), and service areas (urban, peri-urban). Drivers that belong to the same association park at the same 'station' and tend to source and deliver water in the areas surrounding the station (Figure 1). Each of the associations we engaged with had a different history: Association A included drivers who belonged to the very first tanker water association established in Accra in the early 1990s; Association C included drivers that belonged to the first association, but who are now working in peri-urban areas where the water business is flourishing; and, Association B–D had been working in the same area of the city for more than 10 years, but were considering moving to peri-urban areas following the decline in tanker water

demand and improvement of piped water supply in the areas where they operated. In our description of the practices of these associations we have changed their names, precise location, and other identifying features to ensure their anonymity.

We conducted 15 in-depth interviews with local, city-wide, and national water policy makers and water managers to elicit their knowledge, opinions, and practices in relation to tanker water supply. The authors, together or individually, interviewed municipal officials of the districts where the tanker associations operate, engineers and field staff employed by the water utility, members of the Public Utility Regulatory Commission (PURC), officials from the Water Directorate at the Ministry of Water Resources Works and Hosing (MWRWH), and a senior staff of the World Bank. Interviews were carried out in English, Ga, and Twi, with the support of a research assistant and recorded on hand-written notes or audio-recorded when the circumstances allowed.

Table 1. Main characteristics of tanker water associations involved in the study. Source: authors' fieldnotes, 2015.

	Establishment (year)	Trucks Capacity and Type	Main Water Sources (in 2015)	N. of Members (in 2015)	Parking Location
A	Early 1990s	Tank trucks From 4 m ³ up to 30 m ³	Piped water, groundwater and surface water	Not available	Urban, North- West of Accra
B	1995	One tank truck, polytank trucks* From 2.5 m ³ up to 7.5 m ³	Piped water	80	Urban, East of Accra
C	1999-2000	Tanker trucks and polytank trucks	Surface and groundwater	35-40	Peri-urban
D	1999-2000	Mostly polytank trucks	Piped water	About 60	Urban, East of Accra

* Polytanks are plastic storage tanks of different sizes. They are locally referred as 'polytanks' from the company that firstly introduced them in the 1990s. Located on rooftops and hidden in backyards or fixed on the top of flatbed trucks they are used to store and transport water.



Figure 1. Polytank truck parked at drivers' station. Source: Authors, October 2015.

3. Formal Governance Framework

Before describing tanker drivers' practices, we describe the formal governance framework prescribing how the actors that are involved in supplying water should operate. We use this description to reflect on the social order and hierarchies—i.e., the distribution of roles, authorities and power—reflected in and pursued through laws and regulations.

Responsibility for the management of water supply in all urban areas in Ghana (localities with more than 5000 residents) is held by the GWCL, a state-owned company that is expected to operate as a financially independent entity. The GWCL operates under the general direction of the Ministry of Water Resources Works and Hosing (MWRWH) (since April 2017 Ministry of Sanitation and Water Resources). The MWRWH is the lead government organization that is responsible for coordination and policy formulation in the water sector. The performance of the GWCL is monitored by the PURC, an autonomous regulatory agency that is responsible for tariff setting and monitoring performance and customer satisfaction for all public utilities. The Water Resource Commission (WRC) manages and regulates water resources and the administration of water rights, including groundwater abstraction and licensing [8]. Local administrations, in Ghana referred as Metropolitan, Municipal, and District assemblies (MMDAs), are not formally responsible for the supply of water in urban areas, where it is a responsibility of the GWCL [3].

Historically, the development, management, and financing of water supply has been used by different governments and foreign actors to maintain their influence and power on the development of the city and on its inhabitants. The British colonial government exercised authority through water supply to fulfil public health objectives, promote imperial ideologies and racial segregation, while early postcolonial governments, particularly Nkrumah's presidency, inserted the provision of water supply into plans for modernization and nation buildings [53,54] (Kwame Nkrumah was the first president of independent Ghana (1957–1966). Extending basic service provision to all Ghanaian was part of his socialist nation-building agenda and an attempt at breaking from the logics of British colonial rule [1,53]). Later on, the reform of the water sector in the 1990s was instrumental for the introduction of the neoliberal agenda heavily supported by international financial institutions and already introduced in Ghana with Structural Adjustment Programs [20].

All of these plans and programs for the management of urban water supply were not without contestation. Indeed, as Bohman [54] describes in detail, the centralized management of urban water supply—with one utility mandated to develop and manage water provision in all cities across the country—has been contested from its origins until the present. Debates between foreign and national governments, city administrations, international financial organizations, foreign companies, and civil society, over who had the authority over the provision of urban water began soon after the construction of the first pipes in the early 1910s, and resumed in the 1990s during the privatization process, as different actors and agencies made competing claims to the appropriate skills, abilities, and capacities (including financial ones) for urban water management. These debates, for the most part, have remained centered on the roles, responsibilities, and authorities of formal actors (colonial government versus city wide administrations, public versus private foreign companies), ignoring the role of private small scale water businesses [54], including tanker water supply.

The provision of water supply in urban areas by any actor or entity other than GWLC—i.e., tanker water supply, vendors, but also community-run systems—is not legally recognized, absent from any water laws or policies [10]. This is so despite the National Water Policy's recognition of "the role of private sector participation in the operations and management of urban water supply" [55] (p.29) in improving water access and dedicating of an entire chapter to public-private partnerships (focus area 5). However, outside of PURC's role in regulating GWLC, there is no government organization legally responsible and accountable for the overall regulation of operations, prices, quantities, and quality of water delivered by tankers and vendors (Interview, Water Directorate staff C, 2015). Sachet water is one large exception to this lack of regulation of the private sector water providers. The GWCL instituted a specific commercial tariff for sachet producers and registration with the Food and Drugs Board (FDB) is a legal requirement for those producing and marketing

sachet or other forms of packaged drinking water. Despite this effort at regulation, registration remains somewhat voluntary in practice [56].

The example of sachet suggests what many scholars have documented for Accra, in that the realities of water supply in Accra exceed the formal governance framework. While policies for the provision of urban water follow the vision set by the so-called modern infrastructural ideal [57]—a centrally-run networked system offering a uniform service to all urban residents—in practice the utility does not provide water for the majority of Accra’s residents and the (re)sale of water by secondary and tertiary providers and self-supply are common practices [3,7,12,13]. In what follows, we explore these realities—and what they mean for understanding urban water governance—through the practices of water tankers. We start by describing the experiences and daily operations of tanker drivers, and then describe how GWLC, PURC, and other government actors reconcile their mandates with the realities of (tanker) water supply.

4. Governance in Practice: Daily Routines of Tanker Water Supply

Tanker drivers are among the many people involved in Accra’s informal economy, an economy that employs about 73% of labor force in the Greater Region of Accra [58]. The number of tanker drivers (and tanker trucks) that are currently present in Accra is unknown, and it is constantly changing. For 2006, Adank et al. [5] record a total of 500 drivers, as compared with the 600 drivers they record for 2010 [59]. Our own informant, Adam, who has been active in the business for more than 20 years, told us that there are currently more than 1200 trucks delivering water in Accra. Data regarding the percentage of people while using tanker water supply are also limited. According to the Ghana Living Standard Survey, in 2014 about 1.3% of the households in Accra relied on tanker supply and vendors for their drinking water supply, and 17.4% used water from tankers and vendors for general non-drinking uses [60]. However, these percentages focus on the main source of water that is used by households and do not consider the use of tankers as a secondary source to supplement limited piped supply.

Although limited data are available, the role of water tankers in urban water provisioning is undeniable in a city where only about half of residents are connected to the piped network, and the supply in this network is highly intermittent [3]. With groundwater in the city difficult to access for individual residents, and often brackish, water tankers are an important alternative water supply that supplement the growing gaps in service provision by GWCL. Exploring the practices of tanker water supply provides insights on the role of drivers in meeting urban water needs and shaping decision making about water distribution. In presenting the empirical material, we first describe drivers’ identities and motives in engaging in the ‘water business’ and then describe key practices that constitute tanker water provision, including forms of collaboration between drivers, sourcing and delivering water, the use of infrastructure, and price setting practices.

4.1. *Becoming a Driver*

The experience of Kofi, a senior driver, is indicative of the experience of many other drivers that we encountered. Kofi has been delivering water since the early 2000s. He was introduced to the ‘water business’ by Abba, who was already delivering water, while using a metal tank that was mounted on a motorized power tiller, in North-East areas of Accra, now the Adenta Municipal District. When his tiller broke, Abba proposed a partnership to Kofi: Kofi was to provide the truck and Abba a storage tank (the same one he used on the tiller), alongside his experience in supplying water. They mounted the tank on Kofi’s truck and started delivering water. At the time, the distribution of piped water to Adenta was infrequent and intermittent; the majority of residents relied on storage tanks, which were filled by water tankers [61]. There were only a few water tankers that were stationed in Adenta, versus the majority, who drove in supply from central Accra, so Kofi and few other drivers started the business “small, small”, an expression used in Ghana to say in small steps. A few years after this start up, Kofi was able to buy three more trucks, and installed storage tanks on the top. He hired out these trucks to other drivers, collecting a weekly payment for use of equipment. Creating an association, the drivers collected money from all of the members and established a space in

Adenta, where they could park their trucks during the day while waiting for customers to request water. Delivering water with a truck is a good business, he tells us, as there are some places that depend on tankers' as they are not served by the utility (Interview, Tanker truck driver association B, 2015).

The story of Kofi is in many ways the story of many (senior) tanker truck drivers that we encountered during our research in Accra. Typically, drivers are introduced to the 'water business' through partnerships with other drivers, friends, or family members. Drivers often start out as 'mates', paid a daily or weekly salary to help other drivers to deliver water. Kwame paid his two mates daily, depending on the number of customers that they served. If it is a good day, he pays them each 25 GHS, and on a day when he has only one or two customers, he pays them 10 GHS (GHS refers to the local currency, the Ghanaian Cedis, 1 USD in August 2019 correspond to 5.275 GHS [62]). Mates are generally young boys who have often recently migrated to Accra from the rural areas of Ghana to seek employment. As mates they learn how to drive, and after obtaining a driving license (at times with the help of other senior drivers as some cannot read and write or afford to pay for the driving license), they start selling water themselves, or they move on to other sectors. Mates are in charge of climbing on trucks and roofs where households' storage tanks are commonly located, and holding hoses when refilling the tanks. Mates are trusted by the drivers, but they are not involved in decision-making (i.e. about prices, water sources, operating hours).

Like Kofi, some drivers own their trucks and reinvest their profits to buy more trucks. However, not all drivers are truck owners and not all truck owners are involved in driving the trucks. It is common among tanker drivers to drive trucks that are owned by third parties in exchange for a weekly payment, or under a work-and-pay arrangement. Mensah, a driver that we worked with, paid more than half of his weekly profits to the owner of the truck that he was driving. Owners seemed not to intervene in the daily decisions of drivers, leaving them to run their own business so long as they received their weekly payment. However, it is difficult to generalize how far owners influence drivers' actions and the supply of water, as each driver has his own agreement with the truck owner. Some owners have one truck, others up to 20 or even more. Some of the owners live in Ghana while others live abroad. We have heard stories of drivers who migrated to Europe buying trucks and shipping them to Accra. We will go on explain how differences between drivers, mates, and owners are important for understanding how authority and capital are distributed among those that are involved in tanker water supply and who profits from the delivering of water, and how.

Many of the drivers that we talked to, like Kofi, joined the water business, because it was perceived as a profitable, and long-lasting, economic opportunity. The profitability of business is demonstrated by the success of some of the drivers: Kofi managed to buy three trucks during his career as a driver; Adam bought land and financed the building of a three bedrooms house where he lives with his wife and three children; Edu, after working as a mate for five years and as a tanker driver for others for eight years, bought his own truck for 17,000 GHS; Ben paid school fees for his three children. However, not all of the drivers achieve this scale of profit. Daily and weekly earnings are variable, depending on the number of trips they do—as determined by the demand for water and the ability of drivers to access water—and their working arrangements [10]. On our own journeys with drivers, the trucks supplied water to a minimum of three different customers (each purchasing 2.5 m³ for 40 GHS) and a maximum of six customers (each purchasing 11 m³ for 250 GHS) This meant a minimum daily profit of 120 GHS and a maximum of 1500 GHS. While there is an overall consensus between drivers, customers, and policy makers on the profitability of the tanker business, information about just how profitable, and who really gets the profits (owners vs. drivers vs. bulk water suppliers, GWLC) remains scarce. Drivers are not keen on talking about the owners of their trucks, or about their weekly profits.

The personal histories of water tanker drivers and the motivations behind their choices to engage in selling water reveals that they are involved in the water business for many different reasons, as discussed also by Ranganathan [15]. Drivers sell water, because it is a job to support themselves, or because it is a way to learn a job. At the same time, it can be the only job that they like or are capable of doing. As Edu noted when we asked why he became a tanker driver: "this is the only job I know,

the only thing I can do” (Fieldnotes, Tanker truck driver association A, 2015). When compared with other low skilled jobs, the working conditions and a sense of helping the nation are also motives that are given by those who sell water via trucks. As one driver explained: “within this one [the tanker job], I have some time to rest. So that when I go for a trip and come back, I am able to rest for some time and eat whatever food you prefer especially fufu and goat light soup. But with the trotro [small bus used as public transport] kind of business, you cannot do that and you are also unable to eat properly. That’s not a good life. (We like the job) also because the sale of water is a good business. The reason why the water sale business is good is that, as you know water is life and everybody needs water, however, it is not everywhere. [...] so apart from us making a little money out of it, we are serving the nation as well because there are some places where there are no means of getting water except when tankers go to supply those areas” (Interview, Tanker truck driver association C, 2015).

Not all drivers like the working conditions, especially the uncertainty of securing customers while always having to pay the owners of the trucks. Drivers who were contracted by mining companies preferred this working arrangement over that of working as an individual driver. When working for a mining company, the drivers are paid a fixed daily price, with expenses for food and accommodation also being paid. As Samuel explained: “Here is different from the mining place. Here not the car owner is paying you, here you pay the owner and you have to manage your own funds. The driver and the owner have an arrangement. For instance, the owner gives the car to you and you have to pay 300 GHS a week. Often, after one year the owner increase the amount that you have to give him, like to 600 GHS and then for the driver is difficult to raise that money. If you cannot pay the owner takes back the truck” (Fieldnotes, Tanker truck driver association A, 2015). Before coming to Accra, Samuel worked in different mining areas and towns across the country. He used to be a mechanic, but his dream was to be a driver of a big truck, which he realized when he approached a driver and learned how to drive the tanker. Samuel now owns land and his own house in Accra, although, according to him, most of the drivers do not have land and do not own their trucks as they spend money on other things. Successful people, he believes, are the ones who are good in collecting savings and who are not wasteful.

Our conversation with Samuel reminded us of the differences between the tanker drivers, owners, and mates. Although they are all involved in the water tanker business, these actors are unequally interdependent on each other. Mates depend on drivers for learning, but also for their income, while some of the drivers are, in turn, dependent on truck owners for their daily and weekly earnings. Being a mate, a driver, an owner or a driver-owner also involves different sets of skills and expertise. An owner does not need any knowledge about driving. Meanwhile, for a driver, it is not enough to know how to drive a tanker truck; commercial skills and the ability to deal with customers and economize are also essential. As Cleaver [51] notes, unequal interdependence influences the ability of actors to exercise agency in relation to the distribution of water. Mates, who do the physical labor that is required to deliver water, have less influence in decision-making than drivers, whose work is in turn influenced by their relations with truck owners.

4.2. Collaborative Practices

Kofi is the founder and current chairman of a tanker water supply association with the motto “we serve better”. He founded the association together with five other drivers in the early 2000s. Since then, the association has grown and now accounts for 50 registered trucks and 80 members, including both drivers and mates. Kofi’s association collaborates with other associations of drivers working in the North-East of Accra around problems that are related to accessing bulk quantities of water: “for the idea of creating the association, we felt that we have to come together and then see what we can do to get quality water for people. We did not want anybody to go and give any bad water to anybody. [...] So if somebody supply salty water or borehole water to somebody, then we know it’s not from here, maybe it might come from a different place” (Interview, Tanker truck drivers association D, 2015). Other benefits of membership in an association are a secure parking space for trucks, and a social safety net—or what is called ‘welfare money’. As Kofi explained: “we help them [the drivers] in case they have problems, is it a money problem or funeral, in case your father dies,

your mother, apart from then, even your son or your anything (...), we will just go and help you" (Interview, Tanker truck driver association B, 2015). Associations also provide a social network, a space where drivers exchange knowledge about the flow of water in the pipes, changes in water prices, and the location of new sources of water—information that is critical to securing access to water and customers. Through these collaborative practices, drivers create a collective identity that is based on their shared interests and commonly held social norms informing 'proper behavior' of drivers when engaging with customers.

The differences between mates, owners, and drivers that we noted in the above section are also reflected in collaborative practices. There are associations of drivers and associations of owners, but no associations of mates. According to Adam, the truck owners' associations are more influential than the drivers' ones. Drivers are frequently replaced and they can easily be dismissed in the case of misbehavior, for instance if a driver does not respect his turn in serving new customers at the station or if a driver sources groundwater when piped water is available. Some associations, like the one led by Kofi, include a mix of drivers and drivers-owners.

When joining an association, the members pay a one-time fee, and orally agree to follow a set of rules and regulations or at times sign a booklet where these rules are listed. In the case of Kofi's association, drivers used to pay 50 GHS (now 400 GHS) and the rules of the association are listed in a booklet that is carried by each driver. These written rules, together with implicit codes of conduct, define 'good practices' of selling water, and proscribe what is 'good behavior' of drivers. Drivers should not drink alcohol, smoke or fight during working hours, they should respect other drivers, respect a dress code, abide road signs and regulations, avoid competition with other drivers for customers, pay monetary contributions to the association in due time, and respect the rules and bylaws of the association.

Associations are not always registered with the government, but do so when there is an advantage or a requirement. The drivers that belong to one association that we considered for the study mentioned that they registered their association with the Ghana Private Road Transport Union, GPRTU. Another association of drivers, the one Adam works with, formed an association and registered it with the municipal administration, the Accra Metropolitan Assembly, in order to be able to access piped water—formal registration was a condition that was posed by the utility in the early 2000s for drivers to be allowed to install their own connection and thus access piped water [59].

Each association is organized with a chairman, a secretary, a treasurer, and a station master, who are often experienced drivers or owners elected by other members. These, together with senior drivers, mediate the relations between drivers, between drivers and truck owners, and between drivers and the utility, local administrations, and the police. Among other tasks, the chairman of the association keeps an eye on the quality of water delivered by individual drivers. As Kofi explained: "Some people fetch boreholes for their customers but here, no way. If somebody supplies you a dirty water or water that you don't like, you can come back and report to the association so that that person [the driver] will get you another water for free and you will pour the dirty one away and take the clean one" (Interview, Tanker truck driver association B, 2015).

Decision-making within each association works in different ways. Kofi explains relations between drivers that belong to his association are based on a 'mutual understanding'. New proposals are discussed first by the executives, generally a group of senior drivers, and then with all the members of the association. When we met Kofi, he and his fellow drivers were discussing a raise in the parking fee from the current 2 GHS a day to 5 GHS, "...we don't force anybody, we just discuss it so that everybody will accept on one point, if the 5 GHS is too much, we have to bring it down and if it is too low, we have to go up again so if everybody accept it then we start collecting it" (Interview, Tanker truck driver association B, 2015). Other drivers underscored the military-like organization of their association and the strict ruling style of their chairman, who they addressed as 'commander'. Some associations are more organized than others and some are more active than others. For instance, drivers belonging to one association that we worked with were still sharing a parking space, but their association was not fully working, regulations were not implemented, and parking fees were not collected.

Associations are important sites of governance, where decisions affecting the distribution of water are taken. Tanker drivers, as the vendors described by Schwartz et al [45], make use of both formal and informal relations to support their interests and goals. Associations have formal written rules and, at times, are formally registered, but at the same time drivers make use of informal relations to sustain their business with politicians, the utility, vendors, and customers. Kofi, with other senior drivers belonging to the board of the association, lobbied the utility to install an overhead hydrant, from where the drivers could collect piped water. On another occasion, the drivers asked the support of a Member of Parliament (MP) visiting the station for carrying out maintenance works at their parking station. However, the presence of rules and codes of conduct does not mean that these are respected or that they are enforced all the time. Which governance arrangements are working (or not) changes over time (not all association are active at the same time) and space (arrangements differ across the city), and not all drivers belong to an association.

4.3. Sourcing Water

Tanker drivers' source different types of water from differently governed bulk water filling points (Table 2). The type of water that is delivered by the tankers is influenced by individual decisions, but also by the availability of piped water, the geography of the networked infrastructure, and the spatial distribution of groundwater. What kind of water tankers provide, and how they access it, has consequences for the quality of water that is consumed by final users, but also impacts the quality and quantity of water sold by retailers, and affects the operations of the utility.

When piped water is available in the proximity of a station, drivers parking at this station are expected to fetch piped water. This was the case for drivers that belong to the association that is chaired by Kofi, and for another association parked a few kilometers away from piped water supply sources (vendors reselling piped water and two overhead hydrants managed by the utility). Choosing water sources that are close to the tanker station is how drivers can increase profits, as fuel costs are lower, but this decision is also explained as a way to meet customer demand for speedy delivery. Maintaining consumer satisfaction and generating word of mouth recommendations is likewise a key strategy for maintaining or increasing the profitability of the truck.

Not all drivers that we encountered sourced and delivered piped water (Table 2), as not all drivers operate in areas where piped water supply is close by, and not all association chairmen regulate the quality of water delivered by drivers. Some drivers deliver untreated groundwater, which is sourced from private vendors. Some drivers deliver surface water, using a pump and hose to suck up water from a pond, created by a leaking pipe nearby their station.

Table 2. Main characteristics of water sourcing arrangements. Source: authors' fieldnotes, 2015.

Type of Water	Access Mode	Material Configuration	Location
Pipe-born water treated at the source	Purchase directly from GWCL	Overhead hydrants connected with main transmission lines	Areas served by the GWCL in proximity of main transmission lines
Pipe-born water treated at the source	Purchase from private vendors	Pipe connection, Large storage tanks, hoses and pumps	Areas served by the GWCL, mostly in residential neighborhoods
Groundwater untreated	Purchase from private vendors	Borehole(s) and/or hand-dug wells, large storage tanks, overhead hydrants, hoses and pumps	Mostly in areas not served by the utility (but also in served areas) where groundwater is available
Surface water untreated	Purchase from private vendors or with self-organized	Hoses, pumps, overhead hydrants	Both in areas supplied by the utility and in unserved areas

Before setting off in the direction of a bulk water filling point, drivers that we worked with called one (at times multiple) vendors to enquire if water was available, if the vendor was working, and to announce when we would arrive. Drivers want to fill their tanks as fast as possible in order to meet customers' demands, and they do not want to waste fuel by driving to a source where water might not be available. Sharing knowledge among drivers keeps them informed on the status of bulk water supply, from which they act accordingly. While the proximity and availability of the water source shaped practices of drivers, bulk water prices seemed less significant. This might be explained by the fact that the prices tend to be fixed among bulk water vendors that are located in a certain area. While groundwater is cheaper than piped water—during the wet season of 2015, drivers purchased 2.5 m³ of groundwater at 5 GHS and of pipe-born water at 15 GHS—it has a much poorer water quality.

Habits, trust, and social relations also shape the decisions that drivers make about sourcing tanker water. Pointing at several vendors re-selling pipe born water to tankers (four/five vendors within the same neighborhood) a senior driver working with Kofi told us he usually fetches water from just one of them, Angela. His preference was more than a business routine. He explained preferring the Angela water filling point, because he could have breakfast or play with children hanging around while waiting for the tanks to fill. But, he also knew the owner of the filling point, the father of the local Assembly Man, and before working as a tanker driver, he used to be a water vendor himself, helping his uncle who used to live and sell water few meters from Angela.

While the relationship between drivers and vendors plays a role in where drivers source water, the relations between the vendors and the utility was never made explicit to us in our interviews: were the water filling points legal or illegal. Illegal filling points are defined by the utility as vendors using a domestic connection to the piped network, instead of a commercial connection; vendors diverting water from the network with secondary connections, syphon pumps, or through meter bypasses. Tanker drivers are aware of such illegal practices and, at times, purchase water obtained through illegal practices or are themselves involved in illegal practices. Similarly, the possible illegal status of the groundwater vendors appeared not to be a concern for drivers. While new boreholes should be registered with the WRC, and the taxes paid to local administrations, groundwater vendors rarely register their borehole or test the quality of the groundwater.

4.4. Delivering Water

In our participant observations of tanker truck deliveries, we saw how they met water demands of different parts of the city, delivering to i) customers that were connected to the network but temporarily facing water shortages, ii) customers in piped serviced areas but without a connection, and iii) customers living outside of the piped network coverage. Drivers deliver water for different uses, to different customers, as explained by John: “for instance, the customer that just called me, she will use it for domestic purposes; that means, pipe hasn't gotten to her place and so she will be using the water at home. But for some others, when they call you, they need it at site (construction), they will use it to work, like construction of buildings among others. Some rich people too use to call, when they call, maybe they have the pipeline at their place but the water hasn't reached there; all those people call us to supply them with water. MPs (member of parliament) too, most of them have houses which does not get water so they also call on us. We also have a lot of high (private and government) officials who also call us for water” (Interview, Water tankers association D, 2015). As suggested by John's statement, and observed by us, water tanker customers are very diverse: public institutions, like hospitals and airports, construction sites, companies, luxury villas, and gated communities. Customers in these areas buy bulk water from tankers for domestic and luxury uses: watering the garden, washing cars, and filling swimming pools. We accompanied drivers delivering water to a multi-story Western-style villa part of the Trassaco Valley Estate, a gated community of 500 acres styled as the ‘garden city’ in East Legon [63]. However, drivers also deliver water to meet the basic needs of low-income residents. Tanker drivers deliver water to retailers, who, in turn, resell it in small volumes (buckets) to residents who cannot afford a piped connection. This is the water source for many residents living in Old Fadama, one of the largest low-income informal

neighborhoods of the city [64]. As most of the residents do not have the legal land tenure necessary for obtaining a piped connection, the area is not directly supplied by GWCL and the few residents who have direct access to pipe-born water—less than 2% have their own tap [65]—draw it from the neighboring Agboghloshie [66]. Excluded residents depend upon private vendors for daily water supply, which manage showers, toilets, and sell water in buckets, which we observed in one of our delivery rides with the tanker drivers. These vendors purchase water from GWCL, but this is intermittently supplied, and so they also rely on water tankers. Tudu and Stoler [66] report that private vendors are said by residents of Old Fadama to collude with water tanker drivers to create water shortages, allowing vendors to charge higher prices. While inequalities in water access in Accra are very well documented in the existing literature, here we seek to draw attention to the double role of tankers in extending water supply: on the one hand meeting the extravagant demands of high-income residents, and yet also providing water in low income areas that are excluded from piped water provision. Finally, we note how by sourcing water from one side of the network and delivering it to another area of the city drivers reconfigure urban water distributions.

4.5. *An Enabling and Constraining Material Infrastructure*

Practices of water tankers are shaped by the size and design of the trucks, and by the material configurations of the water filling points. The overhead hydrants that are managed by GWCL have a connection to the main lines of the piped network, which guarantees a shorter filling time for water tankers, but accessing this bulk water supply requires a specific truck size and tanker design. Kofi explained that, for small trucks, such as polytankers, the poor road conditions leading to the GWCL operated overhead hydrants located nearby their station present a challenge. “If you go there 2–3 times, your spring will break”, he reported, explaining that drivers of polytank trucks prefer to purchase water from private vendors reselling piped water one kilometer next to the hydrants. While those vendors that were located on level, smooth roads were easier to reach with small trucks, the large tankers who needed wide spaces for parking and turning their trucks could not reach these bulk water supply sources.

The design and size of the trucks also influenced tanker water delivery practices—namely, who they could (not) deliver to. Large tanker trucks are designed to drive long distances on unpaved, gravel and tarmac roads, and they can deliver water to areas of the city with good or bad road conditions—like the newly developed neighborhoods on the outskirts of the city (Figure 2). The size of the tanks also shaped delivery practices: heavy duty tank trucks deliver large quantities of water, from about 10 m³ to 27 m³. As one driver explains “normally real estates and areas where construction is going on, they need bigger cars. Subsequently, also, companies prefer bigger cars because there are some companies which require about 500,000 gallons, we can’t send these smaller tankers but we have to send bigger ones” (Interview, Tanker drivers association C, 2015). Heavy duty tanker truck drivers will only deliver to customers having the water storage infrastructure, and cash money, to order the full tank of water, because it is difficult to estimate how much water is in the tank, and because driving with the tank half full is unsafe. Installing a storage facility requires an initial investment that not all can afford, a large polytank (2.5 m³) can cost alone 1190 GHS, more than the average monthly income in Ghana, 689 GHS in 2017 [67]. In contrast, polytank water trucks can deliver to many kinds of customers. Customers can choose to purchase one, two, or three polytanks (each containing up to 2.5 m³ of water), depending on their demand for water, and ability to pay for storage infrastructure and water delivery. The customers of polytankers are typically middle and lower-middle class residents that live in individual private houses or shared compounds, but polytankers also deliver to construction sites. The design of polytanker trucks also enables drivers to enter and exit the ‘water business’ at any time, as the tanks can be easily installed on top of a transport truck, but also easily taken away if/when selling water is not profitable.



Figure 2. Heavy duty tanker truck delivering water for construction purposes in peri-urban areas of Accra. Source: Authors, October 2015.

4.6. Water Access and Prices

Describing how customers request water, John explained: “everyone (every driver) has his phone. for instance, as you sit there, maybe I supply you water today so I will say oh, madam, take my number so as she has taken my number, the following day, she can call and say oh John, my water is finished, bring me water, I am at American House, can you bring it and I will say oh, I can bring it”. Requesting a driver to deliver water only requires a phone call or a visit to the station. While access to tanker water supply requires the ability to pay for water storage infrastructure and the water delivery, and physical access of the tanker to the delivery point (dependent on road condition), access is not dependent on having legal land tenure and building documents that are required in the lengthy application process for accessing piped water. In order to connect to GWCL’s network, a new user is required to submit a site plan and a building permit, he or she should purchase a meter and contribute to the cost of connection—including the cost for infrastructure and the cost of laying the service pipeline up to the meter.

The prices of tanker water deliveries are also informally set and can change quickly based on decisions that are made by a few actors, although drivers belonging to the same association and/or parking at the same station tend to apply similar tariffs for delivery. The delivery price also changes according to the season, and the type of water delivered. In 2017, the price of water sold by tankers varied from 5.17 GHS/m³ to 7.20 GHS/m³ [3]. Piped water deliveries by tankers are more expensive than groundwater ones. Prices tend to decrease during the wet season, when demand is lower, as residents can harvest rainwater, and increase in periods of high demand: the dry season or when shortages in pipe water occur.

Decisions made by drivers and associations regarding what price to sell tanker water at are shaped by business concerns and commercial calculation. The price of a tanker water delivery must first of all cover the costs of the delivery—the money paid for bulk water supply, fuel costs, the cost of renting the truck, and maintaining the truck. Hence, when prices of fuel or of piped water increase, the prices of tanker water also increase (Interview, Tanker driver association D, 2015; Interview, Water Directorate staff C, 2015). However, the relations between individual drivers and customers also influence prices. Customers who purchase water frequently obtain discounted prices and private households tend to pay a higher price than water retailers, who resell water in buckets. Antony, for instance, sold water at a cheaper price to water retailers (80 GHS for 7.5 m³ instead of 100 GHS) to allow them to make a small profit from the retailing of water in buckets.

5. Governance in Practice: How State Actors Deal with Tanker Water Supply

Formal urban water governance actors—GWCL, PURC, municipal and district administrations, and the Water Directorate at the MWRWH—maintain an ambivalent attitude towards water tankers and bulk water vendors. Employees of the utility and government officials suspect that tanker operators steal water from GWCL network, and accuse drivers of selling bad quality water at high prices (Interview, GWCL District staff A, 2015; Interview, Water Directorate staff A, 2015). However, these actors also acknowledge the contribution of tankers in meeting the water needs in the city given limited piped water supply, and indeed use water tankers themselves in times of piped water shortages (Interview, Water Directorate staff C, 2015). We proceed in this section to describe how different state-related actors in the formal water governance process (re)act to tanker water supply through regulation, practical interventions, and through the recognition of the role of tanker water supply in meeting urban needs in formal policies. We discuss these (re)actions as attempts to reconcile the realities of urban water provision in Accra with their formal mandates, expectations, and ideals.

The description that we present is admittedly partial, as the interviewees were reluctant to describe their practices in detail, changing the subject and refusing to be recorded. Keeping relatively opaque how the sale of water to tankers trucks and by tankers is regulated could be seen as a strategic decision to maintain some level of flexibility and space for maneuvering: not recorded in interviews (and in formal governance frameworks) arrangements can be easily changed. Keeping some arrangements invisible could also be seen as a way through which interviewees distanced themselves from tanker businesses to avoid suggesting any forms of collusion. Forms of petty corruption and collusion between utility's employees and customers are anecdotally referred to and they have been reported in literature [19,68].

5.1. The Water Utility

The GWCL has no formal authority for regulating the operations of water tankers, or sympathy for their presence, but they have had to adapt piped water supply practices in response to water tankers. The scale and concentration of tanker supply in some areas of the city, and the illegal practices of sourcing bulk water supply from the piped network, led to a significant loss in revenues for the utility. This loss in revenue prompted the utility's attempts to regulate the sale of bulk water to water tankers, and a change in practices of piped water distribution. Notably, the GWCL began to manage the bulk sale of piped water. In some areas of the city with lower coverage of a piped water network, and a concomitant high concentration of water tankers, the utility operates water filling points that are specially dedicated for water tankers. The water tariff is set by the utility based on PURC tariffs (Figure 3), and the drivers receive a receipt. GWCL staff also explained this practice of water distribution to water tankers as a public health measure, ensuring safer water quality for water tanker consumers. One district manager expressed hope that customers could change water tanker practices of bulk water sourcing, ordering drivers to use the hydrants: "if I know that Ghana Water (Company Limited) has this facility over here, where the water is coming straight from the transmission line I would tell a tanker, (ok) look I want the water from that place, not from somebodies home, where everything could drop in the tank, they may not be cleaning, there are so many issues" (Interview, GWCL District staff C, 2015). A second change in practices of the utility was to legalize the resale of piped water by private individuals with a connection to the network. Although the resale of piped water is illegal in the formal urban water governance framework, starting from the early 2010s the utility has allowed private residents to resale piped water in bulk. These are issued a registered commercial connection and charged a flat monthly fee rather than on volumetric consumption in anticipation of practices of meter tampering.

The utility's interventions are understood and motivated in different ways. According to Van Rooijen et al. [65], providing water to tankers partially relieves the utility of the responsibility of getting water to the users; meanwhile, the low level of regulation allows private vendors, including tankers, to exploit the situation. A staff of the Water Directorate underscored that the more pipe water is given to tankers, the less people receive from pipes (Interview, Water Directorate staff A, 2015).

Indeed, the abstraction of large quantities of water interferes with the water pressure in the pipes. This, in turn, creates difficulties for operating the network and triggers protests by other customers living in the proximity of water filling point that see their water supply/pressure decrease in favor of drivers. These limitations are recognized by the GWCL district staff, who maintain that their priority is “to take pipes to the homes” (Interview, GWCL District staff A, 2015). However, while they do not want to encourage the tanker business, monthly targets for revenue collection also influence their practices. Improving revenue collection is one of the key measures for tackling the high percentage of non-revenue water (NRW)—estimates put NRW at 50% [19]—and ultimately ensuring financial viability of the utility and a better economic situation and salaries for its employees, as one district manager suggested. Facing these financial pressures, allowing for the sale of bulk water to water tankers generates revenue from flat rate fees. Otherwise, if not legalized, the resale of water would likely happen anyway, given the inability of the utility to control the entire piped system.

GHANA URBAN WATER LIMITED ACCRA NORTH-EAST DISTRICT		
RATES FOR TANKER SERVICE SALES BASED ON PURC TARIFF EFFECTIVE 13th MAY 2013		
1. RAMBO 180 POLYTANK	(2.0m ³)	= GHC 4.00/POLYTANK
2. RAMBO 250 POLYTANK	(2.5m ³)	= GHC 5.00/POLYTANK
3. RAMBO 300 POLYTANK	(4.5m ³)	= GHC 9.00/POLYTANK
4. TANKER 1,500 GALLS	(7.0m ³)	= GHC 15.00/TANKER
5. TANKER 2,000 GALLS	(9.0m ³)	= GHC 20.00/TANKER
6. TANKER 2,500 GALLS	(11.0m ³)	= GHC 25.00/TANKER
7. TANKER 3,000 GALLS	(14.0m ³)	= GHC 30.00/TANKER
8. TANKER 3,500 GALLS	(16.0m ³)	= GHC 35.00/TANKER
9. TANKER 4,000 GALLS	(18.0m ³)	= GHC 40.00/TANKER
10. TANKER 4,500 GALLS	(20.0m ³)	= GHC 45.00/TANKER
11. TANKER 6,000 GALLS	(27.0m ³)	= GHC 60.00/TANKER

DISTRICT MANAGEMENT.

Figure 3. Water tariffs for tankers at one of the overhead hydrants managed by the GWCL. Source: Authors, October 2015.

5.2. The Public Utility Regulatory Commission

Responding to the provision of water by water tankers, in 2005 the PURC developed “Water tanker service guidelines” [69] and the “Social policy and strategy for water regulation” [70]. The first provides a framework for regulating tanker water supply and the relationship between the GWCL, PURC, and tankers associations to encourage and monitor “fair and open competition between operators” [69] (p.5). The second proposes measures for improving the supply of water to low-income households. Both documents recognize the role of secondary providers in meeting urban water needs and (attempt to) regulate their operations. The PURC suggests promoting cooperation between the utility and providers to bring WFPs closer to areas of need, safeguard the quality of service, and require GWCL to allocate a percentage of their production to secondary providers.

More than ten years later, the ‘Water tanker service guidelines’ remains a draft document, tanker drivers are not aware of the guidelines, and the PURC (or any other organization) still does not have the legal mandate to regulate tanker supply (Interview, PURC staff, 2015; Interview, Water

Directorate staff, 2015). Although not formally endorsed, they are referred to in several policy documents, including the recently introduced National Drinking Water Quality Management Framework that was published in 2015. The framework “recommends implementation of water safety plans for vending water supply that incorporate all components of water vending, including sources, methods of abstraction and transport” [29]. It shifts the responsibility of implementing and operationalizing the safety plans to tanker drivers and vendors and of monitoring and reporting to regulatory organizations (e.g., MMDAs or PURC) in the case vendors are registered or have a contract with the utility and conduct independent surveillance.

5.3. Local and National Governments

Tanker water supply was referred as filling a gap also by interviewees at the Water Directorate and by local government officials. As the director of a local planning department told us “we are only using it (tanker water supply) as an improvised (measure) because we don't have a water system” (Interview, Director district planning department, 2015). While waiting for the pipes to come, tanker water supply is recognized and tolerated as a commercial operation, but it is not regulated as a mode of water provisioning (i.e., in terms of affordability and quality). The director of the planning department explained in the municipal district where he works tanker drivers, as other commercial ventures, are asked to pay a levy to the municipal assembly for operating their business, but the local government performs no regulatory function to ensure quality, quantity, and affordability of water after taking this fee.

The presence and role of secondary providers in meeting urban water needs received formal recognition in recent government policies. The Water Sector Strategic Development Plan (WSSDP), a programmatic document setting the objectives and vision for the development of the water sector for the period 2015–2025, recognize the role of secondary and tertiary private providers, but “as interim measures to augment institutional supplies” [71] (p.34). In the document, the government commits to achieving universal coverage for water and sanitation services by 2025 and ensuring sustainable financing for investments, operation, and maintenance of water services [71]. Forms of partnership between the utility and private operators for the management of a water facility, the distribution of bulk water supply from GWCL, and the management of the community-owned network are foreseen as interim measures to provide water to low-income and peri-urban areas not (yet) served by the utility. According to the WSSDP, the PURC “will collaborate with MMDAs and GWCL in enforcing the guidelines to ensure the supply of safe water to consumers. However, the strategy stresses that the GWCL “will remain the sole provider of urban water in the medium to long term” [71] (p.40) and the “GoG (Government of Ghana) will provide the required financing for rehabilitation, upgrading and expansion of the urban water system to ensure 100% water coverage in urban areas by 2025” [71] (p.34).

The above interventions show that the presence and role of tanker drivers in meeting urban demands is recognized by the state, but dealt with in different ways by different state-related actors across different governance sites, i.e., the utility, the policy making environment, the local administration. Despite these interventions, the long-term vision for the provision of water to urban areas remains solidly anchored in the formal set up that is provided by the current regulatory framework and tanker supply remains an interim measure. This was well expressed by a senior expert working for the World Bank at the time of the research: “the fact is that, the water tankers came to fill a gap, a void so in essence, you don't take them as the normal water supply. For Ghana Water company Limited, their target is that everyone should get access to water supply either directly to the house or through standpipes because everybody knows that water tankers are more expensive; [...] they (the water tankers) are important people who are filling in the gap but you are only filling in the gap because demand is more than supply but when they (the utility) can meet demand, then we don't need them” (Interview Senior Water and Sanitation Specialist, 2015).

6. Conclusions

Tanker operators and other forms of non-utility water supply are present in Accra, like in many African cities [30]. By documenting the daily practices of sourcing and delivering, we illustrated how tanker drivers do play a role in shaping decisions regarding how much water of what quality is distributed (and accessed) by whom across the city and at what price. Taking a practice-based approach, we show how the distribution of water via tanker trucks is variously influenced by drivers' identities, preferences and motivations, collaborative practices, and by the material objects that are needed for delivering water, the trucks, but also storage tanks. Tanker water supply is incorporated into the formal system through practical arrangements introduced by the utility, such as dedicated water filling points, through forms of regulations, such as PURC's guidelines, and through the recognition of their role in policy documents, such as the WSSDP, in line with approaches that promote the formalization and regulation of non-utility providers following neoliberal models of market competition or through partnerships with the utility [46,72,73]. However, these interventions remain unfinished and provisional, meanwhile a centrally-run networked system offering a uniform service continues to be the reference model for urban water provision.

How do these insights help us to understand the governance of water? First, a practice-based approach shows that governing water is a messy and open-ended process influenced not only by more or less formal regulations, policies, and institutional frameworks, but also by daily operations and decisions of those that are involved in supplying water and the trade-offs that these entail. The diverse ways through which state-related actors deal with tankers illustrate that governing (tanker) water supply is not a straightforward task, but it entails compromises and provisional and pragmatic decisions. Ultimately, the outcomes of these interventions in terms of what water is supplied to whom at what price remains open, as they depend of tankers individual choices, but also on the wider context in which drivers operate and their relations with other actors. This is exemplified by how water prices are set, depending on vendors' prices, on drivers' own cost-recovery calculation and on drivers' relations with customers, on the season and the amount of rain and on the flow of water in the pipes. Where and when water flows in the pipes in turn depends on the actions of engineers working for the utility, the pressure that they face from politician and cost-recovery targets, but also on the pipes themselves that break, burst, and leak [27,28].

Second, attention to the role of those involved in distributing water, like drivers, reveals the significance of individual and collective agency in shaping urban water distributions. How actors deal with trade-offs and daily decisions is shaped by their complex identities, emotions, moral norms, and their unequal interdependencies, but also the material infrastructure that they use. When taking decisions, tanker drivers act as brokers, piecing together various social and material arrangements and resorting to different rationalities and expertise. In supplying water, drivers mediate between business strategies, commercial and pragmatic considerations (i.e., in absence of pipe-born water they resort to other sources), forms of collaboration and social relations with other vendors and drivers (i.e., sharing knowledge), and infrastructural configurations. Drivers' actions as well as state-actors' interventions are understood, carried out, and motivated in different ways, making it "difficult to determine where a given political orientation or set of structural conditions ends and other commitments, normative engagements, learned habits, and experience begin" [47] (p.2). As Cleaver [51] underlines, understanding what and how influences people's ability to exercise agency is crucial for defining interventions and policies. Understanding how, where, and why drivers choose between one or another source of water becomes key to ensuring and improving the quality of water consumed by final users as aimed in Ghana's National Drinking Water Quality Management Framework.

Third, an attention towards practices makes what does not appear in policies and formal governance frameworks visible. It reveals the many different ways through which people live and inhabit the city and access water and how this is made possible by the complex interrelations between state-owned centrally-run piped water supply and other forms of non-piped water supply. Tanker water supply is shaped by the presence and absence of piped water supply and vice versa. Drivers' depend on the presence of piped water as a source, but also on its absence, as it allows them to profit and make a living. However, piped water supply is also influenced by the presence and absence of

tanker water supply, as abstraction of bulk quantities of pipe water by drivers influences water pressure in the network. At the same time, the presence of tankers partially relieves the utility of the responsibility of getting water to some of the users, particularly those who do not comply with the social orders proscribed in the formal governance frameworks, i.e., because they do not have legal land tenure. Yet, tanker water supply remains mostly absent in formal frameworks. This presence-absence is partly reflected in how state-actors deal with tanker supply by acknowledging drivers' role in meeting urban water needs, while maintaining that the utility is the only urban provider, or by attempting to regulate tanker's operations, but in fact not doing it. The presence-absence of tanker water supply is not to be understood only as the result of a mismatch between formal policies and the realities of service provision, but as constitutive of the working of the water supply system of the city [28]. The presence and absence of certain people, infrastructures, water flows, as well as their recognition as 'normal', 'formal', 'interim', or 'permanent' has important implications for end-users and their recognition as legitimate actors (and citizens) within the city's water supply system [46]. A practice-based approach shows that these absences and presences are produced by particular social, political, strategic, pragmatic decisions, and practices of those who are involved in supplying water. Acknowledging and making visible these practices, especially the hidden ones, is a compelling task for understanding the politics of water governance.

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