6 Water, housing and (in)formality in Kitwe, Zambia

Infrastructure, citizenship and urban belonging

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> We the residents of Wusakile constituency should not be treated as third class citizens. We are not happy with the manner water is supplied to our area. (The Post 2014)

Wusakile is one of the oldest and most prominent mining neighbourhoods in Kitwe, on the Zambian Copperbelt. Since the 1930s, mining companies have provided water and housing to their employees in Wusakile. Throughout the twentieth century Wusakile's residents enjoyed reliable running water, flush toilets and high-quality brick and mortar housing, in stark contrast to the informal areas of the city (Mutale 2004). This situation had changed quite markedly by 2014, when Wusakile "residents complained that they had had no water for many days, and even when there is water running in taps, it is rationed without any reason" (Zambian Watchdog 2014). In October 2014 widespread – and occasionally violent – protests erupted as a result. Erratic water supply sparked riots and brought up issues of equity, citizenship rights and belonging to the city. This is one occasion in which the relationship between infrastructure and citizenship gave rise to activism. More broadly, this chapter shows how "citizens' everyday access to, and use of, infrastructure in the city affect, and are affected by, their citizenship identity and practice" (Lemanski 2018). By exploring the variegated dynamics between water, housing and citizenship in Kitwe, this chapter highlights the ways in which citizens' access to water infrastructure is embedded in historical processes.

The vexed relationship between citizenship and infrastructure in Kitwe today has its roots in the historical dynamics of mining and urban governance on the Copperbelt (Fraser and Larmer 2010). Historical legacies have created a contested yet persistent distinction between "formal" and "informal" urban neighbourhoods. In Kitwe citizenship status depends on spatial and legal delimitations, distinguishing formal from informal neighbourhoods. Yet rather than denoting fixed categories, such distinctions must be understood as heterogeneous and hybrid, invoking a variety of state responses and popular practices (Varley 2013). This chapter argues that citizenship is materialised through access to infrastructure and that this informs citizens' sense of belonging to the city (Kangwa 2004). Infrastructure, in this sense, is highly political (Roy 2005). At the same time, infrastructure is always "in the making" as users, service providers and government officials struggle to keep the infrastructure going (Baptista 2018b). Through the inter-connected cases of water and housing this chapter explores the links between infrastructure, citizenship and urban governance in Kitwe (Peša 2015). It shows that "the policing of the arbitrary and fickle boundary between the legal and the illegal, formal and informal, is not just the province of the state but also becomes the work of citizens (…) [who] recreate the margins of legality and formality, imposing new socio-spatial differentiations", for example through varying access to water pipes or brick housing (Roy 2009: 85–86). In particular the chapter questions how "rights to the city" have been mediated through infrastructure (Harvey 2008). These "rights to the city" might either be interpreted as part of a human rights agenda of universal access to water and housing, or in a more radical Lefebvrian sense as a "right to define urban lived space" through appropriation and participation (Purcell 2003: 578). As the protests in Wusakile show, "rights to the city" are not merely future-oriented, but are instead rooted in everyday experiences of infrastructure access. This chapter

thus asserts the "usefulness of a historical and spatial perspective" in elucidating "the connections between past, present and future" (Baptista 2018a: 30).
How have "spatial differentiation and uneven development (…) been produced over time" and how has this become "embedded in the materiality" of infrastructure (Baptista 2018a: 33)? In the colonial era a binary formal–informal distinction determined citizens' right to access services in Kitwe. Yet in the contemporary neoliberal era of commercialised service provision, the boundaries between formal and informal access have blurred. This chapter explores these transitions in terms of power relations, citizen rights and water access. It thereby contributes to ongoing debates about infrastructure, the role of the state or the market in service provision, and how infrastructure influences citizenship (Bakker 2007; Pilo 2017). This chapter is based on a reading of published historical sources, grey literature on the water sector in Kitwe and qualitative interviews with water utility employees, water users and ordinary urban residents, conducted in 2014 and 2015. It situates current contestations over water access in longer term historical dynamics. This chapter first explores scholarly debates about water infrastructure, the role of the state and the market in water provision and how this influences citizenship. Thereafter, it examines the provision of water and housing in Kitwe from a historical perspective (from the 1940s until the present), revealing the importance and malleability of the formal–informal divide. Subsequently, the case of water kiosks is analysed in the context of the changing binary relationships between formal housing and de jure citizenship, and informal housing and de facto citizenship. In other words, how does access to water and housing inform experiences of citizenship amongst urban dwellers in Kitwe?

Infrastructure, urban governance and citizenship

Water infrastructure, due to its social, economic, political and cultural significance, in addition to its importance to public health, plays a pivotal role in urban life (Bakker 2014: 471). Water has accordingly been conceived of as a tool for improving living conditions within the right to services approach to inclusive urbanisation (Pilo 2017: 399). Yet calls for a universal right to water do not necessarily uproot unequal forms of water governance (Sultana and Loftus 2015: 97). Case studies show that "water is a brutal delineator of social power which has at various times worked to either foster greater urban cohesion or generate new forms of political conflict" (Gandy 2004: 363). Attention thus has to be paid to how urban water infrastructures distribute not only water, but also difference and inequality (Anand 2016).
Infrastructures "have played a significant role in processes of nation-building, modernization and development, as well as in the making of modern citizens" (Baptista 2018a: 32). Liberal-democratic citizenship, in particular, envisages a social contract between individuals and the state in which they consent to be ruled in exchange for access to services, such as water (Purcell 2003: 565). That is why "narratives of state and society have always been deeply entwined with the provision of water" (Angel and Loftus 2018: 2). From the 1850s onwards, the state has figured prominently as a water provider to its citizens. Bakker (2014: 471–472) explains how state-managed water provision improved living standards and facilitated social inclusion. Yet Gandy (2004: 374) reminds us that this relationship "is a fragile and historically specific phenomenon". Since the 1970s, neoliberal trends of privatisation of public services, such as water, have arguably eroded the power of the state, contributing to "dramatic changes in people's expectations of their citizenship rights" (Miraftab 2012: 191). Nonetheless, private sector involvement has not displaced the importance of the state, as governments continue to own, manage or regulate various aspects of water infrastructure (Bakker 2014: 487).
It therefore begs attention how power relations are being reshaped by neoliberal processes, notably the privatisation of urban services (Pilo 2017: 400). Neoliberal reforms assume that goods such as water will be more efficiently allocated through market forces, if treated as

economic goods (Bakker 2007: 432). Yet water commercialisation has questionable distributional effects, as those who can pay for water have it readily but many others are left without affordable water access (Sultana and Loftus 2015: 98). Some authors have argued that the state does not have much power over processes of urban polarisation nor does it have the means to address widening inequalities in the distribution and quality of water supply (Gandy 2004: 372). Neoliberalisation processes, however, are fundamentally variegated (Baptista 2013: 591). There is evidence that privatisation has resulted in considerable government involvement in the water sector, especially in terms of regulation of the water market (Swyngedouw et al. 2002: 130–131). Shifting configurations of public–private partnerships have always been part of urban water supply (Swyngedouw et al. 2002: 126). Water infrastructure is, for instance, closely related to urban governance and municipal authorities play a crucial role in the roll-out of water to urban residents (Parnell and Pieterse 2010). In connection to this, the effect of neoliberal service reforms on urban citizenship has been debated extensively. Bakker (2014: 481) argues that neoliberalism has framed "consumers as customers rather than citizens" and that "consumer access is legitimated not by a citizen's entitlement to water as a service but rather by a customer's purchase of water as a quasi commodity". Similarly, Miraftab (2012: 191) asserts that neoliberalism has decentred "the state in the citizens' expectations of rights and well-being" by eroding public sphere responsibilities and delinking "citizens' civil, political and social rights".

Rather than eroding, however, the relationship between state power, urban citizenship and water access has been reconfigured. One example is the increasingly important role of human rights and other notions of rights (Purcell 2003). The "right to the city" and efforts to achieve a universal right to water are part of this trend (Purcell 2014). The realisation of such rights depends on effective state capacity to roll out urban services (Parnell and Pieterse 2010: 150). Sultana and Loftus (2015: 99) endorse the centrality of the state in enabling citizen rights: "Recognizing the right to water signals that authorities can be held politically and legally accountable, enabling those who are denied water to have means to contest and struggle for water". Even in case of fully commercialised neoliberal service provision, the state has a fundamental role to play in assuring equitable access to water as a human right and as part of urban citizenship. Because infrastructure shapes the daily practices of urban life, it equally informs particular expressions of citizenship. Pilo (2017: 398) usefully explores this "relationship between the 'right to the city' and urban services". This chapter shares Pilo's (2017: 411) interest in examining "the reshaping of power relations as part of a struggle to produce the city" by looking at how water infrastructure plays a role in defining people's "way of living in the city and the way they are recognised by the state and participate in society". By examining infrastructure from a historical perspective, this chapter explores how citizens "lay a claim in the present to a more just and fair urban future, one that situates urban dwellers as central in engaging in necessary socio-spatial change" (Silver 2014: 801). Instead of accepting a fixed distinction between "formal" citizens who can lay claim to individual piped water access and "informal" subjects who have to rely on shallow wells or streams (Gandy 2004: 368), the case of Kitwe suggests that attention should be paid to the ways in which "urban dwellers seek to adjust resource flows, reshape materialities, and experiment with multiple urban futures", illustrating their power to address urban inequalities (Silver 2014: 792). This aspect of negotiation and struggle reveals that "human rights are not necessarily sufficient criteria for the fulfilment of universal, equitable access to water supply" (Bakker 2014: 484). A struggle for the right to water "might mean more than simply achieving access to sufficient volumes of safe water. Potentially, such a struggle would mean achieving the right to be able to participate more democratically in the making of (…) the 'hydrosocial cycle'" (Sultana and Loftus 2015: 100). Examining how daily water access influences urban citizenship, belonging

and relationships to the state therefore has much to say about desired and actual "rights to the city".

Through a case study of water provision in Kitwe, Zambia, this chapter shows that colonial patterns of infrastructure provision continue to matter today, as historical legacies complicate expectations of universal and undifferentiated service provision (Anand 2016). Water provision in Kitwe highlights the enduring role of private sector interests (mining companies and water utilities) in infrastructural development throughout the 20th century (Kazimbaya-Senkwe and Guy 2007). Historical studies are necessary to situate debates on state vs. market water provision in connection to citizenship. The persistent formal–informal divide in Kitwe has shaped water provision (household taps vs. shallow wells) and urban belonging. By looking at the interface between water infrastructure, urban power relations and citizen rights from a historical perspective, the possibilities and impossibilities of future pathways – including Lefebvrian notions of a "right to the city" – can be better understood. Neoliberal reforms and water commercialisation over the past two decades have not had predictable outcomes, and were not introduced onto a blank political or infrastructural canvas, but co-exist with previous and ongoing political and infrastructural interventions, mediated through colonial legacies of infrastructure provision, power relations and citizenship. The "ceaseless reconfiguration of urban [infrastructure] networks" is "an important site from which to analyze the sociomaterial production of cities" (Silver 2014: 788). By laying their own water pipes, for example, residents of informal areas claim a form of urban belonging that is both seceding from the state (in terms of installation) whilst simultaneously engaging with the state (by accessing public services) – whereby both acts demonstrate the rights and responsibilities of citizenship. Only by paying attention to such "historically and geographically specific material conditions" can simplistic binaries such as rights/commodities, formal/informal, public/private or citizen/customer be transcended (Bakker 2007: 434). This chapter seeks to understand how "rights to the city" have been mediated through infrastructure.

A historical perspective on (in)formality in Kitwe

In order to understand housing construction, infrastructure and service provision, it is necessary to appreciate "how much of African urban place making is rooted in historical and geographical relationships and reliant upon variant social relations with state power" (Myers 2010: 582). Kitwe's history as a mining town in many ways informs its current shape, even though urban built environments are rarely the outcome of straightforward historical trends (Fraser and Larmer 2010; Mususa 2012).

Kitwe was officially established as a mining town in 1935. By 1957 the city had a population of 86,000, which rose to 338,207 in 1990 and was estimated to be 522,092 in the 2010 census (Mutale 2004; CSO 2012). From the outset Kitwe had a dual character, divided between formal parts of the city, consisting of mining and city council settlements, and informal urban and peri-urban settlements. Informal settlements resulted "from unauthorised occupation of land, usually with non-adherence to land use and building regulations" (Huchzermeyer 2009: 59). In terms of infrastructure and service provision, the discrepancy between formal and informal areas has been and remains large (Kangwa 2004; Macmillan 2012). The discrepancy originated in the colonial period, but equally dominates post-colonial patterns of infrastructure and service provision (Larmer 2010). Of course the distinction between formality and informality is never clear-cut – not only are there differentiations within categories of informality, but the formal–informal divide itself is blurred (Roy 2005; Varley 2013; Baptista 2018b). Nonetheless, in Kitwe the distinction between formal and informal neighbourhoods – even if ever-shifting, arbitrary and fickle (Roy 2009) – has become inscribed in patterns of infrastructure provision. Whereas mining companies provided reliable services at highly subsidised rates to their

employees (spacious brick housing, running water and electricity), these services were largely absent in informal settlements, where residents were excluded from public service provision, and consequently shallow wells, pit latrines and impermanent housing structures dominated (Kangwa 2004; Mutale 2004). City council areas, where civil servants and other formally employed residents lived, usually had access to water and electricity but not to the same standard as mining settlements – in council areas a water standpipe might be shared between several houses, whereas in mining areas each household had a tap (Mutale 2004). Nonetheless, there was a lot of variety within these categories. A 1959 report congratulated the mining industry for their "well-built, well-served and well-managed housing areas for African workers" (Regional Survey of the Copperbelt 1960: 77). The most luxurious three-bedroomed houses at the time would have a kitchen "fitted with a sink", a shower, as well as provisions "for power points in each room and also for an electric cooker in the kitchen" (Brown Report 1966: 58). Yet accommodation for single miners was often described as "unsatisfactory" or even "miserable" and particularly overcrowded (Moore 1948). Outside of mining areas, informal "squatter" housing was portrayed even more negatively as "unhygienic and squalid in the extreme" – although some houses in informal areas were commended for being "well-built and commodious" (Eccles Report 1944: 1, 13). This formal–informal divide, which linked notions of citizenship (based on labour status) to the provision of particular kinds of infrastructure, was rooted in colonial attempts at mobility and labour control (Macmillan 2012). In principle urban dwellers only had a right to water, electricity and housing (urban residence) as long as they were formally employed. What is more, only a very limited range of occupations (such as mining, nursing or civil service) were considered as legitimate employment, whilst construction workers and woodcutters, for example, were informalised or even banned from residing in the formal parts of the city (Larmer 2010). Through restrictive policies colonial rule purposefully sought to limit permanent urbanisation, especially before 1945, by encouraging temporary labour migration. Undeterred by these measures of control, increasing numbers of traders, charcoal burners and people simply seeking to access the alleged benefits of urban life, continued to move to and settle in informal urban areas (Macmillan 1993). Yet because residents of informal settlements lacked urban rights under colonial jurisdiction, they were cut off from public service provision. This created a contested infrastructural divide between formal and informal areas, which has persisted (albeit in an ever-shifting form) in the contemporary era (Mutale 2004).

After independence in 1964 movement control loosened and legal restrictions to urban residence were lifted. Because urbanisation rates increased rapidly, the demand for services outstripped supply and competition for housing, water and electricity access heightened. A formal–informal divide remained in place, as formal housing continued to be the preserve of mine employees and civil servants (Macmillan 1993; Fraser and Larmer 2010). Consequently, while informal settlements experienced inflated population numbers, service provision capacities did not grow in tandem (Kasongo and Tipple 1990). Mining companies, on the other hand, were "willing to continue to provide housing for their workers and to spend large sums in building new houses of improved standard" (Brown Report 1966: 56). Although mine housing in general "set a very high standard", some houses were still "below minimum standards" (Brown Report 1966: 57, 60). Mining companies considered themselves responsible "for the provision of electricity, water, street lighting and other community services", which former mineworkers today fondly recall as a "cradle to grave" policy (Brown Report 1966: 61; Interview with Edward Phiri, 18 August 2015). Yet such high-quality mine housing and infrastructural services could only be enjoyed by a minority of Kitwe's population. Mine housing remained inaccessible to the majority of casual migrants and the growing council waiting list for formal housing was never resolved (Macmillan 2012). Some government attempts to provide services to informal settlements did occur in the late 1960s and 1970s. Site-

and-service schemes, part of a global approach led by the World Bank (Huchzermeyer 2009), were intended as a solution to growing urban population numbers and poor living conditions in informal settlements (Mutale 2004). In such schemes the council provided basic services, such as roads, standpipes, sewerage and electricity masts, whilst plot owners constructed their own houses and secured access to other amenities. However, progress on these schemes was extremely slow and only catered for a very limited number of informal residents (Kasongo and Tipple 1990). Between 1973 and 1982, Kasongo and Tipple (1990: 161) describe, "the population in squatter [informal] settlements increased three-fold in nine years, while houses increased to 218 per cent of the 1973 stock. At the same time, formal housing stock has increased hardly at all". Due to the inability of mining companies and local authorities to provide adequate housing and services for all urban residents, informal settlements continued to grow (Kasongo and Tipple 1990: 150). By 2010 the number of informal settlements in Kitwe had reached 35 and the gap between formal and informal areas in terms of infrastructure and service provision had widened (Interview with Irene Kayuni, 6 November 2014).
After a period of protracted growth and expansion since the late 1940s, the full impact of the collapse of copper prices hit the mining industry in Kitwe from 1975 onwards, resulting in a dramatic deterioration of living standards for most urban residents (Fraser and Lungu 2007; Mususa 2012). As employment levels on the mines declined, unemployment soared and the economy rapidly informalised, evidenced by activities such as street vending and urban agriculture (Ferguson, 1999; Fraser and Larmer 2010). A severe polarisation in living conditions resulted from the economic crisis. Whereas those mineworkers who retained their jobs barely felt the economic crunch, residents of informal settlements had to queue for basic goods such as soap and cooking oil, while their houses were regularly threatened with demolition in an attempt by government officials to further exclude the informally employed and unemployed from urban rights and limited formal services (Kangwa 2004; Interview with Kabunda Kunka, 31 October 2014). Despite the generally bad performance of the mines, mineworkers continued to be a relatively privileged group, as interviewees still acknowledge:

> The mines continued with their "cradle to grave" policy and provided us with all our requirements. New houses continued to be built and we never experienced electricity or water shortages, everything was just the same as before. The real break came after the privatisation of the mines in 1991. (Interview with Ian Banda, 14 August 2015)

Following stringent Structural Adjustment Programmes, the mines were privatised from the 1990s onwards. In Kitwe, Nkana mine was purchased by Mopani Copper Mines PLC (a joint venture between Glencore International AG, First Quantum Minerals Ltd and ZCCM Investment Holdings) in 2000. Private mining companies were neither willing nor able to continue to provide costly social and infrastructural services to their employees (Fraser and Lungu 2007). As Mususa (2010: 381) explains, "the privatisation of the mines and the ensuing major downsizing of the workforce marked the start of an unprecedented economic crisis, with drastic effects on the local population". After privatisation, former mine housing was sold off to sitting tenants at reduced rates, whilst commercial utilities took over water services and started charging user fees (Kazimbaya-Senkwe and Guy 2007; Mususa 2012). On the Copperbelt, influenced by pressure from international financial institutions such as the World Bank, the water sector was commercialised, which entailed "separating the water services from the rest of municipal services, strict financial performance targets, operating water services on commercial principles, and the introduction of market-based remuneration for managers" (Chitonge 2010: 602). Commercial water utilities remained owned by local authorities, but

operated as separate commercial entities – largely dependent on donor funding. In Kitwe, Nkana Water and Sewerage Company (NWSC) was established in 1998 and is jointly owned by Kitwe City Council and Kalulushi Municipal Council (NWSC 2015). Kazimbaya-Senkwe and Guy (2007: 879) explain how:

> The formation of these commercial utilities is premised on a fundamental neo-liberal argument in which it is envisaged that, separation of water functions from the local authorities, will bring political independence, whilst commercialisation will promote cost recovery, and some kind of private sector efficiency, all of which will lead to better services and connectivity.

This situation still shapes water and housing provision in Kitwe, influencing citizens' (im)possibilities of accessing infrastructural services.

Processes of privatisation and subsequent erratic service delivery (Fraser and Lungu 2007) have undermined the high-quality water, electricity and housing services formerly provided by the mines. In mining areas population densities rose and the population diversified, as ownership/occupation became based on affordability rather than employment status. Furthermore, retrenched mineworkers who had bought houses using their terminal benefits sought to make money by building backyard "cabins" to rent out or for business purposes (Mususa 2012). The subsequent increase in population size caused a deterioration in infrastructural services in mining settlements. Concurrently, some informal settlements have witnessed a construction boom and secured access to reliable water services (Mutale 2004). Informal settlements attracted a wide range of people, some of whom managed to gain considerable wealth through trade or business (Kasongo and Tipple 1990). Blurring formal–informal distinctions, some former mineworkers moved to informal settlements to avoid building regulations and/or because life is considered to be slightly cheaper there. Mususa (2010: 381) describes how some "moved up and some moved down" as "wide variations in the physical infrastructure of houses became clearly visible in the varying degrees of dilapidation and renovation, indicating horizontal inequalities among residents". From 2004 onwards a period of economic boom occurred, but this did not significantly improve service levels in Kitwe's mining areas (Fraser and Larmer 2010). Kazimbaya-Senkwe and Guy (2007: 877) describe illegal connections and water wastage, as "many households did not keep their installations and fittings in good working order". In contrast to infrastructural deterioration in formal areas, there have been numerous attempts to "upgrade" informal settlements, for example by providing water kiosks and by constructing low-cost housing with the help of NGOs (Peša 2015). Numerous residents of informal areas are building large houses, laying pipes for water connections and gaining access to the electricity grid for the first time (Interview with Innocent Kosamu, 16 October 2014). In some cases, water provision or housing in informal areas is now more reliable and of a higher standard than in historically formal settlements (Fraser and Larmer 2010). Nonetheless, the remainder of this chapter shows that the formal–informal divide (notwithstanding mutations) has proven remarkably resilient and that access to infrastructure continues to underpin inequalities in urban citizenship (Kangwa 2004).

The relationship between citizenship and infrastructure in Kitwe today can only be understood by appreciating these historical dynamics (Larmer 2010; Waters 2015). The water protests in Wusakile erupted as a result of a long legacy of mine provisioning and its discontinuation after privatisation (Interview with Leonard Kamanga, 28 October 2014). Although the outline of mining booms and busts, service provision and (in)formality might be familiar (Fraser and

Larmer 2010), it has less frequently been examined how and why a division between formal and informal areas, especially in terms of infrastructure, has perpetuated after mine privatisation. Until 2015, no informal settlements were formally recognised by the Kitwe City Council and consequently all informal residents lacked land rights and even basic services (Kangwa 2004). Yet due to recent settlement upgrading and initiatives to arrange individual water connections, residents in certain informal settlements are claiming urban belonging (Interview with Kabunda Kunka, 31 October 2014). At the same time, mining employees who had long enjoyed privileged citizenship and infrastructural services have lost these as a direct result of privatisation (Mususa 2012). By looking at the case of water it can be examined how infrastructure and service provision have influenced citizenship in Kitwe. What are the "everyday processes through which users produce, maintain, and contest 'formal' and 'informal' infrastructures" in uneven urban infrastructural landscapes (Baptista 2018b: 2)? Although infrastructure can strengthen claims to citizenship, the development of infrastructure has been less than equitable and infrastructure alone is not enough to ensure "rights to the city" (Anand 2016).

Water kiosks: access to water for all?

Nkana Water and Sewerage Company is a commercial utility which started operations in 2000. It claims to be "committed to enhancing service provision and continuously providing adequate Water and Sewerage Services to all customers in Kitwe" (NWASCO 2013; NWSC 2015). Prior to its establishment, water in Kitwe was either provided through the mining companies or through the city council, at highly subsidised rates (Kazimbaya-Senkwe and Guy 2007; Dagdeviren 2008; Chitonge 2010). Yet only formal settlements, comprising mine employees and civil servants, were supplied through these channels (Kasongo and Tipple 1990; Mutale 2004). In informal settlements public water services were not provided and residents were expected to supply themselves, by resorting to shallow wells, illegal connections or the Kafue River (Self 2010; UN-Habitat 2012). Although NWSC is a commercial utility, government is the main shareholder (NWASCO 2013). Social considerations ("water as a right"; Bakker 2007; Sultana and Loftus 2015), international donor lobbying and government pressure have been pushing water provision into previously unserved informal and peri-urban areas (Robinson 2002). Hence, over the last decade NWSC has engaged in service expansion, in an attempt to "improve institutional capacities and operational capacities to match customer expectations for sustainable service delivery" (NWSC 2015). One manner in which they have done this is by expanding water provision to heavily populated informal and peri-urban settlements by means of water kiosks (Self 2010).

In an attempt to reverse the previous pattern of water provision, which had resulted in "exclusivist rather than inclusivist development", NWSC has engaged in establishing kiosks in informal and peri-urban areas since 2001 (Robinson 2002: 851). Kiosks aim to "deliver safe and reliable water at affordable prices to residents of low-income areas" (GTZ 2009: 2). Rhetorically at least, NWSC established kiosks not only to expand access to clean drinking water to previously unserved customers, but also to diminish the incidence of water-borne diseases, enhance school performance, worker productivity and even to stimulate economic growth (Robinson 2002). Providing water to low-income urban households through the low-cost technology of the water kiosk (simply described as "one-roomed buildings where piped water supply has been made available for the community to go and draw water from" (Interview with Mr Chenshe, 10 October 2014)) could, therefore, have pro-poor inclusive effects. The first kiosks in Kitwe were built in 2001 and since then their number has risen to 135, with each kiosk serving a prospective 1,000 households (NWASCO 2013). This increase in the number of kiosks, however, conceals some fundamental underlying problems, which

threaten the inclusive potential of water provision to low-income urban areas (Robinson 2002; Self 2010).

Kiosks have "considerable potential" to include peri-urban and informal settlements in urban water provision networks (Robinson 2002: 856). Yet water kiosks faced problems from the outset and effective demand has remained low. It proved difficult to pick appropriate locations for the kiosks, vendors were not forthcoming and rumours plagued kiosk water, suggesting that drinking water from kiosks would cause barrenness (Self 2010; Interview with Mwangala Chiwala, 10 October 2014; Interview with Innocent Kosamu, 16 October 2014; Interview with Albert Malama, 21 October 2014). In some areas where alternative water sources are lacking, such as in Racecourse, customers might purchase water from the kiosks on a daily basis. Even so, customers whose houses are at a slight distance from a kiosk prefer alternative water sources such as shallow wells, illegal connections or nearby schools and clinics (Interview with Margaret, 22 October 2014). Consequently, some kiosks receive only a handful of customers a day, or might fall into disuse for weeks at a time. The cost of water does not seem to be a major deterring factor to kiosk use (Ashraf et al. 2007). Customers consider kiosk water to be affordable, although the cost of water per m³ is slightly higher than that paid by households with a metered tap connection (Kazimbaya-Senkwe and Guy 2007; Self 2010; NWASCO 2013).[1] Customers are prepared to pay for water, as long as this enhances service delivery and reliability. This willingness to pay (Bakker 2014) is attested by the increasing number of individual tap connections, whereby individuals pay NWSC to lay pipes and connect their house to the main water supply network. Especially if a house is located at a distance from the existing water supply network, household tap connections require a high upfront investment. Yet even in peri-urban and informal areas where kiosks have recently been constructed, the number of individual tap connections is increasing and is challenging kiosk use (Interview with Innocent Kosamu, 16 October 2014). When assessing the use of kiosks, the NWSC community spokesperson concluded that: "The challenge we have is willingness to use, not affordability. It is about valuing the treated water, not really affordability" (Interview with Mwangala Chiwala, 10 October 2014). What has hampered the inclusive potential of water kiosks in Kitwe?

Rather than costs, the reasons for kiosk disuse seem to be related to patterns of urban governance, which create a division between formal and informal areas (Self 2010). Water kiosks have been erected in peri-urban and informal areas where previously no water services had been provided in any regulated manner (Kazimbaya-Senkwe and Guy 2007). Yet kiosks have not been distributed evenly across these areas, but have instead been placed only in those informal settlements which have been recognised for upgrading by the Kitwe City Council. Areas earmarked for upgrading have to meet a number of requirements set by the council, in terms of land tenure, planning and age of the settlement (Mutale 2004; Interview with Irene Kayuni, 6 November 2014). Such requirements favour those peri-urban and informal areas which already enjoy a certain degree of "formalisation", frequently hosting slightly better-off residents who have managed to build large permanent houses. Some of these households might already have invested in individual water connections (yard taps), by buying their own pipes and connecting to the main NWSC water network (Interview with Kabunda Kunka, 31 October 2014). Yard taps subsequently function as substitute kiosks, where neighbours can come to draw water at a fee to the tap proprietor. Whereas informal settlements recognised for upgrading might already have invested in alternative water infrastructure and therefore rarely use kiosks, Kitwe's formal–informal divide ironically excludes both unrecognised informal

[1] For current water tariffs in Kitwe see: www.nwasco.org.zm/files/WATER_AND_SEWERAGE_TARIFFS_FOR_2017_final.pdf (accessed 10 January 2018).

settlements and formal settlements (e.g. former mine areas) from accessing water kiosks (Kangwa 2004; Interview with Innocent Kosamu, 16 October 2014). The technical manager explained that NWSC is not willing to invest in areas which do not have security of tenure, because "you don't know when they [city council] will demolish it – and looking at the limited resources we have, I don't think it is wise to put them into an area that might be demolished" (Interview with Mr Chenshe, 10 October 2014).

Conceptualising water as a commodity rather than a right (Bakker 2014), this refusal of the commercial utility to serve households outside of its operational area means that settlements which have not been legalised are excluded from formal water services, such as kiosks. It is in these informal settlements, however, where the demand for water is greatest because residents lack alternative regulated water sources (Robinson 2002; Kazimbaya-Senkwe and Guy 2007). In the informal settlement of St. Anthony's, women and children can be found queuing at a metered tap minimally and reluctantly serviced by NWSC, where water is sold at prices well below kiosk fares because the water quality is sub-standard. The tap water is brown and contaminated, and consequently cholera is rife in the rainy season. Tap users in St. Anthony's call for the establishment of water kiosks, where water supply would be regular and quality would be regulated, even if this would entail a rise in prices (Interview with Bernadette Mwaba, 24 October 2014). The commercial utility NWSC could considerably increase its coverage and water sales by expanding into informal settlements such as St. Anthony's. But it is unlikely that this will happen at present due to the formal–informal divide, which is underpinned by considerations of tenure security as well as the profitability of water sales (Robinson 2002; Kangwa 2004).

In principle, water kiosks hold the potential of including formerly excluded informal settlements into formal networks of urban water provision at relatively low costs (Robinson 2002). Yet in informal settlements recognised for upgrading the capacity of kiosks is not utilised, because residents prefer individual tap connections to the main line ("full access") or continue to use unregulated water sources such as shallow wells (Self 2010). On the other hand, residents of informal settlements which have not been provided with water kiosks might clamour for their establishment. In unrecognised informal settlements, such as St. Anthony's, the establishment of water kiosks would mark an improvement in formal and regulated water access, strengthening residents' claims to inclusion into the city (Interview with Bernadette Mwaba, 24 October 2014; Anand 2016). Water kiosks, in this instance, can become a first step to legitimate citizens' rights to the city and their inclusion into urban infrastructure networks (Kangwa 2004). However, where opportunities exist for individual tap connections households generally try to pursue these, even if it entails higher costs, as tap connections signal full service provision and are associated with stronger claims of citizenship (Kazimbaya-Senkwe and Guy 2007). Through their own initiative, by laying their own pipes, residents of informal settlements thus connect themselves to "formal" infrastructure networks and thereby seek recognition not only from the commercial service provider (NWSC) but also from the state (Kitwe City Council).

When considering water, citizenship and equity, the case of Wusakile provides a peculiar reversal of fortune. Due to the commercialisation of water services (from mining company to commercial utility) and population increase, water demand in Wusakile has come to outstrip supply potential. Old pipes and poorly maintained networks mean that water in some sections will only flow for one hour a day. Formerly well-served residents now have to walk long distances to access water or get water from unregulated sources. Although each household has an individual tap connection, no water is coming out of the pipes. Erratic water supply in Wusakile, making residents feel like "third class citizens", as the Member of Parliament phrased it, fuelled the riots in 2014. The establishment of kiosks is not viable in this case, as existing water connections are obstructing alternative water provision infrastructure (Interview

with Leonard Kamanga, 28 October 2014). Only a complete (and very costly) rehabilitation of existing pipelines would restore reliable water access for Wusakile's residents, but despite intense lobbying by individuals, politicians and NGOs, plans for this have not advanced much by 2018 (Daily Nation 2018).

As these examples show, water provision is closely linked to ideas of citizenship, but different areas experience different dynamics (Swyngedouw 2009). Whereas informal settlements recognised for upgrading reject water kiosks and aspire to individual tap connections as a sign of full citizenship, unrecognised informal settlements regard water kiosks as a recognition of their belonging to the city. Wusakile provides a different case, as their previously reliable water connections have now fallen into disuse and users are resorting to unsafe water sources, which challenges their formerly privileged citizenship status (Larmer 2010). Water access in urban Kitwe is thus following skewed and unexpected courses, which at times confirm and at other times question notions of citizenship and belonging to the city by challenging and remaking the formal–informal divide (Waters 2015).

Negotiating (in)formality through infrastructure

Through the example of water kiosks, this chapter has sought to show how infrastructure can mediate notions of citizenship and urban belonging. By situating water kiosks in the historical context of water provisioning in Kitwe, the possibilities and limitations of more equal access to water infrastructure can be appraised. Debates on infrastructure have long discussed whether the state or the market would be more efficient and equitable in providing water services to citizens (Bakker 2007). It has been little highlighted, however, that "private sector participation is not new (…) but has been part and parcel of providing water services" throughout the twentieth century (Kazimbaya-Senkwe and Guy 2007: 870), especially on the Zambian Copperbelt where private mine involvement in water supply has played a role since the 1920s. Analysing the historical interdependencies between state and market provision of water obfuscates narratives which connect the commercialisation of infrastructural services to a weakening of citizen rights. Moreover, historical studies can confront the obduracy of infrastructure and the path-dependencies embedded in them (Baptista 2018a: 30). Kazimbaya-Senkwe and Guy (2007: 882) explain that: "The obduracy of water artefacts, the momentum of water technologies, and policy continuity means that, even today, some social groups in the Copperbelt are more predisposed to get access to water than others". On the Zambian Copperbelt, a formal–informal divide was historically rooted in and influenced by not only service provision but also claims to citizenship and urban belonging. It is important to bear in mind that categories such as "formal" and "informal" are always differentiated, embodying varying degrees of power and exclusion (Roy 2005). Although the formal–informal divide in Kitwe was indeed profound, it could nonetheless be reconfigured in distinct ways.

To illustrate such reconfiguration, Silver (2014) has introduced the concept of "incremental infrastructure". The laying of water pipes by informal residents in Kitwe would fit this concept, as "over time, previously informal dwellings develop the appearance and recognition of formal, robust structures. This solidifies not only the building but the household's status in the community and the perceived right to land tenure" (Silver 2014: 796). As Pilo (2017: 399) further explains:

> Often, public authorities deny people access to urban services by refusing to recognize them as city residents based on their illegal land tenure status. Thus, when inhabitants start to install and build infrastructure themselves – water pipes and electricity lines –

> they do so not only to improve their daily living conditions but also to demand recognition from the state through the construction of urban networks.

Infrastructure is thus intimately connected to state recognition and experiences of citizenship. Incremental acts such as the laying of water pipes or building a solid house in an informal area can be seen as "experiments in material configurations that seek to test and prefigure new forms of infrastructure and accompanying resource flows" (Silver 2014: 791). As Miraftab (2012: 195) argues, "for populations without access to legal or formal channels of citizen inclusion, informal practices offer an unnoticeable but effective means to assert their rights to a dignified livelihood". By looking at the case studies of water and housing in Kitwe, this chapter has examined the connections between infrastructure, urban governance and citizenship, the importance of historical legacies and the possibilities of future power reconfigurations.

Conclusion

Like most African cities, Kitwe has long been characterised using the binary analysis of formal–informal (Mutale 2004). As this chapter demonstrates, this formal–informal divide is not static, but has been continuously renegotiated and reconfigured throughout history, often mediated through access to infrastructure, such as housing and water (Larmer 2010; Mususa 2012). This chapter has traced the historical roots of Kitwe's formal–informal divide in terms of urban citizenship, as well as providing an example of a contemporary infrastructural project which has challenged yet equally remade the formal–informal divide. In Kitwe water kiosks have reconfirmed the formal–informal divide because upgraded settlements do not use them, whereas kiosks are not established in informal settlements (Self 2010). Claims of urban citizenship are thus played out through access (or lack of access) to water and housing. This chapter has questioned how infrastructure informs citizenship, rights to the city and feelings of urban belonging (Myers 2010). A study of infrastructure thus enhances understanding of "the relationship between development, materiality and social change in the city" (McFarlane 2008: 342). As it illustrates the possibilities and limitations of reconfiguring the formal–informal divide, a historical analysis of urban infrastructural power relations is imperative to imagining more equitable futures.

Although infrastructure is important for making claims of belonging to the city, infrastructure alone cannot remake the historical formal–informal divide. The history of infrastructural development in Kitwe until now has been largely unequal and exclusionary, rather than inclusive or equitable (Mutale 2004). Neither state nor market provisioning of infrastructural services has ensured water access for all (Bakker 2007). Whilst legacies of colonialism and mining enforced a formal–informal divide, the neoliberal blurring of access to services has not eliminated this divide or its inherent inequalities. Considering issues of urban governance is crucial in this respect, because "infrastructures are sociotechnical in nature, a wide range of social, material, technical, political, legal and economic factors come to the fore" (McFarlane 2008: 348). In order to craft more equitable infrastructural policies that create a broader basis for inclusive forms of infrastructural citizenship, it is paramount to understand the history of infrastructure and (in)equality in urban areas. The situation in Wusakile and the apparent reversal of fortune in terms of water provision in the area can only be comprehended by considering the history of mine provisioning and the privileged status of mining settlements vis-à-vis informal settlements (Larmer 2010; Macmillan 2012). Water kiosks can challenge and reconfigure the formal–informal divide, but infrastructure alone is not sufficient to substantiate urban rights. To a certain extent, infrastructure can remake the city and create new models of urbanisation (Harvey 2008), but historical trends and the materiality of infrastructure

itself have equally propelled the continuation of existing patterns of urban inequality, in the case of Kitwe expressed through a formal–informal divide.

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List of interviews

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