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Examining what impact the lived experiences of the Chuth Ber community have on the re-contamination of healthy drinking water in the home

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Examining what impact the lived experiences of the Chuth Ber community have on the re-contamination of healthy drinking water in the home

Master Thesis

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Abstract

The local Chuth Ber residents have a water kiosk in their community delivering clean drinking water thanks to the partnership between the SWAP Kenya organisation and the University of Illnois, Chicago and Jaramogi Odinga Oginga University of Science and Technology (JOOUST). A success story in so many ways, however despite an innovative solution producing healthy drinking water, this interdisciplinary study examines the different opportunities and reasons behind re-contamination of this water taken from the Sola Maji kiosk, whether at the collection point, while being transported or within the confines of the home. Based on confirmed evidence of drinking water re-contamination, research through ethnography, interviews and focus groups, aimed to understand from a bottom up approach about the lived experiences of those selling, delivering and managing this water in this peri-urban community outside Kisumu city, Kenya. This research was conducted through the participation of the local community including the water kiosk manager, the boda boda water delivery riders and two focus group studies consisting of the ladies that manage water in the homes, and the findings were examined using an interdisciplinary approach through the lens of anthropology and communication. The findings demonstrated how an innovative solution has vulnerabilities when the environment and the local people themselves, are not fully considered from particular perspectives. Additionally, evidence emerged that the importance of understanding the lived experience of the participants delivering and managing drinking water must be factored into such solutions in order to achieve a fully sustainable success story. The aim of this research was to add context and insight into the re-contamination occurrences, in order to consider mitigation where possible for the future planned expansion of the Sola Maji kiosk projects around Kisumu city in Kenya. This in turn is also relevant to other water kiosks in Kenya that operate in a similar manner in peri-urban communities similar to Chuth Ber.

Keywords: lived experiences, re-contamination, drinking water, Kenya, communication

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1 Introduction

It is a natural human tendency to take for granted the familiar aspects of our environment, and the amenities available to us. From a young age when I was physically able to turn on a tap for fresh water, I assumed that this was a universal experience for all children. I remember the excitement of using a garden hose to water flowers and the fond memories of walking ten minutes to a nearby stream to bathe in its clear water during warmer days. Growing older, we become increasingly aware that other people's experiences differ from our own, and for some, it is significantly different. Realizing that something as simple as access to healthy drinking water from a tap is not a norm, is one of the many revelations we learn as we expand our knowledge, travel more extensively, and engage with diverse individuals. This awareness highlights the stark contrasts that exist outside our own familiar world or 'bubble'. Fast forward from that young girl to a student looking through a global lens, realising that at least two billion people worldwide do not have access to safe drinking water due to some form of contamination, accounting for one out of three rural dwellers (Pichel et al., 2019). The World Health Organisation (WHO) have shone a light on this major gap in the supply of clean drinking water in various world locations, and highlighted specific focus on rural areas (World Health Organisation, 2015). Research on drinking water has typically covered a broad range of topics, reflecting the various challenges and priorities associated with water quality, access, and management. Topics including types of contamination, urban and rural disparities, infrastructure impact, treatment technologies and innovation, sustainable practices, health impact, climate change considerations, government interventions and socio-economic factors are all of great importance to understanding the playing field around this subject.

There is no one singular reason that can be attributed to why one community falls into the statistics from the WHO and why others do not. Each community has nuanced reasons behind the quality of their drinking water and indeed if they have access to healthy drinking water in the first place. Fortunately, I had the opportunity to be part of a research project about drinking water in a small peri-urban region outside of Kisumu in Kenya. Three years prior to my journey there, in 2020, WHO/UNICEF had published a report and according to their Joint Monitoring Programme they stated that 52% of Kenyans in urban areas had 'basic' drinking water services which was defined as a less than 30 minute round-trip journey to an improved water source (Musonge et al., 2022). Specifically in and around the city of Kisumu, Kenya, life is significantly impacted by challenges related to drinking water. The city, situated on the shores of Lake Victoria, faces frequent water shortages and contamination issues. Despite the

proximity to Lake Victoria, this remains untreated water, similar to the boreholes that are commonly dug in this region. Both sources need to be tested and regularly treated for safe consumption. Harvesting rainwater is another option for locals, however the dry season in Kenya means this supply is inconsistent, and storage can be an issue. In the urban regions, there is access to piped water for some home owners, however reliability of supply and infrastructure can impact. Alternatively the option of buying water from kiosks is widespread, however proximity to those kiosks in peri-urban and rural regions presents a big gap especially for those with no transport, a lack of time to cover far distances, and economic means. Thus overall, many residents rely on untreated water, which exposes them to waterborne diseases such as dysentery, cholera and typhoid. Inadequate infrastructure and poor waste management exacerbate the problem, as sewage often leaks into water sources. These conditions force families to spend considerable time and resources obtaining safe drinking water, with the necessity to boiling or treating the water themselves. Options such as purchasing bottled water, using filtration systems, or purchasing water purification products, all adds financial strain. The constant threat of illness and the necessity of securing clean water heavily influence daily life, affecting work, education, and overall health and well-being. These are all important factors to share in beginning to understand Kenyan's relationship with water.

With these current conditions around drinking water quality and availability, Kisumu has been a location for research on drinking water solutions. One such project is centred around the Sola Maji water kiosk, in Swahili meaning Solar Water. This is an ongoing partnership primarily between the University of Illinois Chicago (UIC), School of Public Health along with Safe Water and AIDS Project (SWAP) in Kisumu, Kenya. SWAP are a non-profit organisation that drive numerous public health programs in and around the Kisumu area (Safe Water & AIDS Project, 2022). This project, engineered by UIC, focused on building solar-powered water treatment stations (or kiosks) near river water sources to produce clean drinking water in rural locations across Kisumu through a process of ozone disinfection, or ozonation (Dorevitch et al., 2020). By 2021, success had been achieved by way of supplying 1,000 refills of 20L jerrycans of water per month, with clean drinking water produced from the Sola Maji kiosks in line with WHO and KEBS (Kenya Bureau of Standards) drinking water standards (Dorevitch et al., 2021). Dorevitch's evidence and testing at the SWAP Kisumu water testing labs showed that the water quality improved significantly through the process of ozonation they used with the solar powered solution. With two kiosks up and running successfully by 2023, further research began in January that year, which investigated drinking water stored in the home. Part of the results showed occurrences of recontamination of healthy Sola Maji water in the home

which was purchased in the Chuth Ber community at the kiosk. These results were the springboard of my specific research.

Figure 1. Mugruk River in Kisumu West Sub County, in Chuth Ber.

My research examines what happens to drinking water from the kiosk point of sale onwards and what activities or conditions were creating opportunities for re-contamination. We firsthand witnessed a solution in a community that was successful up until a point where healthy water flowed from the kiosk taps. Thereafter the lived reality of the locals led to scenarios that allowed for a threat to this being a full circle robust solution. Through ethnography, interviews and focus group sessions with locals, I identified gaps including the water distribution model, the consideration of the lived experience of the community who would transport, store and consume this water, and indeed elements of communication as factors that needed further consideration in order to close the gaps, if possible. This study was viewed in a multi-disciplinary nature, through the lens of anthropology and communication in consideration of how I witnessed life in this peri-urban region as a student researcher.

From an academic standpoint, this research aimed to build upon the work by the SWAP Kenya in partnership with University of Illinois Chicago School of Public Health. This focused, value-added research on water management in the home first hand was something that was yet to be explored in detail. This research would produce real data derived from first hand lived experience observation. In this smaller peri-urban location, it's is a reflection of many similar communities that source water from kiosks around Kenya and live in similar fashions or environments. For this society, the understanding of the impact and incidents of re-

contamination is not always shown to be understood in depth from a cultural anthropological and communication lens. Understanding the gaps and preventative measures are key to sustainable solutions that work for the communities where they are introduced in. The impact of any successful solution that supplies healthy drinking water in a Kenyan community, in turn has a positive impact on the health and well-being of the residents.

Any solution to produce healthy drinking water needs to become effective by considering several factors. One such factor includes identifying any barriers within communities where the locals are naturally involved in the water collection, distribution, water management behaviour and practices in or around the home. While knowledge allows us to learn about these nuances, it is through lived experiences that we can genuinely attempt to understand and appreciate the profound differences in people's lives, cultures, and daily practices from one location to the next. A solution for one community may not work for the next. Thus, the research question to be answered is the following: *In what ways does the lived experiences of the local Chuth Ber community outside Kisumu, Kenya impact how healthy drinking water from the Sola Maji kiosk may become re-contaminated during the process of collection, transportation and/or managing this water in the home?*

2 Drinking water in Kenya today

Each year, Kenya Water and Sanitation Civil Society Network (KEQASNET) publish a yearly report regarding the Kenyan water and sanitation sector. The content is made up of contributions by civil society organizations (CSO) and social enterprises (SE) working in this sector and gives a picture of the challenges and the progresses being made in Kenya around Water Resources Management (WRM) and Water, Sanitation and Hygiene (WASH). The 2021/2022 latest published report itself admits that Kenya is falling behind on meeting targets for the sustainable development goal 6 by the 2030 target, despite CSO and SE projects directly contributing to the achievement of these goals (KEWASNET, 2022). The report also states that much of the input from CSOs and SEs are based on rural regions, that being their particular focus filling the gaps on water supply issues where there is less attention from government and county level. They suggest that more partnership and communication between CSOs, SEs, government and county including sharing information and resources could be of mutual benefit. Looking towards government on the topic of water, only in 2018, Kenya has created the Ministry of Water and Sanitation with the aim of a universal access to safe and sustainable

managed water resources and sanitation. In regards to policy, Gachenga (2019) delves into the Water Act of 2016 in Kenya which states that all Kenyans have the basic human right to clean and safe water in sufficient quantities and to the right standards. This is not to suggest that Kenya is only just in recent years focusing on water and sanitation. Gachenga states that many policies have been in place, but some needed refreshing, and that within the country, there is concern that this latest water act is just a replica of the 2002 Water Act with the loudest critics being the county governments. There are concerns that there is a lack of a successful framework around water and sanitation in Kenya, and the Water Act 2016 stipulates that the national government are the custodian for water resource governance. It is a nuanced subject especially when we consider county to county, in Kenya differs vastly in water supply, population, terrain, agriculture and economy. Thus, more cooperation is needed between the government and the specific counties in which to understand the challenges and primary gaps and align better policies to address water challenges. There is much literature suggesting the lack of action on the Kenyan water crisis by government, however there are some initiatives ongoing to close the gaps, albeit coming from different silo solutions.

One such solution in Kenya is infrastructure development and strategies around improvements, including the construction and maintenance of boreholes, piped water systems, and water treatment facilities. The European Investment Bank is backing initiatives to enhance piped water supplies throughout the region (EIB, 2020). In 2020, they approved a €35 million loan to support a €70 million initiative aimed at improving water and sanitation in Kisumu. This includes the expansion of the water pipeline network and an upgrade of the sewer system in Lake Victoria area to combat the raw sewage flowing into regions around Kisumu. In addition, Agence Française de Développement and the European Commission are financially supporting this undertaking. Another initiative from 2013, the Kenyan government developed the National Water Master Plan (NWMP) with focus on the creation of small dams and water pans around Kenya by 2030 but more specifically in arid and semi-arid locations (OAG Kenya, 2023). From an audit of this initiative in 2023, the findings were that aspects in the planning, implementation and monitoring of these projects had gaps in collaboration between the parties involved.

In Kenyan cities, aspects such as population growth, climate and demand from industry increases focus around safe drinking water supply (Mulwa et al.,2021). In Kisumu alone, the population growth since 2020 has increased by approximately 3.4% year on year (Macrotrends, 2024). In 2019 the national census recorded a population of 1.156 million in Kisumu County

thus these percentages equate to a real urgency to keep up with demands around drinking water access and availability for the annual rate of growth. In the 2020 WHO/UNICEF report, we learn that in Kenya, 87% of urban dwellers have access to basic drinking water services with 58% having on-premises water sources. In comparsion, 52% in rural areas have access to basic drinking water services, with 23% having on-premises water sources (Musonge et al., 2022). This does not include arid or semi-arid areas and bearing in mind that 85% of Kenya's lands are classified as fragile arid or semi-arid, we can conclude that there are massive water challenges in this country.

Research on drinking water contamination issues in Kenya, within literature are commonly accompanied by statistics on children's mortality rates due to diarrhoea and data on rural communities health (Mulwa et al., 2021; Ananga et al., 2017, Kremer, 2021). Thus there is a prominent focus on water quality and contamination. Mulwa et al (2021) outline the population growth factor in a country defined as 'water-stressed' meaning per capita the water availability is below 1700m^3 per year where Kenya is 1000m^3 annually. With the factors of an inadequate wastewater system, they advocate for better understanding of the water crisis, and of the real scarcity. Armed with better knowledge, this would mean a better examination of solutions in water management and better policy and regulations. They argue that this is a key area to examine including strategic planning, accounting for climate change, the response to sustainable development goals and the challenges of contamination and scarcity of drinking water in Kenya.

According to the guidelines on drinking water quality in Kenya there was an increase for individuals using healthy drinking water from 2016 from 68.8% up to 72.4% in 2019 (Government of Kenya, 2020). The reason behind this they mention is driven by national and county government water supply schemes. However, the necessity for clean and uncontaminated water supply has encouraged a focus on more sustainable solutions in Kenya to be provided for the millions who still remain at risk (Cherunya et al., 2015; Machado et al., 2022; Otundo Richard, 2022). Focus still remains on advances and improvements in sustainable and safe drinking water technologies especially around decentralised systems, chlorine dispensers at water points and water purification tablets (Kremer, 2021; Qi et al., 2019). According to Mwihaki (2018), the role of decentralisation in Kenya for drinking water supply and sanitation services when done well, shows great results in terms of efficiency and effectiveness for water services delivery. Also mentioned is the need for policy revision and the focus on stakeholder participation in which to attain a sustainable water management

solution. Mulwa et al., (2021) examines the water scarcity and Kenya's low supply of renewable fresh water, and argues that advancing technology solutions will add to a sustainable way to manage water and the supply of drinking water to homes in Kenya. Ananga et al., (2017) and Talukder (2012) argue that buy-in, adaption and participation from local communities is a contributing factor to success in water management and adaptation of solutions. Specifically, Ananga et al, (2017) studied water handling hygiene practices in four settlements in Kisumu, Kenya and showed that where there is community participation in such projects, this has had an improved impact on fewer water borne diseases and hygiene of potable drinking water in these homes. Overall, with community-based solutions, and local engagement involved in managing and maintaining water resources, this has proven to be more successful. The bigger question in Kenya's race for healthy water, are the people's needs being examined thoroughly in which to align realistic planning and co-operation in order to solve such a complex topic.

Overall, there is a multifaceted approach in which Kenya is tackling the challenges of providing healthy drinking water to the population today, combining research, innovation, community engagement, and policy development. The national and local government along with NGOs and international organizations do indeed collaborate on research projects to an extent, addressing various aspects of water access and quality, with bigger players such as UNICEF, World Bank, and Water.org having keen interest in Kenya. Institutes such as the Kenya Water Institute (KEWI) conduct research and training in water resource management. Many universities such as Jomo Kenyatta University of Agriculture and Technology (JKUAT) focuses on technological innovations in water purification and management. With the large population of Kenya relying on water for agriculture and farming, the impact on livestock and farming communities in Kenya today is high risk. The International Livestock Research Institute (ILRI) carries out research on the impact of water quality and water scarcity on agriculture and livestock. With a focus on climate change, rainfall patterns and the changes impacting Kenya, in recent years this is a significant topic under consideration. It can be concluded that in a country where there are varying challenges to meet adequate and healthy drinking water supplies for it's population, Kenya has some complex times ahead in which to combat the water crisis that persists today in both urban and rural settings.

3 Theoretical Framework

3.1 Lived experiences with water

Chandler and Munday (2011, p.243) describe the concept of lived experience, as "personal knowledge about the world gained through direct, first-hand involvement in everyday events rather than through representations constructed by other people". Factors such as thoughts, feelings, opinions, attitudes make up one's lived experience, while factors that affect lived experience is age, ethnicity, gender, how long you live in a certain place and socio-economic factors. The lived experience conceptual frame contributes to knowledge from first hand involvement in real events, conditions, and make sense of real experiences. In understanding lived experiences of a group or an individual, people, organisations, governments and such can tailor governance, products and initiatives to meet specific needs.

According to Coulter et al., (2018), 75% of women manage water in the homes around the world. In focusing on their lived experiences with water, there is a strong societal aspect for women having an impact on their day to day activities. According to Sultana, 2009, the focus on the lack of drinking water is a crucial aspect of daily routine, and it plays a central role in cultural practices and indeed a sense of self. Departing from the global lens, Sultana mentions water scarcity having become a gender issue as females manage water, thus the women and girls are burdened with this pressure and the responsibility towards their family every day. It is highlighted also that outside of gender, water is also intersectionally experienced differently depending on region, class, and race, thus the lived experience around water is very different from one group to the next. The fetching of water in a rural community can mean the difference between a girl going to school or fetching water two hours away, or women missing out on certain activities or jobs due to the reality they live in being responsible for water management at home. In research done in Uganda regarding the sourcing of water options, it was discovered that women used unprotected water sources as they were "more permanent and reliable sources of water" but mainly it was about the proximity and access (Fagan et al., 2015). These are some of the choices that women need to make daily.

In research by Collins et al., (2018) on water scarcity near Lake Victoria in Kenya a study was carried out on the lived experiences of water acquisition, prioritization, and use among women. Using a mixed methods approach it was found that women experienced the effects of water insecurity in four ways, those being physical and psychosocial health, nutrition,

and also economic wellbeing. They re-iterate that 'women's work' does not stop for heavily pregnant women, or those who have just given birth. In some other societies, men may temporarily step in to support home activities around this stage, however in Kenya it can mostly falls to female neighbours or other female family members to assist with water sourcing during times when women are incapacitated. Men will only engage in water fetching if it were for reasons to do with their livelihood such as livestock, or washing machinery as examples. With this strain on women to secure water, there is an understanding that in time of water scarcity, women will take water from untreated sources if they need to and have no other choice due to constraints around, low supply, time, and money reasons.

In a study outside Nairobi, Robinson et al., (2022) examine the real effects on people living with water insecurity in areas prone to environmental change and unpredictable climate, thereby impacting income and their ability to make particular household choices. The knock-on effect to this community's physical and mental health is examined. They described where a lack of water can lead to conflict between people and organisations who fight for access in a world where there is sufficient supply for the global population, however unevenly distributed. In the home, a decision on using the remaining water that is there for cooking purposes, or for personal hygiene is a day to day norm for some. In some cases these decision will be determined overall by income in the home, and thus everyday practices around water will vary accordingly. This is the lived reality for this and many other similar communities.

As an outsider, when engaging with local people about local water solutions, considerations should be made to examine the local situation and lived experience from the culture, behaviour and health standpoint (Merson et al., 2006, p. 42). It is deemed necessary for success that the insider view is being accounted for so that innovations and adaption work successfully within a particular cultural context. Adu-Ampong and Adams, (2019) use this insider-outsider concept to highlight positionality in field research between Ghana and Malawi and as such this positionality aspect will materialise when water innovations reach on-the-ground trial phases. From their findings, it is suggested that fluidity and negotiating the positions of all involved in fieldwork is necessary on both sides of the encounter. Only an appropriate strategy will bring success and aid behavioural change according to Merson et al. (2006). Part of these strategies would only benefit by encompassing the insider-outsider concept at all stages.

As illustrated, the application of lived experience theory outside of the actual importance of research, encourages looking at different fields from a key perspective. It is

necessary to utilize insights gained from understanding people's lived experiences to tailor interventions, services, policy and government strategies and with individual, community or social needs at the forefront. This personalized approach not only improves outcomes but also respects and validates the experiences of those involved. In turn this can equate to a deeper sense of trust and cooperation between organisations and their communities. In sum, the theory of lived experience enriches both theoretical understanding and practical application, with an impact on both personal and collective social outcomes.

3.2 Community behaviour change

Celestine (2021) describes human behaviour as learned behaviour, and normally something which is highly ingrained to the point where people can behave automatically in a way without thinking. On one hand, this would seem to then pose a real challenge to attempting to undo, or change behaviour. However, there is a school of thought that behaviour can be unlearned and replaced by new behaviours. Because behaviour is observable and measurable then those deemed unacceptable, or harmful, or not serving a purpose, can thus be unlearned. Its is also argued that small changes can have a major impact on health and life expectancy.

As water becomes scarcer, understanding how communities adapt behaviour is crucial. This may include shifts in household water management through changes in weather with rainy season seeing lower traffic at kiosks despite people knowing the rain water untreated. However, this can be seen to be an economic trade-offs that families make between free rainwater which may be contaminated and in affording clean water from a kiosk

Indeed water innovation has led to behavioural change in communities in certain ways whether that change refers to how famlies source water, how much they pay for water or how they use water in the home. Keeping in mind the viewpoint of the communities who experience a lack of healthy drinking water, the success rate of water initiatives will only work with a certain level of buy-in, adaption and participation from local communities. (Ananga et al., 2017; Talukder, 2012). These community behavioural changes can be impacted by something as simple as water taste. UIC School of Public Health (2021) found in their research that the dislike of the taste of chlorine tables added into their water impacted some people, thus some choose to drink the contaminated water from rivers and other sources. Ching (2016) found in studies on recycled drinking water, that despite this solution being one of the least implemented solutions, albeit well proven to work, the taste of this water had an impact on the uptake and

change in behaviour in drinking this water. They referred to this as the 'yuck factor'. Understanding any impact to people or family behavioural change can shed light onto factors that may impede adoption of products. It takes time to change behaviour, and aspects such as understanding the cultural and social activity around fetching water within a community is an example of one of the more important considerations. Looking at the sustainability of water management and water innovation, these are both more likely to be successful within communities where they are introduced in conjunction with the local women from the household. Keeping in mind the concept of lived experiences. Merson et al., (2006, p. 8) ask us to consider barriers that may block behaviour change and the adoption of new ways of functioning in the home, referencing impact to the daily routines, and the time in the woman's day that is dedicated to fetching water. Mutua & Kiruhi, (2021) writes about decision makers in groups and their attitudes around governance at grassroots level. Their research in Kenyan rural communities show that the local elders play an instrumental role in the process of behaviour change, and elders involvement has major impact on mobilization and adaptation aspects for other community members.

One of the biggest experiments on behaviour change was witnessed during the COVID pandemic. One of those covid studies carried out by Robinson et al., (2022) addressed change in hygiene behaviours from December 2019, September 2021 and March 2022. Evidence did show behaviours had changed, especially in the early stages due to increase in resources at community level. More frequent handwashing was noted at handwashing stations, including changes in mask wearing and social distancing. However, by late 2021, many participants had returned to their former behaviours. What had been impacted was an increased knowledge of the importance of hygiene and hand washing. In addition, the returning to old behaviours was affected by water collecting strategies for women. They being responsible for the provision and collection of water, reverted to gathering less water as it is labour-intensive. Often people opted for fetching water from the closest water source, even if it was lower quality water.

Behavioural frameworks were developed by the World Bank's Water and Sanitation Program, one being FOAM (Focus on Opportunity, Ability, and Motivation) for handwashing, and SaniFOAM for sanitation behaviours (Coombes & Devine, 2010). This frameworks helps in designing, implementing, and evaluating interventions aimed at increasing the prevalence and consistency of handwashing behaviours. There are three main areas examined, namely opportunity to improve a particular behaviour, ability to change behaviour, and motivation to change behaviour. Attributes that are determinants to this are for example comfort,

convenience, and smell. Willingness-to-pay, particularly for sanitation improvements, is seen as a critical component of motivational determinants. Frameworks such as these, are necessary to target key behaviours, improve design and enhance effectiveness to facilitate behavioural change.

Individual behavior is not solely based on independent decision-making, especially in developing countries where extended family households can include three or four generations of women under one roof Figueroa & Kincaid (2010). In these scenarios, familial communication and adopting family practices and beliefs is strong. Research into health behaviours, such as contamination behaviours and water treatment methods must account for the influence of both household and family members alongside the individual .

3.3 Communication about water

Studies show that the perception of water quality significantly influences the adoption of water treatment solutions. If people do not perceive their water as contaminated, they are less likely to adopt purification practices, even when these are available and affordable. Communication and education about water-related health risks are crucial for the acceptance of water treatment methods. Educational interventions that increase awareness about water contamination and the benefits of treatment are critical. Research indicates that continuous education efforts increase the long-term adoption of water purification methods. Programs that include community participation and leadership, demonstration projects, and regular follow-up are more likely to succeed.

Figueroa & Kincaid (2010) crafted a communication model aimed at enhancing water treatment and safe storage practices. According to their model, interventions impact behavioural outcomes through various multi-level intermediary outcomes. At the individual level, the framework categorizes outcomes into cognitive elements, emotional factors, and social interactions. At the household level, factors such as time management, decision-making practices, and household income are considered. No models are perfect, however at the community level, when the model focuses on community action and resources, along with community cohesion, and leadership, it was found to gain success. An interesting take away from Figueroa & Kincaid, is that communication around safe water and hygiene should not be an after-thought or a final step in planning. The communication model and implementation

should be a primary step in planning and be integrated in any water initiatives in a thoughtful and deliberate way.

In attempting to communicate best practices to children, this can effectively be done through education and include school initiatives where possible. Graves et al., (2012) outline a study that aimed at improving children's approach and behaviour in handwashing with the aim to reduce disease and ultimately improve survival in Kenya. The study involved training teachers across 51 schools and installing hand wash stations. To encourage children in this activity, they included a visual aid (poster) competition themed "Handwashing with Soap, at School and at Home." While this study resulted in improvements in handwashing, it was not clearly determined if the development of the poster by children had an impact. However, the poster activity did raise awareness about handwashing from the onset. Another factor mentioned was while it is possible to use communication effectively about handwashing, a success factor is the presence of soap and clean water from the onset in order to wash hands.

According to Ngigi & Busolo, (2018) behaviour change communication is only effective when the correct strategies are implemented for the right audience. There are several different approaches to take with models of communication when promoting positive health behaviours. The different communication tools vary from face-to-face, TV, radio, social media, email and posters. The tailored content of the communication is just as important as how to convey the message, or what message to convey. For example how you communicate to a community with a lower level of literacy will be shaped differently if communicating with medical professionals regarding the transfer of bacteria in the home environment, as opposed to a hospital environment. The findings also share that despite different groups with the communication chain, all stakeholders should be involved in said communication efforts for maximum impact.

The concept of framing, according to Rothman & Salovey, (1997) is very important in health-related communication. Therefore, how information is presented to us impacts our decisions and choices. Effective framing goes hand in hand with knowing the target community in terms of demographics, literacy, education and thereby framing communication accordingly. Framing messages around the benefits or drawbacks of specific behaviours can be most effective and impact significantly in decision-making around health and well-being. Context is important in framing suggesting that effectiveness of communication framed positively about what you may gain, or negatively, about what you may loose, also varies depending on whether the behavior is aimed at detecting illness or promoting health.

4 Research Methodology

Multi-disciplinary research

As a master's student in African Studies, we examine research topics from various perspectives to enrich the process and deepen our understanding. A multi-disciplinary approach reveals interdependencies related to context, culture, or socio-economic factors, enhancing both academic inquiry and practical relevance. My research on drinking water re-contamination integrates the disciplines of cultural anthropology to understand individual and community behaviours, and the discipline of communication to assess societal impacts. The communication discipline explores how communication processes influence individuals, organizations, and societies, driving social change and contributing to the social sciences.

Research Design

Epistemology, ontology, and methodology shape research approaches. Ontology addresses the researcher's view of reality, epistemology concerns knowledge acquisition, and methodology focuses on data collection and processing. Recognizing reality as socially constructed, researchers may adopt a constructivist ontology and an interpretivist approach, viewing knowledge as subjective and culturally influenced. Specifically for my research, ethnography, interviews, and focus groups were used to explore participants' experiences and meanings. This qualitative research, being inductive, interprets the world through people's perspectives (Bryman, 2015). According to Flick (2009), this approach is essential due to social changes and diversification, enabling rich data collection in Chuth Ber, aiding comprehensive understanding and theory building to answer the research question.

Study Site – Chuth Ber

Figure 2. Chuth Ber located in Kisumu West Sub County

The SWAP Kenya organization, headquartered in Kisumu city, facilitated this research. The study site is in Chuth Ber, a peri-urban area 45 minutes from Kisumu, located in Kisumu West subcounty. The River Mugruk, flowing year-round, however impacted during the dry season, empties into Lake Victoria and hosts the Sola Maji water kiosk, one of the drinking water sources for residents. The area's inhabitants are mainly farmers raising cattle or growing rice and sugarcane. Fishing and stone quarry industries are significant, and the Chuth Ber Market is a hub for livestock trading and daily activities. Nearby, a small restaurant, bar, and local vendors sell vegetables, fruits, grains, and household items.

Overview of Established Research

SWAP Kenya has partnered with the University of Illinois School of Public Health and Jaramogi Odinga Oginga University of Science and Technology (JOOUST) for over three years to develop and manage the Sola Maji kiosk, providing safe drinking water from the River

Mugruk in Chuth Ber. This water is sold to locals and to boda boda vendors to resell. SWAP has continuously conducted regular water quality testing for both the kiosk and the river. From January 2023, SWAP began studying bacterial contamination in household drinking water in the Chuth Ber Mugruk River region, collaborating with UIC. They surveyed 150 households within 1.5 km of Chuth Ber, gathering data on water use, treatment, and demographics. Using stratified sampling, they then focused on 43 households, collecting water samples and data on WASH practices over three days. The water, stored in traditional containers, was tested for E.coli, Coliform bacteria, and turbidity levels at the SWAP Water Lab. Some samples from the Sola Maji kiosk tested positive for E.coli, indicating a need for further research into re-contamination, thus the basis for my research and it's value.

Ethical Considerations and Positionality

Before arriving in Kisumu, I consulted with SWAP Kenya on how to engage in local community research, considering my position as a European student visiting for 10 weeks. On arrival, I familiarized myself with the SWAP team, their projects, and community relationships. I participated a little in the Chuth Ber community water research project, meeting the kiosk manager and survey participants, and assisting with water sample collection. SWAP ensured families were comfortable with the home visits and explained my presence. In doing so, I built a relationship with the respected local kiosk manager and interacted with the community, including kiosk customers and boda boda vendors which gave me an entry point for my research.

In parallel, I sought approval for my research from the JOOUST Ethics Review Committee, which reviews research proposals to protect participants' rights and wellbeing in Kenya. The ongoing research project already had approval, and UIC allowed my research as an addendum to their protocol. With guidance from UIC and SWAP, we submitted the application, and it was approved before my research began.

At some point I realised my association with SWAP and interactions with the kiosk manager, led some to believed I had the authority to drive kiosk changes. As an outsider and non-African, some also assumed I was connected to the University of Illinois. Here reflective practice was important in considering my role and positionality in the research process, as Bolton & Delderfield (2018) suggests. Clarifying my research goals, my position as an African Studies student, and my interest in community water solutions was shared. As Maxwell (2013) emphasizes, ethics should guide all aspects of qualitative research. Therefore, all interview and

focus group participants were informed about why this data was gathered, transparency about recordings, and processing of their feedback anonymously. Participants signed consent forms and gave verbal agreement on audio. They were assured they could withdraw at any time and that the research findings would be shared with SWAP Kenya upon completion.

Data Collection

From February to April 2023, I collected data using ethnography, interviews, and focus groups. Initial research preparation in Kisumu helped form the final approach, using triangulation to gain a comprehensive view of drinking water use, consumption, and storage in homes. Assistance from my SWAP colleague, fluent in Swahili and Dhuluo, was key in interpreting and translation during the research process, and was a critical aspect of best practices for research integrity (Babbie, 2016). She translated interviews and focus groups in real-time, allowing me to ask follow-up questions. I transcribed all recordings, and my colleague verified the accuracy as well.

Ethnographic Research

The initial ethnographic research around the Chuth Ber kiosk unfolded organically through participant observation. As Reeves et al. (2013) state, "The ethnographer not only observes a social group, setting or subject matter, but engages in the participation actively with a general commitment to observing everyday social life". My research began with assisting SWAP in visiting families and collecting water samples. Observing home environments, water fetching, interactions, the presence of pets and farm animals, and water storage gave me a clearer picture around water management. I kept a log of the observations and my thoughts on some of my findings at those times.

Visits to the Chuth Ber Sola Maji kiosk provided insights into its operation, hygiene, time management, and community impact through interactions with the kiosk manager (a community chief) and staff. Observing customers and boda boda vendors helped me understand water fetching, container use, and transport methods. Through February and March, while documenting my findings from these activities and interactions, it became evident that interviewing boda boda vendors in addition to the planned focus group sessions with Sola Maji users were crucial for a well-rounded research. A fuller picture in understanding social and behavioural aspects of water usage from different perspectives would add value.

Semi-Structured Interviews

Interviewing boda boda water vendors provided insights into their interactions at the Sola Maji kiosk and with the local families regarding what they observed at the kiosk, and in the homes. Different view for the research aided data integrity, and also provided better preparation for focus group questions.

Purposive criterion sampling was used to select three boda boda vendors. According to Elo et al., (2014) this approach in most common in content analysis. The participants were local, regularly used the kiosk and were familiar with the community and their water usage, which were the predetermined criterion of importance (Suri, 2011). The interview guide (Appendix 1) was shared before getting participant agreement via signature and recording. The semi-structured interviews, conducted in March 2023 near the kiosk, allowed for flexible discussions on topics related to the kiosk operations, perceptions, and personal experiences. A semi-structured approach enables an improvised follow-up based on the participants answers and reactions (Kallio et al., 2016). And according to Kvale & Brinkmann (2009) this allows flexibility to explore emergent topics dependent on responses. I added some additional sub-questions to interviews 2 and 3, due to information shared in interview 1. Overall, fourteen questions were in the interview guide focusing on their roles, the kiosk, and customer interactions. Each interview, carried out in Dhuluo and Swahili (with minimal English) was completed consecutively to prevent information sharing among the participants. Potential biases were considered due to the vendors' engagement with the kiosk, but their candidness provided valuable perspectives on customer interactions and ultimately feedback on perceived kiosk operational gaps. Overall, this comprehensive data, set the stage for the focus groups.

Focus Groups

Focus group research aimed to gather multiple perspectives on the topics presented, providing insights into the community's shared experiences managing Sola Maji water in the home. Group dynamics enhance discussion, allowing participants to build on each other's ideas and generate more insights than individual interviews might. Due to the specific and small population, focus groups were crucial for understanding community perspectives on drinking water and respectfully delving into the topic of recontamination of the drinking water without explicitly suggesting they did indeed re-contaminate their water at home.

Participants were recruited using judgment sampling based on the criteria, female kiosk customers who manage water at home, living near Chuth Ber, and with awareness of the ongoing SWAP project. This sampling approach was best suited to the chosen population due

to a specific set of pre-defined attributes (Babbie, 2016). The kiosk manager, a respected village chief, facilitated recruitment, with SWAP assisting in final confirmations via phone. Enlisting the kiosk manager to help in identifying participants was seen as more efficient as he would be more knowledgeable about those who would be open to participation and who would not feel pressured being asked via SWAP or myself. Having said that, there was a consciousness that those he may encourage to participate may feel obliged to join as he was a respected community member and manging the kiosk. However in sessions, we reminded the participants of their anonymity, and assigned numbers to all instead of using names. This may feel impersonal but was a better approach to demonstrate that they could speak freely.

The two focus groups, held at the end of March and early April, consisted of six and seven participants respectively. After signing consent forms and making introductions, the discussion guide (Appendix 2) was followed, having been shared with the participants. Being conducted primarily in Dhuluo, with some Swahili and English, my SWAP colleague translated in real time. We explored topics such as water usage, storage, cleaning containers, the presence of children and animals in the homes, activities at home around water use, and the role of boda boda vendors in water transportation. About 17 main questions were covered, with additional sub-questions as needed. As stated by Chenail (2016), altering some questions or approaches makes the gathered data more specific or meaningful. Some questions were skipped at times if the flow was leading to other topics. Where questions were slow to be answered, we directly asked ladies if they wanted to answer. This was more necessary at the beginning when we were still ‘warming up’. In the end I observed a level of comfort and openness with answers as we progressed. Being accompanied by a SWAP local colleague very much assisted in the transparency I felt. And she encouraged expansion on answers where necessary. We had discussed this in advance and the teamwork was welcomed for me to so I could reach the objective of gaining real insight from the answers shared.

Data Analysis Approach

Schwandt, (2000, p.197) believes researchers interpret their interviews in a particular way, and how information is received takes into account shared understandings, practices and language There is thus a level of pure impossible objectivity for a researcher but regardless, I endeavoured to take a step back and during data analysis to look at what the data gathered was telling me at the core.

On completion of all transcriptions and ethnography notes, I utilized a spreadsheet with the aim of this being a primary step for data entry and analysis. In the end it became the main analysis tool.[1] I structured the data per tabs for the ethnography, the interviews and the focus group sessions. In each tab I listed the topics or questions asked with the corresponding answers across columns. This structure allowed for quick access to categorise, filter and review all answers together. Not every question was answered in the same way but could be grouped. From there I could compare responses with writing up my summary findings in a new column. This step gave me a better overview and allowed a level of initial data interrogation. This excel approach may seem quite basic and time consuming but, I could structure the questions and answers very clearly for me from three data sources. When looking at data analysis software Atlas.ti, it was not yielding a deeper interpretation of the data in this case. Through the process of content analysis, in grouping and organising responses, particular data painted a fuller picture towards my write up where certain categories and themes emerged. At this stage I highlighted the important statements that would be relevant in my discussion section.

In reflection of the analysis process, it was singularly myself looking at the data, and despite regular reviews and re-reading, it was a thorough approach to qualitative analysis and interpretation. I recognised some 'collective interpretations' of topics, due to my presence in their area for 10 weeks, and my in person observations. Alternatively, my experience regular first-hand experience of the challenges around managing drinking water day to day in Chuth Ber is unchanged. In these instances, as Bolton & Delderfield (2018) suggest, I did a 'self-check' on my positionality, and considered my perspective about some answers that emerged. There were connections across emergent themes in the different data sets gathered from observations, interviews and the focus groups. Overall, the inter-relatedness of all the data was important and content analysis produced the results of research in a compelling way, while zooming a lens into a specific topic that needed more in-depth query (Kiger & Varpio, 2020).

5 Findings and Discussion

Through the lens of anthropology, the data examined looked at individual conversations, attitudes, opinions, and practices, but also is interpreted as part of broader social phenomena. The wider social context is equally as important as the individual perspective. Thus it can be

[1] I used the Atlas.ti software analysis tool, however in the coding phase, it did not yield any more detailed story than what was emerging from the spreadsheet view. As this was a triangulation approach the data was more emergent to me from a spreadsheet view using content analysis.

said that anthropologists seek to understand the extent to which particular actions, events, or practices are influenced or swayed by other individuals, communities, practices, or events. The other lens used in examination of the data was through communication. The focus was to encompass factors identifying, exploring, and measuring communication, in any form and regarding any topic whether human, visual and such.

Nowell et al., (2017) discuss the importance of understanding how researchers carry out their analysis, and make their assumptions with data findings, while simultaneously demonstrating research integrity. It became clear during my visits to Chuth Ber, that in answering the research question fully, there were several aspects around the kiosk activities and water delivery that were also important to a larger context, besides researching only the management of water inside the homes. The triangulation approach allowed me to encompass a fuller picture within the community, and this section describes the unfolding of this data in answering the research question: *In what ways does the lived experiences of the local Chuth Ber community outside Kisumu, Kenya impact how healthy drinking water from the Sola Maji kiosk may become re-contaminated during the process of collection, transportation and/or managing this water in the home?*

The findings ahead are grouped by the three research methods employed to gather data. These findings are further grouped into cultural context, communication, health and hygiene, and lastly infrastructure and kiosk set-up. When discussing the findings around culture, and health and hygiene, a natural anthropological lens is used viewing the information in a broader social context extending to practices, communities, and individuals themselves. However the communication view is also key in these aspects. Some of the findings, are analysed more in-dept with a communication lens due to the topics shared, or not shared as the case may be.

5.1 Kiosk Findings

Conducting ethnographic research across multiple visits over a 10-week period at the Sola Maji kiosk offered a valuable perspective and understanding of various aspects including kiosk management, community interactions, customer profiles, economic behaviours, cultural practices, and the overarching social dynamics of the local community. By beginning here, I was able to observe daily life unfold, providing a firsthand introduction around local lived experiences.

From the outset, I chose not to conduct formal interviews with the kiosk manager, believing that a more natural, observational approach would yield richer insights. Our interactions evolved organically, discussing his responsibilities at the kiosk, his role within the community, challenges faced, attitudes towards water management, and the overall impact of the kiosk on the community. Additionally, conversations about family, religion and values allowed me another level of insight into the community.

Cultural context

Despite some initial shyness and language barriers, most kiosk customers were open to greeting and interacting with me. I witnessed the transportation of water in various ways—on foot, by bicycle, horse (one male customer), motorbike (boda boda vendors), and carrying containers on their heads. Typically, men were less often seen fetching water, except for boda boda vendors and a teen with a family horse, reflecting the cultural norm in Kenya where women predominantly handle water collection. This was evident both at the kiosk and in the general street scenes and aligns with many findings, namely Coulter et al., (2018).

Supply and demand for any kiosk is important. I learned that it is a cultural norm when a funeral, wedding or crusade (religious event) occurs locally, naturally supplying more water to that family is primary, meaning less water for others until replenishment supply returns. Consequently affected households may choose to fetch river water or use other less healthy sources as mentioned by Fagan et al.,(2015). It can also be the behavioural norm for customers to visit the kiosk, not knowing if it is open, thus sometimes waiting, or dropping their container there to return later. The kiosk manager sometimes opened as early as 6am or closed late evening. No complaints were shared about this lack of clarity or communication. In addition, demand drops during rainy season. It is common for seasonal-switching of water supply for homes in Kenya, thus during that time, people use more of their harvested rain water. The economic well-being factor also is prevalent here in these situations, aligning with research from Collins et al., (2018).

I observed a woman who occasionally helped at the kiosk while selling her vegetables nearby. The dependency on a single kiosk manager, a senior community figure and main contact for SWAP, poses a risk. He expressed pride in his role, emphasizing the kiosk's importance in the community. As research shows, success rates of initiatives in communities are heavily influenced by the buy-in of respected elders and group decision-makers (Mutua & Kiruhi, 2021).

As the kiosk is positioned by the river, it is a place of activity for people washing, fetching water and engaging with neighbours locally This river may be seen by some as contaminated and unhealthy, however locally in the past this then unpolluted river was seen as a source of life. This river water quality has today changed, however, it is known that beliefs adopted through families and ancestors are culturally ingrained in some and therefor sourcing water there remains a reliable option (Tratschin, 2010).

Communication

The Chuth Ber community are primarily Dhuluo speakers, with fluency in Swahili. In my initial observations on my first visits to the Sola Maji kiosk, I had looked for signage and, or posters as it was my expectation, albeit from a western mindset. I believed that presented missed opportunities to raise awareness on hygiene, handwashing, pricing, or other SWAP health products which are available. At later stages I discussed community literacy levels with the SWAP team and kiosk manager. A consideration for education levels and literacy in the community is a factor in how signage would need to take into account these local realities. Adult literacy in Kenya is nearly 83%, however this can drop to 50% in the rural regions according to Cowling (2024). This would mean that the communication approach around the Sola Maji kiosk, or for example the results to be shared with the locals from the water testing SWAP carried out in the homes needed to be thoughtfully considered. As mentioned by Figueroa & Kincaid (2010) community interventions are highly impacted by the communication approach taken. I learned that locals use products such as Water Guard, a dilute sodium hypochlorite solution to treat drinking water in their homes. For some, it was also shared with me that reading the instructions on these products to ensure their correct use is a challenge for some. This was a reminder about the necessity of understanding a community and the lived realities very well and taking into account the insider-outsider view as mentioned by Adu-Ampong and Adams (2019).

Health and hygiene

A business owner in the community shared much about the way of life in the area while she was at the kiosk. She managed the water in her home, and shared insights around challenges some women encounter. She was knowledgeable about water recontamination opportunities, mentioning the behavioural norms of the elderly and also in controlling children with both being hard to manage or alter. The research done Figueroa and Kincaid (2010) echos here when their research findings highlighted within families you may have three generations under one

roof, and there are behaviours of all to considering if trying to implement change. I learned that some people think by cooking with other sources of water, that it doesn't affect their health because the water is heated. This is an examples of mis-information regarding water management, as some locals see drinking water, and cooking water differently. This could stem from learned behaviour in their surroundings, again from family influence, and, or, a gap in education on such matters. Health related communication according to Rothman and Salovery (2010) has a major impact to how people understand messaging. They state that how effective communication campaigns around water contamination are, determined by the right framing, influences success and changes in behaviour.

Regarding hand hygiene, I noted there was no handwash station initially at the kiosk. In time, SWAP supplied one and positioned it near the kiosk taps, however I observed no encouragement to use it, or signage promoting hand hygiene. If changes in hygiene behaviour are to be successful, according to Robinson et al., (2022), this can be achieved over time and with the right interventions. Implementing a 'wash hands first, use the taps second' type of policy at the kiosks is worth considering. I observed the use of kiosk water funnels aiding the filling of jerrycans however they looked old and were unwashed. Customers brought their jerrycans for refill, and the kiosk, in some cases provided jerrycans to boda boda vendors for water transportation to customers to refill the water into their storage containers. The vendors also collected empty jerrycans from customers and brought them directly to the kiosk for refill. Overall I witnessed a high amount of visibly dirty jerrycans and this prompted thoughts about the vendors and their role in water recontamination, including an observation on their lack of hand hygiene at the kiosk on most occasions. Through the boda boda interviews, they shared that they understand the link between hand hygiene and water contamination, thus it is more a behavioural aspect in not washing hands. At the kiosk with a hand-washing station present, this presents the opportunity to wash hands and according to Combes and Devine (2010), opportunity influences behaviour. The motivation to change behaviour can be encouraged by those that run a kiosk and setting good examples.

It was noted that the narrow jerrycan design neck may present challenges in cleaning the inside properly, especially for elderly. This can be seen as a barrier to cleaning practices. I saw many jerrycans or water containers with no lids or covering. Some ladies I observed would lift the jerrycan with one hand, inserting their fingers into the opening while positioning it on their heads. This is a normal local method in which to lift and carry water and will remain as so, however the reminder of best practices around hand hygiene to all customers could help

eliminate or reduce contamination. I sometimes witnessed ladies pass by the kiosk going to the river to wash clothes in the water which I learned was contaminated by local factories. This community behaviour is common from the point of a social norm, with proximity to the river as mentioned by Fagan et al.,(2015) an important driver. I observed also that the same jerrycan that is used to gather water from there, is often used to gather water at the kiosk, and if not cleaned thoroughly, this creates opportunity for cross-contamination.

Infrastructure and kiosk set-up

In the early days of research, I was given an introduction by SWAP and the kiosk manager about the kiosk infrastructure and technology including the daily operational activities. There were indeed some related challenges. A primary topic was the need for a second water tank to ensure continuous supply of drinking water from the kiosk, and also to ease some burden on the kiosk manager in meeting the needs of the community. In terms of cleaning the big tanks that hold the water, they have to wait till they are emptied out, thus stopping water pumping from the river, the purification process and the supply of fresh water to the taps for sale during that time. The observation was that water demands warranted a second tank due to community needs and to minimize a local person being forced to use the nearly by contaminated river water, or other options. Thus, there was observed an element of inconsistency in water supply, due to various factors around the kiosk itself.

Kenya is experiencing longer drought periods due to climate change, and thus demand for water kiosks during these times is increasing (Akelo et al., 2023). I observed the dusty, dry season climate in Chuth Ber, where the solar panels needed to be cleaned to ensure efficiency. Not everyone understood in the community how the solar panels functioned, but they welcomed the light that shone brightly in the evening coming from the kiosk. I witnessed the cleaning of the solar panels which included some planning in advance, the tank being empty and the use of particular cleaning agent with some physical climbing involved. Despite this being a labour intensive task, there is an understanding with some, that solar panels are a free source of electricity to run the kiosk sustainably. Not many understood that solar energy aids the ozonation process to clean the water. Some may question, if everyone needs to understand the details of the kiosk, however there are important facts that impact those who purchase water that do warrant attention. In further findings I share how boda boda vendors and some of the focus group ladies may be unclear that they don't need to add chemicals or solutions to the Sola Maji water, and this impacts the water and the mis-use of products they don't need. But adding 'chemicals' to water to make it healthy is a behavioural norm in the community, and

when the water is brownish in colour, as we find from the boda boda vendors, the community may question the quality of the water.

Small aspects about the kiosk were observed, in regards usage of the physical space, and boundary fencing for security. It has been experienced at kiosks that expensive technology is at risk of theft and thus security is an important factor. The physical space could be used to set up a jerrycan cleaning area potentially in this and future kiosks in order to set an example and highlight the focus on the important of water container cleanliness. There were small observations on water spillage when customers were filling jerrycans with or without the funnel. Despite it being small amounts, there is a possibility to look at a way to incorporate a raised platform to aid the water filling activity, and catch any overflow water for reuse. Spending time there in the Kenyan heat, or in the rainy season, it was noticed that shade or shelter would have been welcomed, especially when people were waiting for water. This was shared with me later also by the locals.

It was observed that SWAP still have an active role in the maintainance of the kiosk in terms of technical support, economic support and a backseat monitoring role. There is close communication with the kiosk manger and support for him in doing his role where needed. In noticing this, it remains that the kiosk is not yet self-sufficient or sustainably managed within the community by the kiosk manager. It created a question, what would happen to the kiosk if SWAP were to fully disengage from this backstage role in supporting them in the long term.

5.2 Boda Boda Findings

The inspiration for my interviews in February 2023 with the three boda boda water vendors was encouraged by my early ethnographic observations at the Chuth Ber kiosk. While spending time there, I learned about their role as part of the delivery chain of Sola Maji water from the kiosk to the homes. I was introduced to them as I observed them collecting water for resale and witnessed possible opportunities for water re-contamination on their part. Overall, I understood then that they too had an important role to play in the community and could add valuable insight on my research topic from their viewpoint of the kiosk and of the households they visited. In preparation, all interviews were scheduled near the kiosk, on the same day back-to-back, thus to eliminate any pre-sharing or discussion of questions and answers among the participants.

Cultural context

Being from the community, the boda boda vendors are part of the lived experience around drinking water, delivering water and this being their profession and source of income. All three

were living in a 5km radius of the kiosk and due to owning a motor bike this was a logical job to pursue for them due to community needs. They varied in duration doing this job ranging from 3 months to 3 years, and also they collect water from other kiosks besides the Chuth Ber kiosk.

As they are familiar in the community, they are in a good position engaging with, and understanding locals needs when delivering water. They shared their observations in the homes whether physically entering, or leaving water outside for storage. At times, they have been asked to clean the customer's jerrycan first before pouring water inside which shows the customers being comfortable with them and having an awareness of hygiene. However on the other hand, if the vendors mention the uncleanliness of the customer's jerrycan, and suggest that they need to be cleaned, some customers find this to be disrespectful.

> "Some get hurt. But I try my best cos I never want to loose my clients. So sometimes I do their wish. Sometimes I force them [to clean the cans]. I know their hearts".

Another shared that he has seen the big containers for storage with some dirt in them. When questioned if he suggests to people to clean the jerrycans or storage containers he said:

> "Some think it's disrespect".

Infrastructure and kiosk set-up

In discussion with the respondents, it was clear they didn't understand the correct process of how the Sola Maji kiosk works and how the river water is pumped, and cleaned through ozonation via solar power. There were references to 'chemicals' or 'medicine' used, or chlorine added to the water, which is not the case. In reality because it is common that other sources of drinking water, for example from boreholes would be treated and as such, the boda boda vendors assume similar for Sola Maji water it seems. Thus, from their knowledge, they shared that they would not be able to explain to a customer why Sola Maji water is different to other kiosk water, or to other water sources in detail. On two fronts when considering communication, there is a failure on how they understand the kiosk process, and in turn, they cannot communicate about the purity of the kiosk water with their customers, which are gaps that could be filled. On a positive note, they are open for learning more about how the Sola Maji water is purified.

> "You get it from the river and you make it clean to be used...Using the machines"

> "The medicine which you normally use (in the water), sometimes it's too much".

The availability of water at the kiosk is a risk according to them, and they wish the water supply was always flowing and available. However they mentioned the water being cheaper than other kiosks and thus that's a very key factor. In order to save time for them also, they said that we must improve the pressure of the water as this would eliminate the slow filling of the jerrycans, especially when they fill mostly five each time. Also noted was their feedback on the supply of clean jerry cans from the kiosk being a problem for all of them.

Health and hygiene

With anonymity of the interviewee, we were able to get open feedback on what they observed in the homes. They shared that dirty jerrycans or water containers were a normal occurrence, even mentioning black colour inside them. One mentioned:

> "They know that water can be re-contaminated if it is poured into other dirty jerrycans".

They confirmed that some jerrycans or containers in the home did not have lids and some did.

> "The way they store the water. Some don't store it in a good way. Because there is no cover, or lids. Also I saw that. In those two areas they should be told".

Some customers have super drums or tanks outside, which I observed myself in some homes. When asked to discuss their own jerrycans, it varied as they used the empty jerrycans from the customer for refilling, some used their own, and some borrowed from the kiosk. There was no fixed pattern for cleaning their own jerrycans, with one saying he cleaned it 3 times per week, or one saying he cleans it when he 'sees' it is needed. They mentioned using sand soil with soap to clean the jerrycans or powder soap, which is something commonplace in rural Kenya. And perhaps this is perceived to be sufficient to clean jerrycans thoroughly, however understanding the elimination of bacteria through cleaning was never mentioned.

> "We use sand soil with soap. It is very good when you shake it, it removes the dirt".

In addition, and related to something I observed, one vendor used his own funnel when pouring the water from his jerrycan into the home container of the customer. So this funnel goes from home to home, from jerrycan to jerrycan and if not clean, could potentially transmit bacteria.

Despite Sola Maji water sometimes looking brown in colour even after treatment, the vendors mentioned that the brown colour happens often according to all three. I did not ask them to define 'often' but it can vary from once per month, or a few times per month. Comments about the brown water are mentioned by some of their customers to them, which I address in the communication section. However, some customers may perceive brown kiosk water to be untreated, while some know the colour is not an indicator of contamination.

We discussed hand hygiene, and all said they are aware of the importance of hand hygiene and it's link to healthy water. One mentioned he washed his hands regularly when doing water delivery, however I observed a lack in hand hygiene with the boda boda vendors overall. In discussing this topic, they suggested that some families would not be aware of the impact on hand hygiene while some would understand. This response was linked to the question surrounding if customers know how they re-contaminate water in the homes. One vendor mentioned:

> "The children will never understand". (in reference to hand washing)
>
> "They always want to save time". (in reference to elderly washing hands)

As Figueroa & Kincaid (2010) mentioned that at a household level, factors such as time management and decision-making practices are a real consideration. These vendors shared that they may be asked to collect river water some days, thus this presents a possible contamination point if the jerrycans are not cleaned properly. One said he does clean his jerrycans after transporting river water as he understands the contamination aspect. However, not everyone will choose to spend time on that cleaning activity.

Communication

Social norms or 'rules' don't encourage certain communications out of respect or the social standing of the individual. Knowing from the feedback that the water purification process or information around the water quality is not clear to the boda boda vendors, it is a missed opportunity. The vendors are not seen as an extension of the water provision service, and could be a strong ally in promoting the quality of the water. In addition, one mentioned that he is open to wearing vests advertising Sola Maji as it helps their business. They said that they don't actively advertise themselves as vendors and getting customers is more through word of mouth as a service, or neighbours seeing them working.

Overall the vendors noted that the kiosk has a good reputation for clean water but not necessarily clean jerrycans. This is supported by my research at the kiosk and focus group data.

As mentioned earlier, there are communication failures around the vendors understanding the water purification process, the water quality, and not needing to add chemicals at home. This is a key communication consideration, if customers need to understand details of the kiosk water they purchase from vendors. Customers have communicated to the boda boda vendors about the taste of water. Adding 'something' to water to make it pure is a behaviour norm in the community but will change the taste. In addition, feedback was shared about kiosk water colour being brownish at times, and customers questioning the source. This could potentially create some mistrust. If there was clear communication on these facts aroud the water, this could foster trust and understanding between all parties. The feedback from the customers to the boda boda vendors was that overall they like the taste of the water mainly due to it not being salty and having more a sweet taste, according to the description. This reference to sweet taste appears again in the focus group discussions and as research from Ching (2016) mentions, studies find that taste has quite an impact on communities adapting to a change in water. If they dislike the taste of pure, healthy water, they are inclined to revert to using the contaminated water if they perceive the taste to be better, despite the health risks, thus from a human behaviour stand-point this is significant.

The findings from the boda boda vendors show that families do understand that water can be re-contaminated if it is poured into other dirty jerrycans while others do not. So while they understand this, they still repeat the behaviour nonetheless opting to consider a lack of time or other competing household activities more important.

From a culture and communication perspective, not all the vendors are comfortable giving feedback to the kiosk if there is any issue with the water, or sharing customer feedback from what was described earlier. The kiosk manager is an important person in the community and an important elder, thus this may be a factor. Similar feedback is shared with us in regards their hesitation in giving feedback to the customers when they have dirty jerrycans. However they do feel they are friendly with the kiosk. In response to being asked if they give feedback one mentioned:

"No. I don't. That's why I said I don't have that braveness".

Another stated:

"I haven't, because I think they know. I think. You can realise. Yes".

If the boda boda vendors were equipped with the knowledge on how the kiosk worked, they would potentially feel more comfortable in the communication with the kiosk manager. Indeed, they are open to further 'teaching' about the full Sola Maji process from pumping from the river to the delivery of fresh water. In a discussion about being able to engage better with the customer about the quality of the Sola Maji water and how the cleaning process works, he said:

"I would like to know so that I can tell them".

Another mentioned:

"The only thing I can tell the customer is that the water comes from the river, then the treatment is done. Then the treatment they sell when its safe."

A communication model could be encouraged between kiosk and boda boda vendors, kiosk and customers, and also between customers and boda boda vendors. As stated by Ngigi & Busolo (2018), different tailored approaches in communication, or opening up channels of communication with the correct framing can be effective in behaviour change.

5.3 Focus Groups Findings

The focus group research was the final part of the research in Chuth Ber. All the ladies that attended the two sessions were community locals and used Sola Maji water. Some participants knew each other already, some I had met at the kiosk before, and most were familiar with the SWAP team from their engagement in the community. The ethnography and interviews were a good spring board in preparation for these sessions.

Cultural context

Overall, all participants saw firsthand the opening of the kiosk, and the impact throughout the years in the community. These ladies all managed water in the homes as previously mentioned is the cultural norm. The ways in which they used the Sola Maji water was discussed during the sessions drinking and also cooking with some mentioning it's use for washing clothes.

There are different ways to store water in homes and some challenges around storage was discussed. From jerrycans, to drinking clay pots, to bigger storage containers outside and the large drums catching rainwater. With some people only having small containers, their supply of water is more challenging for them and the family. With bigger drums outside, there is a problem of residue gathering inside and children drinking untreated water from it.

One item that arose a lot was how water is covered, or not covered, and the use of clothes for this. This act of covering came across in a way that this was one main way to ensure no 'dust' got into the water and that helped to combat recontamination. From the focus group engagements, this approach to covering was an accepted norm. It became clear that this factor is something that is not communicated to the locals as a contamination risk. One lady mentioned cleaning the cloth and applying it to a water container. Another lady mentioned sieving water with a cloth. In attempting communication on this common behaviour, referring to Rothman & Salovey, (1997) they consider framing as key to presenting information. When you frame communication positively about what you may gain, results can be achieved. It may seem a hard task to change a widespread behaviour norm when sharing information on the correct way to cover or seal water containers at home, or while water is transported, however this is a big aspect for consideration on the implementation of good water storage practices in the home.

> "And even if you take it [the Sola Maji water] to your household and you store it in a good way, in a good pot, your water that you use at home you must cover it, then it's safe for drinking".

We discussed the presence of animals in or around the home as a cultural norm, ranging from dogs, chickens, ducks and a calf. There was admission that these animals, would enter the homes and drink the water if not covered. Culturally home doors are often left open in Kenya for ventilation and light. Barnes et al., (2018) investigate the association between domestic animal in and around the home, and the contamination opportunities on the household drinking water. This study is indeed based in Kisumu where surveys carried out recorded domestic animals inside the homes. Water samples taken and tested resulted in the presence of microbial contamination in the drinking water and conclude that measures need to be taken to prevent these opportunities. An adequate way in covering and positioning of water in the homes could help towards reducing animal contact with the water. Communication on best practices in the homes around the community is worth strong consideration.

One lady offered the following:

> "I have dogs. Small ones. When they get water they drink. [laugh]. So that's why we must cover the water. So that is why we could get the water re-contamination".

Another shared:

> "When I store my water if I leave the container open, the chicken gets inside and drinks the water. The dog also might drink the water when thirsty. So at times when you come home you find the dog drinking from the water you stored or even the chicken. By that time the water is already re-contaminated".

In our discussions on jerrycans, we delve into this more in the health section, but when asked would the ladies pay somebody to clean the jerrycans, there was an overall negative response. Understandably, this is seen as a woman's task, thus indirectly her not fulfilling her duties. Here are some other responses towards paying for jerrycans to be cleaned:

> "That will make people be lazy!"

> "Some service provider may take you for a ride, for example when the jerrycan is not very dirty they will only wash the outside and bring you back the jerrycan".

Only one respondent suggested she would pay for this service. I am aware that she is running a shop and potentially her income would allow her to do that.

> "I can because at times, I am busy and not able to get that time for washing. And I need clean water. I can pay somebody a little money. And he or she washes it clean. And he or she pours it back inside".

It was also seen as a waste of money, and some also commented about trust in the job being done properly. At the same time, if we define 'cleaning properly', one lady said she takes her jerrycans to the river to wash them, as is the local norm. This is the same river that is polluted. This again suggests the lack of understanding on the definition of 'clean' and removing the bacteria that may be present in the jerrycan thoroughly. She described the process whereby she washes them on the inside at the river and uses steel wool to wash the outside. She uses sand, soap and abrasive to wash the inside. She rinses them well (with river water) and then goes to the kiosk for water collection. Upon hearing this the group seemed to be in agreement. The opportunity to clean jerry cans at the kiosk may combat this issue which I cover later in my recommendations.

When asked about the testing of drinking water in their homes by SWAP and any expectation on the results showing some re-contamination, there was a blend of answers. There were 3 'yes' answers, some were more 'maybe' answers. Interestingly, there were indirect answers from 2 or 3 saying that they covered their water, thereby an indication that by covering the water, that is was uncontaminated.

One lady mentioned:

> "This water if well treated, after 3 days I take it to my house you find it safe. If it is not well treated, you'll find it unsafe and different. I am talking as a person who takes the water every time".

Part of how locals see health and hygiene overlaps strongly with behavioural and cultural norms in the region. Later, in this thesis, I address the actions that SWAP took in dissemination of the findings to the community. They completed an information session with many community leaders and later with community members where they address best practices to the attendees with the aim of reducing re-contamination. The content of this community engagement is covered in appendix 3.

Infrastructure and kiosk set up

When the kiosk was in the planning stages, the local senior males in the community were approached, and included in the process, thus there was buy-in from locals with the blessing from the elders. The role of the women in managing drinking water is key, however it happens that women are represented less in Kenya on committees around local needs where they have value impact to add, and are not included as much as men on projects that are established in communities, such as the Sola Maji kiosk (Coulter et al.,2018). It was demonstrated from the opening questions, and answers given that there was limited knowledge among the ladies about how the kiosk works, and how the water is treated to make it healthy for consumption. One lady mentions the following:

> "The only thing that we want is the stima [electricity]. During weather like this time, that machine cannot pump water. We need stima [electricity] because during this time when the solar panel cannot pump. We need another tank".

This lady was under the impression that a lack of electricity played a part in the process of water delays it seems. When directly asked about how the water was cleaned, many said that this was not explained. Three ladies said they understood when there was no sun, there was no water pumped.

Other feedback shared was the need for a consistent supply of drinking water, similar to the boda boda vendor feedback. They discussed needing a reserve tank and waiting up to two days when the tank is being cleaned before fresh water can be pumped again. One lady mentioned that in the past, pre-filled jerrycans were available during these cleaning activities.

In general, they requested more jerrycans to be added at the kiosk to serve customers whenever the tank is being cleaned, and to replace those that are 'worn out'. This would enable a more continuous supply. The example of a local funeral is mentioned and that the supply of water was prioritized for that occasion. This led to discussing a back up option of rainwater to drink but believing that it is dirty due to local companies. They also mentioned the taste of the water from the kiosk is not salty in comparsion to other sources like boreholes or other kiosks. Again referring to the studies by . Ching (2016), as described, the 'yuck factor' has an influence on the uptake of water from certain sources.

One lady mentioned that the people working at kiosk are supposed to advise customers about washing the jerrycans before fetching water, or again the idea of pre-filled jerrycans so that are ready for purchase is mentioned also. This is somewhat contrary to the opinion of the boda boda riders who shared that when they give feed back to the ladies about cleaning jerrycans, it can be seen as an insult. There is somewhat a sense of disagreement, and finger pointing in the boda boda-customer relationship as heard from both sides during the research activities. Robinson et al., (2022) did research on the effects that overall water insecurity has on communities and one aspect is conflict. From my outsider viewpoint, I saw one group pointing to the other group and indicating water re-contamination via dirty jerrycans was a factor stemming from each party. Trying to eliminate dirty jerrycans can reduce this gap and I know this is a 'perfect world' view. But again, communication and education around the several factors of water recontamination is necessary for all community member to understand. As one lady mentions, needing more jerrycans is one part of the problem, but not the full picture:

"We need more jerrycans. The ones that are there are very few".

There were other aspects mentioned that would be good to have at the kiosk such as a toilet and a small 'waiting room' area for when the weather is bad and they are waiting for water. The light from the kiosk was also mentioned as a plus for the community.

Everyone was happy with the price and acknowledging that 5 shillings is very fair. It was mentioned that some kiosks can sell the same amount of water for around 20 shillings, and some raise the price during dry season. Collins et al., (2018) stipulates the importance of price in decision making on the purchase of healthy or unhealthy water.

Health and Hygiene

There was conflicting accounts during the session about not letting children near the drinking water, and alternatively about how children interact with the water. From what was discussed, it was a factor that children and animals were creating possible recontamination opportunities from playing with water, putting mops in water, and serving themselves. As mentioned earlier, these risks could be addressed with guidance on the positioning of water in the homes and the aspect of how the water is safeguarded with an adequate cover or lid. This is the real lived experience in the home, and children and as children are very much part of the community, as Ananga et al., suggests they too are part of the buy-in factor of changing habits and adaption of new ways of functioning in the home around water.

> "You may teach your children. But children are children. So you find that when you are away and you come back you can find that the water container is left open. And they didn't do what you said".

> "You put jerrycans down and they want to peer inside. When you come with water, you need to cover the water. If you don't cover your water, it's better to close the door. Because they draw water for playing, playing cooking, other things. Sometimes they pour water down their faces on themselves".

Pertaining to hand hygiene with males in the homes, the ladies indicated that at certain times males would wash their hands before eating. Mostly, the women served them water. Some ladies also mentioned they wash their own hands before cooking. And they provide water to wash hands to everyone before eating at home.

The process of cleaning jerrycans was described earlier and some using river water. There are indeed differences in cleaning methods and also the regularity of cleaning with some cleaning them every 2 weeks, or others every 2-3 days. Similar to how the boda boda vendors described the cleaning process, it included a mixture of steel wool, sand, abrasives, and vigorous shaking.

> "So after two weeks, I clean my jerrycan. Then I just soap, abrasive and rinse it with water and that's when I again start using it".

> "For me, I have a pot in my house. So when I want to store my drinking water, I have to wash it before. I have to wash it".

On querying the condition of the boda boda vendor jerrycans, there was some negative feedback confirming the use of dirty jerrycans including the mention of using leaves to cover

them, and often no lids. When asking the participants if they ever suggested to them to clean the jerrycans, some of the responses were:

> "Those people don't have any time to clean that [jerrycan]. You are the owner of the jerrycan. You have to make it [jerrycan] to be clean if it is yours. Those ones are business boys".

> "Among the jerrycan some aren't washed, because in the jerrycans they can be unclean, a green colour inside".

Interestingly, it was felt that giving them feedback may compromise the service and one admitted that after complaining to a boda boda vendor he would not bring her water thereafter. There is an element of a power struggle here in this relationship which is addressed early in terms of conflict and how Robinson et al., (2022) highlights this as a reality:

> "If you talk about it [meaning complain about the dirty jerrycan] nobody will bring you water, that this woman is hateful or whatever else. They will say you are boasting".

> "I once told somebody, but nowadays he won't bring me water".

When asked to share examples of when they think they may re-contaminate drinking water at home, they mentioned when they leave the storage water lid open and dust enters, when they use a dirty container or transfer it into an unclean container and not washing the drinking pot they use. Also mentioned was children at home using the ladle, dropping dirt in the water, or dipping their fingers into the water. Animal contamination was mentioned also.

Overall the focus group feedback was positive about the improvement of health in the family by using Sola Maji water. There is a reduction in malaria, typhoid, stomach problems, and the taste is preferred. Some mentioned in using the water when it is brown in colour, they have not 'faced harm'. The ladies shared that they just know the Sola Maji water is healthy but they don't know why, and it was mentioned that they don't have to treat it. This is contrary to some findings that people treat Sola Maji water at home after they take it home, especially if they are storing it for a long time. There is evidence here of a community and a success story and as mentioned by Rothman & Salovey, (1997) this success story could be framed in communication to other communities when setting up the next Sola Maji kiosk.

Communication

The findings shows that there is a major gap in communication and understanding around how Sola Maji water is different, and that it does not need to be treated at home. However there was clarity from what the ladies shared in the focus group on the health benefits, as they are a measurable result, and have a positive impact on the family.

Mentioned earlier were the examples of when the participants think re-contamination of the drinking water occurs at home. They were open in communicating their opinions that indeed correctly do add risk to recontamination of their drinking water. It can be concluded here, then that behaviour change may be the stronger factor in recontamination, than the lack of knowledge about recontamination causes. As Celestine (2021) mentions, human behaviour can be changed when observable and harmful behaviour is seen as not serving a purpose. If the effects of a certain negative behaviour is measurable, then it can be proven to be counter beneficial.

What defined contaminated water for SWAP and UIC was the presence of E.coli and coliforms in the research I witnessed, along with looking at turbidity levels. The definition of contamination understood by the focus group was unclear, only in that they mostly mentioned dust and dirt in some explanations.

Finally, we see a discrepancy in what the focus group participants divulged regarding their relationship with the boda boda vendors. This communication approach from both sides may be a cause for some examination.

5.4 Summary Findings

The key findings of this research showed several co-relationships reinforcing evidence about the possible points of recontamination of drinking water from the Sola Maji kiosk. By taking a triangulation approach, recurring data emerged from the different methods used, creating a stronger validity to findings. The data gathered describe elements of behavioural patterns of customers and boda boda vendors, local culture, communication impact and the management of the kiosk itself playing a part in how drinking water is re-contaminated in the homes. However some aspects of this are stronger than others. The following main findings are outlined in summary.

Communication was a consistent theme around information sharing about the kiosk and a lack of knowledge in many aspects of the Sola Maji solution. The process of how the kiosk

produced healthy water, that did not need further treatment if stored well, could have a knock-on impact on how customers managed that water. How this water differed from other kiosks or solutions is important too for trust in the product.

Understanding contamination is key to knowing how to prevent it whether through hygiene practices, storing water out of reach of animals and children, the cleanliness of containers that store water. There is much evidence showing a lack of knowledge about contamination. For example, there was recurring references to the covering of the water containers, and how people should determine contamination risks in what they are doing, or how they manage water.

The intermittent supply shortages of kiosk water was mentioned several times .By minimizing people sourcing water elsewhere if the kiosk water is unavailable will limit the potential for sourcing contaminated water elsewhere.

There is a missed opportunity with the distribution of the kiosk water into the community via boda boda riders. They are an important part of the chain and as such from the evidence gathered are considered one of the risks in the recontamination chain.

A big takeaway is the approach on the cleanliness of jerrycans and hand hygiene for all participants including the kiosk itself, the boda boda vendors and the consumers at home. By making the kiosk not just a location to fetch healthy water, but also a location promoting hand hygiene and promoting the consistent and thorough cleaning of jerrycans, this could be a win-win. Making the kiosk a place also a to clean jerrycans (for free) could enhance the behaviour of many overall while promoting the kiosk even more as a positive addition to the locality.

6 Conclusion

Research studies at water kiosks are invaluable for understanding the relationships between a community and their interaction with such an essential resource, in a country where clean drinking water remains unattainable for many Kenyans. This research focused on people, but also expanded to operational factors around the kiosk and water delivery. All data gathered deepened the understanding of the cultural and social nuances of the community, sharing insights that can hopefully add value in implementing the next Sola Maji kiosk in Kisumu.

It is understood that behaviour around drinking water and practices in the home stem from the environment, cultural practices and hygiene habits (Tratschin, 2010). Accepting these factors and identifying the recontamination scenarios is key if attempting to change any behaviours in the future (Merson et al., 2006). The ethnography, interviews and the focus group triangulation approach captured data around these behaviours and answered the research question by illustrating the ways in which the lived experience of the local Chuth Ber community does impact recontamination of drinking water in the home.

The Sola Maji solution was developed thanks to the benefit of technology, collaboration and a real care for community and their needs. The initiative to test water contamination levels in the Chuth Ber area homes in 2023 demonstrated that thorough follow up on the solution was considered. From this evidence and my follow-up research, gaps exist and have been outlined through these findings where the lived experience in the local Chuth Ber community plays a bigger role in re-contamination. This causes a barrier in attaining a full circle solution, one where uncontaminated healthy drinking water purchased from the Sola Maji kiosk will be safeguarded in the home environment. The lived experience of those consuming the water was not part of the analysis of the full cycle of the kiosk water from tap to table.

While very clearly, the Sola Maji kiosks rolled out thus far have created a major benefit for the community, there is room to go further and consider the findings from this research about the lived experience impact on recontamination in the homes. Potentially, future measures, communication, boda boda delivery engagement, and community programs can be incorporated in the kiosk roll-out to address some of the risks presented through this research. While overnight changes in community behaviour are not possible, there are potential approaches that can be considered to work towards solving the gaps to reduce the re-contamination of healthy drinking water while on route to the home, and while it is stored, consumed and overall managed in the home. Over time the change in behaviour can become a new norm however it is important to consider social and ethical aspects. With behavioural it is very important to assess if said changes are socially acceptable in certain households or economically attainable. There is also an ethical consideration to be examined whereby there may be a Western viewpoint about the future of the kiosk that does not fit with Kenyan lifestyle or that may interfere with beliefs or traditions.

6.1 Limitations

Its is a common feeling in research that time is a constraints and for a ten-week internship tackling this subject matter, it is admittedly limiting. Even after leaving Kenya, there were other ideas, questions that struck me and made me feel that I wish I had had time to further study this topic. However, a line must be drawn in all research.

The use of a translator from SWAP was a key advantage, however all researchers would prefer to know a local language, understand the nuances and thus feel that the flow of interviews and focus group sessions can be navigated better.

Near the very end of my time in Kisumu, I had an iinteraction with a local Chuth Ber resident and from our conversation, it was understood by me and her thoughts shared that she had preconceived ideas about me as a European white girl. This prompted more reflection about how I was perceived by others. In my conversation with her about cooking in my home, cleaning my home, etc I did hope that she and her friends came to learn that despite differences between us, we also had many commonalities.

An initial idea for my research was to live with a family in the Chuth Ber area and immerse myself in the lived experience.

In the past kiosk roll-outs, I didn't see evidence of what communication was used during the different phases of the Sola Maji project. This would have been useful to examine what communication plan and information was indeed shared with the community over the years thereby illustrating what best practices were ignored or heeded. I touched on this with some of my focus group questions but it was impossible to assess this without a further deep dive.

6.2 Recommendations

Before leaving Kenya, I shared a presentation with SWAP and UIC on my findings and recommendation at that early stage. The timing was well aligned as during May, SWAP had planned a dissemination of the results upon confirmation and analysis of the drinking water testing study in the homes. They first shared this information with the elders in a meeting, and then shared to the greater community in a 'townhall' meeting. While the local community trusted the results of the water testing, it was important not to discourage the use of Sola Maji water, and more to strike a balance. Two presentations were used, one for the elders and one for the greater community. The intention was to influence decisions they may make and some

behaviours. Some of my findings considered and the presentation included ways in which to address those findings. Appendix 3 outlines the details.

Ahead I outline some recommendation based on the key findings as suggestions for SWAP and UIC for their kind consideration;

For SWAP and UIC in designing the roll-out of the next kiosk location, they study locations to open up kiosks. In future planning they could include a closer examination of the local environment with an angle more on the lived experience. This may include interactions and dialogue with the local ladies managing water in the home through town halls. While including seniors in the community for a new kiosk is key, so too is the inclusion of women. From the onset, the community training program already created and used in May can be implemented focusing on education around water re-contamination factors (lids/covers on jerrycans, cleaning jerrycans, position of the water in the home, limiting access to children and animal). Suggestions on changing behaviour and how this reduces medical costs, etc can be an incentive.

Improvement of communication in and around the kiosk is key to consider. Communication plans including materials to share information with the community is important. Creating signage aimed at encouraging best practices should be considered for example, hand hygiene, the physical placement of water in the home, small poster to bring home as reminders for the family around hand hygiene. Signage on cleaning water storage containers and illustrating the best way to eliminate bacteria is necessary as a visual reminder each time they visit the kiosk.

In proactively preparing to supply locals with water, the first two kiosks have proven successful. Future designs could incorporate two tanks to minimize intermittent supply and water shortages at the kiosk. Included in this design could be a wash station for the water containers with ‘tools’ to aid cleaning, a permanent handwash station, and signage on how to properly clean the dirt and disinfect the inside of the container. A cleaning station to use at the kiosk can become a norm that jerrycans are cleaned before collecting water and where they wash their hand thoroughly.

Taking the kiosk management and the boda boda vendors into consideration, there are real opportunities to make some behaviour change from the onset in how the kiosk is managed, ensuring the kiosk environment is preventing water re-contamination also, strongly encouraging the use of hand wash stations, and such. As an extension of the kiosk, the boda

boda vendors can work in conjunction with the kiosk in promoting the sale of the water, in promoting the quality of the water, in answering concerns that customers may have and in encouraging better habits around drinking water storage and hygiene in the homes they visit where re-contamination occurs. If they are introduced in the community as a positive extension of the kiosk, this may foster good relations between them and locals. Also having a key role with the kiosk will conditionally 'train' the vendors to follow their own best practices and uphold hygiene standards. An increase in business means an increase in income for the boda boda vendors and the kiosk also.

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Appendix 1

Interview Guide Boda Boda Vendors

The research undertaken for my Master's thesis concerns the use of Sola Maji kiosk water from Chuth Ber/River Magruk area. This study looks at the practice of household water management in homes around the River Mugruk region, specifically on re-contamination of this healthy water after purchase.

The respondents include motorbike water vendors who buy and supply water from the Chuth Ber Sola Maji kiosk directly to the local homes who are unable to go in person to buy water themselves.

The interview begins by informing the respondents the approximate interview duration, explaining the background of the research, seeking consent to voice record the interview and enquire if there are any questions before starting. Some topics will cover: challenges in keeping water containers free from dirt/residue. The importance of hand hygiene when handling drinking water. Discussing ways how recontamination may occur in homes.

Introduction Questions:

1. What area are you from? Is it near this kiosk location?
2. How long are you doing the job of selling water on your motorbike?
3. How many kiosks in general do you buy water from for delivery?
4. How do you advertise your services?

Specific Sola Maji Kiosk Questions:

5. How long have you been buying water from the Sola Maji Kiosk at Chuth Ber?
6. Tell us how you found out about this service?
7. Did anyone explain to you how our Sola Maji water is healthy/not contaminated? (Note: the intention is to understand if they know how the kiosk works)

Water Specific Questions:

8. Please confirm that you collect water in your own jerry cans and at the buyer's home you transfer it to their containers? Are there an exceptions?

9. What different types of containers do you see in the homes for water storage?
10. Do most containers have lids on them in the home?
11. How often do you clean your jerry cans?
12. What comments have customers made, if any, about this water from Chuth Ber kiosk? (include positive and negative feedback)
13. How important do you think hand hygiene is when handling water?
14. Some Sola Maji water gets re-contaminated in the home. Do you see examples of how this may happen when you visit homes?

Appendix 2

Focus Group Discussion Guide

Introductions

- About myself, Pat Dowling, my study research aim with SWAP Kenya in the Chuth Ber region.
- Introduction of my co-chair and their facilitator role in the focus group discussion.

Reminder for the *focus group*

This is a small-group discussion guided by us. It is used to learn about opinions on the topic of managing water in the home with focus on water re-contamination. The content of the discussion will help to *guide* understanding of home practices. It will aid potential future decisions or initiatives to combat ways in which re-contamination happens.

We will outline what will take place in the 90 – 180 minute discussion.

We will remind or ask permission for all participants to sign the concent form at the end of the session before we end the focus group.

Advice/Guidelines to share:

There are no right or wrong answers, only differing points of view.

We ask that one person speaking at a time.

Some information sharing may differ with others, but we ask that we all listen respectfully.

Limiting the use of cellular phones would help us greatly.

If in doubt of any part of the discussion, please let us know.

Focus group icebreaker:

> Introduction of all participants in attendance including how you wish to be addressed (first name or other), sharing the number of people that live in their household and how often do you buy Sola Maji water.

Warm-up questions:

1. How did you learn about Sola Maji water?
2. What factors make you use Sola Maji water?
3. What do you use the Solar Maji water for in the home?
4. Do you know why this kiosk water is different, or why it is healthy?
5. Does anyone use the Boda-Boda rider for water delivery?

Exploratory questions:

6. Do you feel that use of Sola Maji water has had any impacts of your household?
   5a. If yes, can you tell us more about those impacts?
7. When the water is brownish in colour, do you still think it is healthy?
8. Do you think the water is a fair price at 5 shillings per jerrycan (20L)?
9. Who had water tested in the other study on home water with SWAP recenlty?
10. What are examples that you believe may cause re-contamination of water:
    a. When collecting the water at the kiosk?
    b. When using the boda boda rider, is his jerrycan clean?
    c. When using water in the home?
    d. Any challenges with children using water in the home?
    e. Do the males in the home wash hands regularly?
    f. Animals in the home?
11. What are the challenges around cleaning storage water containers in the home?
12. Would you pay to have the container cleaned (or do you think it's a good service)?
13. How important is hand hygiene linked to water re-contamination?
14. Are there any patterns of behaviour that you feel could be changed to decrease the opportunity for recontamination in the home?

In closing:

15. Is there anything you would like to mention in this group session?
16. Any recommendations for the Sola Maji kiosk that you think would improve the service?
17. If the water was tested in your home, do you expect that the results will be showing you have some re-contamination?

Debrief:

Thanking all participants.

Update/reminder of ‘what happens next’.

Appendix 3

The topics covered during the May 2023 SWAP training after dissemination of the water test results were as follows:

- Components of Safe Water System Intervention
- Different Methods of Water Treatment
- Water treatment processes, (Source Protection, Decantation, Distillation, Disinfection and Safe Storage)
- Demonstration of how to treat water using Chlorine (P&G Purifier of water and WaterGuard which is most common methods used to disinfect drinking water)
- Water contamination route (at the source, during transportation and at the point of use)
    1. Human activities
    2. Animals
    3. Natural happenings e.g. floods
    4. Industrial wastes

Common Questions from the Participants were discussed

- Why was my water found to be contaminated when from the Sola Maji kiosk it was Safe?
- My Water had too much Chlorine, Why?
- Can I retreat Sola Maji water at home?