Blended finance, transparent data, and the complications of waters' multiple ontologies

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Abstract. In this article, I will utilize the elusive and fluid identity and texture of water to complicate an essentialist view of modern water that finds new relevance in claims to close the financing gap to provide safely managed water for all by the year 2030. To close this gap, models of blended finance are pursued that rely on transparent and auditable performance data of digital systems. Tracing the implementation of pay-as-you-go (PAYGo) water dispensers in off-grid areas in the Global South, I will demonstrate that the supposedly transparent and objective data generated from remote monitoring systems form part of the enactment of only one water reality amidst the multiple enactments of waters in relation to their sociotechnical environments, non-human encounters, and human bodies. Drawing on ethnographic material from two different settings in Kenya – the so-called informal Nairobi settlement of Mathare and a village called Kondo – I will show that, on the one hand, waters' multiplicity proliferates and, on the other hand, multiple waters and alternative water realities are deliberately undone. The paper closes with a call for the attentiveness to multiple waters.

1 Blended finance and market-oriented models of water supply

In line with the declaration of Sustainable Development Goal 6 (SDG 6), "clean water and sanitation for all", discussions about the financing gap in order to achieve this goal have entered global water policymaking. According to the World Bank, the water, sanitation, and hygiene (WASH) sector lacks USD 114 billion a year in overall global investment (Welsien and Lwakabare, 2020). Besides using existing funding sources more efficiently, blended finance is increasingly proposed by a network of policymakers, development practitioners, representatives from financial institutions, philanthrocapitalists, and private-sector actors as a means to fill this gap. Blended finance utilizes public and development financing in order to de-risk investment and thus attract commercial bank loans, microfinance, and output-based aid. The urge for blended finance re-intensifies the grip on water as an economic good and spurs its financialization. The realization of blended finance depends not only on the increased efficiency of revenue collection but also on transparent and auditable data for private investors. As instances of blended finance in the Global South are still scarce, the digitalization of water is seen as having the potential to change this, as digital tools cannot only increase operational efficiencies but also provide better tracking methods.

To guarantee water supply in off-grid areas, namely in the urban fringes and rural areas, pay-as-you-go (PAYGo) water dispensers have been utilized increasingly over the last years. The dispensers are designed to be installed in water kiosks, which is the common mode of water supply in the targeted areas. They combine prepaid smart cards with mobile payment systems that, on the one hand, are supposed to cater for efficient revenue collection. On the other hand, they are connected with an internet-enabled remote monitoring system, also called a water management system (WMS), that tracks every transaction – the amount dispensed and payment of the equivalent price – to ensure complete transparency of the water systems. The dispensers have been promoted heavily by not only a network of consisting of financial-inclusion think tanks, the telco industry, and philanthropic foundations but also traditional WASH NGOs (non-governmental organizations) and the World Bank as the silver bullet to bring about a *financially* sustainable water supply. After years of experimenting with these systems by different organizations, the

World Bank declared blended finance models, based on the transparent performance data derived from PAYGo water dispensers, the future of rural water supply in 2020.

The renewed efforts of water's commodification and objectification in the name of blended finance, however, re-enforces what Hamlin (2000) and Linton (2010) termed "modern water", namely the abstract idea of one water rather than multiple waters, which is mainly captured by quantitative rather than qualitative means. In this article, I am specifically interested in how technologies such as PAYGo dispensers contribute to the abstraction of water while sidelining its multiple ontologies. To problematize the conception of modern water, which comes along with blended finance, I will draw on 8 months of ethnographic fieldwork from 2015 to 2018 on the introduction of PAYGo dispensers in two different settings in Kenya. First, I will engage with an example from the Nairobi settlement of Mathare, where the local water utility, the Nairobi City Water and Sewerage Company (NCWSC), implemented the devices in order to extend utility water services. Second, in a village that I call Kondo, PAYGo dispensers have been implemented by a major WASH NGO, funded by a philanthrocapitalist foundation from the UK, to establish cost-recovering water systems. Although these examples were not yet directly linked to blended finance, they can be regarded as part of paving the way for blended finance approaches and allow me to question the objectifying claims of these new approaches in the water sector.

After briefly sketching out the modernization of water in line with upcoming modern sciences from the 17th century onwards and its persistence until today, I will engage with my theoretical perspectives on the objectification of water. Regarding PAYGo dispensers as "inscription devices" (Latour and Woolgar, 1979) enables me to highlight that the supposedly objective and transparent data from the WMS has to be regarded as one water reality amongst many. Drawing on Mol's (2002) notion of enactment will furthermore allow me to point out the relationality of water. Choosing examples from the fringes of urban water supply, as well as rural water supply, where the self-evidence of modern water is still contested, enables me to, first, point out that the extension of one abstract safely managed water might be difficult to achieve in environments of incomplete modernity, as it is continuously overflown by the enactment of multiple waters in practice. Second, the extension might undo alternative and more nearby water realities.

2   From modern water to blended finance

Hamlin argues that with the upcoming of modern science, rich conceptions of knowing "premodern waters" (Hamlin, 2000:315) were replaced by an essentialist view of water. Regarding premodern waters, properties such as lightness, sharpness, soft- or hardness, and temperature were regarded as properties that were seen as unique to particular waters,

with the human body system as the primary instrument to assess the qualities of these waters (Hamlin, 2000). Premodern waters were known in their relation to people, their productive activities, and their health and were often maintained in separate conduits (Linton, 2010:81). The scientific conception of water as H_2O through chemistry and its measurement against mathematical indexes through hydrology displaced place-specific measurements such as the nilometer and reduced qualitative and incommensurable differences of *waters* to measurable geometries and quantities and a dichotomous determination of pure and impure water (Hamlin, 2000). Hamlin uses the term "modernity" to refer to the historical period that began in the 17th century with the advent of modern science. While the discourse of development mobilized the "modern-traditional dichotomy" (Escobar, 1995:78) to modernize what was assumed to be traditional, I am siding with Latour (1993), who argues that "[w]e have never been modern". Latour points out that, far from being universal, the practices of modern science are no more and no less cultural than any other culture that has been described by anthropologists and therefore have to be analysed and described with the same anthropological scrutiny. *Pure* H_2O does not exist in nature and is thus a scientific abstraction and a product of modern scientific culture (Illich, 1985).

In the 19th century, new scientific theories of disease transmission emerged, which recognized water as a medium of pathogenic contamination, increasingly subjugating it to biopolitical concern (Bakker, 2012). Water has played an important role during industrialization and in urban modernization efforts during that time (Kaika, 2005), since health and cleanliness have become associated with the well-being of society and the "bacteriological city" (Gandy, 2004). The "integrated infrastructural ideal" (Graham and Marvin, 2001) with universal water and sanitation networks also found its way into development approaches in cities in the Global South (Bakker, 2010), although it could never be fully realized (Furlong and Kooy, 2017; Kooy and Bakker, 2008). In the rural areas of the Global South, the belief that groundwater was "wholesome" (Wagner and Lanoix, 1959:19) and "by far the most [...] safe in nature" (Wagner and Lanoix, 1959:57), soon challenged surface water from not only rivers but also hand-dug wells for domestic use, which were widespread in the 1960s. In the post-WWII development period, security of supply dominated over economic concerns.

With generally growing environmental problems from the 1970s onwards and the option of generating new water supplies disappearing, future visions of scarcity gave way to considerations of improving the efficiency of available water supplies. Linton (2010) argues, however, that merely changing the ratio of people to water leaves the idea of modern water intact. To curb water use, water was declared an economic good at the Dublin conference in 1992. Transposing water from a state-owned resource to an economic abstraction open for privatization only meant shifting the same thing from one dimension to the other. The introduction of cost recovery and

privatization also led to universal metering attempts through conventional water meters as well as prepaid systems (Marvin et al., 2001; Loftus, 2006; von Schnitzler, 2008). However, being an elusive and fluid substance, water is difficult to measure and contain. Urban utilities were struggling with then called non-revenue water – particularly in "informal areas" (von Schnitzler, 2017) – thereby ignoring that such supposed loss might replenish people's water sources elsewhere (Anand, 2015). In most privatization attempts, the envisaged financial flows did not materialize, and private-sector activity had declined by the late 1990s because of "revenue-risk" (Bakker, 2010:96). In rural areas, the efforts to establish cost recovery of community-managed water systems could never be realized (IRC, 2003).

While the Millennium Development Goals (MDGs) were primarily about *access* to improved drinking water supply, the discussion on the SDGs shifted to a financing gap to achieve water supply for all by 2030, which is to be closed with blended finance (Welsien and Lwakabare, 2020). With the declaration of the SDGs, the concept of blended finance has become prominent in development cooperation in general (Mawdsley, 2018). The concept has been normalized by US philanthrocapitalist organizations and has its beginnings in impact investing, which was initially not concerned with financial returns but rather with "what works" (Bishop and Green, 2015) in the sense of social or cultural impact. Having increasingly turned towards profit orientation, philanthrocapitalists currently use their funds to connect previously non-market spheres to the market (Kumar and Brooks, 2021). Blended finance utilizes donor/philanthrocapitalist grants in order to de-risk repayable financing, such as microfinance, output-based aid, or raising equity. Blended finance forms part of the financialization of water in the Global North (Ahlers and Merme, 2016; Bayliss, 2014) and has started to enter water supply in the Global South as well (Williams, 2021).

Water utilities increasingly utilize ICTs (information and communication technologies) for pro-poor services to increase their return on investment (Guma, 2019). Specifically in off-grid areas, PAYGo dispensers are being deployed to materially ensure revenue collection (Amankwaa et al., 2021). Their implementation has been promoted by a network of private actors, such as the Groupe Speciale Mobile Association (GSMA) as the world lobby organization of the global telco industry, the financial-inclusion think tank Consultative Group to Assist the Poor (CGAP; Waldron et al., 2019), and philanthropic foundations (Bhatnagar et al., 2017). However, traditional WASH actors, such as the International Water and Sanitation Centre (IRC; Smits et al., 2016) or the World Bank, have promoted the use of PAYGo water dispensers as well. The World Bank declared that it will implement solar pumping stations in 165 villages in Tanzania, to be financed with a combination of output-based aid and microloans to be paid back by the respective communities in 4 years' time, utilizing PAYGo dispensers to facil-

itate this financial model (Welsien and Lwakabare, 2020). De-risking is not only about blending and enforcing revenue collection. As these organizations argue, regarding innovative financing involving banks and microfinance institutions, digital technologies can particularly create transparent and auditable transactions that creditors will require. It is these data that will provide ontological grounds for the realization of blended finance models.

3 Abstracting water with PAYGo devices

With regard to water in particular, authors have pointed out that its elusive and fluid nature and identity make it difficult to reconcile it with efforts of quantification and objectification. Illich (1985) reminds us that water is "stuff", which can perform in infinite ways. Ballestero (2019) has portrayed how attempts to specify the materiality of water in such a way that it is recognized as a human right to counter its commodification has resulted in long lists and taxonomies. Abstraction is central not only for modern water but also for processes of its economization as "'to abstract' is to transport into a formal, calculative space" (Muniesa et al., 2007:4). Regarding the economization of water, specifically von Schnitzler (2008) has shown how the production of calculative citizenship through prepaid meters in Johannesburg, South Africa, has allowed more diverse and multidirectional questions regarding citizenship and anti-apartheid resistance to be sidelined for the sake of economic reasoning. Loftus (2006) has observed how the introduction of prepaid meters in Durban, South Africa, contributed to the reification of rationalistic economic reasoning while suppressing situated knowledges of the water scape. We can consider PAYGo dispensers as economic devices that have the capacity to turn water into an economic good. In order for goods to become "objects" – a necessary precondition for their marketization and for any commercial transaction to take place – "framing" (Callon, 1998) is necessary: goods have to become precisely defined, distinct, and demarcated with clear boundaries. PAYGo dispensers translate water into measured litres, attach a set price to this unit of measurement, and disentangle water from any social ties it might be embedded in, thereby rendering it measurable and calculable. Similar to the observations of von Schnitzler and Loftus, PAYGo dispensers have the capacity to introduce economic rationality into their users' everyday water practices (Tristl and Boeckler, 2022).

However, PAYGo dispensers can also be regarded as "inscription devices" (Latour and Woolgar, 1979), since, when water flows through the dispenser, a sensor will calculate its flow rate, directly translating it into increasing numbers of litres and a decreasing credit balance on the water card. These inscriptions will then be visible not only at the user interface of the dispenser but also on the WMS, enabling calculations of litres dispensed and profit rates possibly representing auditable data for investors. The supposed transpar-

ent data from the WMS, however, represent only one reality amongst many, as realities are enacted in relation to inscription devices. This means that reality is not simply there, waiting to be discovered, but is performative, relational, and emergent in practice (Law, 2004; Mol, 2002). Without the measuring and translating capabilities of water dispensers, indefinite masses of water could not be subject to any calculation. Only after establishing commensurability with universally understandable metrologies – in this case, price per litre – "universal knowledge" can be opposed to what is deemed "local knowledge" (Latour, 1987:229).

Since realities are enacted in practice, different practices may enact different realities (Law, 2004). Studying atherosclerosis in a Dutch hospital, Mol (2002) has shown that atherosclerosis is enacted in multiple ways in relation to different practices of diagnosis, including different theories and tools as well as the patient's body. Mol (2002) refrains from reducing the multiplicity of atherosclerosis to discourse or perspective but argues that atherosclerosis is something different depending on the sociomaterial relations it is performed in. Drawing on Mol's (2002) notion of enactment, Robertson (2016) has shown in her ethnographic account of water practices in Tarawa, Kiribati, how different waters are enacted in relation to different water technologies (wells, pipes, and pumps) and people's affective relationships towards these technologies. I want to draw on these views and show how, beyond objectified water to be tracked in the WMS, in different settings in Kenya, different waters are enacted in relational sociotechnical entanglements with diverse elements, ranging from infrastructures and people's own bodily experiences to soap and rumours.

Infrastructural devices such as the dispenser are open-ended ontological experiments. Since they will integrate and work upon many disjunctive elements and set these into new relations, they will contribute to the enactment of new and unforeseen ontologies in practice (Jensen and Morita, 2017). However, some reality-enacting devices are also "hungry" (Singleton and Law, 2013:261) and "seek to extend themselves and colonize other practices" (Singleton and Law, 2013:261). Thus, as certain realities are enacted, alternative water realities might be "un-made" (Law, 2004:33) or "were never made at all" (Law, 2004:33). Tracing, on the one hand, how alternative and multiple water realities might be undone and, on the other hand, the proliferation of the multiplicity of water that comes along with the implementation of infrastructural experiments such as PAYGo water dispensers allows me to complicate objectifying claims in the name of blended finance.

4   The objectification of water and its discontents

The dispenser renders water abstract and objectified by measuring it in litres. But, far from litres being universal, the common mode of measurement in the areas of implemen-

tation, in Kondo as well as in Mathare, is jerrycans – repurposed 20 L cooking oil containers. In Kondo, for example, one is charged KES 3 for one jerrycan; 20 L was, in fact, negotiable because a jerrycan filled to the top can fit 22 to 23, not only 20 L. On the one hand, 20 L jerrycans were normalized. The water price was set to KES 0.15 per litre so that 20 L was actually dispensed for KES 3. Furthermore, while water consumption could now conveniently be traced from the WMS in the presumably universal measuring unit of litres, in Kondo only *odd* numbers showing up on the interface of the dispenser, such as 0.15, indicated that there might also be alternative ways of measuring water. The production of commensurability and supposedly universal units of measurement had been achieved, and with it "domination from a distance" (Latour, 1987:223), with "digital devices" (Ruppert et al., 2013) once implemented enabling even easier mobility of data. At the same time, fetching water was now rendered strange and *non-transparent* to the users. Since the interface only displayed the price per litre, they now had to calculate the following. What was the balance on the card before they fetched water? How much was it afterwards? Sometimes, there was confusion. Was the water more expensive when it ran faster, since the balance decreased more quickly (field notes, February 2017)? Besides such complicated metrological disputes, waters' multiplicity also proliferated in other ways.

4.1   Extending water supply to informal areas and the complications of modern water

In 2009, an estimated 60 % of Nairobi's population was estimated to live in so-called informal settlements – amongst them Mathare – which comprise only 5 % of the city's residential land (Ruhiu et al., 2009). While official numbers are difficult to obtain, studies indicate that especially youth unemployment in Mathare is high, with the available employment opportunities only lasting a few days (Muiya, 2014). Since the colonial period and after, Nairobi has witnessed donor-funded development projects to bring the city in line with modern ideals of water supply, which could, however, never be realized (Blomkvist and Nilsson, 2017). Also, the failed attempt of privatizing the management of the waterworks in 1999 (Bayliss, 2003) did not contribute to a full realization of the "integrated infrastructural ideal" (Graham and Marvin, 2001). Since a land permit is necessary to gain a legal water connection, most parts of informal settlements are not legible to obtain such a connection. Estimations state that 15 % of the Nairobi's water production goes into these areas. The neglect of informal areas results in a high number of illegal connections, which, in turn, result in frequent water rationing by the NCWSC (Ruhiu et al., 2009:11).

In the pursuit of the MDGs, there was a donor-led push towards "inclusive" and "participatory" formalization of existing water points in Nairobi to extend the regulation of service provision regarding price setting and water quality. Formal-

ization took place by constructing water kiosks and setting up community-based organizations (CBOs) (Ruhiu et al., 2009). For the operation of the official water kiosks, CBOs consisting of Mathare residents were contracted to sell water at a price of KES 1 per jerrycan. In the face of the dire economic situation in Mathare, not only illegal vendors but also the official CBO sold water at a much higher price, ranging between KES 2 and KES 10 per jerrycan. As part of the "arduous and contingent" (Williams, 2021) process of creating the preconditions for the financialization of water in urban Kenya, the NCWSC turned towards revenue generation from informal areas (Drabble et al., 2018), which has been paired with the implementation of ICTs (Guma, 2019). The NCWSC tried to force out illegal vendors through competition by replacing the official CBOs with PAYGo dispensers and offering the presumably "same" water at the very cheap price of KES 0.5 per jerrycan. While directly connected to the NCWSC network, water tanks on top of the kiosks were filled up by water lorries during rationing in order to keep up a steady supply.

In Mathare, the water that came through the main pipes of the NCWSC was generally seen as trustworthy. In many cases, however, people did not receive water directly from the NCWSC main pipe but from all kinds of different connections – official water points and illegal connections to the main pipe. Cholera or typhoid outbreaks are frequent in Mathare and other areas of Nairobi, which is often the result of leaking water pipes running through streams of sewerage. Here, fetching water had nothing to do with trustful routinized tapping from a static infrastructure that fades into the background (Star, 1999). Rather, infrastructure could be characterized by continuous normalized interruption (Graham and Thrift, 2007), where people themselves often had to be regarded as active infrastructures (Simone, 2004). As one resident explained, "I will not go to every [water] seller. Because sometimes you look at where this water is coming from and where it is connected, you feel like 'Jesus, help us! Now I'm getting dirty water!'" (Anne, interview, February 2016). The extension of utility water with PAYGo dispensers has to be situated in relation to these contexts of economic and infrastructural uncertainties.

4.1.1 Water tanks and lorries

Residents of Mathare were concerned about the water tanks on top of the kiosks. Concerns were raised because of the lorries carrying water to Mathare. The big blue water tankers, telling everybody they were carrying "CLEAN WATER" in big white lettering written on their tanks, did cause quite some sensation each time they navigated the narrow paths of Mathare. Residents of Mathare perceived the lorries as old and dirty. They were concerned that the trucks might pollute the water. However, even more than the condition of the trucks, people were concerned about the source of the water.

I see lorries coming with water, so I wonder, where is the water coming from? Because it was announced: no water. Get prepared. Three days, there is going to be no water. Then there are the lorries. Question mark! What is this? (Stella, interview, February 2016)

According to Wallace, an employee of the NCWSC, the water was taken from the six hydrants located at the main pipes transporting water to the city. These hydrants are unaffected by rationing and always have high water pressure (Wallace, interview, January 2016). Residents of Mathare were not convinced by such explanations. They kept on wondering "Is it from Nairobi River?" (Stella, interview, February 2016) or "Maybe there is an expired water somewhere, so they want it to be used and to be sold, so they don't lose money" (Muthoni, interview, February 2016). Considering water as relational, I argue that, amidst circumstances of infrastructural uncertainty, water itself cannot be taken for granted. Accordingly, users as active infrastructurers had to continuously question water in relationship to these environments.

Furthermore, the inhabitants of Mathare were worried that things such as "poo-poo" (Janis, interview, January 2016), "dead cats" (Anne, interview, January 2016), "dead rats" (Anne, interview, January 2016), or "dirty panties" (Christine, interview, January 2016) either might fall or be thrown into the tanks on purpose. Others were more concerned about bad spirits that might contaminate the water: "Last time, somebody threw a bone of a child inside the tank, for witchcraft" (Eric, interview, January 2016). NCWSC staff dismissed such allegations as incitement, as Wallace, the NCWSC employee, explained:

I think that community is dynamic, and there are those who are for it [the dispensers], and there are those who are not for it. . . . The illegal vendors know that this guy is going to buy metered water at 50 cents [0.50 KES]. And I have been selling this illegal water at around two shillings, three shillings, even to five shillings [2, 3, 5 KES]. . . . And if they see they are losing business, they will sabotage definitely. (Wallace, interview, January 2016)

The question that I am concerned with is not whether these allegations are true or if they can be reduced to incitement. Rather, I suggest that such rumours have to be taken seriously concerning the enactment of water in practice. They are, however, only effective in relation to the non-modern infrastructural environments of Mathare and its general "rhizomic trajectories of abandonment" (Kimari, 2021:141), which are, in the context of the enduring imperial planning in Nairobi, particularly well reflected in water infrastructures and water service provision. In the face of such histories of infrastructural violence and neglect, users continued to speculate about

the source of the water. Uncertainty remained and could not easily be cast aside by the objectifying attempts of PAYGo water dispensers.

4.1.2   Non-human encounters and bodily experiences

The "incomplete modernity" (Gandy, 2006:374) of urban water infrastructure in Nairobi, resonating with a history of marginalization, compelled Mathare residents to be sensitive to the characteristics of water. When using the dispenser, people paid attention to the water temperature. When it was cold, it was an indicator it came directly from the NCWSC pipe. When it was warm, it was from the tank. Furthermore, the water users had encounters with non-human interlocutors. Some users fetched water in the evening and realized in the morning that particles had settled on the bottom. Another user explained, "I got a worm in the water. I was using it for everything in the house. It used to be multipurpose. Washing, cleaning, drinking, everything" (Dorothy, interview, February 2016). Yet again, others found the water had strange effects on their body, with physical reactions including itchy skin after bathing or diarrhoea: "then I realized, better boil before drinking" (Joyce, interview, February 2016). These incidents in turn interact with life circumstances such as having children: "I decided, I have kids, I also really care about my health. ... So maybe for washing, yes. But cooking and drinking is out of order" (Sheila, interview, February 2016).

The interplay of rumours, witchcraft, leaking infrastructure, histories of abandonment, particles or worms in the water, and physical reactions, together with concerns for one's own health or that of one's children or relatives, enacted different waters in practice. As explained by the different water users, some were now using the dispenser water only for washing – the most water consumptive activity of domestic use – and used other waters for drinking and cooking, thereby also practising different waters by keeping them separate (see also Robertson, 2016). Others practised what they now considered dirty water by boiling it before use. As the enactment of modern water depends on modern scientific and technological environments, the enactment of waters in Mathare is the outcome of an interplay of sociomaterial practices and entanglements that are shaped by concerns and uncertainties that come along with faltering and unreliable infrastructural systems and the bodily reactions of the people. Water cannot simply be disconnected from its sociotechnical environments, which force people to continuously reflect on their source of water instead of taking it for granted. While the data generated at the WMS serve as the ontological basis for blended finance and can be conveniently utilized by the NCWSC, the goal that is pursued with such funding models, namely to extend safely managed water for all, did not materialize in people's everyday water practices. Rather, the water from the dispenser became one source of water amongst many, to be handled with careful reflection.

4.2   Undoing multiple waters for the sake of cost recovery

The village I call Kondo is located in Makueni County, which forms part of Ukambani, the land of the Kamba people. While off-grid water sources, such as groundwater from wells are common in many cities in the Global South (Furlong and Kooy, 2017), the presence of water from different sources is even more evident in rural areas. Water kiosks in Kondo are connected to boreholes and thus supplied by groundwater. Furthermore, Ukambani has a long history of rainwater harvesting in various ways. Besides boreholes, there are earth and sand dams that have been constructed mainly by the Kenyan government. Dam water is considered to be suitable especially for livestock, small-scale irrigation, and some domestic purposes (Malesu et al., 2008). Makueni County falls under the category of arid and semi-arid lands (ASALs). Here, rains are periodical, and dams will fall dry at one point. The only permanent water stream is the highly polluted Athi River. With 64 %, the poverty level in Makueni is far greater than the Kenyan average of 45 % (World Bank, 2013). Since the community-managed water system was not generating enough revenue to cover its maintenance, PAYGo water dispensers were implemented in every kiosk to cater for more efficient revenue collection. The goal of the philanthrocapitalist foundation funding the project was to find out if the implementation of dispensers could lead to the profitability of the water system.

4.2.1   Making waters one

Many of the residents of Kondo preferred borehole water for drinking. This preference resulted from bodily encounters. When, in the past, a borehole broke down, people contracted typhoid from using dam or river water for drinking, as Grace, a Kondo resident, explained (Grace, interview, February 2017). For other uses, people did, however, prefer dam water. Groundwater in Makueni is saline (Government of Kenya, 2013), which means a lot of soap has to be used when washing clothes. People did not like the taste of tea prepared with the "hard", i.e. saline, borehole water, and the milk flocculated easily. When cooking *githeri*, a common Kamba dish, the corn and beans did not become soft for a long time. The different waters in Kondo were enacted in relation to the water technology; people's bodily experiences; and other elements such as soap, tea, milk, or maize.

However, for cost-recovery reasons, it was in the interest of the implementing agencies that people use as much borehole water as possible. In pilot projects, the manufacturer of the dispensers tried to increase the usage of borehole water through sensitization campaigns on the benefits of clean, i.e. borehole, water, which turned out to be unsuccessful, as Ole, an employee of the manufacturer, explained:

> When these communities are supposed to pay for water, ... it is an expense, and they do anything

they can to avoid that expense. So when it is [the] rainy season, they rather walk those 4 km down to the river and scoop that water. No matter if it is not healthy, whatever. So that is what they do. (Ole, interview, June 2016)

One recommendation for further implementations of PAYGo dispensers was to specifically target ASALs to count on "seasonal effects", i.e. people using more borehole water during the dry season due to limited availability of other sources, as Ellen, another employee of the manufacturer, explained (interview, November 2016). The NGO workers agreed to that view as well: "Given that it is an arid area, where the only source of water are those boreholes, the revenue may be high" (Ezekiel, interview, February 2016).

Problematic was the permanent Athi River, however. Otieno, an NGO worker, tried, for good reasons, to discourage the residents of Kondo from using water from the river:

> The water in Athi River is dirty. ... There will be funny behaviours if you continue taking the water. ... Stop drinking water from the river. It has waste from industry. Heavy metals, which may cause cancer. Cancer is bad because if it affects you, a part has to be cut away. Leave water from the river, and drink this one. (Otieno, sensitization meeting, February 2017)

The Athi River fell victim to the postcolonial modernization experiment, which was accompanied by a low appreciation of surface waters, and rivers were still the focus of the search for the "ultimate sink" (Tarr, 2001) for urban and industrial wastewater until the 1970s. However, the incomplete modernity in Nairobi refers to not only the water supply but also the sewerage network. Only 40 % of the population in Nairobi is connected to this network. The discharge from the two semi-functional sewerage treatment plants of Nairobi, as well as the run-off of unconnected areas such as Mathare, enters the Nairobi River, which flows into the Athi River, untreated. Furthermore, the Athi River is highly polluted with heavy metals and pathogenic pollutants, discharge from industries, and run-off from agricultural activities (Kithia, 2007).

At the same time, users were educated that "water is an economic good" (Otieno, sensitization meeting, February 2017). However, it is difficult to reconcile the commodification of water with health considerations, especially in combination with a lack of budget on the part of users. At one of the meetings, a participant holding up a 0.5 L bottle asked Otieno, "If I fill up this small bottle, will it be charged?" (Kondo resident, sensitization meeting, January 2017). In the past, it used to be common that, in the case of lacking budgets, people would get water for free – especially for drinking. Measuring water against some mathematical abstraction rather than its place-specific context, water was now water, no matter if it was poured in a glass or a small bottle, whether

it was for drinking or some other use, a circumstance that forced water users to turn towards dam and river water for drinking during times of lacking budgets.

4.2.2 Alternative waters?

Far from being natural, the conditions of (water) scarcity in Ukambani have always been partly the outcome of specific colonial, national, and international interventions (Rocheleau et al., 1995). Besides considering water scarcity as temporal and cyclical, as well as relative, amongst others, to rainfall, rather than absolute (Mehta, 2003), we can understand drought as an "infrastructural event" (Carse, 2016) or an outcome of accreted sociotechnical decisions. Infrastructure has the capacity to naturalize certain water uses, such as large dams (Carse, 2016; Mehta, 2003) or, in this case, groundwater, while undoing potential, closer modes of water access such as rainwater, which might flow off unhindered (Mehta, 2003). In Kondo during the wet season, with its heavy rainfalls, water is abundant, and some of the rainwater was already held back by earth and sand dams. There were, however, signs of another, partly realized alternative water reality. Central to this reality was an object that is characterized by an almost obscene simplicity: a water tank. Usually the clumsy, silent, and self-evident companion of the sleek, fancy, highly technologized water dispenser, I want to highlight two encounters where it was the sparkling protagonist.

In Kondo, most people live in compounds with several buildings that house the extended family. I was visiting Musa, a resident of Kondo, whose family was practising rainwater harvesting. Using gutter-to-tank technology supplying a 5000 L tank, they survived on rainwater for drinking and cooking throughout the year. In a perfect example of "community management" (IRC, 2003), the grown-up sons of the family purchased the tank together for KES 33 000 and installed it in 2012 on their own initiative.

> Author: Does it [the tank] need maintenance?
>
> Musa: It is taken care of. Mother treasures it like nothing else in the compound.
>
> (Musa, interview, February 2017)

They cleaned the tank seasonally. Before using the water, they treated it with chlorine and stored it in a dark, cool place inside the house. They preferred the "sweet" (Musa, interview, February 2017) rainwater to what they considered "hard" (Musa, interview, February 2017), borehole water. Since Musa and his family started using rainwater for drinking, they have not experienced any health problems that they would have attributed to water consumption. Furthermore, they now had a water source right there in their compound. Their water-related life was centred around the water tank in their home, whereas boreholes and water dispensers were rather peripheral. During the rainy season, they fetched ad-

Figure 1. Water tanks at a campaign event in Kondo for the 2017 presidential elections in Kenya (source: author's photo).

ditional water for other uses from the dams, and they did so from the borehole during the dry season.

Another encounter with rainwater-harvesting tanks took place during a political rally in Kondo for the upcoming 2017 presidential elections. One of the government representatives for women, who was touring the country trying to win votes, had brought two truckloads of brand-new 2500 L water tanks to be distributed as empowerment measures amongst women so they would be able to collect rainwater from the roofs of their homes (Fig. 1). While water tanks can be powerful tools to bypass state power (Meehan, 2014) – especially in environments where river water is polluted, borehole water is costly and saline, and rain falls abundantly during short periods of the year – water tanks have the capacity to become tools of "technopolitics" (Hecht, 1998).

When handled correctly, rainwater from roof catchments is considered safe for drinking (Kimani et al., 2015; Morgan, 1992). Peter Morgan (1992), the inventor of the Zimbabwe Bush Pump, which has been analysed by de Laet and Mol (2000) as the perfect adapted technology, argues that roof catchment systems are an obvious choice for water supply in Kenya, since their simplicity and durability makes them easy to understand and manage, thereby reducing issues of maintenance. Especially when placed in the family setting, "reliance on outside intervention for its operation is minimal" (Morgan, 1992:14). In Makueni County, 27 % of all houses have roof catchments (Government of Kenya, 2013). However, families usually lack storage capacities to contain water throughout the year, especially because rain falls abundantly during short periods and because of the high acquisition costs of water tanks (Kimani et al., 2015). NGOs usually implement roof catchments merely at community buildings,

such as public schools. Rooftop catchment systems in people's homes are a low priority for donors because they require intervention on a small scale. Thus, they are a bad fit for a goal-driven and unidirectional policy environment with imperatives of rapid scalability.

5 Conclusion: nurturing multiple waters

As Mattern (2015) reminds us in her analysis of the history of the urban dashboard, "dashboard designers are in the business of translating perception into performance, epistemology into ontology". The supposedly transparent and objective data produced on dashboards of the WMS form the ontological basis for models of blended finance in order to close the financing gap, which, in turn, perpetuates the idea of one modern water. While, with the help of digital devices, data can be conveniently viewed not only by the NCWSC but potentially also by investors anywhere in the world, I have shown that these data contribute to the enactment of only one water reality amongst many. In Mathare, water was enacted together with sociotechnical circumstances that came along with infrastructural uncertainties, trajectories of abjection, economic deprivation, and general local and global inequalities. This led to the promise to extend some abstract "safely managed water" for all not being upheld in the everyday water practices of the residents of Mathare. Vice versa, in Kondo, people have always utilized different waters for different purposes. The colonizing attempts of PAYGo water dispensers not only aimed at undoing these different waters by deliberately counting on "seasonal effects" or, rather, drought. The supposedly transparent performance data of dashboards to facilitate blended finance models also fore-

closed some more qualitative and multidirectional reasoning about more moderate, place-specific, and locally preferred solutions, such as rainwater harvesting at the family level.

If there are multiple realities out there, there are some "ontological politics" (Mol, 2002:viii) at play as to why one reality is preferred over others. We should keep that in mind regarding the increasingly unidirectional market orientation of the water sector in the face of models of blended finance that rely on presumably objective performance data. In the context of market-based water supply, alternatives are not only out of focus, but they also represent competition for the centralized provision of water as an economic good. In contrast, not only in Kondo but also in Mathare and other "informal settlements", multiple waters from sources such as rainwater harvesting at a household level and river water were utilized up until the 1960s (Akallah and Hård, 2020). As dependency on centralized water systems has been created, one might wonder whether, in the wake of the drastically increasing global water scarcity, it would not be more "sustainable" – not only in Kenya – to honour and use waters, including surface water such as rivers and streams, with regard to their potentially different qualities. This means that more modest and not so colonizing devices such as roof catchments need more nurturing. And, while we should carefully avoid the trap of the "rehabilitation" of rivers (Kimari and Parish, 2020) rivers and surface waters in terms of "remedying an ahistoricized pollution" (Kimari and Parish, 2020:5), perhaps we should treat them better. Taking seriously the relationality of water means that solutions to problems of water supply need to be context-specific and multiple rather than abstract and universal.

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