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Caught in the middle? Access to water in the rural to urban transformation of Bushenyi-Ishaka municipality, Uganda

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Abstract

This paper aims to contribute to the relatively few empirical studies done on how processes of urbanization affect water supply in smaller towns by providing an in-depth case study of Bushenyi-Ishaka municipality in Uganda. The paper shows how changes in water service provision as a result of the rural to urban transformation of the area differently affect various groups of water users in their access to water. Based on this research, the authors question the process of categorization and labelling in public service delivery, especially rigidly distinguishing between urban and rural water infrastructures and management models, as it often (re)produces binaries and potentially creates structural inequities. Building further on literature focusing on understanding and dealing with complexity, the paper calls for more empirical research to document everyday practices of providing and accessing water in changing environments in the hope to ultimately inform more effective policy interventions that aim for equity in water distributions.

Keywords: Access to water; Small towns; Uganda; urbanization; Water infrastructure; Water utility

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Introduction

A substantive body of literature is available on how urbanization processes shape access to water in large cities and metropolitan areas (e.g., Meinzen-Dick & Appasamy, 2002; Bakker, 2003; Gandy, 2004; Kooy & Bakker, 2008; Hommesa *et al*., 2019). However, relatively few empirical studies are done on how it affects water supply in smaller towns, often located in more rural and remote areas (Tutusaus & Schwartz, 2018; Silva-Novoa Sanchez *et al*., 2019). This paper aims to contribute to this later scholarship by providing an in-depth case study on how residents of two smaller towns, Bushenyi and Ishaka located in south-west Uganda, access water after the provision of water was handed over in 2002 from different government departments to a public water utility. Mandating the water utility to provide services is closely intertwined with the process of urbanization of this area, a process that ultimately led in 2010 to the agglomeration of these towns and the rural villages in their vicinity into a single municipality. Our aim to unravel what happens with water services in these rural to urban transformations and what the implications are for access to water is triggered by research that shows that management models for water service provision in smaller towns often mimic the models used in large cities (Tutusaus & Schwartz, 2018). However, because of disparate infrastructural arrangements, different settlement patterns and often still agricultural based livelihoods of people residing in these small towns, these models often do not adequately fit the contexts of these smaller – yet often fast urbanizing – towns (Adams & Smiley, 2018; Humphreys *et al*., 2018; Tutusaus *et al*., 2018).

In this paper we will discuss how processes of legibility, through which states make life standardized, assessable and amenable for intervention (Scott, 1998; McFarlane & Silver, 2017), disparately shape urban and rural spaces. In particular, we will show how in our case study area the type of water infrastructure, the management arrangements around it and the water use practices are closely intertwined with whether spaces are categorized as rural or urban in public policies (see also Adams & Smiley, 2018). This creates challenges when rural areas urbanize, especially when water utilities are made responsible for water provision on a cost-recovery basis. In this paper we will show how, as a result, the responsibility for maintenance of decentralized, collectively managed water infrastructures is neglected, while in everyday life, these sources continue to be important water sources for large parts of the population and their livelihoods. This exposes water users, especially poorer households, to risks of water pollution and, in some situations, forces them to rely on more expensive water sources. On this basis we will argue that more empirical research is needed to better understand how processes of urbanization unfold in smaller towns and how this affects disparate access to water, ultimately to inform more just and effective policy interventions.

Methods

This research is based on ethnographic research on changes in the access to water in Bushenyi-Ishaka municipality during the last three decades. The field research was conducted between November 2017 and January 2018 and between May and July 2018. In total, 87 people have been interviewed using in-depth semi-structured interviews. These interviewees include staff from the National Water and Sewerage Corporation (NWSC – the public water utility), government officials at the district and municipal level, neighbourhood chairpersons and 65 water users. The water users interviewed were selected through a stratified random selection procedure to obtain insights and experiences from

people residing in different types of neighbourhoods – in particular, residents from the more urban centres as well as residents of the more rural neighbourhoods in the municipality – and to include people belonging to different socio-economic classes, age and gender groups. The interviews have been anonymized by using codes for each interviewee to ensure that sensitive data cannot be traced to individuals.

The data obtained through the interviews have been cross-checked with multiple sources. These sources include policy and project documents, literature, original design documents and observations of built infrastructure, satellite images, detailed participant's observations of operators, utility staff and water users, and consultations with other actors such as staff from the local hospital and researcher active in the region. Moreover, this research is part of a larger collaborative research project on small towns in Africa (see Kanyesigye *et al.*, 2019; Tutusaus Luque, 2019) for which, among others, a large-scale household survey was carried out in 2018 in Bushenyi-Ishaka municipality (Marks *et al.*, submitted). The quantitative data from this survey have been used to triangulate some of the research findings presented here.

This paper is structured as follows: first, we give a brief history of settlement patterns and the establishment of administrative boundaries in the case study area. We continue by providing an overview of water-related legislation followed by analysis of disparate infrastructural development for water service provision in urban and rural areas. We then zoom in on how the transformation to an urban municipality has affected the supervision, management and maintenance of water sources that are considered rural infrastructures, in particular, protected springs. This is followed by an analysis on how this affects different groups of water users differently and what the consequences are thereof. We conclude by questioning processes of legibility in water service provision, in particular, rigidly distinguishing between urban and rural water infrastructures and management models, as it often (re)produces binaries and potentially creates unnecessary health risks and disparate access to water.

Setting the scene

The case study area is located in the south-western part of Uganda, approximately 280 km away from the capital city Kampala (Figure 1). As part of the Lake Edward basin, the evergreen hills receive around 1,197 mm of rainfall per annum (World Bank, 2019) without a clear distinctive rainy season, yet periods with more rain occur between March to April and between August to November (World Bank, 2019). The area is surrounded by wetlands in the valleys and small creeks flow from the mountain hills, especially after prolonged rains. At numerous locations groundwater comes to the surface, which is generally referred to as natural springs.

Around 1950 weekly markets were initiated in the small village of Bushenyi. Indian and Arab traders, attracted to this market place, started to construct commercial buildings as well as a school and a mosque in between the thatched huts of the people residing in the village. By 1965 Bushenyi was declared a Town Board and ten years later it formed, together with the neighbouring town of Ishaka, a town council. The first consensus report done after the formation of this town council indicated a population size of 4,185 people (UBOS, 1980). In 2010 the Government of Uganda decided to promote Bushenyi-Ishaka and several villages surrounding the towns to the status of municipality. Nowadays, Bushenyi is the administrative centre of the municipality and hosts the local government offices including the municipality office, the district office, the NWSC office and the municipal health centres. Ishaka is the main

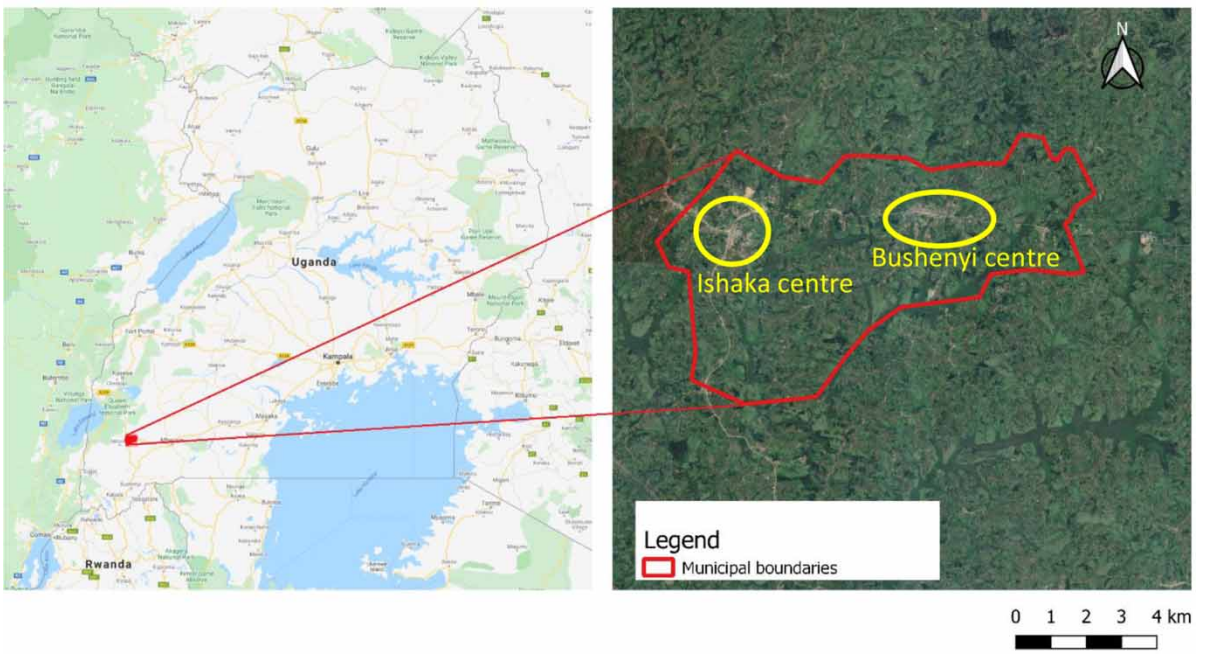

Fig. 1. Location and satellite image of Bushenyi-Ishaka Municipality in Uganda. The full colour version of this figure is available in the online version of this paper, at http://dx.doi.org/10.2166/wp.2020.024.

trading centre of the municipality as it is strategically located at the intersection of roads coming from three larger cities in this part of the country – Kasese, Kabale and Mbarara. In 2004, the Kampala International University opened a campus in Ishaka which led to more shops and a flourishing real estate sector as many (international) students and teachers settled in this part of the municipality. Outside these two town centres, the municipality mainly consists of hilly terrain with agricultural plots and clusters of homesteads along the roads and around the former villages (see Figure 1).

Government policies in Uganda do not have explicit criteria to distinguish between a rural town council or an urban municipality, yet the main rationale for declaring Bushenyi-Ishaka a municipality is the fast urbanization of this area, characterized by population growth, increased trading activities and the presence of larger buildings and facilities. The Mayor of the municipality states that '*the transformation from a Town Council to a Municipality is the proof of the growing population in the town.*' According to him, the physical appearance of the town has gone through a major transformation during the past two decades in which '*thatched roof households have been converted to households having iron sheets roofs*' and, in his view, this is *'a sign of development*'(Interview DIS1). According to the Mayor's estimation, the population grew from approximately 40,000 people in 2006 when he joined office to approximately 70,000 people in 2017, including temporary labourers, students and the many residents that settle without formal registration. The Census Report – published in 2014 based on census night approach – indicates a more modest population size of 41,063 inhabitants residing in the municipality with an annual growth rate of 3.5% (UBOS, 2014).

The conversion into a single municipality came with the promise of getting access to more public funding. According to the chairperson of one of the villages that joined the municipality, this access

to greater resources represented an opportunity to access improved basic services, such as potable water, electricity, health centres and better sanitation facilities (Interview LC1M). This chairperson explains that when the process to form a municipality was initiated stakeholder meetings were organized by the chairpersons at the village level in order to inform the villagers about the benefits of being a part of the municipality. If a village did not agree on becoming part of the municipality, that village was not taken under the jurisdiction of the municipality. The interviewed chairperson claims that this is how the boundaries of Bushenyi-Ishaka Municipality were demarcated, in addition to the already existing town council boundaries.

Categorizing areas, dividing the water infrastructure

In the National Water Policy of 1999 a distinction is made between the type of water infrastructure that is recommended for rural and sparsely populated peri-urban areas, on the one hand, and urban areas, on the other hand. For the rural and peri-urban areas '*preference should be given to point sources such as protected springs, hand-pump equipped shallow wells or boreholes, and gravity-fed piped schemes*' (GoU, 1999: 17). Centralized piped water networks are imagined for urban areas. Even though this document does not specify the reasons for this distinction, the NWSC Ishaka Branch Manager, and other interviewees, explain that this is mainly related to the expected recovering of the costs of water services as it is more costly to extend the piped network to areas that are sparsely populated (Interviews NW6; NW1; NW7).

Not only is the type of water infrastructure different depending on the whether an area is categorized as rural or urban, but also the governance structure of water service delivery differs. In rural areas the District Office is responsible for the construction, monitoring and rehabilitation of water supply infrastructure. The National Water Policy of 1999 promotes the concept of community-based management and indicates that for each water source in rural areas a water user committee needs to be established among residents that use the water source. Under the supervision of these committees, communities are jointly expected to maintain the infrastructure and protect the land around the source. Two members of such a committee need to be assigned as caretakers and become, among others, responsible for organizing preventive maintenance of the spring, overseeing that people stick to the rules set for fetching water, and collecting maintenance fees. Members of the water user committee can use water for free but are expected to contribute to the maintenance, either in kind and by paying fees. The committees are expected to formulate a three-year operation and maintenance plan to guide their activities and the District Office is responsible for giving technical and managerial support to the committees and carry out larger, periodical maintenance work. This collective action-based approach is envisioned for every water source in rural areas that is constructed with government support, even if it is located on private land.

In urban areas National Water and Sewerage Corporation (NWSC), an autonomous parastatal public utility, is mandated to operate and maintain urban water and sewerage services on a sound commercial and financially viable basis (GoU, 1972). In line with the 1995 Water Act, NWSC is supposed to be the sole authority to provide water and sewerage services in any area under their jurisdiction and they are responsible for managing all water resources in their area of operation in ways which are '*most beneficial to the people*' (GoU, 1995, article 47-2a). To achieve their mandate, NWSC signs every few years a performance contract with the Ministry of Water and Environment. These contracts set specific targets which the utility is expected to achieve in relation to, among others, the number of new connections, percentage of paid bills, financial efficiency, customer satisfaction and reduction of

water losses in the system. The operations of NWSC have expanded from providing water services in the three largest towns of Uganda in 1972 to provide services in more than 200 major urban centres across the country (NWSC, 2017). Since 2002, NWSC has become active in Bushenyi district, which includes the area that currently covers the Bushenyi-Ishaka municipality.

Dividing the infrastructure, creating disparities

In the case study area, people have relied on various sources of water. The abundance of water available from wetlands in the valleys and natural springs on the mountain slopes has made access to water reasonably easy when the population density was still low. However, the growing population posed the risk of depletion and pollution of these water sources. Already in the 1950s, the then British colonial government started to protect some of these springs in this part of the country. This protection often included adding a clay layer and a dam to protect the eye of the spring. Also, a cement tank of reinforced concrete was constructed as a reservoir to increase the water pressure and reduce water losses from the spring. Additionally, the soil on top of this structure was to be fenced to prevent the accumulation of waste that could contaminate the spring water by infiltration (see Figure 2). In the 1960s, after independence, the construction and maintenance of protected springs was taken over by the federal, and later central, government through the District Offices.

Also, residents started to build protected springs. For example, one interviewee, Fabiano, an 83-year-old man born in Kizinda, built in 1958 a cement structure around a spring located on his land. According to him he was '*mimicking the protected springs built by the government*' (Interview WYK5). However, by mimicking, he only referred to the external appearance of the structure while the internal part of the infrastructure did not follow the design used by the government. Consequently, the protection that this structure provided to the water of the spring did not follow the government standards, like several other privately constructed protected springs in the case study area. In most cases, people give access to their neighbours to use the water from privately constructed protected springs without charging fees. According to the field data, this is partially because of the belief that it would be perceived as a great injustice to deny access or request money for water that flows naturally out of the soil, but also due to the difficulty

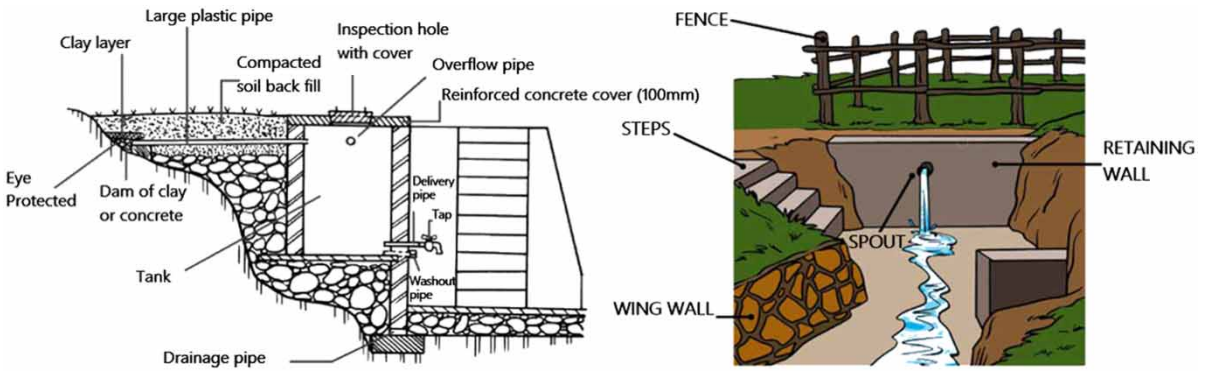

Fig. 2. Protected spring (Ministry of Water and Environment, Uganda). The full colour version of this figure is available in the online version of this paper, at http://dx.doi.org/10.2166/wp.2020.024.

to exert control over the springs as most do not have taps and water would otherwise be spilt. Some springs are also located on pieces of land that are out of sight of the owners which would make it too difficult to monitor who uses the source.

In the early 1980s, the central government began the construction of a piped water distribution system in Bushenyi town, similar to in several other urban centres across the country. According to a retired District Agricultural Officer the government '… *started laying down the pipelines mainly in the central parts of the town. The main source of water during that period of time was the groundwater in forms of springs. These springs served as water source for piped connections and water was distributed by gravity'* (Interview CS3). In the 1990s this gravity system was replaced by a larger water distribution network that supplied water to both Bushenyi and Ishaka town (NWSC, 2008) and thus established hydraulic connections between the two towns. The water in this network was pumped from Nyaruzinga wetlands, located south-east of the towns, and treated in a treatment plant before being distributed to the towns. The piped network was constructed and maintained by private companies under the auspices of the Department of Urban Water Supply and with the support of French development aid funding.

After NWSC took over the responsibilities for supplying water in the district, they initiated in 2009 a project to improve and extend water service provision in the area of operation. This project had two main components, the rehabilitation of the Nyaruzinga treatment plant and the construction of a new treatment plant, called Kitagata, located along Birira River, approximately 16 km south of the towns. The project also included the construction of storage reservoirs, installing transmission pipelines to connect the treatment plant and reservoirs with the water distribution network, and an extension of the water distribution network itself to connect more neighbourhoods in the municipality as well as neighbouring towns and villages (NWSC, 2008). The construction of the Kitagata water treatment plant was finalized in 2017 and handed-over by the contractor to NWSC one year later (NWSC, 2020).

As described above, historically, the government has prioritized more densely populated areas, such as the town centres of Bushenyi and Ishaka, to develop piped water networks that provide treated water. When NWSC took over water service provision this spatial differentiation further materialized. Even though NWSC is formally a public utility, it is expected to function as a private entity on a self-sustaining basis (NWSC, 2017). For instance, local offices of NWSC receive incentives in terms of career promotions, additional staffing and/or autonomy depending on how much money they collect from billing customers (Omuut, 2018; Tutusaus Luque, 2019). Consequently, these offices give priority to areas with a larger customer base and better chances for revenue collection. For them it is financially more attractive to connect houses that are closely located to the already existing pipelines than to extend their pipes to more distant, and often more sparsely populated, locations in the municipality. Moreover, our data show that the residents living in the urban centres of the municipality are more often involved in economic activities that generate cash income than households located in the more rural parts of the municipality where (subsistence) farming is mainly practised (see also Marks *et al*., submitted). These differences in livelihood mean that residents in the town centres are more likely to be able to afford an in-house water connection, and thus generate income for NWSC. The household survey carried out in Bushenyi-Ishaka municipality confirms the spatial segregation in the type of water sources used in different parts of the town with a concentration of piped water connections in the urban centres (Marks *et al*., submitted). The survey also indicates, that despite the efforts made in the last decade to extend the piped water network, the majority of residents of the municipality still use protected springs as their primary source of water.

In 2017 the Service Coverage Accelerated Project (SCAP 100) was initiated to expand the water distribution network to the former villages in the municipality (and other villages in the district) not yet served by NWSC. Promoted and partly funded by the national government, NWSC aims with this project to construct in the year 2020 at least two public standpipes to every (former) village. Even though this project is not expected to recover costs, NWSC still extends the network first to those places with higher concentrations of houses and in closer proximity to the existing piped network to show they are making good progress (Interviews NW6; NW7). Consequently, and regardless of the actual need for piped water, the residents of the more distant and scattered villages will need to wait longer before NWSC services reach their area. Moreover, the willingness of the residents to contribute with labour to dig trenches to install standpipes in their neighbourhoods is considered when selecting which areas will be given priority (Interview NW6; Paul, 2018). This – rather questionable – indication of demand shows another differentiation in how NSWC approaches water services' provision in the different parts of the municipality as in urban centres residents are not expected to assist during the construction works. In addition, some empirical data show that the relationships between NWSC staff and local chairpersons, as well as the personal impression that NWSC staff have of the residents in particular areas, are important in the selection process of which villages will be connected first (Interview NW2).

Creating disparities, producing the risks

It is more than 15 years that NWSC has had the mandate to provide water (and sewerage) in the Bushenyi-Ishaka municipality. However, large sections of the population are not yet reached. This is not merely caused by the slow and expensive process of infrastructural development, but mainly the result of labelling particular kinds of water infrastructure as 'rural'[1] and other water infrastructures as 'urban' as we shall explain in this section. This, together with particular interpretations of policies and strategic choices being made by various actors involved in water service provision, has exposed residents of the municipality to unnecessary vulnerabilities in accessing and using water.

Historically, the population in these areas has relied on 'rural' water sources such as protected and unprotected springs, hand-dug wells, boreholes, wetlands and river streams. Piped, treated water has only been available for a few, those who can afford it and live in privileged town centres. Our empirical data show that even these households regularly rely on 'rural' water sources: for specific purposes like laundry and gardening, to reduce the costs for accessing water in times of financial constraints, to bridge the regular interruptions in the piped water system, or simply because they prefer the taste or the colour of the water provided by the other sources. These practices are not simply undone by the introduction of new mandates or assumingly modern 'urban' infrastructures. Therefore, a crucial question is, who is responsible, in the context of ongoing urbanization in this area, to maintain and monitor the 'rural' water sources?

According to the regulatory frameworks, NWSC is the sole authority of water and sewerage in any area that falls under their mandate, which includes since 2002 the area of Bushenyi-Ishanka

[1] For the remaining part of the paper we will use single quotation marks when we refer to infrastructure or water sources that are labelled either rural or urban to emphasize that this is not an inherent characteristic of, but rather a given meaning to, these infrastructures and/or water sources within the context of the case study presented in this paper.

municipality. This means NWSC has formally the responsibility to provide water (and sewerage) to all parts, and all residents, of this area. However, when asked what the scope of operation is of NWSC in the case study area, the Ishaka Branch Manager states that '*NWSC should operate* [only] *in urban centres*' (Interview NW6). Also, at a higher managerial level, NWSC seems to differentiate between different locations and types of infrastructure present in their area of operation. For instance, the NWSC Bushenyi Area Manager explains that according to him the operation and maintenance of the water infrastructure in the (former) villages should be carried out by local committees with the support of the municipality and the Water District Office. He explains that '*it is the local governments who constructed the protected springs and they are who are supposed to rehabilitate them whenever and wherever required. We as NWSC are not responsible for maintaining the protected springs*' (Interview NW5).

Nevertheless, the District Water Officer in the case study area states that '*the District Water Office cannot operate in areas which has been taken over by the NWSC, even if there are certain parts of the area in which the NWSC has not yet been able to provide piped water supply*'. According to him, all public water sources available in the municipality now fall under the responsibility of NWSC, even if it is accessed with water infrastructures that are considered 'rural' and/or that have been constructed by others than NWSC (Interview DIS1). Yet, according to the Mayor of Bushenyi-Ishaka, the municipality is formally responsible for maintaining the protected springs. However, he explains that the municipality receives its funding from central government and since the area falls under the jurisdiction of NWSC the amount of funds the municipality receives for water-related works is negligible and hence they can no longer afford to maintain these sources (Interview MU1).

This contestation about who is formerly responsible for monitoring and maintaining what is considered 'rural' water infrastructure negatively affects the access to water for the majority of the residents who rely on it, often as their primary source. Several protected springs have been broken without repairs for months, and with increased population density in close proximity of the springs, these sources need extra protection against, and monitoring of, contamination. Field observations show that dump sites for solid waste and latrines – that regularly overflow during rains and are rarely emptied when full (see Nyakutsikwa, 2018; Marks *et al.*, submitted) – are located close to the springs.

For example, in Masya, a protected spring was demolished in 2016 and since then has functioned as an unprotected spring (see Figure 3). That year was excessively hot and the spring stopped yielding water during the drier periods. While few water users wanted to dismantle the spring in order to see what was wrong with the spring, others were of the opinion that they should complain to the Water District Office who constructed the spring and request that it should be repaired. This created a dispute among the neighbours and the issue was taken to the chairperson of the neighbourhood. Talking to the chairperson about this, he stated '*I then forwarded the concern to the chairperson at the ward level, however no action was taken, because no funds are available at the municipality for rehabilitation of springs*' (Interview LC1M). Frustrated by the lack of water, the water users eventually demolished the concrete structure protecting the eye of the spring to look for any blockages or other technical problems with the infrastructure, but soon noticed no water was available in the shallow aquifer due to the drought. Since then, this spring is no longer protected from pollution yet continues to be used for domestic purposes.

The risk of the lack of monitoring and maintenance of protected springs is that, especially poorer households who cannot afford to pay for water, will rely on unprotected sources even for drinking. The District Water Officer acknowledged this public health issue and stated that '*following the law, the District Water Office can no longer monitor the protected springs nor rehabilitate the broken springs, leaving the locals to suffer, who are neither served by the NWSC nor by the District Office*'

Fig. 3. Child fetching water from a spring converted from protected to unprotected (Paul, 2018). The full colour version of this figure is available in the online version of this paper, at http://dx.doi.org/10.2166/wp.2020.024.

(Interview DIS1). On the other hand, the Mayor is of the opinion that every resident of Bushenyi-Ishaka should be connected to the piped water supply for domestic use. Despite limited progress in the past 15 years, he is optimistic NWSC will achieve its target of having reached all parts of the municipality during 2020. The Mayor expects that by then people will only depend on the protected springs to water their livestock and for agriculture as they will either have an in-house water tap or have a public standpipe in the proximity of their household (Interview MU1).

In the meantime, NWSC aims for a water quality monitoring campaign to prove that the water provided by the protected springs (and other sources like unprotected springs, streams and wetlands) is worse than the water they provide (Interview NW5). By sensitizing people about the health risks of using these 'alternative' sources, they hope to convince people to opt for in-house connections or buying water at public standpipes. In that way, they attempt to speed-up the process of extending their services and, as such, providing residents with potable water. Yet this 'creation of demand' also importantly supports NWSC to demonstrate their commercial viability (see also Omuut, 2018) even if it is not necessarily in the interests of the residents to abandon those other water sources. For instance, a limited survey to monitor the water quality of the different water sources in the municipality shows that most of the surveyed protected springs are not contaminated with *Escherichia coli* bacteria (the most common source of water-borne diarrhoeal diseases). Moreover, the survey shows that there is no significant difference in the water quality between the piped water provided by NWSC and the protected springs. This limited study also indicates that contamination with *E. coli* bacteria mainly happens inside the households when people store water in jerry cans and other containers (Marks *et al.*, submitted). Figures on the frequency and duration of interruptions in piped water supply are difficult to obtain and cross-check. Nevertheless, our interviewees with in-house taps indicate that often water flows from their taps for only part of the day, and that in the dry season water services are sometimes interrupted for a few days in a row (Interviews WUK3, WUKi 1, WUKi5, WUKi7, WUKi10, WUKi11; see also Omuut, 2018). For this reason most of these households also store water, which indicates that this practice compromises the safety of the water regardless of the original source of the water.

Producing risks, inflicting the burden

With no longer an authority taking the responsibility for maintaining the protected springs, the water users are left by themselves to keep the water flowing. As mentioned before, according to the 1999 National Water Policy (GoU, 1999: 19–20), a collective action approach is envisioned for the maintenance of water sources in rural areas. The local government is expected to initiate and guide this process by establishing a water users' committee that organizes and oversees the management of the protected springs. However, our empirical data show that, in most cases, these committees are no longer in place. Only at one of the seven protected springs we studied were caretakers still active at the time of the research. For this spring, two caretakers are involved in the maintenance and protection of the spring. However, the process through which they were appointed did not follow the rules stipulated in the policy document. Richard, one of the two caretakers, narrates:

'*I have been taking care of the spring since the past ten years now. Earlier myself and some of my friends used to clean the spring once in a while and seeing this the community people appointed me as the caretaker of the spring. Now everyone accessing the springs identifies me as the caretaker. As the spring is located in a valley and has access only from two sides of the valley, there is one person appointed from either sides of the valley to have a better 'control' over the people accessing the spring. As I also work near the wetland making bricks and am not always around, it helps in having an old person as the caretaker from the other side of the valley, who is always there to monitor the spring*' (Interview WUK26).

Collectively managing and maintaining these sources has become more challenging due to the ongoing process of urbanization. Where it used to be a small group of neighbours who jointly used and maintained a water source, now, many more people, including people from further away, fetch water from the protected springs. This has made it more difficult to organize collective action to maintain the infrastructure as no social relations of reciprocity exist among the water users. In response to these demographic changes, Richard explains that they have adjusted the management approach by distinguishing between 'insiders' and 'outsiders'. He explains that:

'*during summers, when there are a lot of people coming to collect water from different neighbourhoods, we collect a small amount of money from them* [500–1,000 UGX] *towards cleaning the spring. There is no fixed amount to be collected from the water users. We just tell them what kind of maintenance activity we would be doing and it is up to the water user's discretion on how much money they want to donate. It is a voluntary donation. We collect money mostly from the outsiders as often during summers people come from nearby schools, hospitals and organizations with 20–50 jerry cans in their pick up vans*' (Interview WUK26).

It remains unclear what happens with the money collected from mainly the 'outside' water users as no records are kept of the collected fees and expenditure made to maintain the infrastructure.

Even owners of privately constructed protected springs struggle to maintain and protect their water source in this urbanizing context. Fabiano, one of such owners, states that it is impossible these days to know all people personally who come to use his spring, let alone to engage them in work needs to protect the water source. He explains that

'*during the 1950s there was very few people… and it was easy to mobilize all the water users to give maintenance to the spring. Things started to change with the construction of the tarmac road during the 1960s. More and more people started to settle down in the area and the farms give place to commercial establishments. Currently it is very hard to get support from the rest of the users*' (Interview WUKi5).

With the social networks needed to mobilize collective action eroding, these sources of water are more vulnerable to depletion and pollution. As Israel, another owner of a protected spring, states:

'*we cannot prohibit people from fetching water here. Even despite this spring is in our land and was built by us, and we are the ones who maintain it. If we try to stop people from using it, they will contaminate the spring… for example, by dumping in dog faeces'* (Interview WUKi8).

These caretakers of public and private protected springs have thus become the default option for – at least a minimum level of – maintenance and protection of these water sources without any functioning structures in place for support and supervision by the government.

Caught in the middle: everyday water use practices

As discussed in the previous sections, the ongoing process of urbanization in the case study area – a process characterized not only by demographic changes but also by changes in water service provision – has severely affected the maintenance and protection of the springs in Bushenyi-Ishaka municipality. Yet, these 'rural' infrastructures remain highly important in the everyday access to water for domestic purposes for a large part of the citizens in the municipality (see also Marks *et al.*, submitted). Despite more than 15 years of efforts to expand the piped water network, the water utility NWSC has not (yet) reached several neighbourhoods, especially the more remote villages that were incorporated in the municipality. As a result, public standpipes or in-house taps with treated water are not (yet) available to the people living in these areas. Hence, these people are de facto dependent on other sources with protected springs being the most widely used water source (see also Marks *et al.*, submitted). Also in neighbourhoods that have connections to the piped water system, water users opt for others water sources – springs, wetlands, streams, boreholes, rainwater. Interviewees give as reasons to opt for non-piped water the money they need to pay for using piped water; the regular – and sometimes prolonged – interruptions in the piped water system; and/or the perceived water quality of the water flowing from the pipes. Several interviewees state that the piped water has a brown colour and forms a brown layer of froth when boiled. Water users also dislike the taste of the piped water and indicate that they prefer not to use it for making their daily tea as it spoils the flavour (Paul, 2018). Baron, a 75-year-old man, explains that he '*stopped drinking tap water, as I got dizzy and was not feeling well in the initial days after getting the connection. After that I stopped drinking tap water and also told my sons not to drink water from the tap*' (Interview WUK18). These perceived water quality issues cause even people who have an in-house tap, who can afford to pay for water and who have storage facilities to bridge the intermittent service provision, regularly use (protected) springs for drinking and other domestic purposes (Interviews WUK3; WUK9; WUK25).

However, where for the better-off households relying on the protected springs is a matter of choice, for poorer households this is often the only realistic choice. They cannot afford water from taps or from water vendors who sell water from their privately owned boreholes, and water from wetlands, streams and unprotected springs is, by most people, considered too polluted for domestic purposes. Even the aim of NWSC to construct at least two public standpipes to every (former) village and charge relatively low water tariffs is unlikely to change their situation. Field data show that standpipes have become a lucrative source of income for the people put in charge of operating these public infrastructures. For instance, Sarah charges 200 UGX per jerry can of 20 litres for the water from the standpipe that she operates (Interview WUKi3) and Speritu indicates that she charges 300 UGX for the same amount of water (Interview WUKi4). From these amounts the operators pay only 25 UGX per 20 litres to NWSC (NWSC, 2019) and the rest they keep themselves. The Commercial Officer of NWSC explained the operators of the standpipes are expected to maintain the infrastructure from their own resources and, consequently, it is anticipated that they set a higher price to sell water to their customers than the tariff they pay to NWSC. However, he continued that constructing the standpipes is part of a pro-poor strategy that aims to help poorer households get access to potable water at an affordable price. For this reason, NWSC recommends the operators of public standpipes to charge not more than 50 UGX per 20 litres (Interview NW1). In comparison, households with a private in-house connection pay 83 UGX per 20 litres of water to NWSC. As result of the relative freedom that the operators of public standpipe have to set prices, the households that rely on these infrastructures end up paying considerably more for their water use than households with in-house taps.

The above analysis shows that poorer households in the municipality – especially the residents in the more remote and rural parts of the municipality – are caught in the middle as they are forced to rely on a 'rural' water source that is no longer supported in the urbanizing landscape because they are not (yet) hydraulically connected to, and/or cannot afford water provided by, the 'urban' infrastructure.

Conclusions

With this paper we aimed to contribute to the relatively few empirical studies done on how processes of urbanization affect water supply in smaller towns (Paul, 2018; Silva-Novoa Sanchez *et al.*, 2019; Marks *et al.*, submitted). Based on an in-depth case study of Bushenyi-Ishaka municipality, Uganda, we studied what happens with the provision of water services in rural to urban transformations and what the implications are for access to water for various groups of water users. As this case shows, as a result of disparate investments in and designs of water infrastructure, different settlement patterns and often still agricultural based livelihoods of people residing in these small towns, the challenges with providing water services are likely to be quite different than water provision in larger, more densely populated towns (see also Adams & Smiley, 2018).

Yet, also the processes of legibility, through which the Ugandan government attempted to standardize society and make it assessable and amenable for intervention (McFarlane & Silver, 2017), has shaped the water provision in the country. As this case shows, in Uganda – and many other countries (see also Furlong & Kooy, 2017) – it matters whether spaces are categorized as rural or urban in public policies as it affects the type of water infrastructure that is considered appropriate as well as the management arrangements that are set up to construct, maintain and operate it. These processes of legibility lead to different water use practices in rural and urban spaces in terms of using, sharing and protecting

water sources and therefore produce a differentiated distribution of water in terms of quantity and quality (see also Zwarteveen *et al.*, 2017). For policy purposes, these processes of legibility perhaps makes sense and give a rationale to government interventions and associated investments, yet can create particular challenges when rural areas urbanize. After all, an area can be declared urban relatively easily by converting its status on paper to a municipality, but water infrastructures are not changed overnight, nor are the water use practices embedded in the daily routines of the people.

As this paper shows, this is especially challenging when a commercially oriented water utility is made responsible for water provision in these areas in transition. To achieve the targets set in its performance contracts, the utility logically focuses mainly on financial viability and therefore continues to prioritize water services in more densely populated parts and wealthier segments of the municipality to recover the costs (Omuut, 2018; Tutusaus Luque, 2019). Moreover, the utility only recognizes one type of infrastructure, namely, the centralized piped network (see also Furlong & Kooy, 2017). This is partly due to technical reasons (e.g., a centralized system facilitates water treatment processes) but also, importantly, because it allows them to construct in-house taps or standpipes where water can be *sold* to individual households as willing clients. In this process of infrastructural monopoly, other sources of water are labelled as 'alternative' sources, even if these sources are still the primary source of water for the majority of the residents 15 years after the water utility became responsible for the water services in this area (see also Marks *et al.*, submitted). Neglecting the operation and maintenance of these 'alternative' 'rural' water infrastructures, in particular the protected springs, exposes water users to increasing risk of water pollution. This is especially the case for poorer households, who often cannot afford water from 'urban' infrastructure, including the – supposed to be pro-poor – public standpipes.

Even though this research is based on a single case study, it raises many questions and concerns about how processes of urbanization unfold in smaller towns and how this affects disparate access to water for various groups in society. In particular, it raises questions about the process of categorization and labelling in public service delivery, especially rigidly distinguishing between 'urban' and 'rural' water infrastructures and management models, as it often (re)produces binaries and potentially creates structural inequities (see also Kemerink *et al.*, 2016; McFarlane & Silver, 2017). Without denouncing processes of legibility, a growing body of literature is available on understanding and handling complexity in ways that eludes dualistic views on order – or simplicity – on side and chaos – or complexity – on the other side (for an overview, see Mol & Law, 2002). This opens up alternative imaginations of how complex worlds are made, understood, amended and performed (see also Kemerink-Seyoum et al., 2019). To further this, we argue that more empirical research is needed to document everyday practices of providing and accessing water in (continuously) changing environments in the hope to ultimately inform more effective (policy) interventions that aim for equity in water distributions.

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