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ORIGINAL ARTICLE

Institutional factors engendering dissonance between customary and statutory institutions in water access in the Okavango Delta, Botswana

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Abstract
The pervasive entrenchment of Western traditions in Africa continues to fuel the contradiction existing between customary and statutory water institutions on the continent. The paper addresses factors promoting the discord between customary and statutory institutions in water access in the Shakawe, Tubu and Shorobe in the Okavango Delta. Adopting an expert and homogeneous purposive sampling procedure, a total of 455 household heads, 44 community elders and 17 government officials were sampled in three rural villages in the Okavango Delta. Data were collected using key informant interviews, focused group discussions (FGDs) as well as household interview schedules. While quantitative data were analysed using descriptive (frequency, percentages) and inferential statistics (Kruskal–Wallis test, Mann–Whitney *U* test), content analysis was used to analyse the qualitative data. Findings revealed that there was a conflict between customary and statutory water management institutions in relation to how people in the study area accessed water.

Keywords Access · Household · Dissonance · Okavango Delta · Institutions

Introduction

Notwithstanding all the efforts meant to improve access to water across the globe (see Meeks 2018), inaccessibility to water resources continues to plague several of the world's poorest rural populations (Nastiti et al. 2017; Ablo & Yekple 2018). The United Nations World Water Assessment Programme (UNWWAP) (2015) affirms that 748 million people lack access to safe drinking water. Statistics also show that 1.6 million people die every year from waterborne diseases in developing countries (WWAP 2015; Meeks 2018). The United Nations (UN) (2015) regards access to water as essential for full enjoyment of life. Water access indicators include distance, time and quantity among others. Whereas distance entails the area travelled in kilometres to access water, time (in hours) implies walking duration from the water user's home to a water source. However, the anticipated optimal distance covered and time required to access water vary across nations and water-related institutions. For instance, while the World Health Organisation (WHO) (2008) advocates that water sources should be within 1000 m from the user's home and collection time not exceeding 30 min, the African Development Bank (ADB) sets 500 m as maximum distance to a water point and 30 min as the go, wait, collect and return time (Salami et al. 2014; Mwamaso 2015).

The global target 6.1 of the sustainable development goals (SDGs) states that each country must achieve universal and equitable access to safe and affordable drinking water by 2030. WHO (2018) and UNICEF (2012) stipulate that water is safe only when it is drawn from improved water sources.[1] This may not necessarily be the case because water might become contaminated before it reaches the tap. While the UN (2015) define water access on the basis of distance, volume and source, it must also be emphasised that water access

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[1] Improved water sources are those which, by nature of their construction adequately protect the water from outside contamination (e.g. borehole, tap water, protected well).

is a multidimensional concept, which comprises acceptance, availability, reliability and affordability. Cultural factors and statutory institutions are among the criteria used to define water access by citizens. While physical access denotes the easiness with which all households are able to access safe and adequate water facilities within their immediate vicinity in terms of distance and time (Kaushik 2011), economic access relates to the easiness with which monthly water bills are made affordable to all households (including the poor) in a way that does not limit their ability to afford other essential basic services such as food (Frone and Frone 2013). Water is deemed economically accessible when a household's proportion of monthly income spent on water does not exceed 5% (Allen et al. 2006; WaterAid 2011). However, legislative water access entails compliance with customary and statutory institutions in an endeavour to rightfully access water within a given community. In the context of this paper, institutions refer to humanly devised constraints that structure political, economic and social interactions in water use and management (Hodgson 2006; North 1990). In this article, institutions are categorised as customary (comprising unwritten, and nationally unrecognised and unofficial, humanly devised mechanisms regulating water use such as taboos, norms and spirit mediums) and statutory (nationally recognised and written humanly devised constraints like water legislations, policy as well as organisations).

The failing of the definition of water access is its lack of recognition of the actual quality of water delivered by the so-called improved source and how much each household has to pay for the item. The definition assumes that an improved source of water is free from contamination, but no universal monitoring of water quality occurs to verify this assumption (Smiley 2017). While the definition exclusively focuses on faecal contamination, the physical and social aspects are completely overlooked (Khan 2011). It is probably erroneous to assume that all improved water sources provide safe and clean water, as it has been proved otherwise by Gundry et al. (2006) who found *Escherichia coli* bacteria in 12% of improved water sources tested in South Africa and Zimbabwe. In Botswana, studies revealed that there have been instances in which water laden with gelatinous precipitates is supplied for households' consumption (see Moffat et al. 2011; Mashiqa 2018).

Based on Hutton's (2012) perspective, water affordability is expressed in the affordability index, which compares the household's monthly expenditure on water to the monthly disposable income of the same household. This implies that the price paid for water services must not limit people's capacity to buy other basic goods and services. In other words, households must not be forced to make compromises between the need for water and other basic needs such as food or medical costs (Langford and Winkler 2014). However, affordability index differs from region to region. While the affordability index of developed countries is about 3–4% of disposable income of lowly paid households, the index ranges from 2 to 8% across the economic divide in Africa. This index also differs depending on the institution setting the criteria. While the UNDP pegs the index at 3% (Hutton 2012), the World Bank (WB) and ADB both use 5% of the expenditure as the affordability index (Fogden and Wood 2009; Mwamaso 2015). While about one-third of the global population has private water connection (Gadgil 1998), a large proportion hardly receives water for more than 16 h each day, especially in developing countries (Satterthwaite 2003; Rathgeber 2003). It is uncommon for households to not experience incessant dry taps in developing countries. Consequently, unreliable water sources compel people to turn to unimproved water sources.

There are several sources of water in the study area and these include standpipes, indoor private pipes, borehole, tanks, wells and rivers (Ngwenya 2011). Prior to 2013, all households in gazetted villages within the study area obtained water for domestic purposes from standpipes supplied from boreholes by the district councils (DCs) (Bolaane 2000; Mazvimavi and Mmopelwa 2006; Ngwenya 2011). In 2008, the government of Botswana initiated the process of reforming the water sector with the aim of establishing more efficient and sustainable water management (Colman 2013; Setlhogile and Harvey 2015; Molokwane 2018). The reforms delineated water provision activities between DWA (instituted for water resources planning) and WUC (instituted for water resources reticulation) to reduce inefficiencies and fill the existing management gaps in the water sector (Briceño-Garmendia and Pushak 2011; Colman 2013; Setlhogile and Harvey 2015). Thus, water sector reforms led the DWA and DCs to cede water supply responsibility to the WUC. It is important to note that the WUC, which is a government parastatal, operates on a commercial basis (Briceño-Garmendia and Pushak 2011). Thus, the WUC Act (1970) mandates the WUC to recover the costs of service in water supply through revenues raised from the sale of water. This is in line with the government policy, which stipulates that the water sector should be self-financing (Bolaane 2000; Briceño-Garmendia and Pushak 2011). Given that the WUC took over water supply responsibility from the DWA, all potable water tariffs in Botswana are then based on Arntzen's (2007) and Khumalo's (2007) notion that water, which is very expensive to obtain and distribute, should not be subject to subsidies. Bearing in mind the policy shift from free access to potable water to that which compels every household to pay for potable water, this paper discusses factors engendering dissonance between customary and statutory institutions in water access in the governance and management of water resources in selected communities in the Okavango Delta, Botswana.

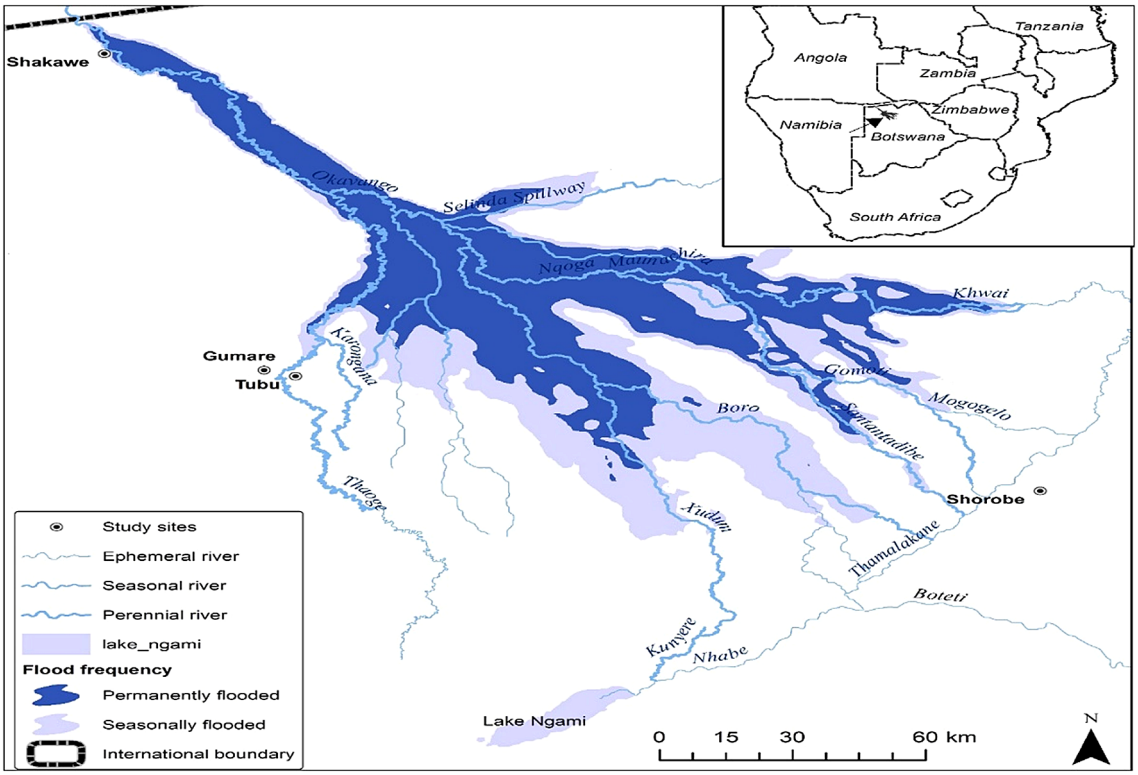

Fig. 1 Map of Okavango Delta showing study sites. Source: Okavango Research Institute GIS Lab. 2019

Methodology

Study area

The Okavango Delta is one of the world's inland deltas with a wide array of flora and fauna. In 2014, the Okavango Delta became the 1000th United Nations Educational, Scientific and Cultural Organization (UNESCO) world heritage site (Darkoh and Mbaiwa 2014). The delta swells in size between 6000 and 15000 km^2 as it floods between March and August (King and Chonguiça 2016). In terms of human population, the delta is inhabited by approximately four major ethnic groups (BaSarwa, BaYeyi, BaHerero and HamBukushu). The people use the area for fishing, growing crops and hunting.

Data collection

Primary data were collected through household surveys, focused group discussions (FGDs) and key informant interviews in purposively sampled rural communities of Shakawe, Shorobe and Tubu in the Okavango Delta (see Fig. 1), where customary institutions are valued and practised. Secondary data were gathered from water legislations, journal articles and policy briefs. The predominantly rural nature of the villages, presence of different ethnic groups and remoteness of the area provided the right platform for studying the cultural and socioeconomic issues, which hinder access to water. More importantly, the reliance on water-related forms of livelihoods within the study area played a part in the choice of the study area.

Sample size

A total of 455 household heads (HHs) were sampled through a multi-stage sampling procedure and interviewed by five field enumerators. One FGD session was carried out in each of the three villages and Gumare where the DWAs officials are based in the Okavango sub-district region. Forty-four (44) key informants who were village elders and 17 government officers participated in the study. The village elders provided knowledge on customary institutions and 16 DWAs officials provided knowledge on statutory institutions.

Data analysis

Statistical Package for Social Sciences (SPSS) version 25 was used to generate both descriptive and inferential statistics. While descriptive statistics were used to summarise the data, inferential statistics were used to make deductions. Also,

qualitative information were generated using thematic analysis to further strengthen the results.

Results and discussions

Social access to water

Water governance in the Okavango Delta is regulated by the Water Act (1968) and the Water Policy (2012). This act is the major legislation on water governance in Botswana. It affirms all water in the country as property of the government and upholds the right of everyone to use it. While the Water Act (1968) is silent on water as a scarce resource, the Water Policy (2012) and Bill (2005) recognise water in that regard. It then follows that the Water Act (1968) has control and regulatory mechanisms on how to administer water rights and meet its objective of making water available to everyone. Judging from the perspectives of the paper, however, these established regulatory and control mechanisms are a hindrance to easy access to water in the study area. The way the Water Act (1968) constrains access to water is exemplified by literature as well as the data obtained from a survey conducted from June to November 2018 in the delta. A water right is an authorised action to use and obtain benefits from water (Johnson et al. 1981). It includes the right to determine who has access to and authority to regulate water use (Schlager and Ostrom 1992). A key informant interview said that "[b]ased on the Water Act (1968), people cannot privately own water sources but can obtain the rights to use water by acquiring a water permit, which gives them a legal license to use but not own water". A review of the Water Act (1968) shows that when applying for a water right or permit, the applicant should state the use of water, the amount required and period of use among other needs. The Water Act (1968) also classifies water use in terms of priority. While domestic use is given the highest priority, livestock use, irrigation, industry, power generation and mining followed in that order. Once a water right is acquired, an individual is expected to pay water taxes, which are water user fees based on how much abstraction is allowed. An individual pays a total sum of P3 400 per annum after acquiring a water right (Personal communication with the key informant, September 2018). The fact that most (85%) of the HHs earn less than BWP1500.00 per annum would make it impossible for them to pay BWP3400.00 per annum to acquire water right. This implies that most of the people in the study area cannot individually own a borehole. With the exception of communal boreholes (which are associated with long queues of people trying to fetch water), the statutory institutions make it difficult for rural people to access water in the study area (Personal communication with key informant 2018).

The Water Act (1968) tends to obviate the role of customary institutions on issues of water. The Act does not categorically stipulate the role of customary institutions in water governance. A key informant said that statutory institutions are unknown to the villagers, and the enforcement in the rural areas was ineffective because local rules were not captured in the statutory institutions. According to the traditional leaders in the study area, lack of participation of local communities in the formulation of the statutory institutions in water governance made it to be alien to them. Based on the information obtained during key informant interviews, an individual is required to obtain land rights from the Land Boards in Maun to drill a well on a piece of land. An individual holds all the rights to both well and the water after drilling the well or borehole. The process of obtaining these rights was, however, described as laborious. Most (85%) of the HHs in the three villages showed that they had a strong allegiance to customary institutions in accessing water. The findings of this study agree with those of Nkonya (2006) who found that the de facto institutions regulating access and use water resources are customary institutions in rural Tanzania.

There is a large and growing body of literature on gender and socioeconomic factors, which impact water access (see Barnes 2013; Buechler and Hanson 2015; Harris et al. 2017). While there are diverse case studies in literature (Crow and Sultana 2002; Harris 208; Caruso et al. 2015), the major issue, which emanates from them, suggests that women are primarily responsible for the provision of water for domestic use at the household level, but are denied major decision-making roles for water supply and governance at both local and national levels. Accordingly, variables such as gender, age and level of education play crucial roles in water access discourses. Most respondents were females (63%) and most (69.9%) of them were below the age of 50 years (Table 1).

The average age of the respondents was 42.5 years with a standard deviation of 16.2 (Table 1). The educational achievement of an individual determines how the individual has access to improved water. Lack of or inadequate level of educational achievement serves as a barrier to empowerment (Bosch et al. 2001). Accordingly, the lower the educational achievement of individuals, the more they have limited opportunities to demand better facilities from the authorities; they are less empowered to demand better services from the providers (Bosch et al. 2001; Mahama et al. 2014). Given the cultural issues in Africa, inadequate water facilities affect the educational achievement of rural children, particularly girls as they bear the burden of water collection (Mahama et al. 2014). Findings show that most (76.3%) respondents had acquired formal education (Table 1).

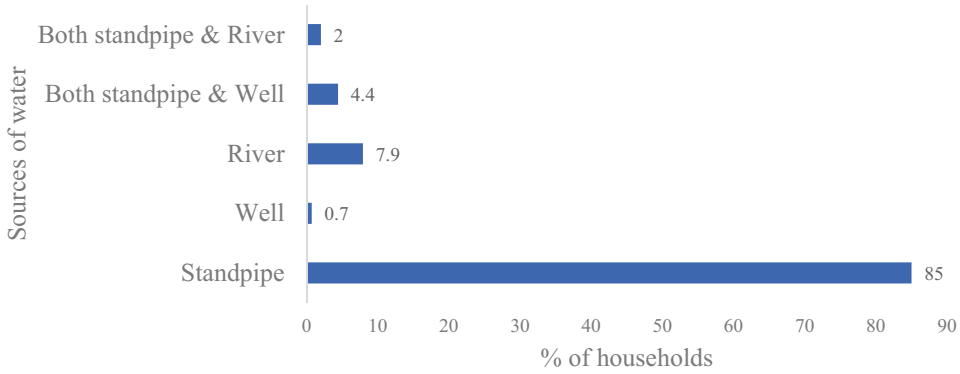

Fig. 2 Sources of water in the study area: source, fieldwork June–October 2018

Table 1 Distribution of HHs by demographic attributes

Variable	Freq	%	$N=455$	Mann–Whitney U	Correlation
Gender					
Male	168		37		
Female	287		63		
Age					
20–29 years	121	26.6			
30–39 years	112	24.6			
40–49 years	85	18.7			
50–59 years	63	13.8	$M=42.5$		
60 + years	74	16.3	SD = 16.2		
Educational level					
Non-formal	108	23.7			
Formal	347	76.3			
Income					
Less than P1500	412	90.5			
BWP1500–BWP2000	19	4.2			
BWP2500–BWP3000	14	3.1			
BWP3500–BWP4000	2	0.4			
BWP4500–BWP5000	4	0.9	$M=603.96$	$z=0.18$	
BWP5500 +	4	0.9	SD = 695.05	$p=0.86$	
Household size					
1–5 members	209	46			
6–10 members	185	41	$M=6.6$		$r=0.85$
11 + members	61	13	SD = 3.9		$p=0.01$
Religion					
ATR	69	15.2			
Christianity	378	83			
Islam	3	0.7			
Others	5	1.1			

Source: Field survey, June–October 2018

Also, household income is one of the determinants of access to water (Cole et al. 2018). Based on Cole et al. (2018), households with lower income have limited opportunities to improve their water supply conditions, as they are hardly able to afford high connection fees, which allow them access to piped water. The average monthly income was P603.96 with a standard deviation of 695.05. A majority (90.5%) of the respondents earned less than the Botswana standard minimum wage of BWP1500[2] per month (Table 1). An independent t test was conducted to compare income of males and females. The results indicated that there was

[2] 1Botswna Pula (BWP) = US$0.093.

no significant difference ($t = 1.12$, $p = 0.27$) between the incomes earned by males and those of females. This implies that the effect that income had on women's and men's access to water in the study area may have been entirely the same. The average household size was 6.6 with a standard deviation of 3.9. While 46% of the households had between one and five members, 41% had six to ten members. Only 13% of the households had 11 members and above (Table 1). Pearson product–moment correlation showed that there was a strong and positive correlation between the amount of water consumed per day (measured in litres) in a household and the household size (which was measured by the number of people living under the same roof). In terms of religion, the majority (83%) of the respondents were Christians with 15.2% being followers of African Traditional Religion (ATR) (Table 1).

Water access issues

Sources and amount of water consumed

Most of the households (85%) obtained water for domestic purposes from standpipes provided by the WUC (Fig. 1). Although standpipes were installed in locations, which enable people to walk less than 500 m to collect water (Personal interview with key informant), households could not easily access water because they were expected to pay for it. Personal interview with a key informant in Shakawe revealed that the residents were now expected to pay for water obtained from communal standpipes (previously provided for free to all rural communities) just immediately after the DWA ceded responsibility of water supply to the WUC. This policy shift was justified on the ground that the WUC would need to recover service costs through the revenue generated from the sale of water. This is also in line with the WUC Act (1970), which authorises the WUC to price water based on full cost recovery. Government policy stipulates that the water sector should be self-financing (Bolaane 2000). After assuming the responsibility of supplying water in rural areas, the WUC's modus operandi was based on the notion that the provision and distribution of water is very expensive and should, therefore, not be subsidised (Arntzen 2007; Khumalo 2007). With water sources in proximity, households can use their time for productive activities. However, it is also very interesting to note that 7.9% of the respondents fetched water directly from the Okavango and Thamalakane rivers. While the most used water source was the tap (standpipe) (85%), 0.7% of the respondents' fetched water directly from unprotected sources. Some 4.4% of the respondents obtained water from both taps and wells, while only 2% obtained it from both taps and rivers. A key informant opined that women were customarily responsible for ferrying water for household use. The findings revealed that while there were some (28.1%) households which satisfied their domestic water needs from unimproved sources and were not willing to pay, most (71.9%) of them were willing to do so. Those who were unwilling to pay indicated that they were too poor to do so, while others felt that "[w]ater from the taps has a bad taste and at times could be black or brown in colour". A key informant buttressed this by saying "[t]he water forms some sediments when stored in containers and we suspect it is not healthy for human consumption". Regarding the reliability of water supply over time, the majority (57.2%) pointed out that tap water might be available for a period of 1–2 weeks and would then vanish for a month or more. A few (5.7%) of the respondents revealed that water could be available for a month, but the tap could run dry within the space of two or more months. While 36.9% of the respondents acknowledged that water could be available all year round, they, however, affirmed that the tap only ran at night and early in the morning. One key informant lamented thus (Fig. 2):

> There is no point having a standpipe within 500 m if it runs dry most of the time. And if the queues are too long, an individual is unable to collect water on a timely basis.

Table 2 shows water consumption per household in the study area. A household consumed 75.4 l of water with a standard deviation of 37.3 (see Table 2). While a small percentage (2.6%) used 20 l per household, the majority (97.4%) consumed at least 40 l of water per household per day. Table 2 indicates that 21.1% of the households in the study area consumed less than the recommended amounts of water per household per day. This low daily water consumption probably reflects the high water charges in the study area. The findings corroborate those of Wagah et al. (2010) in Kisumu District in Kenya, where 25% of the households consumed less than the recommended 100 l of water per household per day. Similarly, the studies by Fan et al. (2014) and Gallego-Ayala (2014) in Mozambique revealed a similar trend in which a small proportion of households consumed less than the recommended amount of water per day.

Table 2 Amount of water consumed per household

No. of 20-l buckets	Amount (l)	Percentage	Descriptive statistics
1	20	2.6	
2	40	18.5	
3	60	22.2	Mean = 75.4 l
4	80	56.7	Std. dev. = 37.3

Source: Fieldwork, June–October 2018

Table 3 Distance and time taken to reach a water source

Time and distance	% of HHs	Descriptive statistics	Pearson correlation
1. Over 2 h	0.9		
2. More than 1 h	3.5		
3. Less than 1 h	2.4		
4. Less than 30 min	93.2	Mean = 1.12 h	
Total	100	Std. dev. = 0.48	
5. Over 6 km	0.2		
6. 4–5 km	1.1		
7. 2–3 km	4.8	Mean = 1.08 km	$r = 0.57$
8. Less than 1 km	93.8	Std. dev. = 0.33	$p = 0.000$
Total	100		

Source: Fieldwork June–October 2018

Distance and time taken to fetch water from sources

The proximity of the home to a water source is a vital variable in measuring water access (Mwamaso 2015). While the government of Botswana has set 500 m as the maximum distance to a water point (Mmopelwa and Mazvimavi 2006), literature has shown that there is no consensus on a standard distance to measure access to water but any distance less than 1 km is ideal (Smets 2009; Hutton 2012). Nonetheless, access to water is extremely impaired when travel distance and the average waiting time exceed 1000 m and half an hour, respectively (Howard et al. 2003; Smets 2009;). The average distance travelled to a water point was 1.08 km with a standard deviation of 0.33. Results revealed that while most (93.8%) of the respondents travelled less than 1 km, 0.2% covered over 6 km to complete a journey to and from water sources (see Table 3).The average travel time to water point was 1.12 h with a standard deviation of 0.48. Most (93.2%) respondents took less than 30 min for an all-round trip to and from water points. The relationship between distances travelled to a water point (measured in kilometres) and time taken to go, wait, fetch and come back (measured in hours) was analysed using Pearson product–moment correlation. The result shows a strong positive correlation between distance travelled and time taken to complete one trip to and from water sources. It is, therefore, inferred that people who live far away from water sources would take more time to travel to and fro.

Analysis shows that most (93.8%) households got potable water within 1 km distance. It is noteworthy that while water was physically accessible to 93.8% of the studied population, only 0.6% of them lived within less than 1-km radius of water point, but took more than half an hour to return from water sources. According to a key informant, this delay was because "[w]ater has low pressure and in most cases, there are long and winding queues at the standpipes especially during morning and evening hours". Given that water was within 500 m for most (93.8%) respondents while approximately 1% of them preferred to fetch it from far away is probably an affirmation to Mwamaso's (2015) argument that water users are likely to give more attention on the intended purpose of water and acceptability of certain water sources rather than just proximity to sources. Thus, water for cultural rituals is purportedly not obtained from ordinary sources, but rather from certain sources which are perceived as sacred (see Mwamaso 2015).

Water affordability index as a measure of water access

Water affordability is a ratio of a household's monthly income spent on water against its total monthly income given as a percentage (Peprah et al. 2015). Affordability of water is represented in affordability ratio (AR). This measure can be calculated for an individual household or aggregated statistically for a defined group of households (Gawel et al. 2011). For instance, for a household c, the AR is given by the formula below:

$$\mathrm{ARc} = \frac{\mathrm{Pc(W + S)}}{\mathrm{Ic - Ec}},$$

where I is the household income, E is the essential household expenses other than water, P is the number of household members, and W and S are the per capita cost of essential water.

For instance, the AR for a three-member household with a monthly net salary of BWP1500, with other essential household expenses (other than water) amounting to BWP1300 and the cost of essential water per month is BWP60 is shown below:

$$\mathrm{ARc} = \frac{3(60)}{1500 - 1300} = 0.9.$$

Table 4 shows the WUC's potable water tariff structure, which came into effect on the 1st of April 2017. Based on

Table 4 Domestic potable water tariffs (2017-date)

Block tariff category (kl)	Exc. VAT Revised 1st April 2017	Incl.VAT Revised tariff 1st April 2017
Minimum charge	BWP0.00	BWP0.00
(i) 0–5	BWP3.50	BWP3.92
(ii) > 5–15	BWP10.40	BWP11.65
(iii) > 15–25	BWP18.20	BWP20.18
(iv) > 25–40	BWP28.00	BWP31.36
(v) > 40	BWP35.00	BWP39.20

Source: Water Utilities Cooperation Annual Report, 2017

Table 4, a consumer who uses 40 kilolitres of water per month pays BWP808.22 (see Table 5). A standard connection fee of up to 50 m connection distance in which the WUC digs trenches and provides connection materials would cost BWP2000.00. However, this amount is reduced to BWP1500.00 in the event that the customers dig the trenches and the WUC provides the materials and labour (WUC 2017).

Given that the majority (90.5%) of the households earn less than BWP1500.00 per month, paying BWP808.22 for water is beyond the affordability of the households in the study area.

While water affordability is dependent on the financial dispositions of individual households (Smiley 2017), a household's monthly water bill should not exceed 5% of its monthly income if water must be economically accessible to the household (WaterAid 2011). Analysis revealed that the average income of households was BWP603.96, with a standard deviation of 695.05. While 1.1% of the respondents earned BWP1500 per month and spent 1.3% of their income on water (see Fig. 3), some 1.1% also earned between BWP50 and BWP850 per month and spent between 2.4 and 40% of their income on water. However, most (91.9%) of them earned less than the minimum wage of BWP1500 per month and spent 40% of it on water bills. A relatively small percentage (8.1%) of the studied population, however, earned above BWP1500 per month and spent between 1.5 and 5% of their income on water bills. A Kruskal–Wallis test revealed a statistically significant difference ($\chi^2 = 5.2$, $p = 0.014$) in the mean ranks of water expenditure across income groups. The findings affirm Smiley's (2017) findings that households in lower-income groups spend less money in terms of absolute figures but more in terms of percentages, and households in higher-income groups spend more in absolute terms and less in terms of a percentage of income expended on water. Also, a post hoc test using Mann–Whitney U analysis revealed a significant difference ($U = 579$, $p = 0.003$) in expenditure on water between the lowest and highest income groups. Moreover, the effect size for the sample difference was 0.1.

Table 5 A water bill for a 45 kilolitres of water consumed per month

Potable water	Total (excluding VAT)	VAT @ 12%	Total (inclusive of VAT)
First 5 kls @ BWP3.50	BWP17.50	BWP0.00	BWP17.50
Next 10 kls @ BWP10.40	BWP104.00	BWP12.48	BWP116.48
Next 10 kls @ BWP 18.20	BWP182.00	BWP21.84	BWP203.84
Next 15 kls @ BWP28.00	BWP420.00	BWP50.40	BWP470.40
Total	BWP723.50	BWP84.72	BWP808.22

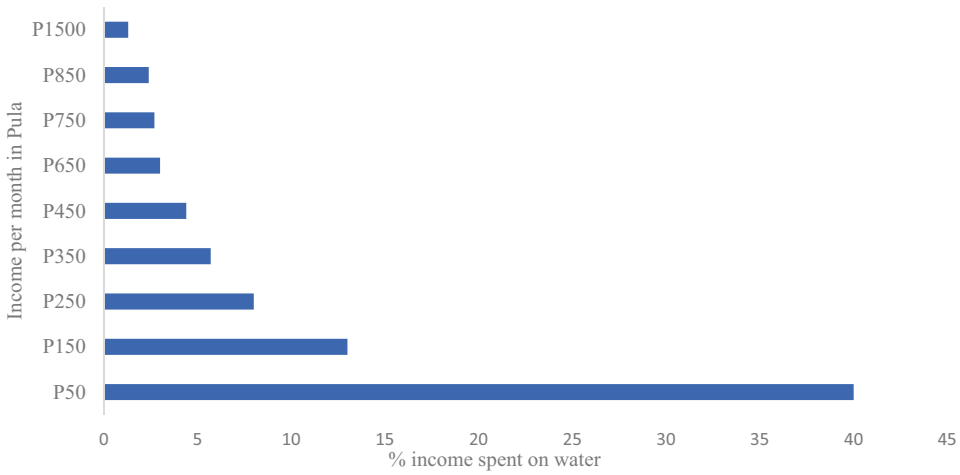

Fig. 3 Income and percentage spent on water bills (Source: Fieldwork June–October 2018)

Table 6 Distribution of HHs by their perceptions about the role of cultural taboos in accessing water

Statement	SA (%)	A (%)	N (%)	D (%)	SD (%)
(i) There are taboos for water abstraction from a source	35	24	8	17	16
(ii) Taboos are set and enforced by chiefs	12	7	10	39	32
(iii) There are sanctions for failure to comply with taboos for water use	29	26	16	14	15
(iv) I came to know about taboos for water use through folktales from elders	36	39	11	12	2
(v) There are spiritual beings which live in sacred water sources	37	39	16	3	5
(vi) Snakes, frogs and crocodiles are the commonest creatures associated with local water rules/taboos	44	36	10	4	6
(vii) If one kills a frog in a sacred water source, the source dries up	14	10	8	32	36
(viii) Local water taboos were meant to monitor and control water pollution	35	26	14	12	13
(ix) It is a taboo to use water meant for religious devotions for domestic purposes	62	23	6	2	7

Source: Field survey, June 2018-October 2018

SA strongly agree, *A* agree, *N* neutral, *D* disagree, *SD* strongly disagree

It is, therefore, concluded that people in the lower income bracket use a lot of their meagre earnings to access water as compared to their counterparts who earn big incomes per month. As the lower income group spend on average more than 5% of their income on water, it is concluded that improved water supply is economically inaccessible to most of the people in the study area. Given that the more water an individual uses, the more they pay for the item, some (15%) of the households resorted to fetching water from the Okavango and Thamalakane rivers. This scenario is most prominent in Tubu, because the community "…does not have any stand-alone water supply system but relies on water supply from Gumare village which is about 20 kms from Tubu" (Key informant interview, September 2018).

The ratio of water bill of a household to its disposable income describes the affordability index of the household (Smets 2009). The index is low and very high in affluent and poor households, respectively. While the index is between 1 and 2.5% for rich households, it can be as high as 50–90% in very poor households in which most or all household members are unemployed. Improving access to affordable water requires paying attention to the affordability index and taking measures to reduce it through differentiated pricing, targeted programmes and cross subsidy systems. If the index is high, water is said to be too expensive and hence it is unaffordable.

Households' perceptions about water access

The distribution of HHs by their perceptions about the acceptance of cultural taboos in water access in the study area is presented in Table 6. While cultural values and practices are not static, changes in them and belief systems are, however, not accompanied by the transformations in the material aspects of a given society (see Kolawole 2001, 2012). Literature has shown that people in different cultures conceptualise water in different ways (Nkonya 2006; Akpabio 2011, 2012). The findings revealed that there were myths and taboos in accessing water from rivers and wells, especially in Tubu and Shakawe. Based on Shoko and Naidu (2018), myths are tales which are believed to be true by a specific community and use a spiritual explanation to interpret and make sense of the natural world and behaviour of humankind. While a myth is a legend with a supernatural explanation, a taboo is a social or religious custom prohibiting a practice (Akpabio 2012). In attempting to determine how customary institutions restrict access to water, HHs' perceptions about the efficacy of taboos in water management were analysed. How HHs felt about the role of taboos in accessing water and how effective they thought these cultural taboos were in hindering access to water were examined.

While some of the statements were analysed to show whether there were myths and taboos surrounding water access in the area, others, from another perspective, were meant to analyse people's perceptions about the effectiveness of myths and taboos in water management. These statements were constructed based on literature (see, for instance, Nkonya 2006; Akpabio 2011; Amerson 2018; Amanda 2018; Shoko and Naidu 2018). They were rated on a 5-point Likert scale of 1–5 points. The minimum points possible for a household was 9 and the maximum was 45. In terms of the existence of taboos related to water abstraction from water sources, some 35% of the HHs affirmed that "[t]here are taboos relating to water abstraction from water source". However, interviews with the key informants indicated that local people had more inclination towards customary than statutory water management institutions because of their personal experience over the years. The assertion buttresses Akpabio's and Shoko and Naidu's viewpoint (see Akpabio 2011; Shoko and Naidu 2018), which confirms that in rural areas of developing countries, certain water sources are of

high spiritual and religious importance such that restricted entry is openly enforced by certain traditional codes of obeisance.

It is noteworthy that the perception of the existence of sacred water points is one peculiar aspect of water resources governance in the study area. A key informant opined that revered water points were believed to be linked to a deity and were of importance to rural communities. The study revealed that water is perceived as an abode of spirit beings and human souls, which animate in the form of frogs, crocodiles and mermaids. This belief in water spirits was more emphasised in Tubu and Shakawe and amongst the elderly than the young and in state institutions. Another key informant indicated that certain water points had restricted entry and openly enforced by certain traditional codes of access to maintain their sanctity. Such water sources accorded some measure of respect and ritual oblations. Consequently, entry is restricted in some days to enable the fulfilment of ritual formalities (personal communication with key informant). Also, one key informant said "[i]t is very dangerous to fetch water from the river in the evening and women on their monthly periods are not allowed to go to any river to fetch water". In the context of water access in the study area, thus, taboos and myths had an impact on accessing water in the study area. The results of this study agree with the findings of Huggins (2000: pp. 22–24) in Kenya and Akpabio (2011: pp. 584–596) in Nigeria, where they found that certain water sources were greatly valued and were deemed sacred. A critical analysis of the myths and taboos in the study area revealed that there is nothing spiritual for women undergoing menstruation to be prohibited from fetching water from any river or doing so at night. The taboos were only devised to deter people from polluting water and encourage promptness in carrying out some water-related activities. While these taboos used to be effective in the past, they are no longer obeyed by the majority of the people particularly the younger generations who have been exposed to Western civilisation. Thus, one key informant had this to say:

> The white people who came to our area brought their religion—Christianity—and they said what we are doing is part of witchcraft and these Christian believers are against those practices. That is why these taboos are no longer effective, especially these days.

Perceptions about water as a social or economic good

In this section, two opposing views on water management, namely "water as an economic" good and "water as a social good" were examined. Thus, the distribution of HHs by their worldviews on these two notions is shown in Table 7. Literature has shown that since the Dublin Conference on water and environment in 1992, there has emerged a dissonance in the way water is conceptualised and how it should be managed (see Akpabio 2011; Gondo et al. 2018a, b; McNeill 1998; Savenije 2002). On the one hand, there is the belief that water is an economic good, while on another, water is regarded as a God-given commodity. Those sympathetic towards statutory institutions argue that water should be priced at its economic value if it is to be managed sustainably and the adherents of customary institutions opine that water should be accessed free of charge regardless of whether it has been purified or otherwise, as it is a free gift from God. While the meaning of water as an economic good is somewhat elusive, Savenije and van der Zaag (2002) came up with a working definition. Firstly, where water is conceived as economic good, it should be priced at its economic value so that it is accorded its best uses. Secondly, where water is conceived as a social good, there must be an integrated decision-making on its allocation from different stakeholders, which does not necessarily involve financial transaction at all. Here, water being an economic good would imply that the decision on its allocation and use should be based on a multi-interests analysis in a broad societal context, involving cultural and economic considerations (see Savenije 2002; McNeil 1998; Rogers et al. 1999). However, the other school of thought argues that water must be accessed freely as people get it free from nature. Thus, they opine that there should be no price tag placed on water whether purified or in its natural state. In an attempt to understand how people in the study area conceive water and on how it should be accessed, two statements "[w]ater is God-given and therefore people must get it free of charge" and "[w]ater has an economic value and so people must pay to access it" were placed and rated on a 5-point Likert scale (see Table 3). While the majority (71.9%) of the HHs agreed with the assertion that "[w]ater is God-given and people must get it free of charge", the rest (25.5%) disagreed with the assertion. Regarding the statement that "[w]ater has an economic value so people have to pay to access it", most (68.7%) of the respondents disagreed with the assertion. While 28% of the households agreed with the assertion, only 3.3% of them were neutral.

Table 7 HHs' conception of water

Statement	SD	D	U	A	SA
(x) Water is God-given and people must get it free of charge	11.4	14.1	2.6	18.5	53.4
(xi) Water has an economic value, so people must pay to access it	35.8	32.9	3.3	11.7	16.3

Source: Field survey, June 2018-October 2018

SD strongly disagree, *D* disagree, *U* undecided, *A* agree, *SA* strong agree

Two key meanings were assigned to water, namely "gift from God" and "the embodiment of spirits". There was a consensus on water as a gift from God among all the respondents, irrespective of faith and religious affiliation. The belief that water is a gift from God is loaded with many meanings. It assumes the status of perfection because it is God given. The inherent belief is that anything associated with God is presumed perfect (see Akpabio 2012; Gondo et al. 2018a, b and Nkonya 2006). Regardless of water quality or source, this notion tends to encourage usage of any available water.

Conclusion

The paper analysed customary and statutory institutional factors engendering the dissonance existing between customary and statutory water management institutions in accessing water in the study area. The elusive nature of the concept of water access is engendered by a lack of consensus amongst institutions, which set the criteria for the measurement of water access. Findings showed that the majority (91.9%) of people in the study area earned less than the minimum wage in Botswana. The average household size was seven members. Although most of the households fetched water within the UN acceptable distance of 500 m or less, most households spent more than the required proportion of their income on water as against those prescribed by relevant international and financial bodies. Although water is relatively accessible in the study area, there is a lack of harmony between customary and statutory institutions addressing water issues. The paper has demonstrated that some households were more likely to opt for water from specific sources depending on intended use and affordability. Although statutory institutions stipulate that individuals need to apply for and be granted a water right (paid for in the form of water taxes), customary institutions perceive water from a social good perspective in which there is no payment required for water access and use either in its raw or purified state. This viewpoint refutes statutory institutions' water access policy. As water is available to everyone in the context of customary institutions, acquiring specific water rights either for an in situ or river draw-off waterworks is not required. Thus, customary institutions differ from statutory institutions, which are capitalist oriented in water issues. In the context of customary institutions, the study revealed that local people perceived water as a blessing from nature, which gives and sustains life, and which is an essential component of life that is supposed to be accessed free of charge. This is against statutory institutions' position, which 'justifiably' pushes for the commodification of water to conserve and realise its value as well as ensure its supply infrastructure sustainability. The paper, therefore, recommends that the government needs to substantially subsidise potable water to enable indigent individuals in both rural and urban areas to have access to the resource.

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