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Exploring water access in rural Kenya: narratives of social capital, gender inequalities and household water security in Kitui county

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ABSTRACT

Access to water and sanitation as a basic human right is still limited within resource-poor rural settings of Africa, including Kitui, Kenya. This is exacerbated by prevailing gender inequalities which can be mediated when communities leverage on social capital. Qualitative methods were used to examine how values embedded in social capital enable women and vulnerable groups to cope with household water insecurity. How communities exploit the bonding and bridging dimensions of social capital to cope with water insecurities has gendered implications. Understanding the role of social capital is important in advancing public policy to reduce gender inequalities in water access.

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Introduction

Globally, around 2 billion people live in countries experiencing high water stress, with almost half of Africa's rural population having limited access to safe drinking water (GLAAS, 2019). Access to water in Kenya is not any different and is estimated at 41% of the population. Even within populations in developing countries water access remains challenged; those living in rural areas and the urban poor still rely on unimproved water sources including shallow wells and rivers (WHO/UNICEF, 2019). Kitui county, the study site, is a semi-arid environment in Kenya characterized by high poverty, sparse settlements and rainfall extremes (REACH, 2015), with the population experiencing water insecurity. This relates to the inadequate or inequitable access to clean, safe and affordable water to meet all requisite water needs and the inability to adapt to major water disaster at both the community and household levels (Habiba et al., 2013; Jepson et al., 2017; Schimpf & Curtis, 2020). Considering these key aspects, we define water security as the conditions in which sufficient, reliable, quantity and quality of water resources is available, accessible and affordable to all household members (Gain et al., 2016).

Sustainable Development Goal (SDG) 6 seeks to have all communities with access to safe and affordable drinking water. In its target 4, the SDG aims at ensuring sustainable withdrawals and supply of freshwater to address water scarcity and tackle the challenge of

water scarcity (UN Water, 2015). As Dabla-Norris et al. (2015) note, inclusive practices in water management and access, by extension, have the potential to reduce inequalities, thereby contributing to economic growth and increased social cohesion. For its part, UN Water (2015) examines access to water as the capacity of a population to safeguard sustainable access to adequate quantities of, and acceptable quality water for, sustaining livelihoods, human well-being and socio-economic development. Further, as noted in UN Water (2007), water shortage for poor people is not only about droughts or rivers running dry: it includes warranting the fair and safe access they require in order to sustain their lives and secure their livelihoods. Agenda 2030 reiterates this with the recognition of safe drinking water as a basic human right playing a vital role in sustaining healthy livelihoods (UN Water, 2019). In the context of this exploratory study, water access is regarded as the acquisition of safe, sufficient and dependable drinking water. Water access needs to be at an affordable cost in order to meet basic needs, including sanitation and hygiene, and safeguard health and levels of well-being among the rural communities (REACH, 2015; UN Water, 2015). Further, resilience is observed as the ability to cope with water-related uncertainties and risks arising from droughts and pollution. We thus note that securing water for both productive and domestic uses is critical in achieving sustainable development of rural livelihoods, particularly for those living in arid and semi-arid areas often characterized by water scarcity (UN Water, 2015).

As in other studies there is a close association between widespread water scarcity and gender inequalities in as far as water access is concerned (Bradley & Bartram, 2013). Gender inequalities refers to the social processes in which individuals face discrimination and unequal treatment based on their gender identity (Gezen, 2020). In water-insecure circumstances, women and girls are seen to carry the greatest water collection burden (Geere & Cortobius, 2017; Graham et al., 2016) in ensuring household water security for domestic use. Further, women and girls play a crucial but often unrecognized role of managing water for livelihoods, such as subsistence agriculture, especially in resource-constrained settings (Yuerlita, 2017). Notably also, while there are prevailing gender disparities in social and economic structures leading to women's limited control and access to resources (Farnworth et al., 2020), women continue to be resilient and have taken up key roles in securing household water through leveraging social capital exhibited in their everyday water-sharing. There should be a deliberate understanding beyond the difference between women and men when interrogating the intra-gender differences in access to water based on intersectionality, such as age, marital status, income levels, disability, remittance flow and land ownership. The differences among women, for example, need to be better understood if the poorest and most disadvantaged members of a community are to benefit from a programme designed to improve equal access and use of land and water resources (Leder et al., 2017). The rural community can never be treated as a homogenous entity; these elements of inter- and intra-group dynamics characterize their existence and, by extension, influence patterns of access to water from various sources.

Social capital is considered the most important resource available for poor communities that are often burdened with low incomes, poor education, and few material and financial assets, more so women (Njuki et al., 2008). The literature shows that the concept is used in a variety of ways. Scholars in varied disciplines provide slightly different interpretations of the concept (Bowen et al., 2010; Fukuyama, 2001; Putnam, 2000). Woolcock and Deepa (2000)

outline four common views of social capital: communitarian, institutional, synergy and networks. We deem the question of networks significant in the analysis of water relations (production and consumption of water) within rural communities given its interest in the intra- and extra-community relationships.

The observed intra-homestead/neighbourhood ties and inter-village ties are definitive of social and bridging capital, respectively. How these ties are positively exploited for water access (physical reach and consumption) by the economically and socially disadvantaged groups (women and persons with disability) drives the debate in this paper. Thus, social capital is viewed as a cultural behaviour that drives the community towards the benefit of 'collective good' (Ostrom, 1990). While social capital is key in water acquisition, we appreciate the interconnectedness and pluralism (Koehler et al., 2015) of systems in water service provision beyond community-level arrangements that shape universality of water access.

Bonding social capital is the network of trusting relationships, or social cohesion and trust, among members of a neighbourhood; bridging social capital is the trusting network of relationships between members of a neighbourhood and outside organizations and institutions. The networks view attends to both intra- and extra-community relationships, recognizing that neighbourhoods' function both as closed systems that serve the needs of the individuals in the system and as open systems that build relationships with policymakers, service organizations and local businesses. Water-sharing entails relatively small and direct transfers of water, whether as a gift or an exchange between households, and is shaped by varying sociocultural determinants, such as kinship, social networks and local leadership systems (Brewis et al., 2019; Wutich et al., 2018). In essence, water-sharing hinges a lot on social capital.

This paper, therefore, draws on the experiences of women and people living with disabilities in leveraging social capital to bring an understanding of how the two forms of social capital (bonding and bridging) are used in addressing household water insecurity in a rural area in Kenya by using qualitative methodologies. This paper also recognizes that women are not a homogeneous group and may experience the risk of water insecurity differently based on various intersecting factors, hence they may manage the water risk differently. Koehler et al. (2018) noted various local ways that communities use to manage water risk. Further, we take note of the interrelationship between social capital and water-sharing and will proceed by examining social capital as the broader concept within which sharing of risks and opportunities, water-sharing, and informal safety nets are created and drawn upon for household and community benefit.

Social capital in water

In this section we describe social capital and elaborate on its bonding and bridging aspects in water access.

While drawing a variety of meanings dependent on contexts, social capital broadly comprises social organizations, networks, norms and social trust within a community (Putnam, 2000). Similarly, Siegler (2014) revisits Putnam's trust element while noting such connections are important for tolerance and solidarity in the society. This speaks to the cohesion-building virtue of exercised social capital within the society. On the other hand, Scrivens and Smith (2013) observe social capital from the contingent of human

relations and behavioural norms necessary for improving the socio-economic and political facets of people's lives. Social capital comprises three dimensions: bonding, bridging and linking; however, this paper mainly draws from the bonding and bridging dimensions.

Bonding social capital refers to the social cohesion cemented through kinship, geographical and physical location, ethnicity and shared values. On the other hand, the bridging element of social capital is hinged on the relationships or networks that go beyond social stratification to involve collaboration and networks geographically dispersed. Such cooperation could be established with distant friends, and in the water space, the grouping around water production and consumption. At this level, norms, values and social structures are exploited to facilitate more macro-connections (Kreuter et al., 2002). In summary, bonding social capital refers to strong ties among individuals with similar background (such as family, close friends, neighbours), while bridging social capital relates to strong ties with distant friends, associates and colleagues (Ellison et al., 2007). In the quest for water, this is evident in how people use water sources in other localities based on rules of group cooperations.

Hence, social capital in a community enables greater cooperation among individuals and creates an informal safety net as it enhances the sharing of risks and opportunities among people in the community including water-sharing (Narayan & Pritchett, 1999; Wutich et al., 2018). Several studies (Amendah et al., 2014; Belay et al., 2019; Gallaher et al., 2013; Natcher, 2015) have shown the value of social capital in addressing marketing in cooperatives, health problems, food insecurity and other vulnerabilities, especially among low-income communities. Some studies (Bisung et al., 2014; Kelly et al., 2017; Person et al., 2017) have looked at social capital in relation to water from a quantitative perspective, while others (Brewis et al., 2019; Wutich et al., 2018) have looked at various aspects of social capital from a qualitative perspective. There is a dearth of qualitative studies on the implications of social capital in securing water in water-stressed environments and its implication for women and vulnerable members of the community, particularly people living with disabilities.

Methodology and context

Study site

The study took place in Kitui county in eastern Kenya (Figure 1), Mwingi North sub-county (Figure 2), Tseikuru ward between July 2018 and August 2019. The county is Kenya's sixth largest by land area, covering approximately 30,496.4 km² and it is among the arid and semi-arid (ASAL) counties with sporadic rainfall and cyclic droughts (Government of Kenya, 2018). Tseikuru ward covers a total area of 1328.40 km² and is one of the five wards in Mwingi North sub-county. It has a population of 40,871 (19,619 males and 21,252 females) (Government of Kenya, 2019).

Earth dams, sand dams, shallow wells, rivers and boreholes are the main water sources in Kitui county; some of these sources have fresh water, while others have salty water. The larger proportion of the community relies on unimproved sources, including collecting water from unprotected wells and springs, streams and ponds, or from a tanker truck or vendor; only a quarter of the population uses improved sources of water such as from protected springs,

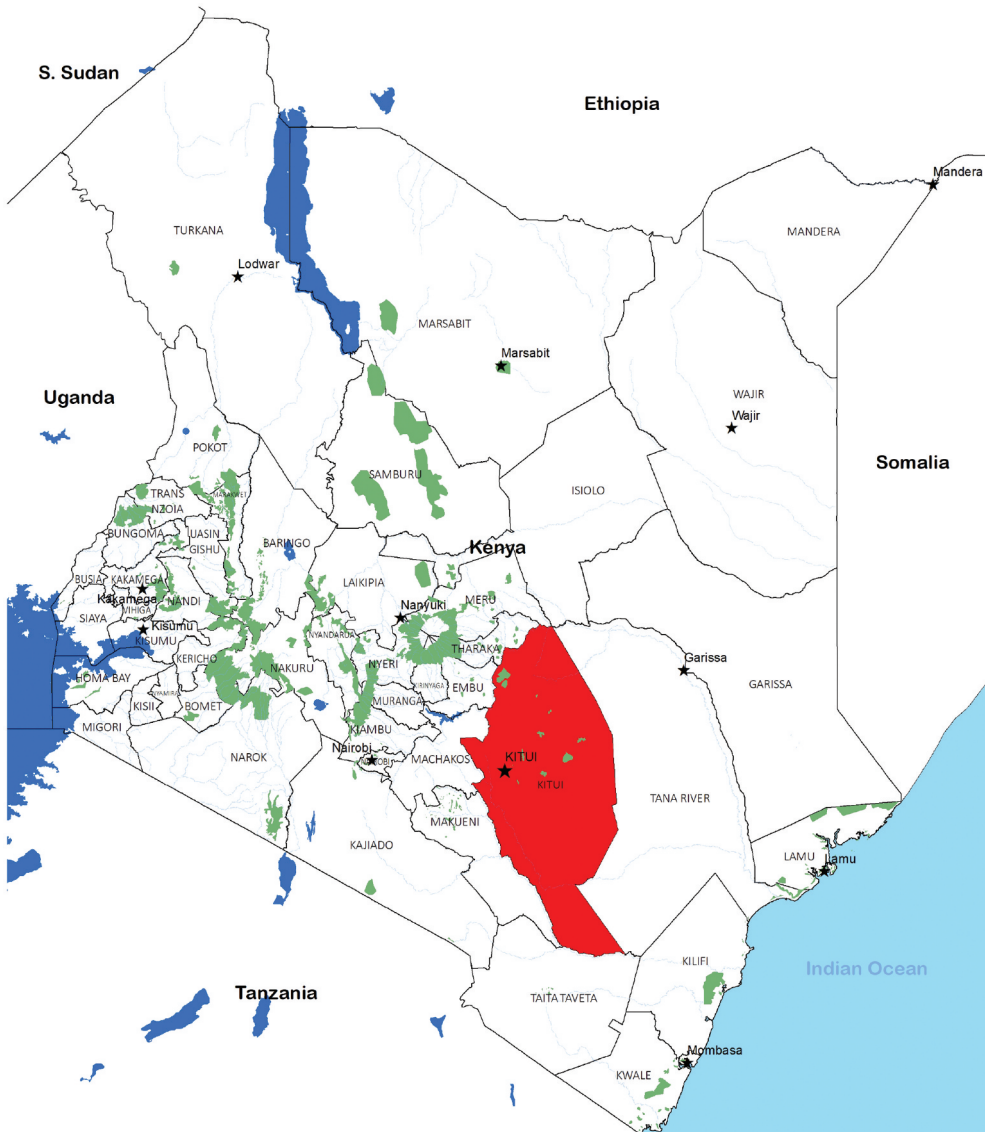


Figure 1. Map of Kenya showing Kitui county.

boreholes, piped water to kiosks or homes, and harvested rainwater (Kenya National Bureau of Statistics, 2010).

Methods

Sampling and ethical clearance

Purposive non-probability sampling was utilized to sample the study participants. Being a qualitative study, the sample size was guided by the principle of reaching data saturation as per Guest et al. (2006), which was achieved after 85 in-depth interviews (IDIs) and 10 focus

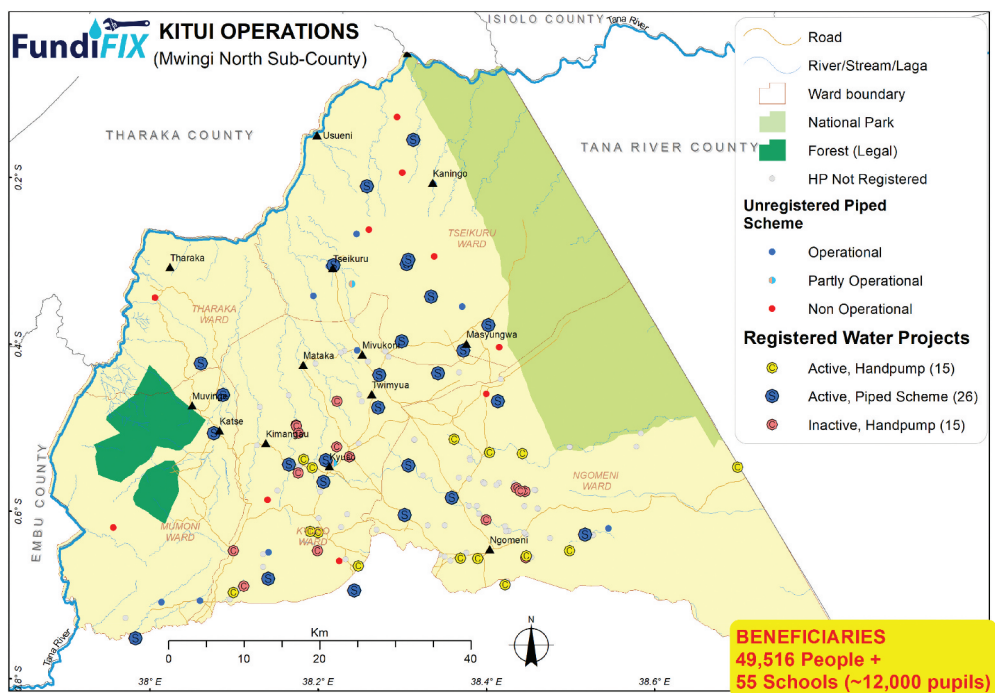


Figure 2. Map of the study area: Mwingi North sub-county, Kitui county.

group discussions (FGDs). The ethical approval and permit for this study were issued by the University of Oxford, Central University Research Ethics Committee (CUREC) (Reference SOGE 18A-193) and the National Council of Science, Technology and Innovation (NACOSTI), Kenya (NACOSTI/P/18/3232/20890). Collaboration and approval were further sought from the county government water offices. Further, at the community level, the research team engaged the different actors and shared detailed information about the study, highlighting its objectives, the possible engagement as study participants, any anticipated risks and benefits, confidentiality, anonymity and voluntary participation. Any questions were addressed before the informed consent of the participants was sought.

Data collection and analysis

The study adopted an ethnographic approach primarily using participant observation complemented by IDIs and FGDs to enable the in-depth exploration of emic perspectives on water security. The fieldwork was spread over two phases staggered over an extended period of 12 months. This was to allow for the seasonal variations in water availability and access during the dry and rainy seasons to be explored in line with the research questions. The researchers interacted in the study setting as participant observers and also carried out interviews and focused discussions with different community actors to inform the study.

At the initial phase of the research, community entry was enabled through the community gatekeepers who introduced the research team to the different community actors and guided them to the different water sources. The water sources were mapped alongside markets, and these became the points of contact to initiate rapport and allow for follow-up interaction with

community members. During the rapport-building researchers documented water-related observations as well as information obtained through informal conversations.

Data were transcribed verbatim and translated from the local language Kamba and Swahili audio-recorded interview files to English. The transcripts were thereafter reviewed alongside the audio recordings for quality. The research team then read through one-third of the transcripts for the identification of the codes to inform the development of the codebook that guided the coding of the data set on via MAXQDA. The study findings were analysed thematically based on the grounded theory approach to inform the study objective. Research findings have been integrated and presented as thick descriptions complemented with verbatim quotations in this paper.

Results

Demographic characteristics

The study participants' primary livelihood was mixed farming mainly for subsistence. This included rearing goats, cattle, donkeys and cultivating drought-resistant crops such as sorghum, pigeon peas, cowpeas, green grams and pearl millet. Most of the community members also engage in small-scale income-generating activities. Of the 85 IDI informants, 50 reported that men headed their households, while 30 were headed by women. The other five households were headed by a mother-in-law, grandmother or a son/daughter of the household. The household size range was between one and 11 members per home needing to access water daily for domestic and farming activities. The average distance to a water source for most households was an hour, and the typical water sources in the study area included shallow wells, private earth dams,¹ boreholes, rainwater collection and piped water to kiosks/homes.

Gender and social capital in water access

Water access in this environmentally harsh climate is difficult: women walk long distances under the heat and take more than an hour to access the water sources and back. This is done with the backdrop of juggling their other household responsibilities. As a coping mechanism, women and the rest of the community have learned to leverage on social capital and water-sharing. 'It is a matter of, you borrow and say that you will return upon collecting yours, you borrow and wait to be told the conditions or the giver sets the conditions upfront' (FGD#16, female).

Men and women, but more so women who are the main household water collectors, draw on social capital in times of need, especially during dry seasons. For male-headed households, men mainly rely on their economic resources and occasionally on friendship when identifying a water source for the family. After that it is the women's role to engage in routine water collection for their households.

For men, it is their job to secure for their families a safe place where they can get water. After they have done this it is the role of women to go and get that water from wherever the man secured. . . . People normally know where to go to when they need . . . a friendly shallow well owner who can meet their water needs . . . (IDI#23, male)

Good neighbourliness in securing water for the vulnerable

The bonding aspects of social capital were interwoven in the community's water-related activities and were expressed in the way people relied on friendships, neighbourliness and family relations. There was consensus in the FGDs that if a woman were sick, or had a complicated pregnancy, had undergone childbirth and especially through a caesarean section, and their children were not available or old enough to collect water, their kin, neighbours and friends would help to collect water for her. Nothing is expected as compensation for helping, but in most situations factoring in the distance and time taken to the water source, they share the water collected equally. The nature of this bonding social capital was brought out in cases involving women in different stages of their life cycles, especially as related to childbirth and nurturing of children:

Some vulnerable women have money and so they depend on water vendors who sell a Jerrycan at twenty (20) Kenya shillings. Alternatively, they find a neighbour or a friend and give them their donkeys and jerrycans to collect water for them. Once the water is brought, the pregnant woman or the new mother decides to give the friend some 'tea' just for appreciation. (IDI#17, female)

If I have a small child and I don't have anyone else at home who can help me, I will give my donkey to my neighbour who will go to fetch water on my behalf up to one month before I get enough strength where I can fetch water for myself. (IDI#24, female)

Women and vulnerable members of the community, particularly people living with disabilities, relied on friendship to tackle water insecurity and sometimes had to make prior arrangements:

Women who give birth through caesarean section make the agreements early in advance, they talk to friends or a relative whom they are well acquainted with. After giving birth, such friends will be alternating in helping her get enough water for household use up to six months. (FGD#1, female)

Friendship and good neighbourliness with a shallow well² owner, who were mostly men, enabled one to access water at very subsidized costs: "Most of the time we sell the water to our neighbours and friends. You can't give them at a higher price because they are your neighbours. . . . Others [neighbours and friends] can just use the water for free depending on your relationship but not as free as such, we agree on the manual labour . . . on how they can help us dig and maintain the shallow well. (IDI#10, male)

Particularized trust for non-kin relations

Access to water from different water sources (shallow wells, private earth dams,³ boreholes) required community members to draw on different aspects of social capital. For the private earth dams, unlike the shallow wells, payment is on a pay-as-you-go basis. Two aspects that work based on trust and good relationships is food-for-water, where one will exchange farm produce for water, and work-for-water in private earth dams, where one either digs a 3 × 2 ft piece of land for the owner of the water source or carries a specified number of buckets of soil from the earth dam/desilting. Lack of a trusted reputation or relationship with the owner can deny one physical and economic access of water, as is illustrated in the IDI excerpt:

If you want 10 jerrycan of water, then you carry 10 buckets of soil, so one bucket of soil is equivalent to a 20 litre Jerrycan of water. In some instances, the owner accepts, pay in terms of food. What happens in this case, is we take the current market price of our cash crop, green grams and equate it to the amount of water we need. For example, if a kilogram is sold at 15ksh or 20ksh as that is normally the price during the drought season, due to lack of money and jobs, then we talk to the owner of the water source, a jerrycan there costs at 10ksh so you can do the math, if I take 3 kilograms or 4 kilograms, how many Jerrycans do I get? (IDI#11, female)

Given the low income levels of the majority of community members, their purchasing power is also low, hence, lending or paying in a hire-purchase manner is also a common survival mechanism. According to one key informant, payment for accessing shallow wells has to be paid in full prior to commencement of a season, before the owner gives a subscriber full access to the water source. She indicated that strangers were rarely invited; however, having a close personal relationship with the owner meant that one could be permitted to pay for water in instalments. However, she indicated that this did not happen to everyone, and if one had a tendency of shifting from one water source to another leaving behind debts, they were forced to make a full payment irrespective of the relationship they shared with the well owner. This brought out the aspect of trust as a key virtue that earned one occasions of subsidized payment as further elaborated in the following excerpts:

I can say it's the friendship that we have with that man that makes us depend on his shallow well. Because of those relations one can subscribe to those agreements and pay through instalments, you can even pay KES 50 [US\$0.5] as you look for the other amount. (IDI#17, female)

If I have a good relationship with the owner, s/he might just ask me to fetch and pay later but this is not common. What normally happens is that you are either assigned a portion in the earth dam to dig, or the owner digs a portion in the earth dam then apportioned you the task of removing the soil out of the earth dam. (IDI#51, female)

In essence, the community, mostly women who fetch water from these shallow wells, is allowed to fetch water on different arrangements either at subsidized costs, in instalments or without paying money, but still having to pay in kind by helping with dredging of the well or cleaning the surrounding area. This arrangement helps women to meet their immediate need, that is, to access water without cash; however, associated obligations place a burden on women, who maintain the households. The implication of this is that women end up having limited time to spend on productive activities, decreasing their coping capacity of frequent droughts. In this case, social capital becomes a double-edged sword for women and presents them with a dilemma that they have to face on almost a daily basis and more so during seasons of drought when water sources are scarce and far removed from each other. In such scenarios, water-sharing becomes a coping mechanism utilized by mostly women to ensure household water security and is anchored on the social connections and relationships within the neighbourhood.

When it is really dry, I might have some challenges meaning that I cannot get to the water source. In such a scenario, I will go to my neighbour and borrow a jerrycan of water I will return later when I am in a position to do so. There are those who will not allow you to return the water, they will just tell you to go use the water and meet the needs that you wanted to meet" (IDI#47, female)

Reciprocity in mediating water access

Reciprocity is a common phenomenon in the community: when people help without expecting an immediate return, but with a strong conviction that, in their times of need, others will not hesitate to share with them. It is particularly common during ceremonies, when women come together and provide water for use by friends, kin or neighbours based on the notion of balanced reciprocity of social capital, where in future the favour will be returned. Ceremonies and celebrations, such as burial, graduation, wedding and bride price, and *harambee* (pooling together) foster the spirit of cooperation and unity among the people in solving, among other things, water challenges. Pulling together in groups is illustrated in the following excerpts:

There are also these groups, which we form to help one another in completing tasks from one household to another. Task include activities such as farming. The same groups are also involved in provision of water during large ceremonies. (IDI#10, male)

When you have a friend, you relate with so well you can give them water from your well for free for their livestock and when it [the well] dries up, then they are obligated to extend the same and help with the digging of the wells or removal of silt. (IDI#20, male)

Various aspects of reciprocity play out in the proceeding and preceding excerpt and may entail balanced reciprocity, returning an equivalent measure of the water that was borrowed at a later time, or generalized reciprocity where one does not necessarily have to pay back given that they may not have the means to do so. Lack of money to purchase water leads women to depend on reciprocity as a coping mechanism.

Because the reason we borrow in the first place is due to lack of money, so if you don't have the money to top up the token, where do you get to refund. Again, we all do this for the sake of good neighbourliness, if we start returning money, then I don't know . . . (IDI#40, female)

Sharing water is not always about direct sharing of the actual water but can entail the sharing of the means to access the water. For example, borrowing of digital cash in the form of cash tokens to access water when one is in need. And again, we see these negotiated on the bonding elements of social capital in which the social networks revolve around families and neighbours.

We also borrow the token [An innovative technology used in purchasing piped borehole water]. If someone, a neighbour or a relative has credit in their token, we normally can borrow and go use it to fetch our water. To repay, the most common thing we do is wait until we top up our token then give them to go fetch the same amount of water as we did with theirs. (IDI#40, female)

The social network of families and friends was also a useful aspect of social capital in the water space, especially for people living with disability and the elderly. This is a case where gender intersects with disability and age to produce a different layer, on top of the layer of being female, of vulnerability to risk. Close kin provided support and helped people living with disability to access water. However, in the absence of their care givers, social networks in the form of friends, neighbours or the church provided the much-needed support either by sharing water or by fetching water on their behalf, as shown in these excerpts:

We cope in many ways like borrowing of water, if one is vulnerable, we help them. (IDI#1, male)

even those living with disabilities when they get to the water sources, the owners take the responsibility and give them water for free. So, if someone doesn't have a caregiver then the church may organize itself to help or someone volunteers to do the fetching of water for them. (IDI#5, male)

In the case of people living with a disability and the elderly, the moral obligation to help without asking for anything in return seemed to be a key driver, while widows and widowers were considered capable of getting their own water:

For the elderly, either relatives or good neighbours give them water even if it is a 10 litre jerrycan. . . . As for the widows and widowers, if they are young and energetic and not sick, they do not get any special treatment . . . (FGD#1, male)

Kinship ties in water access

Bonding social capital is also well illustrated in how the community utilizes kinship ties in dealing with household water issues. The social ties in the water space are not homogeneous. For instance, our study reveals variations of kinship-ties in relation to water access.

If a shallow well is owned by a brother, only his nuclear family has the right to access water for free and probably his parents. If a shallow well or earth dam belonged to the household head, his entire family [sons and their wives] are free to use it however, extended family members such as in-laws have to buy water just like any other members of the community. (FGD#2, male)

Notably, kinship principles of water-sharing work only among people of similar ethnic communities. Results shows strained social relations between two neighbouring ethnic groups which affect water access for many households in the area:

So even if I sold the Somali person the shallow well, I cannot fetch water there until his family and extended family have collected enough water and have water for all their livestock. The temporary agreements don't work for them, because I will form terms of water use with one of them for a certain period and then he will later say 'the door is long' to mean that the family members are very many and that an agreement with him covers all of them. They deny us access to water, we cannot even fill jerrycans from their wells even if they are the only wells with water during the dry season, and we suffer a lot. (FGD#4, male)

The above narratives confirm familial bonds in leveraging social capital for water access though with variations amongst the different ethnicities in a water scarce setting.

Bridging social capital

Group membership in water access

Bridging social capital for enabling water access in the resource-limited setting was expressed through membership in groups and associations, comprised mainly of women.

They [groups] are formed by self-help groups which mainly comprise of women as they are the ones who feel the pain of water shortage the most. Women are the ones who deal with almost all things that require water. Unless a man has a hotel business that requires water throughout, they are rarely part of these groups. (FGD#2, male)

These groups have formalized social capital through different rules of engagement and norms that guide the daily operations, maintenance and use of the water source. Rules help to govern the utilization of a natural resource by a community:

The lack of rules and regulations guiding the community or the members has seen many water sources which were dug by donors' collapse, silt and converted to livestock watering areas. Ours almost collapsed. It is our strict rules that have made us to take care of it hence serving us for long. (IDI#17, female)

However, the rules also delve into the questions of who fetches water, where, when and how. These rules, for instance, forbid the watering of livestock at the water point, define the timings and frequency of water collection. Sanctions are applied to those that break the set rules.

Every member is supposed to be present on the working days to carry five buckets of soil out of the earth dam each day we are working, if one doesn't work, they are not allowed to fetch water. (IDI#60, female)

The sense of unity, togetherness, transparency and accountability coupled with a sense of belonging and ownership were some of the reasons why many households chose group earth dams.⁴ According to a key informant, the ability each individual household had on influencing the rules in a group earth dam and ensuring they were enacted and adhered to gave them the free will to participate in labour, management and contribute towards the prosperity of the water source. This was unlike in the community earth dams⁵ which were used by people from diverse backgrounds with no similar experiences and values. The rules of the community earth dams were reported to always be fluid and subject to manipulation due to the long chains of command involved. The key informant further reiterated that the involvement of the local administrators and committees which were chosen by the administration worsened the situation due to conflicts of interests that existed between the administration, mistrust with the public and amongst themselves as well as a perceived history of embezzlement, hence the preference for group owned earth dams.

Community earth dams cannot help alleviate water challenges here, we would rather have group-owned earth dams. As a member I will feel accountable because I paid the registration fee and I participate in labour meet ups all the time and there is no interference from the local government hence it is easy to form rules and implement them. (FGD#6, mixed)

To sum it all, in a harsh environment with no constant reliable water, communities have to draw on their social capital to ensure household water access, which is well illustrated in this excerpt:

If he fetches four jerrycans of water and I don't have water, I can go to request a jerrycan of water from them and promise to refund the following day after we fetch. This might be necessitated when for example, one's wife has given birth and they cannot go to fetch water. At that point the practice of sharing has always been there due to water insecurity. It can happen that you don't agree on many things with your neighbour but when it comes to water, they will always give it to you . . . (FGD#2, male)

Discussion

Within the water space, social capital is evidenced in water-sharing by water-insecure households through leveraging on its notions of trust, reciprocity, neighbourliness, kinship, social networks and local leadership systems (Stoler et al., 2019). According to some studies (Collins et al., 2018; Kelly et al., 2017), water-sharing can help in maintaining key relationships, thus promoting trust and building beneficial social capital within communities. These values in closed networks serve to help people 'get by' in life due to strong reciprocal transactions taking place within the existing relationships (Stone, 2001). Social capital in the form of sharing and reciprocity are coping strategies that communities have used from time immemorial to help mitigate risk (Gouldner, 1973; Sahlins, 1974). Thus, we argue that the coalescing of reciprocity, trust and shared values in bonding and bridging serve the individual and community water needs in the face of vulnerability, and more so among the low-income community groups including women and people living with disability, albeit with varying consequences.

Findings from this current study illustrate water access through sharing, enabled by social capital, as benefits derived from interpersonal relationships of community members. Water at the household level is mainly a women issue given that they are at the core of water collection and in charge of domestic water management (Geere & Cortobius, 2017; Graham et al., 2016; Watts, 2004). Women drew a lot on water-sharing through social relationships to secure water in times of need given their vulnerability to shocks vis-à-vis men. This is in line with Holmes (2019), who notes that women tend to be more vulnerable than men to shocks and face heightened risks because of pre-existing gender inequalities which is further exacerbated by their life cycle and other intersecting risks and vulnerabilities. Geere and Cortobius (2017) posit that beside gender, other factors such as difficult pregnancies, childbirth, old age and disability contribute to reduced capacity to access and carry water, hence they may contribute to household vulnerability to water insecurity, as is demonstrated in this paper.

By tapping into bonding and bridging social capital, women and people living with disability were able to access and share water in a resource limited setting. This was made possible through friendship and kinship ties, groups and associations, driven by trust and often aligned along gender. As observed by Brewis et al. (2019) and Shalean et al. (2019), water-sharing offered an insight into the everyday and, at times, invisible ties that bind people and households with water and to one another, insights that need to be understood in terms of gender and ethnicity, and examined in terms of social and political power.

Mutual trust based on friendships and neighbourliness served as a foundation for the bonding social capital that helped to cope with harsh climatic and economic conditions. Community members were able to meet their water needs by borrowing and/or lending water, as well as donkeys for its transportation. Social ties enabled households to share, borrow, loan or help each other get water during times of lack of money or vulnerable stages in the life cycle (due to childbirth, pregnancy or sickness). Due to friendship and good neighbourliness, in some instances water is sold at a somehow subsidized price and/or 'in kind' payment is accepted. Besides sharing of water there are also instances of shared practices through which water is secured (Brewis et al., 2019).

Doss et al. (2015) observe that women's weak access rights and control over land continues to accentuate the feminization of gender inequality, and for this study in the water relations. In consonance with Geere and Cortobius's (2017) observations, women in this study are exposed to time poverty as they engage in 'in kind' payment through manual labour in exchange for

water. Men on the other hand remain the owners of land where the earth dams are situated and therefore control the use and access of the resource within the provisions of kinship and family ties and at times may influence the relevance of social capital as a resource to tackle water insecurity. Given that women are generally not the owners of land in most of Sub-Saharan Africa (Doss et al., 2015) may influence their ability to benefit from social capital for water access and further increase the transaction costs.

Bridging social capital was exhibited through water groups, mainly comprised of women, among the water insecure families, allowing them to develop pathways to longer term survival and wider neighbourhood and community revitalization (Hawkins & Maurer, 2010). These groups enabled consistent and reliable water access; relief from the economic burden of water access given alternative non-cash forms of payment; a reduction in the physical distance to community water sources as well as improved access to less saline water in comparison with that of boreholes and shallow wells. Shared rules, regulations and sanctions helped keep the groups active and effective, whereas social norms and social sanctions were an important part of the social control process (Fehr & Fischbacher, 2004). Such collectives were defined by village, familial or friendship boundaries, hence they exhibited the bonding aspect of social capital operational within the community. To be effective, there existed a chain-link of shared values and norms that cemented the group cohesions. The membership of the groups was however open, and in most situations people of low socio-economic status, mostly those who could not own shallow wells or afford water at the piped schemes, joined together for a common pool of resources which they could depend on during times of drought. Kelly et al. (2017) and Bisung et al. (2014) also noted the mediating role social capital plays in achieving inclusive water access and creating a sense of ownership in community-managed water systems. Community groups proved to be significant for women, contrary to Belay et al.'s (2019) argument that women depend more on bonding rather than bridging capital.

The existing bonds and bridges facilitating social capital were definitive of values, feelings and actions, related to access to water and proved the functional effect of reciprocity coined in the social networks. Such norms define a sense of moral obligations implied in terms of water-gifting between water producers, owners of water sources and consumers. It is this kind of sharing that Malinowski (1922/2002) examines as a factor of 'beneficence', which by and large serves to securitize household water and express the lived meaning of altruism among the Akamba community. This blends well with the propositions of Gouldner (1973) who noted that a free gift without any strings attached is more likely to bring higher returns, in this case improved access to water to persons across socio-economic classes in the community. Reciprocity was key in accessing water from neighbours, friends and kin when one faced the risk of going without water. In this case, the payback can be in the form of labour, cash or market equivalents of amount of water collected. It is the altruistic pattern of gifting that stimulates social exchange where recipients are expected to reciprocate the good deeds in the near future (Sahlins, 1974). This is evident in incidences where relatives were occasionally allowed to fetch water for payment in kind, hence leveraging on non-cash-based payments.

Reflecting on Animesh et al.'s (2016) study of operationalization of water security, the bonds and bridges of social capital in the study serve the purpose of ensuring that the available water resources are accessible to society and the ecosystem. Thus, we see water access in Kitui as a by-product of cultural behaviour (values and practices) enabling various groups of people within the community to acquire and use common pool resource. Essentially, water access

and use reflect the community idea of belonging. Thus, it has to be interpreted within the cultural framing of such resources which amount to community identity. Further, the World Bank (2018) affirms that achieving water security means much more than coping with water scarcity. Understanding the quantity–quality–society nexus is therefore critical in making sound water security decisions, especially how the various networks and relationships define household water security. Social capital is often treated as mere socio-structural layering in the society, while their functional effectiveness in risk-smoothing at the individual or community level is often ignored (Fafchamps & Lund, 2003). Yet, such organizational and collective levels form the foundations for building adaptive and resilience responses for women and people living with disabilities, which can also be exploited to address household water insecurity (Adger, 2003). Social capital is seen as a critical asset for attaining common goals for communities that would otherwise be unattainable (Musavengane & Simatele, 2017).

Social capital as highlighted in this study is a significant public good (Putnam, 2000) among the rural community living in water-scarce settings such as those rural Kenya. Notably, community-level relationships, linkages and associations mediate access to water for the majority of vulnerable elderly community members as well as expectant and lactating women. The level of water security is incumbent on the scope and dimension of the social network pursued by an individual. As illustrated in this study, community members who link beyond the bonding ties (kinship and friendship) to those of bridging (group membership and associations) are more water secure than those who remain at the bonding social capital level. This observation ties in closely with Lin (2008), who views social capital as resources embedded in one's social networks, resources that can be accessed or mobilized through ties in the networks, as evident in water abstraction mediated through bonding and bridging networks. In the face of extreme droughts, social capital buffers (Adger et al., 2005) the effects of this natural hazard and promotes intra- and inter-community reorganizations towards securing water. It is evident that there is continued exploitation of the networks between groups, the community norms of reciprocity and social trust among the kinsmen for purposes of accessing water. The exploitation of these traits not only facilitates but also allows cooperation (Putnam, 2000) among different community members for mutual benefit defined by enhanced access to water, especially in water-scarce settings, and in this way ensures water security.

Conclusions and recommendations

Water security risks are often skewed towards women, but when social capital is well-utilized in communities it can ease the burden on women to secure household water, especially in resource-limited settings. The paper reawakens a focus on social capital as a coping strategy for water insecurity at the disposal of the community from a gender lens. The very use of Putnam's (2000) conceptualization of social capital as constitutive of community habits, relationships, norms and trust thrust into focus an often-ignored asset in society in debating culture and water (in)security. Communities in resource-scarce settings can leverage on informal groupings already cemented by bonding and bridging social capital to tackle water security. There is a need for community participation in intervention formulation to provide room for incorporating context-specific dynamics, including social capital to enable sustainability and uniform access to

resources such as water. Theoretically, the paper builds on a networks view of social capital and its relevance within the broader plural water systems and advocates for cognisance of the power of informal organizational citizenship based on shared cultural values in the design of exotic and market-driven water provision solutions.

The bonding and bridging elements of social capital captured in the efforts by the community to tackle water insecurity offer important trajectories on community-level organization and collectivism. Social capital helped people with disabilities or women experiencing difficulties to temporarily access water, but on its own, it is not a panacea to existing inequalities to water access. The lens of social capital carries with it a wealth of resource that can be tapped into to improve water security within the community. In water provision, communities should not be considered as a set of individuals who would pay for/use a water source, but rather as a set of interlinked collectives whose rules would be prioritized in the access. Therefore, water provision should be designed in concert with, in support to, rather than in contradiction to existing social links. However, even though social capital provides a safety net for communities and women as household water managers, it should be understood for its unintended negative gendered consequences. This is especially true where rules of limited abstraction and exclusionary access are determined by restricted membership (Koehler et al., 2015). Ideally, water provision should go hand in hand with gender empowerment initiatives to avoid, as in this case, increased burden of tasks on vulnerable women. Whereas the social capital is significant to rural water access, we also take note that it does not operate in isolation: there are a range of actors, (in)formal institutions internal and external to the community that influence water access patterns. The place of these actors' influence in decision-making must be considered alongside social capital in rural water provision.

Notes

1. Private earth dams.
2. Shallow wells are privately owned water points.
3. Private earth dams.
4. Group earth dams are privately owned and managed by members of self-help groups.
5. Community Earth dams refer to publicly owned water points funded by the local government and managed by members of the community in the catchment area.

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