
Seeing the Unseen: Subaltern Voices and Actions for Water and Health Security

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Abstract:

This paper highlights the complex realities of subaltern voices in relation to the water-health nexus. By supporting subaltern groups' stories and perspectives, we aim to assist in creating an open dialogue that will challenge current water-health practices. This chapter will argue that current water-health practices and perspectives fail to include subaltern realities, perpetuating a cycle of failed water-health programs implemented in the global South. This chapter will follow in five further sections and will begin by providing a brief introduction of water-health issues and the connection to subaltern people. The second section will address water-health linkages and the extended application of the water-health nexus. The third portion will highlight the Ecosocial and social capital theories and how they can be applied to water and health studies. Next, an evaluation of Water, Sanitation and Hygiene (WASH, WatSan) programs and single community pump solutions will take place. The fourth section will unpack case studies that bring to light the need to ensure that subaltern perspectives are legitimized in water-health practices. Finally, this chapter concludes with the recommendations of the use of innovative resource techniques and the use of the water-health nexus in knowledge to sustainable action frameworks. Going forward, it is envisioned that subaltern voices will remain forefront of the water-health conversation and lead the way to achieve Sustainable Development Goal 6 (Clean Water and Sanitation) and Sustainable Development Goal 3 (Good Health and Well-Being).

Introduction: The Subaltern and Water and Health Security

Gyatri Spivak (1988) was one of the first thinkers to popularize the post-colonial theory term ‘subaltern’. She states that this term should not be used as a means to describe the ‘oppressed’, rather used to describe those who are voiceless because they are excluded from hegemonic discourses. Unable to participate in the hegemonic forces that have the power to invite equal and adequate treatment, people are pushed into a space of difference — the periphery. For the purpose of this chapter, the meaning of subaltern will draw from Spivak, representing anyone who has limited access to cultural imperialism and whose voices are silenced because of this. This includes but is not exclusive to being marginalized due to identity associations with poverty (both rural and urban), indigeneity, race, gender, and the working class. Because the subaltern are viewed as voiceless, when injustices are realized, it is common practice for outsiders and even the oppressors to attempt to speak for them.

A common injustice that subaltern groups face in the global South is access to potable water and sanitation facilities. Approximately, 2.1 billion people lack access to safely managed drinking water services and 4.5 billion people lack safely managed sanitation services (UNWater, n.d). Unsafe and unclean water, sanitation, and hygiene show adverse effects on human health and well-being as approximately 3.5 million deaths globally are attributed to unclean and unsafe water, sanitation, and hygiene (Confalonieri & Schuster-Wallance, 2011). These quantitative statistics numerically show the inequality of access to safe and clean water and draw large amounts of attention due to their numerical size; however globally, we must now ask “*Who*” is representing these statistics? The subaltern are the ones who live these statistics everyday and in the end they are brought to the forefront as sole numbers that are used in global organization reports. This chapter challenges the need to go forward on a knowledge and action

journey that gains awareness on the different perspectives and frameworks between water and health for the subaltern in order to implement innovative interventions and programs, that ultimately close the gap between knowledge and sustainable action and in making the invisible, visible.

Water-Health Perspectives

How water-health relations are perceived impacts every aspect of action in water-health practices such as in research, data collection, management, or interventions. The challenge with perceptions is that they are fluid in change and they require supporting evidence to be valid and arguable. The Sustainable Development Goals (SDGs) have emerged as the universal call to action and has emphasize a priority to address inequalities and to ensure that “no one is left behind.” SDG 6: Ensure availability and sustainable management of water and sanitation for all and the 2030 Agenda promotes the disaggregating of regions between countries, within countries, individuals within countries, between urban and rural areas, and within wealth quintiles in order to further identify inequalities and to commit to “leave no one behind” in regards to universal water access (WHO, 2017). For example, Angola has a relatively high coverage of basic drinking water, but there is a 40% gap between urban and rural areas and a 65% gap between the richest and the poorest in Angola with basic drinking water coverage (WHO, 2017). To reduce the gap, there needs to be challenges on the current water-health perspectives in order to reveal the deeper realities of those who experience day zero everyday.

It is known that access to safe water is a basic human right for many, however it is often far from reality for about one billion people who lack access to safe water (Bisung & Elliott,

2014). Those without access to safe drinkable water are forced to consume surface water, unprotected and contaminated wells, or from vendors selling water of unknown provenance and of poor quality (UNWater, n.d). Access to proper sanitation facilities like proper latrines are vital in order to avoid practising open defecation, which can adversely lead to increases in vulnerability of rape for women during the night and it can lead to increases in the spread of diseases such as cholera (UNWater, n.d). Hygiene is also a key determinant in the spread of disease. Proper washing facilities and safe water can be transformational changes for protection from diseases. There is a potential to save about 840,000 lives of people who die every year caused by unsafe water, inadequate sanitation and poor hygiene practices (UN Water, n.d).

The perspectives of safe water, sanitation, and hygiene are common accounts that need to be challenged in order to divulge new perspectives that place the lives and voices of the vulnerable and marginalized at the forefront. In order to begin this trans-disciplinary knowledge journey between water and health, challenging questions must be probed such as: it is not just how much water there is, but who has access to it? How do societal relations affect the flow of water? Lastly and most importantly, how do we translate perspectives into context appropriate and sustainable action? If we do not ask these questions that challenge the current perspectives of water and health, we will not be solving the water-health problems but simply we will continue spinning the unchanged wheels. A deeper trans-disciplinary approach in perspectives is needed for water-health relations and it is recommended that four aspects be considered and acted upon: communicate as scientists (natural, clinical, and social) about the priority of water-health problems, the need for research for knowledge, and the need for effective and sustainable action; second, that investigations in perspectives are theoretically informed and studied; third, to

broadly contextualize investigations in perspectives between water-health; fourth, uphold local/indigenous knowledge (Elliott, 2011).

Water-Health Linkages

Water is essential for human life. As each human body is comprised of up to 60% of water each individual naturally relies on water for survival and well-being (Perlman, 2016). However, as water provides life, it can also deliver the burden of diseases and even death. The triad of water, sanitation, and hygiene (WASH) play a globally predominant role in the water-health linkage. The big data statistics illuminate the direct effects of water and health by statistically representing the lack of access to clean drinkable water, poor sanitation, and poor hygiene globally. It is underlying implied that these statistics represent the subaltern in developing nations who beside these big numbers are often pictured as African women fetching water from distances from contaminated lakes or impoverished children drinking water straight from the road surface. The usual statistics that are flooding the water-health linkage state that:

- 10% of the burden of diseases is attributed to unsafe water, inadequate sanitation and poor hygiene.
- 1.4 million children die each year as a result of diarrhea
- 1 in 5 children born in the developing world will not reach their 5th birthday due to mortality from water borne diseases

(Bisung & Elliott, 2014).

These upsetting statistics show that water and health follow a linear causation pattern. These statistics are often used to call the attention to stakeholders to address the issues of WASH that people face. However, although powerful in quantitative stance, these linear linkages are

missing the essential “*Who?*” question, then following the what, why, and how. Who are the faces behind the 1.4 million? What are the 1 in 5 children specifically facing and does it go beyond water issues? Why are children dying from water borne diseases? And how can this be addressed? The call to hear voices from the field and to reveal the faces behind these big statistics are needed in order to make progress in ensuring that each human being has access to clean water, sanitation and hygiene. The linear causation pattern between water and health needs to be expanded into accounting to the profound wider socio-economic relations that exist between water and health. Therefore, the water-health nexus is recommended as a means to creating a perspective to water that helps bring the subaltern to the forefront and ahead of the numerical data.

Water-Health Nexus

Water and health is a complex relationship that goes beyond the water-health linkage approach. The water-health nexus is a recommended perspective that goes beyond the dominate linear approach of water and health as the water-health nexus represents the intersection at which issues of water, sanitation, health, and well-being meet (Bisung & Elliott, 2014). The water-health nexus highlights four trans-disciplinary aspects: the biophysical system of water (ecosystem), the socioeconomic and political system of water (hydrosocial) and human health (Confalonieri & Schuster-Wallance, 2011). The hydrosocial perspective is unique as it is a socio-natural process by which water and society make and remake each other (Confalonieri & Schuster-Wallance, 2011). In conjunction with the well-known hydrological cycle, the

hydrosocial cycle can reflect the social nature of water. These four interfaces of the nexus of water and health create new avenues of perspectives for deepening the water and health linkages.

How water and health are perceived affects the way water-health issues are addressed. There are two proposed approaches that address the adverse water quality and human health outcomes. The first is through enforceable water quality standards, like the standards that are set by the World Health Organization's water quality guidelines (Confalonieri & Schuster-Wallance, 2011). This approach is supported by water-health linkage approach where there is linearity in stating a cause and effect between water and health (eg. cholera in water (cause) and diarrhea (effect)). The second approach is a quality management approach. This approach identifies all points in the source to end-of-pipe chain and places a management plan to mediate these risks accordingly and ensure sustainable protection of water quality (Confalonieri & Schuster-Wallance, 2011). This approach embraces the integration of water and health, which then creates more holistic ways of data collection, policy, management, interventions, and perspectives that support the water-health nexus. An example of a this second approach is from South Africa where GIS for water management was proposed with fourteen aspects for inclusion such as water, energy climate, health, agriculture, ecosystems, and socio-economic aspects (Confalonieri & Schuster-Wallance, 2011).

The water-health nexus perspective aids to reveal the complexities of the water-health relationship and provides fertile ground for the synthesis of reducing inequalities and improving human health, wellbeing and development (Bisung & Elliott, 2014). As awareness in complexity increases the need for trans-disciplinary approaches to public health, water management, and the hydrological perspective become more indispensable. The water-health nexus has the leverage to

create meaning to big data statistics and ultimately propel the voices, stories, and water knowledge of the subaltern to the forefront.

Connecting Embodiment

With the surfacing of the water-health nexus, embodiment is simultaneously related as it assists in understanding the determinants of health and well-being (Bisung & Elliott, 2014).

Embodiment is commonly used in epidemiological studies in order to reveal population patterns of health, disease and well-being and interpret the biological expressions of social relations and structure (Bisung & Elliott, 2014). Embodiment contains four areas of beliefs:

1. “Bodies tell stories about and cannot be studies divorced from the conditions of our existence
2. Bodies often tell stories that often, but not always, match peoples stated accounts
3. Bodies tell stories that people cannot or will not tell either because they are unable to, they are forbidden, or they choose not to”

(Confalonieri & Schuster-Wallance, 2011).

In the context of water and sanitation, water-related diseases such as schistosomiasis, leaves marks on the body of infected persons’ which tells the stories about the persons’ living conditions or state in regards to access to safe water, sanitation, and hygiene (Bisung & Elliott, 2014). Embodied epidemiology promotes the understanding of different social processes that affect a person to reach ill health and then further states that in turn poor health outcomes become “embodied” to then generate disease profiles and health or well-being of a person (Bisung & Elliott, 2014). Overall, embodiment states that the conditions of our bodies can tell insights and understandings of the body politic, which questions, “who has access to safe water and sanitation, under what conditions, and at what cost?” (Confalonieri & Schuster-Wallance,

2011). Embodiment demands attention for the subaltern bodies that reflect the statistics that are solely superficial numerical figures. Embodiment is a connecting framework within the complex water-health nexus that is used in conjunction with theoretical frameworks like the social capital theory or ecosocial theory, in order to effectively theorize water-health, well-being, and to reveal where the authentic data representing the subaltern lies.

Current Frameworks

The linkages between water and health are connected by a wide variety of elements such as politics, biology, economics and social factors (Bisung and Elliot, 2014). The water-health nexus is a complex, multifaceted approach to understanding the relationship between water and health in varying contexts but due to a variety of compounding factors it can be difficult to identify the elements present in water and health issues. Theories such as the social capital framework and the ecosocial theory are tools utilized by scholars and policy makers to help understand the complex web of water and health.

Social capital in relation to health is comprised of three varying perspectives based on the concepts brought forward by Pierre Bourdieu, James Coleman and Robert Putnam (Bisung and Elliott, 2014, p.195). Bourdieu, Coleman and Putnam may have differing views on the development of social capital but the scholars can agree that at the core social capital is a resource that actors can benefit from as they are a part of a social network or structure (p.195). In the water-health nexus, social capital tends to focus on the community and local level identifying potential social and economic factors that can affect the health status of a given community (Bisung and Elliot, 2014). Social capital investment theoretically should lead to improvements in the health and wellbeing of a community, as the social networks and structures of the community are strengthened in this process. Within the water-health nexus, as social capital investment

would enhance water related behaviour, as information dispensed could facilitate improved management of water therefore having a positive effect on health and wellbeing (Bisung, Elliott, Schuster-Wallace, Karanja and Abudho, 2014). The development of social capital within the water-health nexus should theoretically produce beneficial outcomes for the communities as an environment that fosters active participation and strengthens community structures (Bisung and Elliot, 2014). The main tool used in a social capital approach is the Social Capital Assessment Tool (SOCAT) created by the World Bank to measure social capital over a period of time in a community in relation to development indicators (Bisun et al., 2014, p.149). The tool can be modified to focus on specific indicators such as water and health at a community level and this is known as an Adapted Social Capital Assessment Tool. An important aspect of social capital is that it can lead to collective actions within communities, this in turn can impact the water-health nexus in the given community (p.149). Community groups provide a space for collective action and social capital engagement, the stronger the social capital network the more likely collective action will be prevalent in societies. Collective action can impact how resources such as water are managed and ensure safe water is provided for those in the community, as social capital supports this venture.

Ecosocial theory focuses on the causes for population patterns in terms of health, disease and wellbeing seeking to understand who and what is responsible for past and present health inequalities (Bisung and Elliot, 2014, p.196). The Ecosocial theory examines health in a given area by understanding the social processes, structures, cultural norms and ecologic factors (p.196). This theory takes a multifaceted approach to understanding the nexus of diseases, in relation to water and health it seeks to understand the physical, social and biological factors that lead to prevalence of certain diseases in various regions (Bisung and Elliot, 2014). Within this

approach it is understood that interventions must be targeted to suit the everyday lives of individuals and cannot be removed from current social practices as that will lead to an ineffective intervention. As the Ecosocial approach focuses on social factors in relation to health, social capital can strengthen the approach as it concentrates on community networks and social structures. Understanding the social aspect of communities and their structures is important as it helps to identify varying power dynamics and forms of social capital which is necessary component for the Ecosocial theory to understand the dynamics that exist, the patterns of health in regards to water provisions (Bisung and Elliot, 2014). Ecosocial theory aims to understand health inequalities from within a web of social and biological factors whereas, social capital examines why inequalities in access to water and sanitation exist within a region to begin with. Social capital integrated with Ecosocial theory provides a helpful holistic model to understand disease, health and wellbeing as it accounts for social and biological aspects.

Gaps in Knowledge to Sustainable Action

Despite the plethora of knowledge regarding water and health and the commitment from the global community in both the Millennium Development Goals and the Sustainable Development Goals, little sustainable actions have come to fruition. This has promoted scholars such as Wandersman et al. (2008) and Kruk et al. (2011) to ask questions about the gap between water-health knowledge and translating it into long-term action. Kruk et al. (2011) believes that this is due to equity and wealth disparities arguing that regardless of how much funding is channelled into a nation to assist with nutrition, water, sanitation and healthcare, these services tend to reach people in proportion to their wealth rather than their need (Kruk et al. 2011). Being unable to reap benefits from these services, subaltern voices, are pushed further into the periphery while continuing to carry the burden of health and water illnesses. Other scholars such

as Loevinsohn and colleagues (2014) argue that the sustainable action limitations are a result of different water-health stakeholders remaining in a ‘knowledge silo’, whereby individuals, programmes and organizations become fixated on their particular perspective or mission and operate in a restricted uncollaborative manner (Loevinsohn et al. 2014). Moreover, these actors often attempt to push their perspective forward creating disagreements amongst schools of thought, dysfunction, and the inability to see interconnections between disciplines that could be invaluable to water-health frameworks (Bartram et al. 2010). For instance, if HIV/AIDS stakeholders strictly looked at HIV/AIDS through a medical lens, the intervention tactics would not include the interconnections between gender, age, race, the environment, contextual experiences, poverty, nutrition, and even its relationship to water (West et al. 2013). By having access to safe water and sanitation, the quality of life for people HIV/AIDS positive increases simply because having clean water eliminates other illnesses that can be detrimental to someone who has a lowered immune system. Furthermore, being able to take medication with a clean and reliable water source assists in being able to increase the likelihood of adherence of prescribed therapy (West et al. 2013). However, due to the ‘silo’ effect, HIV/AIDS intervention lacks a robust universal framework and it is unlikely that individuals will challenge the hegemonic conditions that preserve the current subordination of marginalized people because the complexities of the whole system are seen through such a narrowed lens. When looking at wicked problems, such as water and health and its effects on the poor, a restricting mentality contributes to intervention models that have large gaps in which vulnerable people end up falling through. This hinders the ability to translate knowledge into long-term sustainable action for the people who need it the most (Loevinsohn et al. 2014).

Regardless of the reason for failure, there is a consensus in the literature that as

Wandersman and colleagues (2008) states “if we keep on doing what we have been doing, we are going to keep on getting what we have been getting” and a call for new approaches of research and practice models, specifically community-centered models, are needed. Undeniably, there is no shortage of theories and perspectives aimed at understanding and addressing water-health and development issues. These include but are not exclusive to feminist theories, medical lens, post-development ideas, ‘pro-poor’ approaches and as mentioned above ecosocial and social capital theories. Despite the extensive knowledge and ideas, sustainable action is sparse; water-health and development practitioners continue to implement the same programs and use the same models that have seen limited success in the MDG era and now into the SGDs (Kruk et al. 2001).

WASH & Single Community Pumps: Only Two Ways Out?

The two predominant forms of action seen within the water-health discourse are highly funded WASH programs and smaller NGO implemented community pump installations. These two approaches have similar characteristics such as being often externally funded, believe in utilizing a ‘pro-poor’ perspective, seek community participation, and focus on producing tangible quantitative entities that can be counted to measure success. It is important to acknowledge that these approaches have seen success as 1.6 billion people gained access to potable water for the first time between 2000 and 2015 (United Nation, 2016). However, behind that statistic, the real picture is that too many water and sanitation services in the Global South are unreliable, short-term, and although these programs advocate for community involvement they are innately top down initiatives which carry repercussions (Ajay, 2017). Top down approaches tend to make it difficult to hear subaltern voices and their needs concerning their realities surrounding adequate water and sanitation access. For example, WASH programs are

heavily funded by supranational organizations such as WHO and UNICEF. WASH focuses on subaltern people, particularly children, to be able to access safe water, and adverse sanitation practices such as open defecation, and nurture good hygiene practices including hand washing with soap that are vital to disease prevention (WASH, 2018). The concepts of WASH attempt to take a holistic and integrated approach to water and sanitation with the hopes of limited health burdens on subaltern people, however, these endeavours such as in Trans-Nzoia County, Kenya, do not experience the results that are envisioned. For example, Trans-Nzoia County, has been apart of a WASH program for over a decade and continues to experience persistent water-health shortcomings. In a study done by Silali and Njambi (2014) on this region, communities documented how they felt about the WASH problem. Participants felt that the gendered aspects of water were not included and wished that men were included more in water-health programs and dialogue (Silali and Njambi, 2014). Participants also noted that the education portion lacked their indigenous appropriate technology and community blessings to prosper. They stated that they lost all hope of ownership of implementation and were forced to implement programs that they had no idea how they “came into existence” (Silali and Njambi, 2014). Additionally, the scholars note the recurring themes of affordability, accessibility, security of water, and minimal long-term behavioural changes. Interestingly, 67% of households were unable to afford the levy put against sourcing water or were too far away from the safe water source to utilize it (Silali and Njambi, 2014). Sanitation practices remained low, with pit latrines being built too close to water sources and hand-washing behavioral remained inadequate. How can a program that is targeted at helping subaltern people only reach 33% of the people in the community (Silali and Njambi, 2014)? The scholar acknowledges the potential that WASH concepts holds but states that changes need to be made. Santos and Gupta (2017), believe that this change needs to arise from

the way water and sanitation (WatSan) programs implement the ‘pro-poor’ approach. While pro-poor approaches have good intentions, it tends to create a passive role for the poor and responsibilities for the providers. WatSan is then viewed as ‘charity’ rather than a ‘right’, hindering the legitimacy of the opinions from the subaltern and perpetuates a one-dimensional view of water-health issues (Santos and Gupta, 2017).

Additionally, as mentioned above the single community pump technology is a popular way to address water provision issues. These pumps are usually installed by NGOs or other smallholder groups, with the belief that they are “doing the right thing” or “what they feel is best for the community” (Ajay, 2017). Commonly, a hand pump is installed via drilling a borehole, a formal pump committee is often established in the community, sometimes maintenance training takes place, and then the external group that brought the pump leaves. What happens after smaller scale pump actors leave is limited in academic literature, however, The Guardian Writer and former NGO worker, Ajay Peters (2017), states that within two- three years, the pumps break and due to limited resources such as supplies to be able to perform maintenance, the pump remains inoperative, resulting in the local community having to return to their old methods of retrieving water. Interestingly, de Lacet and Mol (2000), bring to light the case of Zimbabwe's national Bush Pump. Zimbabwe is one of the only Africa countries to have a national hand pump system that is funded by the government. In 2009, there were approximately 40,000 pumps installed and is regarded as a national treasure throughout the country (Manual: The Zimbabwe Bush Pump, 2010). While the Zimbabwe Bush Pumps were mainly installed by the government and some NGOs, they all hold similar shortcomings that are seen within grey literature regarding small scale hand pump installation.

De Lacet and Mol (2000) state that installation of pumps is accompanied with positives

and negatives for poor people. To begin, the scholars remind us that just the simple installation of a pump creates large divides and inequality between those who have access and those who do not. Hostility is created within communities and marginalization within the marginalized becomes apparent. Beyond the social tensions, pumps see failures in mechanics and hygienics (De Lacet and Mol, 2000). Mechanics while a fixable failure, tend to not see the maintenance that is requires, rendering pumps unable to lift water. The Brush Pump, does have some resilient features such as reinforced steel bars and hydraulic components that are designed to be easier to replace, however, acquiring the parts to fix the pumps, funding, and having a trained mechanic are often unstable and challenging (De Lacet and Mol, 2000). In addition, the hygienics of the pump are called into question. Here, the authors mention that health and the pump are highly interconnected but sometimes pumps are unable to act as health-promoting technology. According to the International Reference Centre for Community Water Supply and Sanitation (IRCCWSS), drinkable water should have *Coliform* less than 10 per 100ml sample and *E.coli* less than 2.5 per 100 ml sample (De Lacet and Mol, 2000). While these standards may seem easily attained, in rural areas there are a number of reasons as to why this is not so easy. In peripheral settings, the soil around the pump changes with the seasons. In the rainy season, the soil becomes soaked with water and bacteria thrives, which has been seen to impact well water. Most wells have higher contaminant levels than what is recommended due to precariousness of the settings during this season and pumps that are not designed to purify water with these changes (De Lacet and Mol, 2000). Additionally, hygiene around the pump can become contaminated when water is exposed during pump and transportation to run off from inadequate sanitation facilities.

After installation, there are three levels of responsibility, the individual (or community),

the ward, and the district (De Lacet and Mol, 2000). The individual, who has received little training regarding pumps and water quality sampling, is often left to handle pump issues on their own as it may be difficult to contact other actors for assistance. Water sources need to be constantly monitored and sampled, however, resources such as trained personnel and laboratories restrict this, making it difficult to know when the water becomes inadequate (De Lacet and Mol, 2000). The authors note that standards such as the ones posed above should be considered relative not absolute as these standards require uniformity which well water in rural contexts tends to lack. Regular monitoring needs to include checking for installation errors, changes in size and depth, weather damages, and improper locations. Moreover, if a community does fall ill, it is important to see if there are any other factors that might have contributed to this. Perhaps, the lack of sanitation or education that accompanies pumps was to blame or perhaps people are unable to walk the distance to the pump and revert to original habits (Saxton et al. 2017) and WASH, 2018). Without speaking and involving communities in implementation, monitoring, and educational training, pumps may bring water, but the sustainability of increased health and community conditions are called into question (Saxton et al. 2017). What is important to note is that installing a hand pump is not a panacea to water-health related problems as hand pumps require a great deal of investment after they are installed. Of course, having a pump is better than not having a pump but why do water-health practitioners continue to use linear models when failure is witnessed over and over? From the highly funded WASH programs to the very common hand pump solution not including subaltern perspectives results in less favourable outcomes. Health and water practitioners need to move away from Band-Aid solutions. Extra caution is needed to not overlook key inclusive elements and to dig deeper into communities unearthing needs, wants, abilities, and look for the untold story in their bodies in order to ignite a

change in the current practices.

Voices from the Field

This section of the chapter will focus on case study examples that highlight the positive outcomes of community based participatory methods such as photovoice in relation to water, sanitation and health in rural communities. Participatory methods such as photovoice and community mapping allow members in the community to share the knowledge and perceptions of current practices to researchers in a channel that entrusts power to participants. Their voices are heard, and complex information about practices in relation to water and sanitation can be uncovered in a method that is sensitive to the community. Collective community concerns can be raised through participatory approaches but also leaves room for community based solutions to be created (Levison, Elliott, Schuster-Wallace and Karanja, 2012). A variety of case studies that utilize photovoice as a participatory approach to understanding the water–health nexus and its relation to communities at the periphery of society will demonstrate the effectiveness of this approach and highlight why utilizing approaches such as this help to raise the voices of subaltern groups. The water, sanitation and health issues raised in this section of the chapter is to assist in raising the voices of groups that tend to be ignored from the larger conversation of water and health with hopes of showcasing their agency and capacity for change within their community. Bringing stories such as the those in the case studies to the main stage of conversations on water and health will hopefully help shift the current water and health practices away from large scale interventions that tend to leave the true needs of subaltern groups unaddressed.

The use of photovoice to create a dialogue for change can be seen in Susan Elliott, Elijah Bisung and associates review on water and sanitation practices and its impact on health in the Usoma community of rural Kenya (Bisung, Elliott, Abudho, Schuster-Wallace and Karanja,

2015). In Usoma, water could be accessed from Lake Victoria however, it was not deemed as safe water and secondly, from a Coca-Cola bottling plant three kilometres away from the village (p.208). For this research it was ensured that minority groups and vulnerable groups such as women would be participants in the photovoice process. The participants were entrusted with a camera and given the necessary training and instructions in order to complete the instructions given. The participants then explained the purpose of the photos taken in relation to water, sanitation and health in the community and then categorized based on common themes. Issues such as open defecation, broken, damaged or poorly constructed sanitation facilities and far distance to the bottling plant were just of the few commonly noted problems the community was dealing with (Bisung et al., 2015, p.211). Underlying social issues such as the gendered dynamic of water collection was highlighted through photovoice and that a lack of safe water and poor sanitation disproportionately affected women and children in the community. Identifying issues related to water, sanitation and health was only half of the battle, programs to effectively address these issues was the other half. The community collectively decided to implement strategies to address the issues identified by the community; water and hygiene education programs and community meetings were some strategies used (p.212). Educational initiatives were aimed at teaching individuals within a household, effective water sanitation methods such as how to sieve water, along with proper methods for water storage at a household and community level, and lastly discussions on the potential benefits of a borehole in the community was considered (p.212). Through an Ecosocial lens a number of intersecting elements such as unemployment, marginalization and mistrust have been contributing factors to the poor water and sanitation conditions and practices in Usoma (p.213).

The Indian Sundarban is a remote area of the country surrounded by harsh terrain making the area removed from accessible water sources, health clinics and modern infrastructure (Gosh, Bose, Bramhachari and Mandal, 2016). Using photovoice women from two villages within this region were selected to identify the major health issues affecting children. Ten women from the participating villages were selected, from varying educational levels, castes and age to ensure a diverse composition of participants in hopes of uncovering various health challenges within the villages. The intended audience for the information collected were health care workers, NGOs local government officials and the governing body of the community with hopes of raising awareness about issues faced by groups in the Sundarban region and creating positive change (p.121). Through the photovoice process participants identified a variety of major health issues affecting children's health such as malnutrition and water and sanitation. Fresh water sources for communities in this region was quite scarce, therefore women relied on unhygienic sources such as shallow ponds within the villages (p.124). The water in the ponds were used for drinking, washing and cooking purposes; the constant use of unclean water for drinking and food preparation purposes increases the likelihood children will become ill due to ingesting unsafe water. In regards to sanitation, mothers identified that schools and home did not have proper sanitation facilities in place (p.124). Pit latrines were common in the home and in schools but due to minimal maintenance the facilities were dilapidated and open defecation was a common practice (p.125). Mothers in the Sundarban area and relevant parties were able to develop approaches that addressed the mother's' health concerns for their children and allowed for the overall development of the community. One village was able to have funds allocated for a tube water sources (p.126). Throughout this discussion process with government officials at a variety of levels it became evident that many were unaware of the circumstances the rural communities

of Sundarban were constantly dealing with as the communities are in remote regions and are rarely visited by officials (p.126). The women perceived participating in the photovoice process and the official channels of discussions that followed as an effective way of having their voices heard as a collective (p.127). The health issues raised by women were common regardless of education, caste and occupation but little focus was given to these concerns when raised on an individual level. The social capital of this community increased throughout the process of the photovoice as community structures were engaged, developed and strengthened. In the Ecosocial theory the villages' remote locations, limited economic income and isolation would help to explain the water and sanitation issues and its relation to health problems in the community. Using participatory methods such as photovoice, allows for marginalized groups and individuals to voice their concerns and needs in relation to numerous issues. In the examples put forward in this section women in both Usoma, Kenya and Sundarban, India (Bisung et al., 2015 and Ghosh et al., 2016) from various economic standings, educational backgrounds and in the case of Sundarban, various castes were able to voice their concerns about health in relation to water. Health in relation to water and sanitation is complex and can be compounded by numerous factors such as income and geographical location. Photovoice allows marginalized communities and individuals to shine a collective light on the needs of groups that tends to be ignored. The changes that spring from participatory research tends to be created and controlled by the communities which allows for ownership over the actions taken and leads to effective change. Photovoice as a community based participatory method is useful for bringing subaltern voices out of the dark but the longevity and consistency of having their voices heard is brought into question. There is a gap between knowledge and action in the water-health practices, particularly due to power dynamics therefore it is important to focus on innovative ways to ensure subaltern

voices are heard and actions taken are appropriate to community needs.

Recommendations

Preceding forward it is evident that there is a pressing need to fill in the gaps between knowledge and sustainable action by changing the mainstream way of “doing” water-health interventions that are directed at people in the periphery. Questions need to be posed on what “*is*” happening in regards to practices and what “*ought*” to be happening, as well as evaluating and scrutinizing the “for who” is also key for change. This chapter believes that the gaps that hinder sustainable action in health and water provision arise from using inadequate inclusion methods such as token participation or benchmarking, that do not take into consideration fully subaltern experiences. Research on innovation participatory methods need to be conducted to illuminate new methods that truly assist subaltern people to become the agents of their own change (Wilson et al. 2011). Currently, some scholars such as the ones exhibited in the case studies portion of this chapter are advocating for the use of photovoice in research that is being conducted on vulnerable populations and has been gaining momentum in water-health studies. As a relatively new research method in health-water and development studies it is critical to monitor the outcomes of photovoice and ensure that the exposure people are experiencing actually leads long-term change. Photovoice is an innovative technique that gives people at the periphery the agency to tell their own story, the way they wish to tell it, and thus enhances the understanding of their lived experience. This new approach is on the right track to changing the way research is conducted, however, this research needs to bring action to fruition and go beyond just being ‘sad’ pictures that end up in an archive. They say “pictures are worth 1000 words” and when used in a marginalized cohort setting they give rise to words that may not have been heard due to this populations position in society. Photos are a powerful tool in our

modernized world and research should be conducted on how to translate this power into long-term and context specific action.

In addition to establishing innovative participatory approaches, this chapter recommends that a trans-disciplinary approach, such as the water-health nexus, be utilized in theory and in practice. The four interfaces of the water-health nexus assist in deepening the perspectives of water and health linkages and is a tool that can be used to have contrasting stakeholders break away from the knowledge ‘silos’ that hinder change and valuable interdisciplinary collaboration. The water-health nexus should be used as leverage to attach meaning and voices to big statistics, reminding practitioners that subaltern people and their relationship with water is complex and complex problems required a non-linear solutions. Moreover, this chapter recommends that the water-health nexus can be used as template to organize knowledge into action frameworks, regardless of what particular disciplinary the practitioners belong to (Arredondo et al. 2012). The application of the water-health nexus in research, dissemination, implementation, and post-implementation reminds stakeholders to see the issue through the lens of others, illuminating the system as a whole, and attempts to make visible the needs, barriers and resources of other stakeholder in the system. From here, a more enriched action framework can be created with the trans-disciplinary knowledge obtained from a more robust way of thinking about issues. This begs the question of how to ensure that subaltern voices are included in a meaningful way throughout these processes? While this notion may seem daunting, this chapter recommends again by starting with and changing the way practitioners address the “*who*”. Who is this work for and if it is subaltern people, then everything should be done to ensure that their voices, agency, and capacities, are portrayed in an unfiltered and authentic manner and heard above anything else.

Conclusion

For the global community to achieve SDG 6 among others, understanding the water-health nexus and the complex role it plays in the wellbeing of individuals and communities is pivotal. There are numerous models and perspectives that can be used to understand the water-health nexus, such as using mixed method approaches (transdisciplinary) as mentioned in the previous sections. However, it goes beyond understanding and having the necessary knowledge, a bridge between knowledge and appropriate sustainable actions is crucial. Many of the current practices found within interventions geared towards the water-health nexus are not contextually appropriate and dilute if not ignore the voices of those most affected by water and sanitation issues. The emergence of photovoice has allowed for greater exposure for subaltern voices but there is still a disconnect in the dialogue that could create sustainable programs based on community perspectives ensuring projects would be start from the bottom up. Ensuring the groups most susceptible to water and sanitation issues have allies that support their voices in the water-health nexus and addressing these problems is step in a positive direction to achieve sustainable action, but the capabilities of the subaltern groups on the periphery of society needs to be recognized as they have the knowledge to address many of their issues and may just need support in enacting their vision.

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