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Women and water scarcity in Botswana: Challenges and strategies in Kweneng District -The case study of Gakuto Village

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Abstract: The purpose of the paper is to examine how water scarcity affects women in Gakuto and strategies they use to adapt to water scarcity. Water is a basic necessity and a requirement for all according to United Nations Sustainable Development Goals. Botswana is one of the countries faced with water scarcity. The key geographical features of low rainfalls and semi-arid conditions contribute to the scarcity of water resources in the country. The paper highlights challenges faced by women in Gakuto village and strategies they use to cope with water scarcity. A conceptual framework has been used to discuss the relevant concepts that underpin the research. These are water scarcity, adaptation and coping, vulnerability. Data was collected during a site visit through semi structured interviews, field observations and secondary data sources from the government reports and publications. Using semi structured interviews, 23 women from 12 households were interviewed to outline challenges they face in accessing water and sanitation in the village. A traditional leader was also involved to outline the situation of water access in the village. Results show that over 80% of participants travel more than 1km from their households to access water. According to World Health Organisation, in Africa, women walk an average of 10 km per day collecting water. Data was coded and analysed to outline an overview of the various coping and adaptation strategies that participants employ at household level. Majority of them use rainwater, change water routine, access water through social networking and reuse at household level.

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Keywords: Sustainable Development, water scarcity, water access, sanitation, adaptation strategies, vulnerability

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Summary: This study examines challenges faced by women in Gakuto and strategies used to adapt to water scarcity. The study highlights that although Botswana is a middle-income country with just over 2 million people, the country is facing problems of water scarcity which has affected mostly areas in the southern part of the country where the majority of people dwell. This is because the capital city Gaborone is located on the southern side.
It has been observed that Botswana is a water stressed country with below average rainfall. The key geographical features of low rainfalls and semi-arid conditions contribute to the scarcity of water resources in Botswana. The problem of water scarcity, and by extension disrupted potable water supply, is widespread across the country including Kweneng District which has a population of about 30 000. There are limited surface water resources for supplying villages within the whole of the project area. Water scarcity is a key to disruption of livelihoods especially among women in rural areas.

Gakuto village is located in Kweneng District and is 20km away from Gaborone, the capital city. Water Utilities Corporation, which is the main water supplier, has not reached its mandate. Women rely on water supply for their various activities namely cooking, washing, and bathing. Their lives are cantered on the availability of water for both social and economic benefits and gains. Scarcity is a threat to their health and personal hygiene. Women have prioritised several adaptation and coping strategies at household level such as storage of water in buckets and containers, purchasing, reusing water. This alone however does not solve the problems of water shortage and sanitation at household level.

Water is a basic necessity and a requirement for all according to United Nations Sustainable Development Goals. However, in Gakuto Water provision has been a thorny issue for more than a decade. Women in this area are faced with a serious problem of limited access in their households. This has affected their livelihood such as daily use of water, increased stress levels, poor health, hygiene and sanitation. Although participants are aware of water scarcity in the country, they believe effort should be made by the government to provide them with daily access to clean water.

Keywords: Sustainable Development, water scarcity, adaptation, access, Gakuto, Water Utilities Corporation

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1. Introduction

Water is an important natural resource that is useful in every facet of life. It is required in food production, processing and consumption. Achieving universal water security can be said to have been formally established as an international goal with the inception of the United Nations (UN) Sustainable Development Goal (SDG) 6, which is to ensure availability and sustainable management of water and sanitation for all. As is the case for many other targets of the SDGs, the realization of universal water security depends on its trade-offs and synergies with other goals of the 2030 agenda. For example, the SDG 5, to achieve gender equality and empower women and girls. (United Nations, 2019). But about 4 billion people, nearly two-thirds of the population of the world, face severe water scarcity and over 2 billion people live in countries experiencing high water stress. (World Health Organisation, 2015).

Gender is widely recognized to play a crucial role in the management and consumption of water. There is now broad agreement that any solution to global water scarcity must include a gender dimension. For instance, major international water accords, such as the Agenda 30, the Ministerial Declaration of the International Conference on Freshwater and the International Covenant on Economic, Social and Cultural Rights General Comment on the Right to Water all acknowledge the centrality of gender in water provision (UNESC, 2018). While women and men both participate in water management in important ways, there is often a clear division of labour in gendered roles and responsibilities. At the household level, women take primary responsibility for water acquisition, allocation, and use in many cultures. Women and girls are generally tasked with household water acquisition, including waiting for water distribution at the tap stand, walking to far-off water sources, locating water vendors and buying water, and carrying water back to the household The responsibility for the allocation of scarce water supplies to different household members and water use tasks often belongs to women and girls. Additionally, women and girls perform the majority of water-related chores within the household, such as cooking, childcare, housecleaning, and laundry. (United Nations, 2019).

Women tend to be more vulnerable because they often stay at home in rural areas while men look for work in urban areas. The women are rarely trained as professional natural resource managers with policy-making ability, yet they are the key actors in environmental management activities. In addition to these geophysical constraints, other socio-economic constraints leave many women and people in the rural periphery with little to protect themselves from shocks. Poor health care, limited access to education, information and technical assistance, and higher urban unemployment, reduce the opportunities for out-migration and lower the remittances sent back to the villages (Caruso et al, 2015).

For developing countries, meeting the basic needs of water supply and sanitation is the most pressing water security issue. (Ritchie and Roser, 2019). As water becomes increasingly scarce, governments are allowing market forces to privatize water in an effort to conserve water. Water privatization occurs when private companies take ownership of the production and distribution of water. Water prices usually skyrocket when it is privatized even if the service is poor, causing many impoverished families to use large portions of their income to pay for a basic right. Women are the first to experience negative impacts of water privatization because as managers of their households, they are often forced to purchase water and must forego other productive activities such as subsistence farming of cash crops that need irrigation. (World Health Organisation, 2015).

For more than 844 million people worldwide, or one in every nine people on Earth, access to clean and safe water is still out of reach. The majority of these people live in rural areas and have to walk for hours to collect water for themselves and their families. And the burden of gathering water for households falls disproportionately on women and girls. In Africa alone, women spend 40 billion hours a year walking for water, time that could instead be used to go to school, run a business or improve their households. (United Nations Water and World Health Organization, 2014).

The problem of water scarcity and long distances is further compounded by the fact that water-storing devices at home are in most cases either lacking or inadequate, both in terms of quantity and quality. Poverty in rural areas makes it difficult for households to acquire and establish good storing devices. Even where drums are used as storing devices, they are often uncovered and become good breeding spaces for mosquitoes, rendering water unfit for consumption and subjecting people's lives to further health compromising conditions. To exacerbate the situation, as has already been mentioned, cattle herders, both older men and young boys, take their animals to drink from the same water source used for collecting domestic water. This normally pollutes the clean water that could have been drawn by women. Most water sources are not protected or fenced against animals. (Logan, 2015). In Botswana, the majority of people without access to adequate sanitation and safe drinking water are vulnerable groups living in poor informal settlements, mainly consisting of poor women. These challenges result in adverse health impact on women and their families and increased potential loss of their productivity. (Statistics Botswana, 2014)

Gakuto is a small village in Kweneng District in the Southern part of Botswana, located 20km from the capital city Gaborone. Due to its proximity from the city, its population is anticipated to increase and therefore demand for water is also expected to rise. Several studies on water scarcity in Botswana have been carried out in rural areas in the Northern part of the country and the capital city Gaborone. There is still insufficient research on water scarcity in rural areas in the Southern part of the country, especially rural areas that are in the outskirts of Gaborone. Based on the above statement, there is a need to interrogate more water scarcity issues with special attention to vulnerable groups especially women. Study will therefore address the following aim and research questions:

1.1 Aim - The main objective of the paper is to document the experiences of the women in Gakuto village in relation to water problems. This includes documenting the problems women face in accessing water and the coping and adaptation strategies that they use to sustain themselves in times of water scarcity .The findings of this study will provide a basis for recommendations to planners at district and national level who are developing policy for managing water scarcity. The study limited its scope by focusing on Gakuto, a small village in Kweneng District.

Research question(s):

In order to achieve a broad aim, specific questions were:
1. What challenges do women in Gakuto village face in accessing water?
2. How do women in Gakuto village cope and adapt to water scarcity?

1.2 Scope and delimitations

This research is based on qualitative data collection in Gakuto Village in Kweneng District. Although Gakuto is not an isolated case, it represents a broader national problem of water scarcity. Despite many similarities with various rural communities that also face water scarcity, access to water is different across the District. This research focuses on Gakuto Village, located in Kweneng District. Research does not include water scarcity in agriculture but rather domestic water consumption in the village.

1.3 Study Area

The chapter outlines a brief introduction of Botswana and Gakuto village.

Botswana is a landlocked, semi-arid country with an approximate area of 582 000 km2 and a population of 2,3 million people in 2011. (Statistics Botswana, 2014). Fig 1 shows that Botswana is bordered to the north by Zambia, to the northwest by Namibia, to the northeast by Zimbabwe and to

the east and southeast by South Africa. The country is an almost uniform plateau with an average altitude of 1 000m; elevation ranges between 700m and 1 300m. (Statistics Botswana, 2014). Because of the semi-arid climate, most rivers and streams are ephemeral. The country is no stranger to the discourse surrounding a sustainable water future. Water distribution within the country is uneven due to approximately 70% of the nation being covered by the Kalahari Desert, and drought is considered endemic to the country (Swatuk and Rahm 2004; Juana 2014). The country receives rainfall that is below 250 mm per annum in the southwest and approximately 600 mm per annum for the northeast. Furthermore, groundwater resources are not only unevenly distributed over the country, but are also limited, both in quantity and quality. Overall, the country's water resources are highly dependent on transboundary water and are widely spatially variable. Because of its flat topography, Botswana's storage capacity is one of the lowest in the region (United Nations Development Programme (UNDP), 2017). The total dam capacity in the country is 800 million cubic (Mm3), while the capacity of developed underground resources is at 131290m3/day (UNDP, 2017). It is therefore imperative for the population to embrace sustainable water use.

The problem of water scarcity, and by extension disrupted potable water supply, is widespread across the country. Most of the water is located in the North, far from the population centre in the Southern corridor. However, the physical shortage of water in Botswana is arguably complemented by lack of efficient and effective water supply and management institutions and water infrastructure. The policies and legislative framework the country has adopted to manage, govern and distribute water resources play a vital role in directing water use and supply towards sustainability (Global Water Partnership (GWP), 2012). While the Government of Botswana, though rhetorically, embraces the general and international principles of integrated water resources management (IWRM), the country's water allocation decision making process has moved from a decentralised and customary law basis to a centralised and common law basis (Colman, 2013).

Due to a growing and increasingly prosperous population, as well as the development of industrial and other commercial uses demand continues to rise. By 2030 demand is forecast to reach 285.8 million cubic meters (Mm3), or about one and a half times the 193.4Mm3 annual demand in 2000. Both ground and surface water (rivers and dams) resources are utilized, however as most rivers are ephemeral, groundwater now accounts for three quarters of the country's requirements. The demand is forecast to exceed 280 Mm3 by 2030 (DWA, 2013). In 2009, the Government of Botswana awarded Water Utilities Corporation (WUC) the responsibility to supply water to all settlements.

Fig 1: Map of Botswana, AfriGIS Pty Ltd

Kweneng District is located in the Southern part of Botswana and has a population of more than 300 00. There are limited surface water resources for supplying villages within the whole of the project area and groundwater is the mostly used viable source of potable water for the area for the current period and the foreseeable future. (Statistics Botswana, 2014). The other alternative is supplying the villages from surface water sources in the north of the country. According to the World Bank Report (2017), the implementation of this alternative is restricted by the huge cost implications involved as well as the technical hurdles in the form of the long distances over which the water will have to be piped. Water Utilities Corporation (WUC), a government-owned corporation that provides water and wastewater management services in Botswana, has long-term plans of connecting some of the huge demand centres in the area, to the North-South Carrier (NSC) II Project. The NSC project is still in its infancy. The main aim of the project is to provide safe water supplies to the Southern part of Botswana where the demand for water is high by developing water resources in the Northern part of the country and constructing dams and water treatment plants. Fig 2 depicts map of Kweneng District.

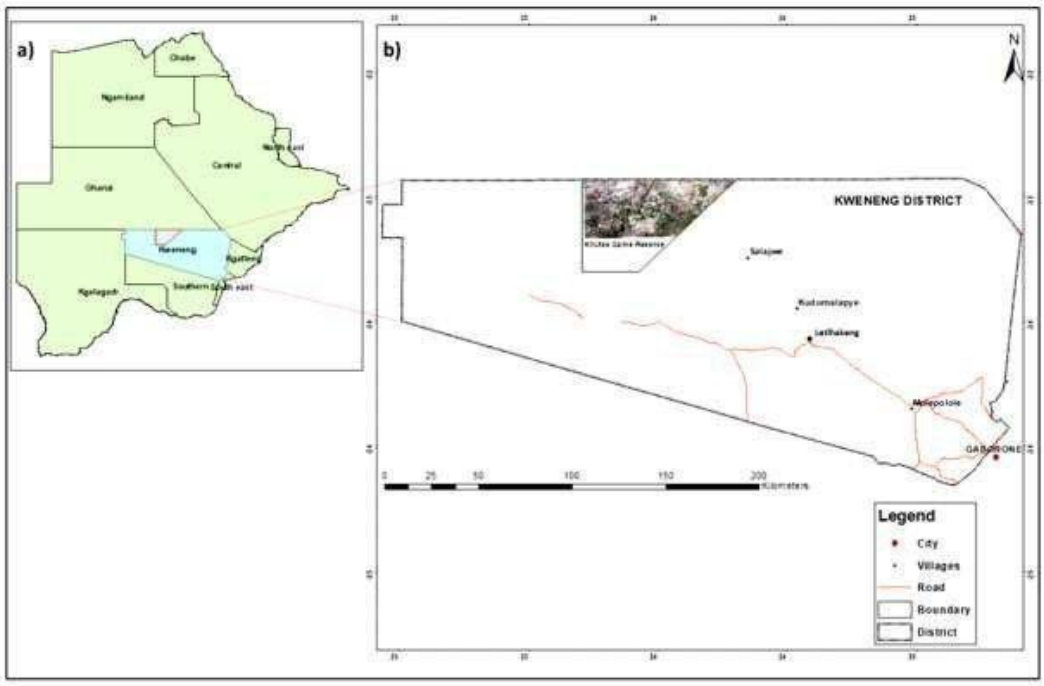

Fig 2: Map of Kweneng district, Google maps online

1.4 Gakuto village: The case study

Gakuto is a small village in the Kweneng District, not very far from Gaborone, is gradually making its mark. Its presence is being felt as far as development is concerned perhaps due to its proximity to the city. The village has taken advantage of government development initiatives to usher in a new lease of life. New developments are visible and people in the village are optimistic that what they are experiencing could in turn help diversify and create employment opportunities. Gakuto means "a place where people listen", this could then mean that residents of the village really listen and adhere to anything positive they are told, hence they embrace the government call to utilise government policies to develop themselves. The village boasts of a primary school, health post, post office and telephone facilities. Water is not abundant, however, some residents still manage to access some drinking water. In 2011, the village had a population of 1811 people. (Central Statistics Botswana, 2011). It should be noted that Botswana carries out a population census every 10 years, and the last one was done in 2011. Fig 3 shows an aerial view of Gakuto village.

Fig 3: Aerial map of Gakuto village, Google maps online

2. Conceptual Framework

In this qualitative research, a conceptual framework has been adopted and various models have been used for results analysis and to draw discussions and conclusions. These are water scarcity, water access, adaptation and coping and vulnerability.

2.1 Water scarcity

Water scarcity arises in situations where there is insufficient water to simultaneously support both human and ecosystem water needs (White, 2014). Most often this arises as a result of a basic lack of water (i.e., physical water scarcity), but it may also result from a lack of suitable infrastructure to provide access to what might otherwise be considered ample available water resources, which is referred to as economic water scarcity. The concept of scarcity also embraces the quality of water because degraded water resources are unavailable or at best only marginally available for use in human and natural systems. In this study, water scarcity is defined as limited availability of water resources to meet the needs of the people according to how they expressed themselves during interviews.

There is a relationship between water scarcity and access. Access to the minimum quantity of water necessary for domestic use, usually meaning that for drinking, cooking, washing utensils, and basic hygiene, can be defined in many ways. The UNICEF/World Health Organization Joint Monitoring Program, 2014, the main source of national level data on access, defines reasonable access as 20 liters per person per day from an improved source, no more than 1 km distant from the dwelling. Improved sources are household taps, public standpipes, boreholes, protected dug wells, protected springs, and collected rainwater. Unimproved water sources according to the JMP are unprotected wells, unprotected springs, rivers, or ponds; vendor-provided water; and bottled water.

According to the World Health Organization, access to water is defined roughly through distance and time spent on fetching. Access to water is complicated to define because there are more aspects to consider than the above. Seasonality of water availability affects people's pattern of water consumption. People may also get some water from a safe source and at the same time collect water from other sources. Pricing of water is an aspect that can lead to reduced access for poor who then economise their water consumption. This can lead to further marginalisation of women since they in general have less paying capacity (Harris, 2009).

There are divergent opinions on the interpretation of access to water but there is also a general consensus. The United Nations (2019) refers to access as the physical accessibility and affordability but stresses that economic accessibility does not mean water should be provided free. The WHO definition of access to water varies according to location but averages 20 litres per person per day within one-kilometre walking distance from the household. African women may walk over six kilometres per day in search of water, spending as much as eight hours collecting water. (Baguma et al, 2013).

In most countries, women often are given the task of collecting water, carrying 15 to 20 litres of water from the water point home. Access to water and sanitation is therefore related to the time that girls need to attend school and can be the reason why they are kept out of school. In many developing countries, furthermore, girls are often not permitted to attend schools that do not have latrines out of concern for their privacy and modesty. Access to fresh water and sanitation does not only improve the health of a family, but it also provides an opportunity for girls to go to school, and for women to use their time more productively than in fetching water. It is estimated that the investment required to meet the sustainable development goals for safe drinking water and basic sanitation would require an additional investment of approximately $30 billion a year, twice what is now spent in those countries which currently have large numbers of people without access. (Guo et al, 2017). Collecting water takes time. Simply to get water for drinking, bathing, cooking and other household needs, millions of women and girls spend hours every day traveling to water sources, waiting in line and carrying heavy loads often several times a day. (Ndikumana and Pickbourn, (2017).

The new UNICEF/WHO report states that 263 million people worldwide have access to water sources that are considered safe, but need to spend at least 30 minutes walking or queuing to collect their water. Another 159 million get their water from surface sources that are considered to be the most unsafe, such as rivers, streams and ponds. Water from these sources is even more likely to require over 30 minutes to collect. United Nations Water and World Health Organization, (2014).

The definition of improved water source needs to accomplish three dimensions of water security quality, quantity and proximity. Inside house connections, standpipes, protected wells and pumps are in the category of improved water sources. Water acquired from vendors and water trucks, as well as water drawn from streams or unprotected wells are all considered unimproved sources and are therefore not counted into access to water (UNDP, 2019).

In a study of 25 countries in sub-Saharan Africa, UNICEF estimated that women there spent 16 million hours collecting water each day. Women reported spending an average of 4.5 hours fetching water per week, causing 77 percent to worry about their safety while fetching and preventing 24 percent from caring for their children. These responsibilities represent lost opportunities for women's employment, education, leisure or sleep. (UNICEF Annual Report, 2015). The World Health Organization recommends 20-50 litres of water per person per day for drinking, cooking and washing. In Africa, women walk an average of 10 km per day collecting water (World Health Organization, 2015). Carrying such loads over long distances can result in strained backs, shoulders and necks, and other injuries if women have to walk over uneven and steep terrain or on busy roads. Some of the health problems in relation to water are blamed on time and energy spent in selecting quality water. This is because water sources in rural areas are often situated far from the reach of most women and

an average of 5km is travelled to reach the water source. This distance increases during the dry season when most springs and wells are drying up, leaving women with no other alternative but to walk further distances in search of water. (World Health Organization, 2015). Table 1 shows the relationship between water access and distance, WHO, 2015).

Service level	Distance/time	Likely volumes of water collected	Needs met	Intervention priority and actions
No access	More than 1 kilometre/more than 30 minutes	Very low (often below 5 litres per capita per day)	Consumption cannot be assured Hygiene practice compromised Basic consumption may be compromised	Very high Provision of basic level service
Basic access	Within 1 kilometre/within 30 minutes round trip	Average unlikely to exceed approximately 20 litres per capita per day	Consumption should be assured Hygiene may be compromised Laundry may occur off-plot – i.e. away from home	High Hygiene education Provision of intermediate level of service
Intermediate access	Water provided on-plot through at least one tap (yard level)	Average of approximately 50 litres per capita per day	Consumption assured Hygiene should not be compromised Laundry likely to occur on-plot – i.e. within the confines of the household	Low Hygiene promotion still yields health gains Encourage optimal access
Optimal access	Supply of water through multiple taps within the house	Average of 100-200 litres per capita per day	Consumption assured Hygiene should not be compromised Laundry will occur on-plot	Very low Hygiene promotion still yields health gains

Table 1: Relationship between water access and distance, WHO, 2015).

2.2 Adaptation and coping

The concepts of coping and adaptation in the face of water scarcity are central to practice of adaptation to climate change limited water resources. Although there is habitually an understanding in the literature that coping and adaptation differ in terms of timeframe and sustainability the concepts are often used interchangeably. Coping is viewed as an immediate response to extreme events and threats, suggesting that people can handle a certain amount of destabilization and that at some point this capacity may be surpassed (Cardona et al. 2010). Successful coping strategies may reveal the capacity of households to respond to immediate threats, but divulge nothing about how effective they will be in the long term and what they mean for future vulnerability. This underlines the need also to integrate a long-term adaptation perspective when addressing disasters, as well as the necessity to consider short-term coping strategies when examining adaptation. Adaptation is defined as adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities (IPCC, 2001).

Women's access to water is particularly compromised in situations of scarcity. When there is competition for water, poor people often lose out to those who can afford more powerful machinery for extracting water or those who have more political and economic influence. Such consequences have often been reported from developing countries, although they are still not taken into account in practice. To support the integration of gender knowledge into policy and planning, it is necessary to train planners and raise their awareness of gender issues. Toolkits available from women's or gender networks should be used as a starting point, and gender networking between experts from the South should be strengthened. Many countries are developing national adaptation plans and/or adaptation measures and projects and identifying priority activities to respond to urgent and immediate needs. Coping with water scarcity, heavy rainfalls and floods are important issues to take into account in adaptation planning, and the equal participation of women and men is indispensable for successful

planning. Additionally, gender experts should be consulted during the planning process. Gender aspects must be integrated into the whole procedure (research, consultation, planning, implementation and monitoring), supported by appropriate tools. (U.S. Agency for International Development, 2018).
To cope with water scarcity means to live in harmony with the environmental conditions specific to and dictated by limited available water resources. For millennia, civilisations developed in water scarce environments and the cultural skills that made it possible to live under such conditions are an essential heritage of those nations and peoples. Water consumption and demand has increased everywhere for domestic uses. However, these increases became particularly evident in regions where water is scarce or, at least, not abundant. Therefore, manmade dry regimes are now adding to the natural water scarce conditions, in many cases aggravating the existing situation. (Fonseca, 2017)
Solving water management problems that are faced in water scarce regions calls for innovative approaches to cope with water scarcity. Innovation includes the adaptation of traditional know-how to the current day challenges, the adaptation of the externally available technologies to the prevailing physical and social conditions, and the creation of new and well adapted technologies and management approaches. Innovation must be used to assist man to cope with the environmental constraints and engineering and managerial solutions must be found that are specific to the existing causes for water scarcity: nature produced aridity and drought, and man induced desertification and water shortage. (Fonseca, 2017).

2.3 Vulnerability

According to Pelser (2001), social vulnerability to water scarcity varies not only by regions, but by social group as well. In virtually every country, socio-economic factors greatly influence access to water. People with the lowest status and wealth in the social hierarchy, often suffer disproportionately when water supplies are limited. It is therefore very important to look at the most vulnerable and where they are located. Except for the fact that Africa's water supply is currently the most vulnerable in the world, there are also specific categories of vulnerable people and social sectors. These vary between cultures and environments. These categories may differentiate between at least three social levels of particular vulnerability at individual level and household level (rural areas).

In Sub-Saharan Africa, where rural women are solely responsible for the collection and provision of water in the household, special vulnerabilities women may have can put them at an even greater disadvantage in accessing water. According to Geere & Cortobius's (2017), older women may be less able to access and carry water, and therefore particularly vulnerable to household water insecurity. Pommells et al, (2018) noted that pregnant women are also highly vulnerable to water insecurity due to their physical limitations in carrying out the water fetching activity. While all these groups may have different physical or circumstantial limitations, their inability to pursue the journey of fetching water widens the issue of inequity in water access and either leaves them forced to take more threatening trips to water sources, make other costly arrangements, or forfeit much of their basic needs for water use if neither two alternatives can be satisfied.

Besides age, health status and family conditions, social and political status have also created special vulnerabilities to water access among women. According to Geere and Cortobius (2017), since economic, political and social inequalities are reflected in the access to drinking water (UNICEF and WHO, 2015), it is likely that marginalized groups suffer disproportionately from the negative economic and health impacts of fetching water. In this instance, even after journeying to the water resource, power relations, financial status and social standings governing that resource can affect the quantity and quality of water women collect and the amount of human dignity shown in the process. Understanding these special vulnerabilities is as important as revealing gendered dimensions to water access because both entail situations of water insecurity and great need for more equitable access.

3. Methodology

3.1 Research Design

This section discusses the research design. Research takes the form of a case study focusing on Gakuto Village. Researcher identified the village as the proper site for study because water supply is currently low. Most people do not have access to clean water and sanitation. The target group of the study comprise women residing in the area. Women were targeted because the aim of the study is to establish and analyse impacts of water scarcity on their status and adaptation and coping strategies. The women are also still largely responsible for domestic water and they collect their water from supplies.

Research design is a plan, or a blueprint used when one intends to conduct research (Babbie & Mouton, 2001). For the purpose of this study, a qualitative design and a case study method is used. This study to a large extent uses a qualitative approach. Primary data was collected from the key informants with regard to water supply in Gakuto. The primary data was collected through open ended questionnaires in order to allow for more probing by the researcher and the respondents to freely express their opinions.

3.2 Data Collection

The research is descriptive, with primary data obtained from semi- structured interviews. In semi-structured interviewing, a guide is used, with questions and topics that must be covered. The interviewer has some discretion about the order in which questions are asked, but the questions are standardized, and probes may be provided to ensure that the researcher covers the correct material. This kind of interview collects detailed information in a style that is somewhat conversational. (Lassenius and Smolander, 2014). Semi-structured interviews are often used when the researcher wants to delve deeply into a topic and to understand thoroughly the answers provided. Interviews were instrumental to assess the various uses of water by the local people, understand the economic uses of and the conditions of water sources in the study area. According to Mouton (2001), in order for the researcher to capture the essence of the descriptions rooted in the life-worlds of participants and produce an insider perspective of the actors and their practices, it is best to use qualitative methods. By utilizing a qualitative approach, an attempt was made to understand the experiences of rural women faced with harsh conditions as a result of water scarcity. Their complexities, richness in knowledge and diversity of their lives could only be captured by describing what really goes on in their everyday lives.

Semi-structured interviews were conducted with households from residential areas and the chief between February 20th 2020 to March 7th 2020. A total of 12 structured questionnaires were administered to households across both old compound houses and the newer areas in the study communities. The questionnaire targeted women in the selected households. Women were purposely selected as respondents because of their traditional domestic roles as water collectors and water managers for household use as per research questions. The questionnaire aimed to capture socioeconomic characteristics of households as well as information about their access to water. In overall, a total of 23 participants were interviewed. The Traditional Leader (Chief) was first consulted and interviewed because culturally chiefs are supposed to be consulted first before because they hold authority over the village and some of the developments. All participants were informed on the objectives of the study and if they agreed to participate, they were asked to be recorded using the voice recorder. Photographs were only taken through consent. During the field survey, it was important to record events or features within the survey area that were of interest to the study. This was done through systematic observation which resulted in generation of information that was used qualitatively in discussing the results of the survey data analyses. The researcher assured the participants of anonymity and none of the participants were coerced into participating. Ethical considerations during interviewing were strictly adhered to and all interviews were conducted in mother language (Setswana) and later translated to English.

Secondary data was collected from concerned offices; relevant literature and documents were also reviewed to provide conceptual framework. As part of data collection, secondary data related to the topic was collected from the United Nations Development Programme (UNDP), Ministry of Rural Development, Water Utilities Corporation (WUC) and Botswana Bureau of Standards and the Integrated Water Management Plan Revised Policy for National Rural Development (Botswana).

3.3 Research Limitations

Semi-structured interview was carried out. Focus group method was also proposed however the method was not carried out during data collection because of time constraints.
This is because the Village Leader was unreachable for consultation for some time. Although two of his assistants were available, they do not have authority to give permission to visitors to carry out any inspections or duty in the village without his consent. Focus groups are used to gain information and insight that are not equally accessible in individual cases. This is based on the fact that some information can only be derived from group interaction and discussion (Flick, 2009). Focus groups are a useful methodology to explore what, how and why they think in a particular way by permitting discussions to flow on specific issues, without pressures of, for instance, reaching a consensus.

A number of households were targeted however due to lack of access to transport only a few were interviewed. The researcher was walking from one household to another. In the households, the target group was reluctant to participate whereas others were doing household chores. As for secondary sources, there was no data specifically on Gakuto village relating to water scarcity, women and socio-economic development, implying that research is yet to be carried out.

4. Results

This chapter comprises findings that were derived from analysing the primary interviews and government records. The chapter is divided into subsections resultant from this analysis. First, a general background of the village by the chief is outlined in the interview, followed by water development and experiences of water scarcity in the village. Then a household survey is outlined to highlight female participants' experience to water access and shortage at household level.

4.1 Interview with the Village Chief

According to the Village Traditional Leader, Chief Abdulah Boikotlhao Letlamma, Gakuto was initially used as ploughing fields for Bakwena, an ethnic tribe that originates in some parts of Kweneng District. As more people migrated and settled in 1984, Gakuto was then recognised as a small village. Like in any Tswana village, the organization of Gakuto is structured through administrative units, known as kgotlas and wards, which derive from households. A kgotla is the assembly centre (both the physical location and the body of members) of a group of households presided over by a male headman or wardhead; in the past, all household heads were related through the male line although there are some changes today. The political community within Bakwena society, like that of other Tswana merafe (plural of morafe, polities), is conceived of as a hierarchy of progressively more inclusive coresidential and administrative groupings, beginning with households which make up kgotlas, then a group of kgotlas make up wards. Wards are the major units of political organization of a Tswana village; they are still presided over by men. Fig 4 shows a sign board depicting the village name on the side of the road.

It is within this social and political structure that disputes under customary law are processed. Where parties are in dispute, especially where family matters are concerned, the matter will first be raised privately with the senior male relatives of the parties on both sides. Where this fails to promote

agreement then the dispute will be taken to the headman of one party's kgotla, and the matter will become subject to public discussion by kgotla members who encourage the parties to reach consensus. In the event of failure, the dispute will move up through the social hierarchy from headman to subwardhead to wardhead and end up, finally, in the chief's kgotla. Traditionally, women responsible for collection of water needed for cooking, sanitation and hygiene. Fig 4 shows the Kgotla (Customary court) used by the village Leader

The chief claimed that, although they appreciate the water development project brought in the eastern part of the village, water is yet to be connected on the western part of the village. WUC was supposed to commence the project in February 2020 after some delays but the commencement has been postponed for 6 months. A number of villagers experiencing water crisis access water from private borehole owners. Before then, villagers used to access water from public standpipes which are no longer in use. Their usage has been terminated because they accelerated water wastage. People carelessly left them open whereas pastoralists used them for livestock watering. Donkey carts are still used as an alternative mode of transport in the village especially by people with low income. They use them to fetch water from one area to another. Fig 9 shows a donkey cart in the village which is still used a mode of transport for water collection.

Fig 4: Gakuto Customary in Kweneng District Botswana: By the Author, 2020

Fig 5: Gakuto Village board with telecommunication tower in the far end, by Author, 2020

4.2 Household Interviews

Woman 1: 45-year-old single mother of 5 who stays on western part of Gakuto. She has been experiencing water shortage since relocating to Gakuto in 2005. According to the respondent, she has been waiting for water connection by Water Utilities Corporation (WUC) since relocation. She often goes for kgotla meetings to get updates concerning water access from the village chief and government officials. There have been no improvements since the problem surfaced, as a result, she is obliged to buy water from private borehole suppliers. She uses her cellphone to communicate with water supplies for easy access. Her water priorities include drinking, cooking and bathing once a day. A 2000 ml water tank is used for storage and only lasts for 2 weeks because she has a large family. She uses pit latrine as a basic sanitation facility. Respondent is aware of water scarcity in the country but she hopes the government rectifies the problem in her area. Fig 6 shows a jojo water tank used by the respondent in her yard

Woman 2 : A youthful mother of 2 girls who resides on the western side of Gakuto. Experienced water shortage as long as she can remember. Her main source of water is private borehole owners who charge P150 ($15) per 2000 litres of jojo water tank including transport fee. Woman 2 has been waiting for water supply from service providers since 2004. She stores water in a 1000 litre tank and uses it for drinking, cooking, laundry and other household chores. Respondent has no access to alternative supplies except private borehole owners who according to her, water quality does not meet those of Botswana Bureau of Standards. She is still waiting for supply from WUC. In order to conserve water, she does laundry once a week and stores some water in buckets. Respondent uses pit latrine and reuses wastewater from bathing to clean the house.

Woman 3: A middle aged married mother living on the western side of the village. Respondent was interviewed after the husband consented. Family lives in a 3 bedroomed house with a water system toilet but does not use it because of the current water crisis. She uses a pit latrine as a basic sanitation facility and accesses water from private borehole owners which lasts for 3 weeks in a household of 4 people. She is aware of the water crisis in the area but concerned about slow response for supply from service providers. Respondent sometimes obtain water from relatives who live in the eastern part of the village using a donkey cart. Wastewater from washing clothes is reused to water the trees.

Woman 4 and 5: Middle aged friends renting a 2 bedroomed house in a multi residential plot. The two respondents who work in the capital city have been experiencing water shortages since 2018. Although they were aware of the water crisis situation, they decided to rent in Gakuto because of high rent prices in the city. According to them, there has been no improvements or communication from the government and water suppliers. Alternatively, they purchase water from private borehole owners and store it in jojo water bowsers. Water is mainly used for cooking, drinking, laundry and bathing. The two complain about high levels of salt in water which sometimes cause diarrhoea. Water is reused to clean the toilets. Respondents use pit latrines but lamented that the other three compromises their health because they are full and are no longer in use. They believe the government should collaborate with WUC to accelerate water supply in the area. Fig 7 shows pit latrines used by respondents in a multi residential plot.

Woman 6: 32-year-old Accountant residing in the eastern part of Gakuto. She faced a water crisis in 2008 when relocating from a rented apartment in Gaborone to her house in Gakuto. She managed to build her 4-roomed house with the help of private borehole owners. According to her, the situation has improved because WUC managed to install water pipes around their area and a result, her source of sanitation is a water system toilet. Though she laments about high water tariffs, she appreciates that she no longer travels long distance to access water from private borehole suppliers. She uses water on daily activities such as cooking, cleaning, bathing, drinking and laundry twice a week.

Woman 7: 71-year-old woman who has been living in the village for more than 4 decades. She used to collect water from community standpipes before the government disconnected them. She has been experiencing water shortage since relocating to Gakuto with her children and grandchildren. Currently she lives in a 2 roomed house with her 3 grandchildren. The four use a pit latrine as their primary source of sanitation. According to her, there has been little response from the government to address the water crisis however there is great expectation from WUC who are supposed to supply their village with water. Water obtained from private borehole suppliers is used by the family for drinking, washing, cooking, bathing and other domestic household chores. Much of the water in the household is reserved for bathing children especially when schools are open, which increases water stress level in the household. Water used after bathing is used to clean the toilet and water the trees in the compound. The old woman spends P150 ($15) per 2000 litres and travels more than 1 km to access water from private borehole suppliers. She complains about high levels of salt in the water which sometimes causes diarrhoea. During the rainy season, the family collects rainwater to supplement water shortage in the household. She sometimes fetches water from neighbours using a wheelbarrow

because of difficulties in walking longer distances. She is aware of water shortage in the country but hopes the government improves the supply in her area.

Woman 8: Middle aged woman who has been enduring water shortage with her family of 4 including a baby since 2002. She and fellow villagers have been in touch with the government and village leaders whenever there is a gathering at Kgotla. She claims the officials are aware of the problem but there have been no improvements. She uses a pit latrine as a source of sanitation. Private borehole suppliers are primary suppliers of water at a rate of P150 ($15) per 2000 litres every week. Water is mostly used for domestic use such as cooking, cleaning, bathing and watering trees. Elder members of the family sometimes avoid taking baths daily to preserve the little they have in the house. She mentioned that access to water from private borehole suppliers sometimes takes longer than two hours. The woman complains about high levels of salts in the water which sometimes causes diarrhoea. During the rainy season, she collects water in the buckets to reduce water shortage in the household. She is aware of the water crisis in the country but hopes WUC addresses the problem in her area.

Woman 9 and 10: Two teachers who share a house and work in one of Primary schools in the capital city. They claim that due to high rental prices and cost of living in the city, they stay in Gakuto. The house has 3 bedrooms with a master ensuite, guest toilet, open plan kitchen, electricity and it is connected to the main water line which also connects to the water system toilet. The two ladies claim they have less experience in water shortage despite water rationing that occurs once in a while. They are aware of water scarcity across the country, however thankful that they have access to clean water in their house.

Woman 11, 12, 13, 14. Relatives living in separate houses in a large compound. The family inherited the plot from their late parents who lived in Gakuto before it was recognised as a small village. They have been experiencing a water crisis for as long as they can remember. Apparently, they access water from private borehole owners but before then, community standpipes in the village were their main water source before they were disconnected by the government. Water in the household is used for daily domestic use such as washing, cooking, drinking and laundry once a fortnight. Rainy season according to them is a blessing because water is collected and stored in buckets. The women lament about high water prices by private borehole suppliers. They claim water is salty and sometimes results in diarrhoea. Although they are aware of the water crisis in Botswana, they hope the Water Utilities corporation resolves the problem around their area soon. The family has one pit latrine in the compound which they use as a basic form of sanitation.

Woman 15,16, 17: Sisters in their late 40s who have been living in Gakuto since the 1990. According to them, they do not have a water tap in the household. They used to access water from village standpipes connected by the government, but they are no longer in use. They access water from private borehole owners because they are still waiting for Water Utilities Corporation to connect water in their plot. Respondents use pit latrine as the basic form of sanitation because they do not have a water system toilet. They mentioned that there have been little improvements so far, but they hope for a positive resolution from the corporation and the government officials who sometimes hold meetings with village leaders to address the problem. They sometimes obtain water from friends and relatives using a donkey cart who live on the eastern side of the village. Water is used for washing, drinking, cooking, cleaning, bathing and laundry. The women sometimes ration their water usage by skipping baths.

Woman 18: A nurse who lives in the Eastern side of the village with her 2 children. She purchased a plot in Gakuto in 2016 because of the proximity of the village from the capital city. Her house is connected to the Water Utilities Corporation water system which makes it easy to access water daily. She uses a water system toilet as a basic source of sanitation. Water in the household is used for

domestic use such as drinking, bathing, cooking, laundry and cleaning. Respondent claims that the water crisis has not been a problem however, she sometimes experiences water rationing. She appreciates that the corporation always makes an effort to communicate with them in case of water rationing to avoid any inconvenience. Although she understands the problem of water supply across the country, she appreciates efforts made by the government to supply her area with water.

Woman 19: A single mother of 4 who lives in the Western side of the village. Her homestead is along the road, just adjacent to the Eastern side. She fetches water daily in buckets from households in the Eastern side using a wheelbarrow. According to her, every day she makes 3 trips for water collection which she then transfers to a 1000 litre jojo tank. She mentions that village leaders and the government are aware of the problem, however there has been little improvements in their area. She uses water for bathing, drinking, washing, cooking, laundry and sanitation. Wastewater from washing dishes is used to water the trees and clean the toilet. She would like to have a water system toilet for easy sanitation access but due to limited water supply, she uses pit latrine as a basic sanitation facility. She is aware of the water crisis across the country and hopes the relevant authority will solve the problem in her area.

Woman 20: A married woman living with her husband and children. Family lives in the Eastern part of the village and have been experiencing a water crisis since 2003. She mentions that they have been contacting the village leaders with respect to their problem, but so far little effort has been made to address the issue on their side. She uses a pit latrine as a sanitation facility because she does not have a water system toilet. She spends around $150 per 2000 litre of jojo tank from private borehole suppliers. She claims that it is her responsibility to cook for the family, wash their clothing and bath children, therefore, the water crisis adds more burden and stress to her than the husband. Water in the household is used for cooking, laundry, drinking, cleaning, and bathing, whereas trees are watered using dirty water from washing. Although she is aware of water scarcity in the country, she still hopes WUC will rectify the problem.

Woman 21, 22 and 23: Youthful sisters who inherited their late parent's plot. According to them, the family has been experiencing a water crisis since they were young. They used to collect water from community standpipes before the government disconnected them. Apparently they access water from private borehole suppliers for daily usage and spend around $150 per 2000 litre of jojo tank. Water is used for bathing, laundry, drinking, cooking, washing and cleaning. Pit latrine is a basic facility for sanitation. One sister lamented that as a woman, their sanitation facility poses a threat to their safety especially at night. They are aware of water scarcity in the country, but they maintain that it is the responsibility of the government to provide them with clean water.

Fig 6: Jojo Water tank used by woman 1 in her yard in a multi residential are (Taken by the author)

Fig 7: Pit latrines used by women 4 and 5 (Taken by the author, 2020)

Fig 8: Water storage containers in one of the households (Taken by the author, 2020)

Fig 9: Donkey cart moving on tarred road in Gakuto, taken by the author 2020

4.3 Secondary Data

4.3.1 Population and Infrastructure

Population of the Gakuto village is slowly increasing because the village is in the outskirts of Gaborone. Apparently, the population of the village is 1811 according to the 2011 Botswana population and housing census report. The digital revolution has changed access information and connect with each other as it offers opportunities to those who use the new technologies. Gakuto has been provided with major telecommunication infrastructure to expand Botswana Telecommunication Services (BTC) network and services. In addition, BTC has coverage on wireless loop service in the villages. The Rural Telecommunications Development Project or Multi Access Radio System has been extended to the village. Telecommunication services have also improved since the introduction of the cellular network companies. (Botswana Population and Housing census report, 2011).

4.3.2 Water Utilities Corporation (WUC)

The Water Utilities Corporation is the main supplier of potable water resources in Botswana. WUC is a parastatal organisation wholly owned by the Botswana Government. The corporation was established in 1970 in terms of section 3 of the Water Utilities Act [Cap. 74:02, Laws of Botswana). In the water sector reforms of 2009, the mandate of WUC was extended to supplying potable water to all urban centres and villages in Botswana. Today, the Corporation is the sole provider of pipe water to households and businesses in the whole country. Furthermore, the reform mandated the Corporation to manage wastewater under the Water Sector reforms Programme The Corporation produces potable water resources through 16 management locations in the southern and northern parts of the country. The objective of the Water Utilities Corporation, as a parastatal organisation, is to plan for a provision of adequate supplies of potable water in all areas of statutory responsibility on a commercially viable basis, including the approved non-designated areas, to meet reasonable domestic, institutional, commercial and industrial demands. This service contributes indirectly to improvement in the standard of living and also plays a catalytic role towards national economic development (Water Utilities Annual Report, 2008). Fig 10 shows WUC pipes in the Western side of the village

Fig 10: Water Utilities Corporation Pipes on the side of the road at Gakuto: Taken by the author 2020

4.3.3 Botswana Bureau of Standards (BOBS)

Water quality standards are designed to provide us with understanding the critical importance of adequate supplies of clean, available fresh water for the environment, the country's economy and the quality of life. In Botswana, the Botswana Bureau of Standard (BOBS) is the organization that is solely responsible for setting drinking water quality standards, guidelines and amendments. Its standards are aligned with World Health Organization guidelines. The guidelines for drinking water quality are used as the basis for regulation and standard setting to ensure the safety of drinking water. Water sources are monitored on a regular basis to assess its quality. There are various variables monitored by the Water Utilities Corporation and Department of Water Affairs to measure water quality. According to the BOS 32:2000, the water quality standards are classified in three categories: Class 1- Ideal, Class 2- Acceptable and Class 3- Maximum allowable standard of water quality. The common water quality parameters important in drinking water, wastewater, and natural water are as follows: alkalinity, ammonia, carbon dioxide, chlorine, nitrates and nitrites, oxygen- dissolved in water, pH, phosphates, temperature and turbidity. Most of these levels allow a sufficient margin of safety. It must be noted that acceptable contaminant levels vary widely among individuals, for example high sodium which may be harmless for many people can be dangerous for elderly, hypertensive persons, pregnant women and people having difficulty in excreting sodium.

4.4 Data Analysis

The analysis was conducted using coding methodologies commonly associated with conceptual framework (Hahn, 2008). It outlines coding of semi structured interviews transcripts. First, participants' experiences with water access and shortage is analysed then an overview of the various coping and adaptation strategies are outlined, as well as women's vulnerability due to lack of water. Women of different age groups and educational levels were interviewed; however, age and educational level were not integrated much in the study.

16-30 yrs	31-45 yrs	45-60 yrs	60+
8	10	4	1

Table 2: Age groups of respondents

Table 2 depicts the number of women who were interviewed according to age group. Significant number of young women were present during the interview as compared to older ones.

Standard 1-7	Grade 8-12	Certificate	Diploma/Degree
1	3	10	9

Table 3: Education status of respondents

Table 3 depicts the number of women who were interviewed according to education level. More women holding higher qualifications were present during interviews

4.4.1 Water Scarcity

The extent of water scarcity in the village was probed through interview questions and compiled in table 4. This includes women's access to water supply, length of water shortage, current improvements and awareness of water scarcity in the country. On the question which prompted the respondent's opinions on whether they are accessing adequate water supply or not, 19 respondents responded with a NO answer and only 4 respondents answered with a YES answer. As for the length of water shortage, duration varies from one household to another, majority of respondents have been experiencing water scarcity for more than a decade and only two experienced improvements since they reside in the eastern part of the village. Over 70% reported experiencing water scarcity, whereas only 4 reported that they receive clean water daily, and over a third consider their water as low or very low quality. Residents living in western part of the village are not connected to the water network, and thus depend on private borehole suppliers. Majority of these householders use pit latrines and only a few have access to water system toilets. Out of all women in households that were interviewed, only 4 have access to water system toilets and 19 use pit latrines as their sanitation facility. Respondents residing in the Eastern side of the village are connected to the WUC water line. All participants are aware of water scarcity in Botswana.

Respondents in the Western side of the village use different water sources for storage to respond to water scarcity. These include the Jojo tanks and water buckets. A total of 19 respondents rely on Jojo

tanks in their households, only 4 in the Eastern side have running water in their yards and are dependent on taps as the main source of water. Water stored in jojo tanks is obtained from private borehole owners.

Vulnerability to water scarcity in this study was determined through interviewing individual households on a number of issues that were examined. Respondents were also asked to elaborate on the different ways in which water scarcity affects their represented households. The results were grouped into various clusters, namely health and hygiene are negatively affected, domestic activities are negatively affected, and daily activities are negatively compromised as well as their daily lives. 20 out of 23 respondents experienced negative health effects and the majority experienced increased stress level. In figure 11, it is observed 19 out of 23 respondents travel more than 1km to water points whereas only 4 access water within a kilometre or less. Majority of participants experience high water scarcity as per Table 1 WHO standards.

Water usage and challenges at household level	Number of respondents with YES	Number of respondents with NO
Sufficient access to water supply	4	19
Significant length of water shortage in the last decade	19	4
Current water access improvements (easy access)	4	19
Awareness of water scarcity in Botswana	23	0
Respondents using pit latrines	19	4
Respondents using water system toilet	4	19
Respondents with water taps in the yard	4	19
Respondents using jojo tanks for water	19	4
Reuse of water at household level	22	1
Negative effects on health	21	2
Negative effects on hygiene	21	2
Affecting daily domestic water activities	18	5
Increased stress level	22	1

Table 4: Household water use and challenges by respondents in Gakuto

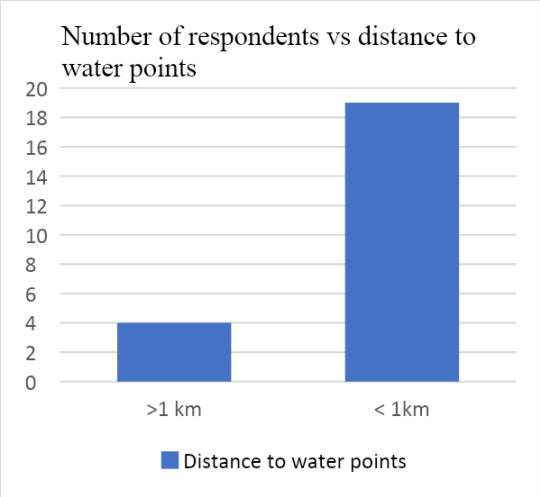

Fig 11: Distance travelled by respondents to access water at different points

4.4.2 Adaptation and coping strategies

A number of adaptation strategies are employed by women at a household level to protect themselves from exposure to water shortage as well as lessen its impact. Some participants highlighted that rainwater harvesting during the rainy season enables them to increase water access. Another coping strategy adopted by households is getting water through their social network, including friends and relatives. Storage of water in tanks and buckets is another mechanism used in adapting to water scarcity. The table below illustrates how the majority of strategies employed by households are reactionary. Out of 23 participants, 22 reuse water such in watering of plants, washing of toilets and cleaning of the house. Almost half of the participants use rainwater as an adaptation strategy, mainly during the rainy season. 10 participants access water from friends and relatives who live in the Eastern side of the village. Less than half of respondents have changed their daily usage routine to conserve the little they have at household level.

Adaptation and coping strategies	Number of respondents with YES	Number of respondents with NO
Reuse of water at household level	22	1
Rainwater harvesting	12	11
Alternative water sources	19	4
Social networking to access water	10	13
Changing water use routine	7	16

Table 5: Adaptation and coping strategies by respondents in Gakuto village

5. Discussion

This chapter is a discussion of the results of the household survey that was conducted on 12 households in Gakuto village with where 23 women were interviewed. This research looked into current access to water resources, in order to understand how rural household water usage is affected by limited access to water.

Study found that majority of participants in the Western side of the village have limited access to clean water. This outcome is supported by previous findings that the majority of people without access to adequate sanitation and safe drinking water are vulnerable groups living in poor informal settlements, mainly consisting of poor women (Statistics Botswana, 2014). The length of scarcity for the majority of women interviewed exceeds a decade, reflecting that the village has been experiencing water shortage for long periods. The evidence is supported by Colman (2013) who indicated that the problem of water scarcity, and by extension disrupted potable water supply, is widespread across Botswana. Based on the current improvements, the majority of respondents have experienced little or no improvements of water supply in the area. However, they are very much aware of the water crisis across the country. Concerning sanitation issues, lack of water access has greatly compromised sanitation of women in Gakuto because the majority of households use pit latrines instead of water systems. Pit latrines expose some of them to danger by compromising their safety at night when they have to leave their houses especially during night.

Women in the village use water for their various activities namely cooking, washing, cleaning and bathing. The literature has long established that women have disproportionate responsibility for water-related housework, and this was also clearly the case in the village. Findings also reveal that some respondents have changed their daily routine such as bathing once a day to conserve the little that is available. Health challenges related to drinking water from private owners that is not accorded with Botswana Bureau of standards is of concern amongst the respondents. Also, water shortages have resulted in social exclusion and embarrassment where some people changed their bathing routines to skipping showers. Findings from interviews also reflect deprioritisation of laundry which contributes to poor hygiene practices. The findings are backed up by previous studies which highlight that scarcity poses a hygiene threat to women. According to (Botswana Water statistics report, 2011), water scarcity is a threat to human health, personal hygiene, water borne illnesses and hard hit on women who are socialized to serve as caregivers for all family members. Culturally, water shortage threatens hygienic practices in that there is overall pollution and lack of personal and environmental hygiene. Study also shows that easy access is the main issue considered when people are looking for and collecting water for domestic use. This is because easy access helps to save time since one does not have to walk long distances to collect water, neither wait in long queues.

Research shows that women have prioritised several adaptation and coping strategies at household level such as storage of water in various size containers. With that in mind, while the affected interviewees all attribute their health challenges to poor quality of the water, other potential sources of contamination cannot be excluded. Majority of respondents do not use tap water, rather jojo tanks for storage, which increase the risks of water contamination. Those who rely on Jojo tanks are displeased with having to turn to Jojo tanks for water. They have expressed negative impressions about water from the Jojo tank. Most respondents are suspicious of the quality of water from Jojo tanks, and believe water does not meet criteria set by Botswana Bureau of standards. According to Griffiths (2018), water contamination is likely to occur at household level between point and source of use. Consequently, a case can be made for the importance of an exploration and relationship between the coping strategy of decreased hygienic practices, the coping and adaptive strategy of water storing and water related health challenges in future research on adaptation to water shortage. The results of such research may furthermore challenge the current perspective of this research of anticipatory water storage as an adaptive strategy.

According to the WHO standards areas with access to water of more than 1 km more than 30minutes of the total collection time pose a great threat to human health. This likely results in low volumes of water collected per day and often compromises hygiene practice and basic consumption. (WHO, 2015). Over 80% of participants in the study travel more than 1km to access water. It is significant that the majority of respondents have little access to clean water which has a negative impact on their status because they are responsible for collecting water. This is because they always have to travel a distance of more than 1km to collect water from private borehole owners or relatives. The means with which they transport water to their households raises more concern especially on water quality.

Although ethnicity was not integrated in the study, the research generated new findings because according to the Chief, the Bakwena ethnic tribe originated in the village. Some respondents however highlighted that they were allocated land in Gakuto although they come from other tribes. Other ethnic groups purchased land because of its proximity from the capital city. This reflects that the village has multiple ethnic groups. It should be noted that respondents did not show any difference in terms of responses or vulnerability and adaptive capacity.

Several limitations should be considered when interpreting this study's findings. The relatively small sample size is likely to increase some misconceptions of water scarcity in the area. Also, due to limited transport in the area, the researcher was walking from one residential area to another. The sample population is concentrated on the Western side of the village and only few women on the Eastern side were interviewed. Despite these limitations, this research makes an important contribution to the growing literature on water insecurity and gender.

6. Conclusion

Study has shown that respondents living in the Western side of the village face water scarcity as compared to those dwelling in the Eastern side as a result of the limited or no water supply by Water utilities Corporation. Furthermore, the study shows that women are vulnerable to water scarcity as a result of their social status. Respondents have further pointed out that, as a result of their social status, they are vulnerable to water scarcity. These women are particularly prone to health problems, wasted time and energy to collect water, and are mostly spending more money on water services for household chores. The study has, in addition, demonstrated that over the years women have developed coping strategies in order to adapt with water scarcity such as rainwater collecting, changing water routine, social networking to access water and reuse at household level.

Water provision in the Western side of Gakuto has been a thorny issue for more almost 2 decades. What is impacted negatively by the lack of water was also probed and the findings showed that the women are sitting with many challenges of which some of them are life threatening. For example, the respondents alluded to drinking salty water, buying water, lack water for bathing, washing and poor sanitation access. The main challenge faced by women is the distance they travel to access water. Over 80% of respondents walk more than a kilometre to collect water for their daily use which in turn end up compromising their health and access to sanitation.

Findings emphasize the importance of equitable and universal access to water as articulated in the Sustainable Development Goals. Women are the primary bearers of household duties in Gakuto and throughout most of sub-Saharan Africa, meaning that they bear the burden of water collection and psychological distress resulting from poor, intermittent, and seasonal access. Additional research on how to improve water, sanitation, and hygiene programs to accommodate the needs of women is urgently needed.

Sustainable Development Goal target 6 was designed to improve water access to all including vulnerable groups. An inclusive and participatory approach is necessary in order to create water solutions that work for each specific community or region, realizing that different communities and geographic regions have differing needs. In order for local water governance solutions to be effective, it is crucial that a gendered approach is utilized to empower women to actively participate. In most rural households, the burden of ensuring enough water is available primarily falls on the women. It is very common for marginalized groups such as women to be excluded from community water management which reinforces social inequalities of water.

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Appendix 1

Interview guide - Chief Abdulah Boikotlhao Letlamma

Date: 20 February 2020

1. Can you briefly tell me the general overview of the village?
2. Do you experience water shortages in Gakuto? If yes,
3. How long has the village been experiencing this water shortage?
4. Who have you contacted with respect to this problem?
5. What are the responses of the government officials?
6. What are alternative sources of water supply?
7. Have there been any improvements since the problem first surfaced or has it worsened?
8. Are you aware of water scarcity issues in Botswana?
9. What is your suggestion on solving water shortage in your area?

Appendix 2

Interview guide - Residential interviews

Gender: Female

Age

1	2	3	4
16-30	31-45	45-60	60+

Education:

1	2	3	4
Grade 1-7	Grade 8-12	Certificate	Diploma/Degree

1. Do you experience water shortages where you live? If yes,
2. How long have you been experiencing this water shortage?
3. Who have you contacted with respect to this problem?
4. What are the responses of the government officials?
5. What are alternative sources of water supply?
6. Have there been any improvements since the problem first surfaced or has it worsened?
7. What do you consider your basic needs for water? What is essential that you use water for?
8. What do you use the most water for? How do you prioritize water use?
9. If the price of water increases, how would you react?
10. Are you aware of water scarcity issues in Botswana?
11. How do you cope with water supply shortages in your area?
12. What is your suggestion on solving water shortage in your area?

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