Dreaming of toilets: Using photovoice to explore knowledge, attitudes and practices around water–health linkages in rural Kenya

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ABSTRACT

As part of a knowledge, attitudes, practices and empowerment (KAPE) project implemented by the United Nations University Institute for Water, Environment and Health (UNU-INWEH) in the Lake Victoria Basin, this paper reports findings from a photovoice study with women in Usoma, a lakeshore community in Western Kenya. Drawing on ecosocial and political ecology theory, findings reveal that access to water, perceptions and practices were shaped by ecological and broader structural factors. Further, collective actions to improve access were constrained by institutional and economic structures, thus (re)enforcing inequalities.

1. Introduction

For over half a century now, there have been significant global initiatives and a developing political consensus to improve access to safe water and basic sanitation. Beginning in 2000, the Millennium Development Goals (MDGs), particularly those related to water, became the major global agenda with targets and benchmarks for improving access to water and sanitation (UNDP, 2003). Due to the interconnected and mutually reinforcing nature of the MDGs, it is widely agreed that achieving the water and sanitation MDG targets is key to achieving the other MDGs (Mehta and Knapp, 2004). For example, achieving water related MDGs is regarded as key to reducing child and infant mortality (MDG 4), pre and postnatal risks (MDG 5) as quantified by Cheng et al., (2012) and prevention of vector borne diseases such as malaria (MDG 6C). Further, with the sunset of the MDGs in 2015 and the continued need to improve access to drinking water for 700 million and sanitation for 2.5 billion people, the world is currently discussing post-2015 within the context of sustainable development goals (SDGs). Desired outcomes from the proposed water goal – i.e. universal access to water, sanitation and hygiene by 2030 – under the proposed SDGs include improved maternal and child health, improved nutrition and better educational outcomes for girls (UN Water, 2014).

In attempts to understand the complex linkages between water and health, an important strand of research in health geography has been studies that examine the environmental, social and political processes that simultaneously shape disease patterns within the context of water. These studies have explicitly invoked the political ecology of health framework (Mayer, 1996) as well as ecosocial theory (Krieger, 2011) as integrative approaches to elaborate conceptual connections between broader environmental and socio-political processes – at various levels – and water-related disease distribution. For example, through an examination of a cholera outbreak in the Marshall Islands between 2000 and 2001, Yamada and Palmer (2006) concluded that the outbreak could be considered a biological embodiment of political, social and economic conditions as well as ecological imbalances. Though lack of water was a major cause of the outbreak, other socio-political conditions such as; overcrowding due to displacement of populations for US nuclear activities, poor living conditions, and social differences between land owners and the landless, were seen as major precursors. Similarly, Hunter (2003) demonstrates links between construction of agricultural dams and schistosomiasis in the Upper East Region of Ghana. A combination of ecological, political, economic, and social factors was regarded as main catalysts for the construction of the dams and the subsequent unpredictable disease outbreaks (Hunter, 2003). Echoing similar conclusions through his work on cholera and bacillary dysentery in Mozambique, Collins (2002)

suggested that changes in patterns and processes of change in diarrhoeal incidence were shaped by changing environmental and societal factors that affected the ecology of the disease as well as overall development trajectory and livelihood security. More recently, Mulligan et al. (2012) drew attention to connections between economic transformation, urbanisation, urban planning and dengue fever in Putrajaya, Malaysia.

Adding to this nascent literature, this paper examines health and well-being in a rural lakeshore community in western Kenya within the context of lack of safe water and adequate sanitation. Specifically, the objectives of this paper are to (a) explore local perceptions and practices around water–health linkages; and (b) to explore how the ecological and socio-political environments shape these perceptions and practices. In doing so, we unpack some of the structural forces that not only drive water challenges in the community but also serve as barriers to community action. This research forms part of the Knowledge, Attitudes, Practices and Empowerment (KAPE) project headed by the United Nations University Institute for Water, Environment and Health (UNU-INWEH) and implemented in collaboration with Kenyan Medical Research Institute (KEMRI) and local communities in East Africa. The overall goal of the KAPE project is to educate and build capacity of local communities around water and health and empowering evidence informed decision making.

2. An ecosocial approach to understanding water–health linkages

This research draws on Krieger's (2011) ecosocial theory to investigate ecological and structural factors that determine water-related health outcomes. Ecosocial theory explicitly incorporates constructs pertaining to political ecology, ecosystems, spatiotemporal scales and embodiment (Krieger, 1994, 2011). In integrating these constructs, we examine how socio-political processes, economic structures and ecologic settings together shape practices around water, access to water and economic activities in the Lake Victoria Basin. We give particular attention to two core constructs (*embodiment and accountability and agency*) of ecosocial theory. Embodiment literally refers to how humans incorporate, biologically, their lived experiences, in societal and ecological contexts (Krieger, 1994). Embodiment requires understanding of the different social processes and circumstances that become "embodied" to generate disease profiles, health and well-being. With regards to water, engagement with these social process and structures is important as inequality in access is increasingly an outcome of mutually constituted interplay between geographical conditions, technology and socio-political arrangements in society (Bisung and Elliott, 2014; Swyngedouw, 2009).

Accountability and agency directs attention to factors that (re) enforce inequalities in water access and the ways these inequalities are addressed. This construct also directs attention to institutional and individual capacity to take action (agency) to improve access and the need to take responsibility (accountability) for any (in)actions. The many instances of individuals and community groups undertaking water and sanitation interventions or countering injustices in water delivery systems underscores the importance of accountability and agency. For example, the successes of community led total sanitation projects in Africa, Asia and the Middle East (Kar and Pasteur, 2005) and the well-known water protest, *la Guerra del Agua* in Cochabamba, that led Bolivia's third-largest city to cancel its private water concession contract in 2000 (Murthy, 2013) points to the centrality of human agency and collective actions in improving access. While ecosocial theory considers the role of agency in improving conditions and health, it also recognises that macro-level structural phenomena may sometimes drive or constrain the capacity of individuals or communities to act (Krieger, 2011).

3. Research context

This research was undertaken in Usoma, a lakeshore community located about 15 km from Kisumu – the third largest city in Kenya (Fig. 1). Based on a household survey implemented as part of the larger research project, the community has approximately 3000 residents. Though located by the second largest freshwater lake in the world, the community had no access to safe water at the time of this study. The nearest safe water source was a tap located about 3 kms away on the premises of a Coca-Cola bottling plant. With regards to sanitation, access to adequate sanitation is significantly lower than Kisumu, with 42% of the population practicing open defecation (Bisung et al., 2014) as compared to 5% in Kisumu (Maoulidi, 2010). Continuous contact with the lake through economic activities such as fishing and domestic water collection has resulted in high incidence of water-borne and other water related diseases. For example, studies reveal high rates of schistosomiasis in the community, with over 90% infection rate among school children (Shane et al., 2011).
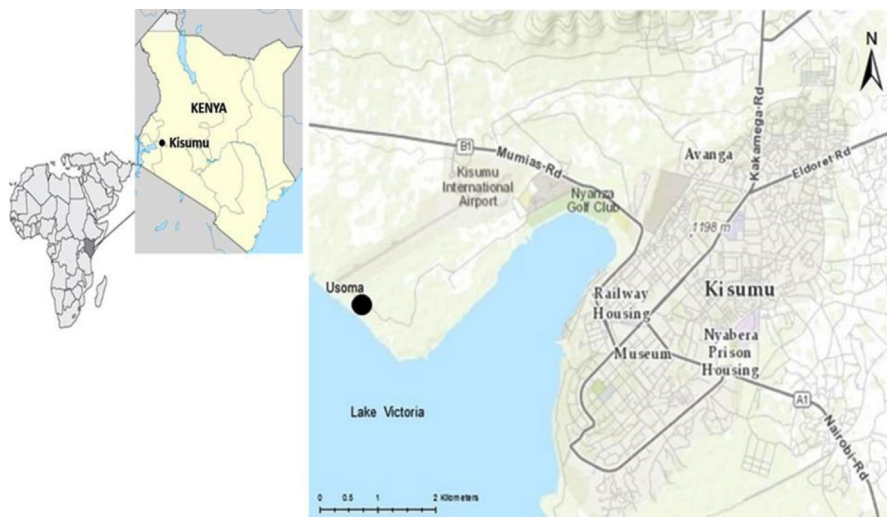

Fig. 1. Study Site: Usoma, Kenya (Bisung et al., 2014).

There is a strong presence of community groups that have been actively involved in attempting to solve many of the environmental and development challenges in this community. Examples of such groups include the Usoma Beach Management Unity, Usoma Community Health Volunteers, Usoma Water Sanitation and Hygiene Organisation (UWASH), a women's group and youth groups. UWASH was specifically formed to mobilise the community for undertaking water and sanitation interventions. Their efforts have since resulted in the extension of piped water to a vending tap in the community by the Kisumu Water and Sewerage Company Limited (KIWASCO) and the construction of a sanitation facility through financial support from UNU-INWEH, Rotary Club of Hamilton, Canada, and private contributions.

4. Methods

We used photovoice as a participatory action research method to address the research objectives. Photovoice is a relatively new technique built on the principles of social constructivism, community empowerment, education, and documentary photography (Grieb et al., 2013). The concept of photovoice was developed from three main foundations (Wang and Burris, 1994, 1997). First, it assumes that education should start with issues people see as central to their lives and facilitated through active participation and sharing of mutual experience. Second, by drawing on feminist theory and practice, photovoice is meant to empower and ensure adequate participation of vulnerable groups such as women, children and minority groups in community development as well as value the lived experiences of these groups in the production of knowledge. Third, building on the ideas of documentary photography, photovoice is premised on instigating social change through photography by ensuring that people are not treated as passive participants and images but as active participants in the taking of photographs and discussing the images (Wang and Burris, 1997; Rose, 1997).

4.1. Data collection

The study was undertaken between June and August, 2013. Eight women participated in the study over the entire period. The sample size was adequate to generate rich information (photographs and narratives) on the phenomenon studied (Miles and Huberman, 1994; Curtis et al., 2000). The number of photographs generated was also manageable for participant's face-to-face interviews and discussions thus providing an opportunity for conceptually relevant thick descriptions (Dennis et al., 2009; Curtis et al., 2000). Women were recruited for this study because they typically bear the greatest burden for providing water for households in most parts of Kenya, do not hold decision-making authority and are equally at risk from both health and social challenges associated with water collection from the lake and other open water sources (Bisung et al., 2014). Using convenience (snowball) sampling (Creswell, 1998), participants were recruited by first identifying two key participants based on past community

collaborations. These initial contacts were then asked to suggest other women they felt would have interest in the project. Though participant recruitment was not designed to be representative, it is worth noting that good maximum variation in terms of age, length of stay in the community and occupation evolved (Table 1).

4.1.1. Data collection procedure

Participants were first provided detailed information on the research as well as training in basic photography skills and ethics associated with taking photographs. The training was conducted in DhoLuo (the language widely spoken in the community) and all training manuals and consent forms were also translated into DhoLuo. A Ph.D. researcher from KEMRI was recruited as a research assistant and acted as a translator for the study. After the training exercise, disposable cameras (with 28 exposures each) were given to participants to take photographs of what they felt best represented *attitudes and practices around water and sanitation that influence health in the community*. Participants were allowed to take any number of photographs they felt adequately represented their views. All cameras were retrieved after eight days and the photographs were printed. Overall, participants took between 16–26 photographs. It is however important to note that some of the photographs were not related to the project but rather photographs of participants' household members. One set of pictures was given to each participant as a token of appreciation.

Each participant then chose four photographs that best represented her views. These were used as a basis for discussion in follow-up individual interviews. Thus, thirty-two ($n=32$) interviews were conducted ranging between 60 and 90 min per photo. During interviews, each participant was generally asked to explain the following regarding the photo: (1) what the photo was and where it was taken; (2) why the photo was important to understanding water–health linkages; (3) how the photo related to health and wellbeing in the community; and (4) what could be done about the issues or challenges highlighted in the photo. After the one-on-one interview sessions, participants were invited to a group discussion. The purpose was to give all participants the opportunity to comment or share their views on the collection of photos in a group setting (Haines-Saah et al., 2013) and also share their experiences with the project. All the interviews and discussions were conducted in DhoLuo.

4.1.2. Challenges of using photovoice as a methodology

Photovoice presents a number of ethical challenges because it involves unique relationships between the researcher, the research participants (photographers) and those photographed. Though a number of studies have offered some guidelines and examples on how ethical considerations can be dealt with in photovoice (Wang and Redwood-Jones, 2001; Castleden et al., 2008; Grieb et al., 2013), every photovoice project presents additional ethical challenges because of cultural and contextual differences (Prins, 2010). Following recommendations and examples from Wang and Redwood-Jones (2001) and Castleden et al., (2008), consent and confidentiality,

Table 1
Summary description of participants.

Participant's pseudonym	Age (years)	Education	Occupation	Length of stay in the community (years)
Zaaria	28	High school	Unemployed	5
Anita	33	Standard eight	Fish seller	12
Shemima	22	Standard eight	House wife	7
Mary	49	Standard seven	Seamstress	23
Betty	54	High school	Fish seller and a community health volunteer	30
Dorcas	34	Standard eight	Unemployed	6
Wintima	43	Standard eight	Businesswoman	12
Diana	39	None	Housewife	24

particularly of those photographed was dealt with in the following ways: (1) training was conducted with all research participants to explain the research objectives and the ethical considerations that the researcher and participants needed to ensure; (2) a community *baraza* (*A community durbar or forum where people come to share ideas, thoughts and opinions around issues of importance to the community that require action.*) was held to explain the project objectives to the whole community; (3) research participants signed consent forms indicating their responsibilities and agreed to have their photographs used in teaching, scientific presentations and/or publications; (4) signed informed consents were required from people who appeared in the photographs; (5) a set of photographs was given to people who appeared in the photographs and requested a copy. This was to ensure that they were satisfied with the photos used for the project. Ethical clearance for this study was received from University of Waterloo Ethics Review Board and the Ethics Review Committee of KEMRI (SSC Protocol # 2468).

4.2. Data analysis

Interviews were audio recorded with permission from participants and transcribed verbatim. The photographs and transcripts were then imported into NVivo 10, a qualitative software package, for analysis. Photographs were first coded according to the themes identified by participants; more themes were then added from the interview transcripts as the coding progressed. Some photographs captured more than one theme and were thus coded in more than one category. Themes, sub-themes and the photographs were reviewed more than three times to ensure concepts and photographs that related to the same phenomenon were coded under the same category. Data was coded by the lead author with assistance from the second author. Preliminary findings were presented to the community in May, 2014 to discuss themes that emerged and to solicit feedback and enhance rigour. Codes were organised around four major themes: environmental concerns and practices; social and health impacts; structural factors; and water related collective action. Quantitative counts of the number of photographs under each theme are presented in Table 2.

5. Results

To facilitate reporting, Tables 2–6 report the number of pictures in which particular themes and sub-themes were captured. Pseudonyms are used in reporting to ensure anonymity.

5.1. Environmental concerns and practices

Participants had concerns with open defecation, as illustrated in their photographs. The inextricable links between open defecation and water were demonstrated by many participants during interviews:

You can see bush, these bushes are places for open defecation, so people walking to go fetch water are exposed to all sorts of infections because the water becomes polluted after heavy rainfalls (Zaria; photo of a man and a child walking through a bushy path towards a lake water collection point).

Participants also talked at length about the inadequacy of some sanitation facilities, such as pit latrines, to protect human health. Such pit latrines were regarded as inadequate, inappropriate and unacceptable in terms of protecting the health of those who use them and their neighbours:

This toilet is not well made, the owner thinks he is better off than somebody going into the bush to defecate, but this condition is not good for protecting his health either (Betty).

Table 2
Thematic summary of photos.

Emerging theme	# of photographs representing theme
Environmental concerns and practices	41
Health and social impacts	44
Structural factors	12
Collective action	15

Table 3
Environmental concerns and practices captured.

Types of environmental concerns and practices	# of photographs in which captured (*n*=41)
Open defecation	9
Lake pollution/contamination	8
Poorly constructed pit latrine	6
Unsafe water	6
Unhealthy practices of fishermen	4
Sand harvesting/abstraction from lakeshore	4
Washing of clothes and utensils inside lake	4

Table 4
Health and social impacts.

Types of health and social impacts	# of photographs in which captured (*n*=44)
Exposure to water related diseases	14
Water collection burden on women and children	12
Disease burden on women and children	6
Impacts on savings	6
Impacts on education	3
Opportunity cost of time used in collecting water	3

Table 5
Collective actions to address water challenges.

Emerging themes related to collective action	# of photographs in which captured (*n*=15)
Community mobilisation (coming together)	7
Importance of "baraza"	4
Role of village elder/leaders	4

Table 6
Reported structural factors.

Types of structural factors	(*n*=12)
Power relations	5
Unemployment and low incomes	4
Unequal distribution of resources/marginalisation	3

You could even see house flies all over, they fly in and out. Even the doors are not there, so there is very little difference between defecating in the bush and this toilet (Wintima).

Participants were also concerned with the effects of sand harvesting/abstraction; a common practice whereby young men

shovel sand off the bottom of the lake or from the lakeshore for sale to local construction firms. Once sand is harvested from the lakeshore, the top soil is usually degraded and large parcels of land are turned into open pits and ponds after heavy rains. These ponds become breeding grounds for mosquitoes. This was illustrated in a number of photographs and interviews:

Mosquitoes breed here and most people living close by these sand harvesting places are always suffering from malaria as a result of stagnant water providing breeding sites for mosquitoes (Dorcas).

Pollution of the lake was another concern captured. Though the lake was identified as an important source of water for domestic uses, most participants expressed concern about how it has been polluted by industrial activities:

It is not the villagers who pollute the lake. Trucks from construction firms around are washed inside the lake. There is also a Molasses company at the other side that discharge waste into the lake (Zaaria).

Related to these environmental concerns were other water-related practices that participants felt had influence on their health. From the interviews, these practices were largely shaped by the environmental context (presences of lake), economic activities and the general lack of water. Commonly captured practices were children swimming in the lake, fishing and washing in the lake. Participants were able to adequately link these practices to their health and wellbeing and explained the reason for engaging in these practices. An example is illustrated below:

Because lake water is the only source and it is free and convenient, children prefer to do all their daily activities there at once. They will usually carry clothes and go wash there, then bathe, and then carry some water home. What is more convenient than this? But it is not safe at all since these children are exposed to bilharzia and other diseases (Diana).

Most participants were also critical about the practices of some fishermen. Though participants understood and explained the health risks associated with fishing activities, they attributed some practices of the fishermen to inadequate knowledge and ignorance:

When these people [fishermen] are washing their nets, they stand in the water and unnecessarily exposed themselves to bilharzia infection. Sometimes too when they are fishing and right in the middle of the lake they get thirsty, they just drink the contaminated water. It is sometimes ignorance if not they can easily carry water with them into the lake (Anita).

5.2. Health and social impacts

Participants also highlighted the health and social impacts of lack of access to safe water and adequate sanitation. Aside from direct exposure to water related diseases, the impacts on the health and well-being of children and women were emphasised. It is not surprising that gender related impacts were a dominant theme as lack of safe water and adequate sanitation are disproportionately felt by women and children (Cheng et al., 2012). The impacts on maternal health, educational opportunities for children and loss of calories expended by children in fetching water were exemplified. The impact on maternal health and child health was particularly expressed in a photo that showed a pregnant woman carrying water and her son pushing barrels of water in a wheelbarrow:

This [water carrying] affects the lives of our people, sometimes children need a lot of energy to push these wheelbarrows and carts, and as you can see the boy is barefooted and is exposed to

all kinds of injuries. Even the woman is pregnant and carrying this 20 liters on the head and still holding 10 litres (Zaaria).

Participants were also particularly aware of how the lack of water affected their children's education:

Fetching water always affects the time children go to school, sometimes you go to the well and you find children and ask them why they are fetching water when it is school time? They tell you the water in the well can get finished by the time they return from school (Shemima).

Participants further captured economic impacts to households and the community. Not only did they talk about productive time wasted walking long distances to get potable water, they also explained the direct cost involved if a household decides to buy from a vendor:

I took this picture because I wanted to show where we get clean water [tap location]. It is far and if you want to walk you must forgo all other productive activities. If you want to buy from a vendor too, each of these jerry cans [20 litres jerry cans] goes for 20 shillings [about 0.25 USD] and because you cannot use only one jerry can for your household needs, we virtually finish all our savings buying water (Mary).

According to the WHO, between 20 and 100 litres of water per person per day is needed to ensure basic needs are met and health concerns are controlled (Howard and Bartram, 2003). In Usoma, this translates into spending between 0.25 and 1.25 USD per person per day if a household decides to buy from vendors. Considering the level of unemployment and incomes in the community, it is very unlikely households can afford to buy the required quantities from vendors.

5.3. Collective action

Participants reported taking a number of actions to cope with or find solutions to the water-related challenges in the community. For this research, collective action was defined broadly to include a variety of mutually beneficial actions undertaken by a group or the whole community (Bisung et al., 2014). These actions included water and hygiene education, contributions towards common activities, attending community meetings and participation in community based groups focused on water, sanitation or hygiene. An example of an educational intervention is illustrated in this quotation:

Through our own initiatives, people are taught basic hygiene. Even children know how to sieve water, though they may not do it very well but at least they know the water is not safe for drinking if not treated. The community health volunteers do very well by going round from house to house to educate people on healthy practices and lifestyles (Wintima).

Important avenues for community mobilisation for such actions are community based groups. The presence of community groups including women's groups, youth groups and cooperatives are features of social capital that facilitate water-related collective action (Bisung et al., 2014):

Sometimes when we go for women group meetings we discuss things such as water treatment, storage and even how we can get help to construct boreholes. The groups are really helping to bring all the women together (Anita).

Leaders within the community, especially the village elder, play a very important role in facilitating collective action. Particularly during *barazas*, they facilitate discussions and try to educate people on the need to take some form of action. For example:

The village elder and chief has talked about it [sand harvesting] several times during barazas. The whole village agreed to stop some few years back and even some families have stopped giving out their land for sand harvesting (Diana).

Though the above quotation illustrates the importance of community leaders, most people reported general lack of trust in community leaders during our community feedback. The inability of leaders to build trust was seen to be partly responsible for the continued water and sanitation challenges. The community attributed lack of trust to a number of factors; monopolisation of leadership positions; elected leaders wanting to stay in office forever; and disrespect towards leaders who were considered young.

5.4. Structural factors

Participants generally perceived environmental concerns and practices to be influenced by two primary determinants; lack of economic opportunities (unemployment) and unequal distribution of resources (marginalisation). Participants indicated that the youth continued to engage in sand harvesting because of the lack of economic opportunities and the high rates of youth unemployment:

We try our best to avoid sand harvesting but because of the lack of employment some families will go hungry if the young men do not go to harvest sand (Shemima).

They further explained that the lack of safe water in the community is partially due to unequal distribution of resources and lack of commitment from local government authorities to solve the problem:

If the administration was fair to provide us with water most of our problems will be solved. Sometime we need to talk about the way we have been cheated and neglected over the years (Betty).

Further, some structural factors were identified as barriers to collective actions. These factors were closely tied to power relations, inequalities and the lack of economic activities. Particularly with respect to strategies to stop industries from dumping waste into the lake, they felt some form of help from government was needed since those industries had more power than the community:

Hmmm… these construction firms are big and have money, it is very difficult to stop them easily unless some big people or government officials also help. The other day we held a meeting and chose some people to go and talk to them but because we are powerless nothing will happen (Mary).

Finally, while participants felt they had a better chance of constructing sanitation facilities or boreholes if they came together, low incomes and unemployment were again seen as a barrier to achieving such "dreams":

We have a water and sanitation committee that is trying to mobilise people to solve these problems, but the problem is how to raise capital to either build public toilets or help people construct their own toilets. Sometimes I tell people we are dreaming. How can we contribute money when we don't have jobs? We just need help from government! (Dorcas).

6. Discussion and conclusion

Though the application of ecosocial frameworks in health geography has been limited, it provides researchers with a deeper understanding of factors that drive population patterns of disease. It directs attention to the interplay of ecology and social processes, and makes use of spatiotemporal events and processes in determining disease patterns. This research has identified a number of

structural factors – unemployment, unequal distribution of resources (marginalisation) and lack of trust in leadership – that become embodied through lack of access to water and sanitation in Usoma. Historical and current industrial activities around the community have also led to two major adverse impacts; disruption of pipelines that used to supply the community with water and pollution of the lake. Though contamination of the lake cannot be solely attributed to industries around the community, seeing heavy trucks being washed in the lake and waste being discharged in the lake created discomfort and anxiety in the community. The effects of unemployment and lack of economic opportunities were manifest in a number of ways. First, respondents indicated that unemployment was a major factor that drove young men to engage in sand harvesting which destroyed the environment and created breeding grounds for mosquitoes. Secondly, unemployment affected their incomes and savings which made financial contributions towards communal projects (such as construction of sanitation facility) very difficult. Thirdly, low incomes also meant little money available to buy water treatment products and soap for hand washing. Lastly, during our community feedback exercise, many members of the community indicated unemployment resulted in less time for participation in community *barazas* as few local economic opportunities resulted in most community members leaving very early in the morning to go search for casual work in the city.

Unequal distribution of resources and marginalisation was also tied to the lack of water in the community. Some participants regarded the provision of water to be the responsibility of government and therefore attributed their challenges to government neglect. Water services in Kisumu are provided under the mandates of the Lake Victoria South Water Services Board (LVSWSB) which contracts service provision to Kisumu Water and Sewerage Company (KIWASCO), a subsidiary company of the Municipal Council of Kisumu. Though KIWASCO has a "pro-poor" water delivery model expected to serve the needs of poor communities such as Usoma, its implementation has been difficult due to the large number of poor and informal communities in the region, and financial requirements (Maoulidi, 2010). Thus communities such as Usoma feel marginalised by the current distribution system in the city and see themselves as victims of government policies.

This research further provides important information for understanding barriers and facilitators to water-related collective action. Collective action was common in the community with varying degrees of success. For example, while actions/interventions by the community health volunteers group and UWASH were seen to be successful, other actions to stop sand harvesting were considered unsuccessful. Identified key facilitators of collective action were availability of community groups, attendance at *baraza* and commitment of the village chief and elder. On the other hand, structural barriers to collective action included unemployment (affecting contributions) and perceived lack of power. Particularly, low community efficacy and perceived lack of power affected the initiation and likely success of interventions that involved negotiating with other institutions or industries. As reported in similar studies, community members are sometimes unwilling to fully participate in actions if they feel the effectiveness of the actions will be limited due to their powerlessness (Wakefield et al., 2001).

Findings suggest that access to water and sanitation, and water related behaviours and practices are played out as part of everyday lived experiences embedded in social processes, economic opportunities and the ecological context. We draw on these findings to develop a framework (See Fig. 2) for understanding embodied health and well-being within the context of water in Usoma. The framework has four micro-level determinants: water related practices; sand harvesting (including other economic activities around the lake that expose people to water related diseases); lake contamination; and access to water and sanitation. At the macro-level, we identify lack of economic
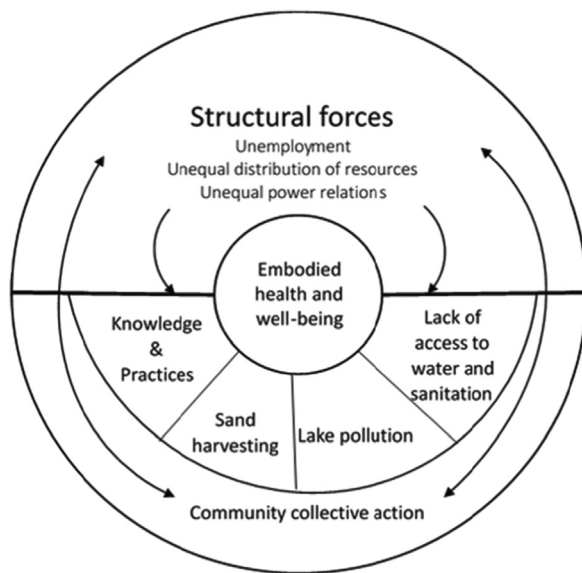
Fig. 2. Embodying access to water and sanitation in Usoma.

opportunities (unemployment), power relations and unequal distribution of resources as structural factors that influence health and well-being. These wider structural factors also drive the micro-level factors. For example, unequal distribution of resources manifest in disparities in access to water and sanitations and unemployment drives people to engage in sand harvesting. We observe the centrality of human agency and collective actions in addressing both micro-level and macro-level factors. For example, at the micro-level, there were collective efforts to stop sand harvesting and lake pollution and to build sanitation facilities. Also, findings demonstrated that individuals took actions such as water sieving, proper water storage, contribution of resources and volunteering in water related activities to improve their access to safe water. Further, there is a constant dialogue between collective actions and the structural forces. For example, while the community continued to petition relevant local government and water sector agencies to address their concerns, the lack of employment meant that some people skipped community meetings and deliberations for fear of not being able to make financial contributions.

In conclusion, these findings suggest that understanding water–health linkages in marginalised communities require adequate examination of the environmental, social, economic and political context that determines access to water. Thus, community based water–health interventions must take a holistic approach that considers: broader policy issues that determine who gets access to water and at what price; the ecological setting within which people live and work; and micro and macro-level factors that facilitate or constrain community mobilisation and collective actions. In Usoma and perhaps in many other rural lake shore communities in sub-Saharan Africa, efforts to improve health through community based initiatives will have to confront these structural forces and complex human-environment interactions. In terms of policy directions, local government policies and institutional frameworks need to recognise poverty indicators such as low income and unemployment both as determinants and outcomes of sustainable improvements to water and sanitation. Thus greater policy emphasis on community capacity building and its retention for sustainable access to water supply and sanitation needs to incorporate direct economic and social programs that enable people to achieve their full potential. This can make meaningful contributions (financial, time and resource) towards community based water and sanitation projects.

Further, future research that highlights the breadth and association between socio-political, economic and ecological indicators and sustainable access to water and sanitation will help in the application of these findings. Finally, as suggested by Dennis et al., 2009, photovoice and other participatory photography methods should move beyond engaging only policy makers and government officials towards strategies that involve direct interventions. Though this project has a component that directly supports the community to construct a water and sanitation facility; future research must also include strategies for evaluating interventions in order to contribute to our current stock of knowledge.

Acknowledgement

Appendix A. Supplementary materials

Supplementary data associated with this article can be found in the online version at http://dx.doi.org/10.1016/j.healthplace.2014.12.007.

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