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# Assessing water security and urban poverty linkages. A case study of Mathare informal settlement in Nairobi, Kenya

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# **Assessing water security and urban poverty linkages. A case study of Mathare informal settlement in Nairobi, Kenya**

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**Cover picture:**  A photograph showing a person using a traditional water storage method in an informal settlement. The person is standing next to a large, cylindrical container, possibly a water storage tank or a well. The background shows a simple, informal structure, likely a part of the settlement.

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## Abstract

Water has various multiple uses not only in the household but also globally, this therefore means that ensuring water security is very vital. Even though water is a basic need for the household, the poor who are highly represented in the urban informal settlement are faced with multiple challenges to accessing water. The researcher was guided by two research question that aimed to find out the economic, social and cultural impact of water accessibility on the livelihood of the residents in Mathare village 1 particularly the women and how the access to water affects the health of the residents. The data was collected through observation, document analysis and face to face interviews using open ended interview schedules.

Though illegally connected, Mathare village one has available water, which is sold by water vendors and no water rationing takes place in this place. However, water availability is not a guarantee of water accessibility. The urban rich access water easily while the poor have income hindrance to the accessing water. Due to poor connections at times the water is mixed by sewage hence making it to be unsafe for human consumption and which in turn is a health threat to the residents. The household can only acquire water that they are able to buy and store in their houses, hence economic capability of the urban poor has a great impact of their accessibility to water.

Urban poverty is multifaceted and intergenerational and improving a person's income is not a guarantee of improvement in security or environment pollution. The women gender are the most affected not only by water security since they take care of the household ,but also poverty in the urban area. On the other hand, though poverty is widespread in informal settlements, not all the women who live in Mathare village 1 are poor, but those who depend on their husbands and sons for income are indeed poor. Dependency is the worst form of poverty it delimits ones choice, urgency and freedom to diversify.

To improve water accessibility in the informal settlement might require government presence in the planning of water provision and putting in place poverty eradication strategies. The women must also be on the forefront in standing up for their rights for them to see real change occur.

*Key words: poverty ,water accessibility, gender ,water vending, land, informal settlement.*

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## List of Abbreviations

Kco - Kenya Constitution

Ksh-Kenya shillings

MWI -Ministry of Water and Irrigation

NIWASCO- Nairobi Water and Sewerage Company

OECD -Organization for economic Cooperation and

Development  
SDG-Sustainable Development Goal  
UN-United Nation

UNHABITAT-United Nations Human Settlement Programme

WA - World Bank

WDR - World Development Report

WHO World Health Organization

WRMA -Water Resource Management Authority

WSB - Water Service Board

WSRB - Water Service Regulatory Board

WSUP-Water and Sanitation for the Urban poor

USD-United States Dollar

*changaa*-illegal liquor brewed locally by residents

*matatu*-means of road transport that resembles a small bus

## CHAPTER 1

### 1.0 Introduction

According to the World Bank (2005) In Eastern Europe, Central Asia, Latin America and countries for the Organization for economic Cooperation and Development(OECD) urban households with access to safe water typically obtain water through household connections but in Sub Saharan Africa ,many of the urban households with access to safe water do not have private connections ,and they also lack communal water but get their water through buying from the water vendors .In addition to this, in informal settlements where residents have no metered water, they tend to pay more for the water than the rich who rely on legal water connections .It is important to note that of the world's 1.2 billion poor people, two-thirds of whom are women, live in water-scarce countries and do not have access to safe and reliable supplies of water. "It has been estimated that a large part of the global population already experiences water stress and that this will increase by 2025,primarily as a result of population growth." ( Gordon,2003: 10).

In Africa, as urban populations grow, the quality of the urban environment will play an increasingly important role in public health with respect to issues ranging from solid waste disposal, provision of safe water and sanitation, and injury prevention, to the interface between urban poverty, environment and health (WHO, 2015). Close to one billion people in the world live in informal settlements located within urban centers (UNHABITAT 2006).In addition to this, the World Bank (2003) contends that currently 74 percent of the world's population lives in low and middle-income countries and the population growth rate is also high in this places.

The basis of this research is therefore to show that, even though water is a basic need which people cannot do without, as some people access it easily, others(the urban poor) do not and inaccessibility of water affects their life tremendously. According to the United Nations(2015) to achieve Sustainable Development Goal(SDGS)1 "end poverty in all its forms everywhere" and SDG 6"Ensure availability and sustainable management of water and sanitation for all", various steps need to be followed and for the goals to be achieved, the government, private sector, civil society and the rest of the people need to do their part.

Nairobi is the capital city of Kenya, which was constructed as a node of the Kenya- Uganda railway in 1907. It acts as an administrative, diplomatic, industrial, communication, education,



tourist, recreation and agricultural collecting centre. The town attracts many young people who come to seek for employment opportunities. According to Mohamed(2010) in Nairobi alone, it is estimated that 60% of the four million residents live in informal settlements on approximately 5% of the land ,and the population in these areas is expected to double in the next 15 years . In this situations, access to basic but improved water and sanitation services is a growing challenge especially for the urban poor. There are 61 slums in Nairobi metropolitan area: Kibera being the largest followed by Mathare and others, such as Kiambio, Mukuru Kayaba, Mukuru Kwa Njenga,Kiamaiko, Kosovo and Kawangware to mention just a few.

### **1.1 Research objective**

The aim is to try to grasp how the women that predominantly access and distribute water to their household ,the impact these practices have on their life worlds and how they perceive their role.The study intends to explore the connection between water access and poverty. The research was conducted in the informal settlement Mathare village 1,located in Nairobi,Kenya.

### **1.2 Significance of the study**

The intention is that this study will contribute to improved understanding of the situation of water accessibility within the informal settlement and the social and cultural and health impacts water access and distribution has on the women.

### **1.3 Research Questions**

The two research questions that guide the study are the following:

1. What are the economic ,social and cultural impact of water accessibility on the livelihood of the residents in Mathare village 1 informal settlement, particularly on the women?
2. How does the access to water affect the health of the residents in Mathare village 1?

### **1.4 Research method**

This was an ethnographic research and it involved understanding how people make sense of their life. Since it was a case study it enabled the researcher to understand the people's lives in detail. This study adopted qualitative research methodology as explained below.

According to Creswell (2014),"*Qualitative research is an approach for exploring and understanding the meaning individuals or groups ascribe to a social or human problem. The*

*process of research involves emerging questions and procedures, data typically collected in the participants setting, data analysis inductively building from particulars to general themes, and the researcher making interpretations of the meaning of the data. The final written report has a flexible structure.....honors an inductive style, a focus on individual meaning and the importance of rendering complexity of a situation"(Creswell 2014:4).*

I collected the data through participant observation and interviews . Observation are very important in that it enabled the researcher to see the non verbal communication cues. Observation also helped to complement information that might have been missing in the interviews. I was also aware of the biases of observation since I had previous knowledge of the place, it could be really easy for me to miss what was not conforming to my previous knowledge of the place. I wrote field notes in the field. I decided to use a similar method that had earlier on be used by a masters student (Franziska 2013:16),

*"Participant observation can be conceptualized as "immersing yourself in a culture and learning to remove yourself every day from that immersion so you can ... put it into perspective, and write about it convincingly" (Bernard 2006, p. 344). Removing yourself is thereby connected to going towards objectivity. As Bernard argues, "it is important to hold our field observations up to a cold light and ask whether we've seen what we wanted to see or what is really out there". Full objectivity is not possible, but we should try to "transcend our biases" as much as possible (Bernard 2006, p. 370f).As Bernard argues, participant observations can provide an "intuitive understanding of what's going on in a culture ... It extends both the internal and the external validity of what you learn from interviewing and watching people" (Bernard 2006, p. 355).*

I did ten in depth interviews with the women that lasted between 15 to 30 minutes. This helped in analyzing any difference in the time period .Qualitative, semi structured, face to face interview questions were used since they allowed probing of further questions and giving of more clarity from the interviewees answers. This was mostly captured by tape recording and note taking. The interviewees narratives were also very important since I could hear how they constructed and contextualized their stories.

*Bernard describes, a semi-structured interview is "open ended, but follows a general script and covers a list of topics" (Bernard 2006, p. 210). It provides "access to interviewees' views, interpretations of events, understandings, experiences and opinions"(Byrne 2004, p. 182)".*

Every day before my interviews I made sure that I arrived in the field early to enable me to observe how people buy water, how the women carry the water, the number of trips for fetching water made by at least two interviewees and how the water vending business was done. I also observed the area economic activities that were going on and how the women, children and teenagers passed their day. The observation was not random, I had pre-written questions on what to observe. Some of the women were not ready to talk about their income and hence I observed what they owned in their houses for easy categorization.

I also used document analysis, even though there are many policy papers in Kenya in regard to water use, I decided to pay much attention to the Water Act(2002)- that explains use of all the water resources in the country- and the Constitution of Kenya(2010) -that supersedes all the policies and laws of the land and contains all the laws in Kenya that directs governing of the country. In analyzing the documents I looked at what the water laws stipulated and how this laws impacted on informal settlements.

This research being a case study, Silverman(2014) notes that using qualitative research method is advantageous in that it recognizes the importance of locating the research within a particular social, cultural and historical context, enables in depth analysis and use of "how" and "why" questions . It also enabled me to triangulate and compare information from different participants. Collecting the data was easy since I can speak Swahili which is the dominant language for the study sample. On the other hand, Yin(2009) notes that the disadvantage of using case study is that scientific generalization of the findings to other places and population is not easy but it can be done by use of a theoretical framework.

I collected the data through an already established water institution that is working in Mathare village 1, which enabled me to have easy access to the families that the institution works with and a community leader who works in this area, helped me around who gave me a good link to the residents of the area. Mathare village 1 is not one of the safe areas and hence to ensure my security, I only collected the data during the day and when my resource person was available. Collecting the data through an already established institution also had draw backs in that at first the interviewees connected my presence not as an individual but to the water organisation. This might perhaps have hindered how they answered my questions, but with time they gained confidence in me but I also had to assure them of the confidentiality of the research I was carrying out.

## **1.5 Data Analysis**

Maunther (1998)notes that data analysis is an ongoing process and begins at the onset of research and goes even beyond the end of the research process. Since I was using open ended interview schedules, to ensure validity and reliability of the research process, first I presented my data collection tools, and readjusted those questions that I found to be vague or not understood by the interviewees. I guess this also enabled me estimate time taken for each interview . I think being flexible in this whole process is what really counted.

When I began the real field study, every time I was conducting the interviews I probed the respondents to find out what they really meant by their answers. Paying much attention to how and why they make meaning to their life. I always adjusted the interview questions once a new issue came up from the previous interview that I felt I needed to know more about. The moment I started getting just the same answers for my questions, I knew the data I had collected was sufficient to write my thesis. Much of my data collection in the field was through observation and this made me to ask myself many questions of the things I observed. Reflecting every day after data collection and writing down my thoughts of what I saw and heard helped me be in time with my research work. This also helped me to write down ideas that I felt were important and still fresh on my mind that would have been easily lost had I done it at the end of data collection.

I did 10 interviews, two per day. Every day after field work I transcribed one of the interviews and the other the following day. Even though the interviews took around 15 to 30 minutes, the transcribing took more time between one to two hours. When writing I paid much attention on what people said, why they said it and how they did it. Non verbal cues, facial expressions were also important to capture how they stressed their points. After transcribing I used coding to put together the similar answers and views that I got from the respondents and also to put together different answers. The findings were organized as per the two research questions. Analyzing different views was quite challenging since I did not know whether to treat them as just noise? I guess this is where my own opinion, academic history and even my livelihood as a person had much effect. As much as we try to be objective Buijs(2013)notes that our emotions are also are part and parcel of the research process. Then again I only collected the data during the day ,would I have gotten a different gender perspective of the household during the night when the husband, wife and children were all present unlike daytime when the women were present? I have mostly used narratives in

presentation of my data collection since I wanted the interviewees voice to be heard and to make their presence felt in the whole research process.

### **1.6 Sample of Study**

The study comprised of 10 households. All the interviewees were women since I have lived in this neighborhood I knew in advance that the women are the ones who are mostly responsible in the household for fetching water. Figueres et al (2003) contends that women play an important role as water collectors and managers and family health and they also possess indigenous knowledge of local water conditions which is passed over to successive generations. To find more appropriate data for my study I used purposive sampling .The sample consisted of women between the ages of twenty to sixty years . Three of the women were water vendors while the other seven were residents in the area . Since I needed more diversified information I tried to get a sample of women who are engaged in different kinds of work and whose income vary so as to explore how these factors affect their capacity to access water and in turn the effects on their livelihood.

### **1.7 Area of study**

The study was carried out in Mathare village 1 informal settlements in Nairobi Kenya. It is located 6km from the Nairobi city centre. I chose Mathare village 1 since I have a previous knowledge of the community and the fact that I had an existing contact organization in the place. The means of transport to link the settlement to the town is by use of *matatus*(kind of small bus) or motorbike through Juja road. Approximately 600,000 people are housed in Mathare. The dominant tribe is the Kikuyu who own most of the houses and are also water vendors but other tribes like Luo, Kisii and Kambaa also live here. Even though different languages are spoken in this place, Swahili is the dominant language .The neighboring estates include Euseleigh, Muthiga which is across the Nairobi river , Pangani and Mathare North. Christianity is the major religion and the people believe in God who they say has the power of getting them out of poverty. We have both nuclear households and extended households in Mathare village 1.

### **1.8 Thesis outline**

This research is organized in five chapters. The first chapter deals with the introduction and background of the research problem .This is followed by brief description of the research purpose and research problem,as well as the methodology. Chapter two consists of a explanation of the

gender approach as well as literature review on water security and urban poverty. Chapter three gives a brief presentation of the collected data that is organized into subheadings that include: water quantity and pricing ,water harvesting and storage, water vending business, Nairobi river and income. Chapter four focuses on discussion and analysis of the research findings. Finally chapter five gives a conclusion of the whole research based on the two research questions.

### **1.9 Water governance in Kenya(Water Act 2002)**

The water governance in Kenya is stipulated in the Water Act(2002),and the responsibility falls under the Ministry of Water and Irrigation(MWI).The ministry is charged with control and promotion of investigation and conservation of all water resources in the country, which include the Nile basin, the flood control systems, irrigation canals, drains and ground water resources and proper use of the water resource .The Water Resource Management Authority(WRMA) is under the ministry's authority. WRMA develops principles, guidelines and procedures for allocation of water resources, issue permit for water use, regulate and protect water resource quality, manage and protect water catchment areas and determine charges imposed on the water use from any water resource. Immediately below WRMA is the Water Service Regulatory Board(WSRB),that issues licenses for provision of water services, determine standards for provision of water services to consumers. The board handles complaints, regulate licenses, construction, fix tariffs, disseminate information about water services and determine the amount of fees and levies to be charged. Under WSRB is the Water Service Board(WSB),that ensures efficient and economic provision of water service. It provides licenses for water services, purchase, lease or acquire land for purpose of provision of water service. Under WSB is the Water Service Providers(WSP).It is an agent of WSB and it consists of several WSP depending on how big the area is. They get into an agreement with WSB that limits the supply of water to a specific area, and shows indemnity of WSP in case of any liability. Finally we have the water consumers who use water for their everyday use.

## CHAPTER 2

### 2.0 Theoretical and conceptual framework

This chapter will involve literature review on water accessibility and urban poverty and a description of the gender approach that the research intends to use for the analysis of the research findings.

#### 2.1.1 Water accessibility

Water accessibility might be seen in terms of the distance that women have to cover in order to get water, time taken, amount of money used to buy the same and the quality and quantity of water used by the household. The researcher is aware that water accessibility might be defined differently by different people for different purposes that is the reason this research adopts the UN(2012)definition that water access means **sufficient** water for personal and domestic uses which is between 50 to 100 liters of water per person per day. The water should also be **safe**-free from disease causing organism and not posing any health risk- and also **acceptable** to the people using it that is they believe the means of supply is safe. In addition the water should be **affordable** to the people that is it should not exceed 3%of the household income. The water source has to be within 1000m of the home and the time used by households to collect it should not exceed 30 minutes.

The household and not the family will be used as a social arena of analysis in this research, this is because a family might mean people living in other residential places and might not be facing the same challenges faced by the urban poor in respect to water accessibility in Mathare village 1. Even though household might be a difficult concept to define, this research adopts Ellis(2000)definition of household,

*"The household is conventionally conceived as the social group which resides in the same place, shares the same meals, and makes joint or coordinated decisions over resource allocation and income pooling. This definition places the emphasis on co-residence as the key attribute of the household. The household as a co-resident social unit may sometimes have non-family members permanently in resident"(Ellis,2000:18).*

The researcher intends to analyze the linkages between water accessibility and urban poverty. Since water accessibility encompasses factors explained above like affordability, quality, quantity,

safety and time, it can be theorized that even though the urban poor might be using less than 30 minutes to the water point, but they are on the other hand faced by income challenge to accessing the same since they might be using over 3% of their household income on water buying. Then again if we are to take into consideration all that is considered household water accessibility, can this be realized in an informal settlement or perhaps in other middle income residential places? Moreover, water accessibility might just be one of the many examples of urban poverty-if we adopt the definition of informal settlement as meaning a place lacking the basic infrastructure-water infrastructure being one of them.

### **2.1.2 Urban poverty**

Gikaru and Nyakangi(2011) define urbanization as the development and growth of towns due to population increase or economic activities. On the other hand Mohamed (2010) views urbanization with respect to land as concentration of many people in small areas .People migrate from one place to another due to various reasons ,whether it is international or internal migration it leads to changes from the place of origin and the destination. Urbanization leads to pollution and waste production due to increased demand for energy and raw materials which in turn affects urban ecosystem including urban water and leads to water degradation.

According to Mohamed(2010) In developing countries, cities like Calcutta in India and other Asian countries are expected to have an increasing population over the next years leading to more urban area problems if the population growth rate is higher than building of houses and job provisions .The reason people are migrating to urban centers according to Ellis(2000) is diversification from the agricultural sector in search for better living conditions , jobs and more income in the urban areas. Rural to urban migration has in turn led to expansion of urban areas. Even though few people manage to realize their dreams after migration to the urban areas, most of them actually do not and become urban poor. Whereas Dercon (2008)notes that Rural area poverty is often linked to agriculture, the sector on which most rural poor depend on their survival, urban poverty is mainly linked to the amount of monetary income one gets which enables then to buy commodities for example water that is sold in the market. In the rural area, people can be able to draw water for a river which is free of charge and so an household can access it as much as they can, on the other hand in urban area where there is absence of the government in provision of the



basic need like water in the household, the poor who have to buy the water are therefore faced with a challenge to do so.

This research will adopt a definition of poverty according to National Poverty Eradication Plan 1995-2015 (1999) poverty in urban areas is characterized by,

*" lack of access to income earning opportunities, lack of assets and savings, lack of access to healthcare and education and poor environmental conditions which is brought about by poor integration into administrative and service support derived from a socially inclusive nation "(NPEP,1999:13).*

WSUP (2015) explains that with an average monthly income of 70 USD per household, it is estimated that a family of five spends up to 10% of their monthly expenditures on water, the rest 90% of the income left might not be adequate for other household expenses like food, clothing, education, housing and hospital.

This study will assume that the fact that water is in plenty supply and can be bought from the water vendor for a fee, the urban poor lack of financial capital limits them from accessing water. Ellis(2000) defines financial capital as stocks of money to which household has access and it can be in form of savings or access to loans. On the other hand, "neither money savings nor loans are directly productive forms of capital, they owe their role in the asset portfolio of households to their convertibility into other forms of capital, or indeed, directly into consumption"(Ellis,2000:34). The previous statement is also well illustrated by Sen (1981) quoted in Ellis( 2000), who explains that "the essence of the entitlements approach is that people do not necessarily or even mainly starve, due to an insufficient supply of food ,they starve because they possess insufficient command over or access to food"(Sen 1981, quoted in Ellis, 2000: 17).The urban poor lack the capabilities of turning one asset to another or accessing an asset.

The two terms rich and poor can be used in regards to water access, as the kikuyu women supply the water and can open and close their water vending business as they wish, the Luo women have to struggle to get money to buy the same and they are also highly affected by the actions of the Kikuyu women water vending business for example when they decide to raise the price of water in times of water scarcity or not operating the business if they are to attend to other family business. However, directing our attention to the definition of urban poverty as mentioned above, though in different

scales, both the Kikuyu women and Luo women still belong to the same category of urban poor , in that they all share the same environment and face almost similar if not same challenges faced by the residents in Mathare village 1 informal settlement.

Urban centers are advantageous in that they encourage economic growth of businesses ,they provide easy access to social amenities, enable exchange of ideas from people of different cultures and communities and allow agglomeration of industries. On the other hand, according to Gikaru and Nyakangi(2011) urban centers are faced by multiple problems which include inadequate housing, high rate of unemployment, frequent shortage of water supply, traffic jams, increase of street families, increase of crime rates, Informal settlements, environmental pollution and pressure on limited amenities like health centers and schools. For one to enjoy either face of the urban centre, largely depends on one's economic wellbeing ,as others sink deeper in poverty, others languish in riches, wealth and multiple investments.

There are many definitions of poverty Dasqupta(1993) as quoted in Ellis(2000:77) describes poverty as fundamentally connected with a lack of wellbeing, i.e. lack of agency, choice and freedom."Poverty signifies the inability of people to realize their potential as human beings"(Ellis,2000: 77). On the other hand the World Development Report(WDR 2001/2002)notes that poverty is multifaceted and we cannot only use income and expenditure to define it. It includes health and education, vulnerability ,voicelessness, powerlessness, nutrition and fear. Chant(2007) notes that poverty is also multidimensional and an household income can improve while it's health worsens." Poverty is increasingly acknowledged as encompassing factors pertaining to social deprivation such as self esteem, respect and power"(Chant, 2007: 31). Waugh(2009)explains that vicious cycle of poverty and deprivation makes escape from poverty very hard hence it becomes transferrable from one generation to the next.

The WDR(2000/2001)highlights that the child mortality rate is higher among the poor than the best paid sections of the working class. In poorest areas one child out of every four born die before the age of twelve months.

## **2.2 Gender Approach**

According to Ortner (1974)gender is a term for social organization and cultural interpretation of biological sex, i.e. what is regarded as feminine or masculine in specific cultural and social setting.

The social context affects- how different genders are interpreted and socialized meaning that one is not born a woman but becomes one. Lovell (2003) explains further that agency is socially constructed using language, not only what is said, but also who is saying it brings more impact. In addition Inglis and Thorpe(2012) argue that repeated practice of these gender roles, norms and values make them seem natural whereas in reality they are constructed.

Ortner(1974) argues that male domination almost universally is based on the cultural inclination to regard male as linked to notion of "culture" while women are associated with "nature". Inglis and Thorpe(2012) notes that gender approach might not only be more inclined to the understanding of a form of societal order brought about by the patriarchal society but also about the women understanding this order in order for them to bring change. Gender approach helps us to investigate gender division of labor, structural components, different access to resources brought by power and influence, material property, inheritance, kinship, social network and ideology and their consequences to men and women. On the other hand, Ellis(2000) argues that, gender is fundamentally about power ,subordination and inequality.

In the informal settlement ethnicity was a big deal it defined who a woman was and acted as a form of power structure in itself. There was a big difference between the kikuyu women and the Luo women. The kikuyu women were venturing in multiple businesses one of them being water vending business which in turn enabled them to earn income, where as the Luo women were mostly housewives. For the Kikuyu the children belong to the mother and they have to work hard to feed them but for the Luo, they belong to the father. The income earned by the Kikuyu women gave them some form of dependence hence they can be termed as "rich "as compared to the Luo women who depended on their husband or sons for income and can therefore be termed as poor.

Advantage of using the gender approach is that firstly, "the gender approach recognizes the vast diversity of relations between men and women across cultures, but nevertheless asserts the lessening of the social inequalities experienced by women as an overriding goal"(Ellis,2000:139).Secondly "analyzing poverty from a gender perspective makes it possible to connect with other forms of domination (e. g ethnic and racial)that structure social relations, and to understand it as a result of power relations that affect access to, and control of goods and services, as well as other material and symbolic resources"( ECLAC 2004, cited in Chant 2007 :31).Thirdly, "gender considerations forges increased awareness that women's experiences of poverty are

different to those of men and brings poverty analysis focused on voice, participation and legal and structural reforms needed for advancing the status of women" Kabeer (1997) as quoted in Chant (2007:31) .In addition to this, the World Bank (2012) report shows that higher incomes do little to reduce gender gaps but focused policies have a real impact.

According to Bourdieu as quoted in Inglis and Thorpe (2012)gender relations are often expressed in binary oppositional categories and terms and therefore we need to investigate-gender division of labor ,how gender is socially constructed. different access to property based on gender, inheritance, how men and women are embedded in kinship, gendered social networks and gender ideologies. In order to understand women's roles in the households' access to water and its distribution ,it is important to see how decisions are taken within the household and what power and agency women can exercise in connection to water accessibility not only between male and female but also within the female themselves.

The study will act on a general hypothesis according to Ellis(2000)that women are more likely than men to spend money they have or earn on basic household needs, while inmost instances the cash in the hands of men is retained for personal consumption expenditures(Ellis,2000:146).The researcher will also take the women to have the sole responsibility of providing the water to the households.

The gender approach has some critics from counter examples promoted by the feminists and gay rights movements and they give examples like in Scandinavian countries where there is increase in men taking over women roles like diaper changing and child paternity leave. The researcher might also not lose critical connection of gender to other social categories since no one is simply male or female, white or black. Inglis and thorpe (2012)also argue that even the women themselves do not belong to just one group, we have different kinds of women, socialized differently and have different opportunities and face different societal challenges.

## CHAPTER 3

### 3.0 Data collection

In this chapter the researcher will present the collected data which are organized in five subheadings that include: water quantity and pricing, water harvesting and storage, water vending business, the Nairobi river and income.

#### 3.1 Water quantity and pricing.

Water is actually in abundant supply in Mathare village one but for one to get it you must buy it. One of the interviewees said,

*"Water rationing that is done by NIWASCO does not exist here like in other estates since the water is usually delivered illegally but on instances that the water access is interrupted, it does not take more than three days for it to come back, but when this happens the cost of water rises from three shillings(0.03USD) to twenty(0.20 USD) per 20litre jerry can, it becomes too expensive ".*

All the interviewees said they do not have a problem with water availability. Most of the households use between three to eight 20 liter jerry cans of water per day depending on the household activities one has planned to do. The days that one washes clothes which is mostly once a week, is when the water is used most. A person can also pay the water vendor 20kshs(0.20 USD) and clean all her dirty clothes near the water point irrespectively of the amount of the water she uses. One 20 liter jerry can of water costs 3kshs(0.03USD). The water is mostly fetched by the women and the men take very little responsibility to ensure that the household has water. On the other hand the women who have men say that the men give them money not specifically to buy water but to take care of households needs of the day, so it is actually upon the women to decide how much portion of the money they can pay for water use and how much they will allocate to food and other household needs. The women view on safety of the water varied. Even though some felt it was safe others felt otherwise as shown below,

*"The smell of water from different water vendors vary and it is not rare for some water to smell like sewerage at times. Water contamination might be as a result of the poor connection of the pipes. We treat the water only when there is outbreak of cholera or typhoid which rarely happens..*

*At times we do not go to hospital, you know it is expensive. But when we are seriously sick we depend on our son for hospital money," laments a woman.*

### **3.2 Water harvesting and storage**

Most of the women said that they do not use the rain water due to the state of the iron sheets some of which are quite old and they felt might not be hygienic . The space between the houses is also very small and made up of foot paths making it hard to place a bucket on the path way. The size of the houses were also quite small, so they could only manage to store very few 20 liters jerry cans of water. Some women also just buy water that they intend to use immediately but that might become a problem if they cannot access water a certain day for example because water vendor will not sell water that day and hence the women have to walk far to buy it.

One activity the women agreed to have mastered is water reuse. Water one has used-like water after cleaning the clothes -which seems relatively clean can be used for another activity like washing the house. To reduce water wastage, the women use basins to clean their clothes and in one basin of water, several clothes can be cleaned in order to save water and the amount of soap used. Most of the women washed the jerry cans before storing water and they believed that when the jerry cans are clean, the water is safe for use. They also said they rarely treat the water unless they hear there is a disease outbreak, of mostly cholera or typhoid in the neighboring Mathare 4A estate. In those rare instances they boil or use water guard-which is a water treatment liquid- to treat the water even though they say it is quite hard to dictate which water the children drink. One of the woman said,

*"You know it is very hard to control children, at times you are away they come and drink water not from the treated jerry can but from any source near them. We do our part as parents but it is only God who protects those children".*

The women also agreed that neither health officer nor water inspectors go around to teach them about water safety issues and inspecting the water. The government absence in the informal settlement was so evident. It is not always that the water in the pipes are clean. The women know which water from which water vendor is better than the other. However, they say this pollution does not happen often ,they believe NIWASCO-which is responsible for water provision in Nairobi-treats water with enough chlorine making it fit for human consumption.

*"Even though I boil drinking water, I do not do it all the time. Buying kerosene is quite expensive and even when I do, I prefer to use it for cooking food not boiling water. I know drinking untreated water might be the cause of typhoid but I am poor, there is nothing much I can do. After all only God can protect our lives,".*

### **3.3 Water vending business**

In Mathare village 1, the water vendors provide the water to all the households. The water vendors have small kiosks with some using it as a shop too which they run their business. The water often illegally connected is tapped from the neighboring estates through pipes. For one to connect water from the main pipe, you need to talk to a person who has already earlier connected to a pipe and he or she allows you to get a connection for a fee that ranges between 15000kshs (149USD) to 25000kshs(249USD) but this depends on how far your house is from the main pipe. The pipes are visible everywhere and it is quite evident that there is no planning for the connection since some pipes pass near trenches with dirty water or near sewerage lines. All the three water vendors were women mostly in their late twenties. The water vendors often operate so smoothly because of the state of insecurity, the city council and people responsible for water issues are very afraid to carry out inspections. However, on the day of connection to the main pipe, if the city council get to know about it, one has to bribe them with around 4000kshs(40USD).

All the three water vendors agreed that for them their hard work of selling water and using the money to invest in other businesses like shop keeping, has really paid to remove them out of poverty. They can afford to pay for their children school fees and to buy sufficient food for their families. They are also able to save money in the bank for their children's education insurance. Apart from selling water, they also have other businesses and own rental houses. The rent per room ranges from 1500(15USD) to 2000kshs(20 USD) thus for 5 rooms they obtain reasonable sums of money and can also save some part. One water vendor also had a bathroom and a toilet which residents in the area pay 5kshs(0.05USD) to use. In a good day, the water vendors said they can make between kshs300(3USD) to 400kshs(4USD) but when the sale is low they make around 150kshs(1.50USD). Even water vendors own their houses and are quite affluent in relation to settlement residents, they do not consider relocating from Mathare village one to a better off estate since the rent of houses range from 5000kshs(50USD) and above.

*"I was born here and lived and paid no rent since this house belonged to my father, Even though I would love to move to a better estate, paying such amount of money for rent is wastage of money"* one water vendor said.

The water vendors argued that residents poverty was caused by laziness. One water vendor said,

*"People here are lazy, they do not want to get tired, they are so used to handouts that they cannot think of anything else".*

All the three agreed that engaging in only one business is not enough especially if it doesn't do well. Apart from selling water, owning some few rental houses, one water vendor said she is employed and earns salary, while another quit formal employment and started selling "exbit" -a slang word for bhang - an illegal drug in Kenya, she was forced to bribe the police around 150kshs (1.5 USD)three days a week which was too costly and she decided to stop selling the drug. The water vendors said that due to selling water, they can now take their children to school, buy food and still afford to save some money in the bank for their children's future education .

*"I own a shop and part of the shop is also my house. When I wake up in the morning, I open the shop and sell commodities but at the same time, when the customers are not there, I have to clean my house, utensils, children and cook food. My husband goes to work in the morning and he does not care whether I was busy in the shop or not, but he has to find the house clean and his food ready. Even though I am married it feels like I am raising these children by myself. At night I am so tired but he is still waiting for me in bed I cannot sleep immediately..... Being a woman is so hard, it is like a punishment, I do not have time for myself but I do it for my children you know,"* laments an interviewee.

### **3.4 Nairobi river**

At first glance on Nairobi river one cannot imagine that water is flowing but consist of backwater full of pollution. *"This is not a river, it is sewage"* laments one interviewee. The color of the water is green. At the sides of the river are also human excreta and dumpsite. One of the interviewees said the river is in this state because of lack of toilets in this area. This river acts as their toilet at night, and during the day those who cannot afford to pay for the toilets use polythene papers in the house and throw them in the water hence the term "flying toilets". The few public toilets found in this area also lack sewer and they are all connected to the river. Even the people



who are able to build latrines, still direct the waste to the river. Ironically during the time of my research, Athi water and sewerage company was also planning to build major sewer lines along the



Figure 1: A section of the Nairobi River showing it's state of pollution. photo by: Okumu,2016

river but the sewer lines are be used by the Mathare Village 1 residents, who will be highly affected its construction since some of them were forced to relocate to other areas and pave way for the construction, the users will

be middle class estates that have legal water connections ,flush toilets and sewer lines. In the river, there is also brewing of illicit beverages by men.

Most of the interviewees have lived in this settlement for a long time and they told me that the water in the river used to be very clean, 20 years ago, they could use its water for washing clothes and the children could also swim in it. It was a free source of water for the household too. They however blame the present polluted state of the river on the overpopulation in the area and congestion of the place. Along the river is also a very good hangout place for teenagers, most of whom are school dropouts and they sniff glue and smoke *bhang*.

*"Excreta passes by our door steps to the river, so we have to pour clean water to make it flow faster and reduce the smell. I would not like my child to play with the excreta and this adds to the amount of money I spend on buying water. We are environmentally poor I wish the government could put up measures to clean Mathare village 1.If you are a visitor you cannot come here a second time,"* a woman said.

### 3.5 Income

Four of the women were housewives and relied on handouts and their husbands to get income , three of the women were water vendors and landladies while the other three sold vegetables. The few children who have managed to secure jobs send remittances to their parents. Most of the

women said they are in table banking which help them so much. Table banking is where few women come together and agree to be removing a certain amount of money from individual savings and pool the money together after an agreed number of days , which is then lent to one of the members and it becomes a merry round until all members have gotten the money. The women use this money to start small businesses like selling vegetables or for buying household food or water. Some women even said their sons, most of whom did not finish high school engage in for example stealing cell phones and sell them to get income. Even though the mothers know this is a dangerous venture for their boys, they say they cannot tell them to give it up, since their sons also give them money at the end of the day to take to the table banking and to buy food. However, the women say the worst form of poverty is depending on another person. One of the interviewee said,

*"Begging is so hard. You ask for money from your son, he asks you what you did with the other money he gave you even if it was a week ago".*

One of the woman who does not consider herself working said,

*"I do not work, but I wake up early in the morning, make breakfast for my family, prepare the children to go to school, then I clean the house, utensils and clothes ,and any other household activity for the day then I sit and relax and wait till evening when my children are back ,I cook dinner, I wash them and help them with the homework. My husband always come late in the night obviously when he is drunk when we are asleep but I have to wake up and warm his food, ".said one woman.*

Another woman said, *"I am a widow my husband died two years ago leaving me behind with two children. That time I was twenty two years only but the good thing I was not depending on him even when he was alive. I own five rental houses, I engage in water vending business and besides that I also have commercial toilets. All the money from the toilet I save for my children in the bank for their education and medical insurance .I also teach my children how to save money. With this businesses, buying food is not a problem .I sell water meaning I can use as much as I want in my house .I also take part in government youth sponsored job projects like sweeping the roads or cleaning the Nairobi river. I can do any job provided it can earn me income. I cannot consider myself to be poor as other Mathare village I residents, but it has taken me hard work to reach where I am today, other women prefer sleeping to working and depending on other people for income that is why they are poor "*laments an interviewee.

A close look at each woman's life history offers a vivid explanation of their present life. One widow who is now in her sixties said,

*"I used to work and provide myself with basic needs but quit employment due to sickness. I had 5 children, 4 of whom are now dead living behind grandchildren who I have to take care of. My only remaining son does a good job and provides for me but the money is not enough, my son also has his own family I feel like I am overburdening my son".*

## CHAPTER 4

### 4.0 Introduction

In this chapter the researcher will discuss the findings of the research using the gender approach. The discussion will attempt to show the linkages between water accessibility and urban poverty.

### 4.1 Discussion

Poverty can be the result of political instability, ethnic conflict and climate change but one of the greatest causes of poverty in Africa is also the most overlooked....the lack of access to clean drinking water. According to Gikaru and Nyakangi (2011) over 60% of the urban population in Kenya-Mathare village 1 being one of them- relies on water vendors, water kiosks or unprotected natural sources, where water quality varies and there is a high risk of contamination through faulty and often illegal connections. This is made worse by unhygienic connections, storage and handling in the household.

Even though water is a basic need and can be termed as a human right, Gikaru and Nyakangi(2011) notes that in the world market the use of various water bodies has been commoditized to follow the supply and demand rule-when the demand is high and the supply is low the price of water goes up and when the supply is high and demand is low the price of the water goes down. The former rule applies to water due to its low supply and high demand in the urban area informal settlement due to the high population density experienced in this place. When the water is lost or scarce the price of the water can be raised as high as 20kshs(0.2USD) which is six times more than the usual price of 3kshs(0.03 USD)this in turn limits the quantity of water bought by the urban poor and the households water activity for the day. A compromise has to be made on the amount of food to be bought too in the case that extra money has to be added to buy water. In these instances that there is scarcity of water and the women has to buy few jerry cans of water because of the limited money they are given by the husbands, they do not wash the food properly before preparation and this might in turn lead to ingestion of intestinal worms found on poorly prepared food.

When the water is lost, the women have to go look for it no matter the distance. The extra time spent by the women to go and look for water in case of water scarcity could be used in other income earning activity like selling vegetables in the local market to add to the household income. The

women carrying the water in their backs in the long run might bring other health problems like back aches which might require more money spent in the hospitals rather than in household daily use.

When the urban poor cannot afford to get water quantity as recommended in chapter two, it brings multiple effects in their health for example when eating poorly washed food which further exposes them to diseases like cholera and typhoid forcing them to use more money on hospitals in seeking for treatment hence straining further the family economy. The absence of government hospitals(that are cheaper) in Mathare village one forces the residents to seek treatment from private hospitals(more expensive) in order to treat the water borne diseases. This might perhaps mean that the urban poor who live in informal settlements spend more money to seek for treatment of water borne diseases as compared to other residents of middle income estates that have easy access to government health centers.

According to the World Bank (2005) improved infrastructure raises productivity, improves living standards, reduces poverty, improves educational outcomes and reduces the time spent by women and children in accessing infrastructure, time that can be spent on for leisure or productive activities. Lack of water accessibility results in death, malnutrition ,stunting and reduced productivity and keeps most girls out of school due to the poor sanitation this in turn makes them lose education which can help them in future to improve their livelihoods.

The water vendors lacking legal water supply according to Amnesty International(2009) makes the residents of informal settlements pay 20 times more for piped water than many wealthier areas. This might be, "because illegal vendors in informal settlements lack a beneficial economy of scale for constructing infrastructure and because they frequently have to pay bribes to officials to avoid disconnection, water prices in these settlements are often many times higher than the prices paid by consumers in formal settlements with legal connection"(KWENCH,2006:3),this in turn limits the quantity of water that one household can access for their daily use due to their constrained financial capability in the informal settlements.

According to Ellis(2000) one form of capital can enable the poor to access another form of capital which might be a challenge faced by the urban poor. The women water vendors even though they might be regarded as the rich in the informal settlement they also face other forms of financial and legal constrains like lack of title deeds for the land and specific amount of money in the bank, that can enable them expand their businesses to the level of WSB in order for them to be regarded

as legal water suppliers by the government which can in turn enable them get financial loans in assistance of water supply. On the other hand the government and NIWASCO are not the only to blame, these water vendors do not pay any levies or taxes for the illegal water vending business, which has in turn made NIWASCO incur expenses of water use that are not metered and non accounted for hence whose use cannot be regulated. The continued absence of government and in particular NIWASCO from Mathare village one has ensured continued unsustainable supply of water in the informal settlement.

One reason NIWASCO gave for their absence in the informal settlement was violence and insecurity in the informal settlement, yet the Kco(2010) mandates the government to provide security to all the residents in the country. Lack of water access due to insecurity in the informal settlement can be seen as a form of inequality faced by the urban poor living in the informal settlement. The mere fact that one lives in an informal settlement can automatically be regarded as a form of class structure imposed by the government of who is entitled to water access and who is not which is contrary to what the Kco(2010) stipulated that all citizens are equal and have a right to water access.

Mathare village 1 has available water and the women do not need to walk long distance (more than 1000m and not more than 30 minutes) to fetch it unless in those rare circumstances that the water gets lost. However, availability of the water is not a guarantee of its safety for human consumption. The water vendors usually use cheap, plastic pipelines to transport water from NIWASCO main lines into informal settlements. These pipelines frequently rupture, allowing raw sewage and other contaminants to enter the water supply between the main lines and points of sale. Some of the pipes are also laid in dirty trenches and contamination of the water is so easy. We can easily lay the blame to lack of urban planning but this might not be the case because other neighboring estates do not face similar problem. It is like in the ministry of urban planning Mathare village 1 being an informal settlement it does not exist.

From analyzing the Water Act(2002) it clearly showed that it is not urban poor friendly in different situations. According to Mumma(2005) the Water Act(2002) is first of all centralized and treats the pluralistic nature of Kenya communities and water resource management with a singular strategy. Again being very centralized the minister who has all the authority over all water resources might miss the information on exactly the problems encountered with the urban poor in respect to

water access keeping in mind that the government presence in Mathare village one is lacking. Moreover, the informal settlement have very limited access to the state based system of provision of public services that include household piped water connection in fact Mathare village 1 has none. Again the state directs its funding to WSB who are the ones that provide water and sewerage but due to the many regulations that WSB has to pass to get the funding, it is lacking in Mathare village 1. Mumma(2005) explains further that the poor without access to water are usually the poorest and most marginalized of Kenya people. Both the Water Act and Kco(2010) does not allow the government investment on water infrastructure on illegally owned land which is one of the major problem that the urban poor face because they do lack title deeds. Perhaps the policy makers need to revise firstly the Kco(2010) and then the Water Act that might ensure legal water accessibility in Mathare village 1.

According to Kjellen(2006), women are the primary care givers, they are therefore undoubtedly more affected when house members fall sick from the water borne diseases like diarrhea, cholera or typhoid. For the women water vendors, some of them have managed to have a medical insurance for their families but they perhaps represent a very small population of the people living in the informal settlement. Moreover, it is quite unrealistic even if you have a medical insurance but to stay exposed in the same disease causing zone might see a person getting the water borne diseases recurring.

Lack of toilets in Mathare village one and expose of the residents to Nairobi river which acts as the toilet is contrary to the Kco(2010) clause 43, that every person has the right to the highest attainable standard of health, to accessible and adequate housing, and to reasonable standards of sanitation, to be free from hunger and to clean and safe water in adequate quantities. The women are forced to buy more water quantity in order to direct feces to the river and keeping in mind that the urban poor might face challenges of buying sufficient quantity of water for their households in the first place. With availability of water maintaining sanitary conditions becomes so easy which in turn leads to decrease of water born diseases. A simple practice as washing hands after visiting the toilet has proved to keep away diseases caused by germs which force families to spend fortune on. Referring you back to the definition of poverty in chapter 2, poor environmental conditions is one form of urban poverty and NPEP1995-2015(1999) notes , since poverty and environmental concerns are intertwined, they need to be addressed simultaneously. It might not be easy to come up with one single solution but perhaps it might require different stakeholders and the residents

coming up with ideas and possible solutions and policies for the same. Women must also be on the forefront in discussing how not only they are faced with lack of water access and poverty, but also come up with possible practical solutions for the same.

According to Kjellen(2006),"When sanitation is unsafe secondary barriers against the spread of diseases becomes more important. Sufficient water is then needed to wash away disease causing agents from hands, kitchen utensils and food preparations. For the poor the sheer lack of water quantity is often more pressing than that of water quality"(Kjellen 2006:23).On the other hand, with this multiple vulnerability should the women not treat the water regularly? With more than half of the women depending on their husbands and sons for income, boiling the water is an expensive venture keeping in mind the price of fuel, moreover buying food and saving the paraffin is given priority over water quality. However, Can we have clean food with dirty water? Portes (2010) recognizes the importance of social capital in the urban communities, but most of the people do not get sufficient or any information about jobs in towns and other places. This limits them from gaining better jobs offered elsewhere. Portes(2010) notes that the nature of jobs in the urban centers in developing countries are mostly informal, black-market or underground jobs where people manage to evade tax hence trade of illegal goods for example drugs is quite common. If caught by the police engaging in illegal business, these urban poor spend a good part of their productive life in jail.

Lack of toilets and sewerage services has continued to expose the urban poor to poor environmental conditions and even though the informal residents might be willing to change the situation,there is very little they can do unless the government and civil society comes up with strategies to help and get involved. Even though the water is available and the women with money can buy it,after using the water with no proper channel to drain the used water, it becomes an environmental pollutant to the urban poor most of whom are found in the informal settlements.

According to Karani (2015)the problem with water scarcity is not the rainfall, but water waste. If residents harvested the rainfall they could have plenty of water for use in three consecutive months, for a very small cost. However, on the other hand this study found out that in informal settlements where the proportion of the house to the number of household members is so minimal, one wonders where even if they wanted to harvest and store the water, if the jerry cans and equipment will be able to fit or should this harvesting be done in a large scale basis by the water providers? Most of



the households can only afford a small room, that serves as the sitting room ,bedroom, kitchen and is shared with a household comprising at times at least five children, parents and grandchildren. The house space might be so limited to fit the water storage equipments and the insecurity in Mathare village 1 might not make it possible to put water tanks outside the houses for fear of theft .

Even though all the women have first hand to water use and its distribution in Mathare village one, the widows seemed to be better off economically since they engaged in different businesses and the opposite is also true of the women who had husbands. Even though it is not easy to deduce that having no husband is better, but perhaps this gives the women better chance and freedom of diversification. Chant (1997) and Kabeer (1997 )as quoted in Chant (2007)best explain this as trade-offs that women make and a woman remaining without a man after bereavement or break up might be more tactful and beneficial to the women within a constrained range of livelihood options. Chant(2007)also notes that money in women's hands are more invested back in the household than money on mens hand which might be used on other things like drugs and personal entertainment, this in turn raises the living standard of the household. "Women may well be poorer in income terms on their own than as wives and partners in male headed households, for example, but can feel better off and importantly, be less vulnerable, on account of having more autonomy, more control, and/or greater personal security," (Chant,1997as quoted in Chant 2007:44).

The water vendors owed their financial capability to using their brains. Even though this might be true using the brains might also be in the form of freedom and power .The widows can decide to do what they want anytime but the women with husband must in most cases seek consent from their husbands to venture into income earning business which they might not get and this in turn limits their freedom of diversifying in whatever business they may want. On the other hand ,the widows do not also have a choice, they do not have anyone to depend on and hence they have to work hard to make ends meet and they also lack social capital that might come by the family ties from their husbands lineage. This was also well illustrated by ethnicity as explained earlier in chapter 2.Belonging to a particular ethnic group exposes the women to challenges and opportunities from birth, but can this be changed and by who? Women must be on the forefront in fighting for their rights and in seeing cultural change occur. According to WHO (2016)even though life expectancy has increased by five years since 2000,inequalities still persist even within females themselves.

Ellis(2000)stresses the need to diversify income sources a practice well mastered by the water vendors to remove them out of poverty. My interview with the water vendors however demonstrate the parents of the water vendors were not poor, compared to the average income of the settlement and two of the water vendors inherited the water vending businesses from their parents. The poorer women interviewed on the other hand, never finished school thus making it impossible to obtain formal employment and they also lacked financial capital to start small scale business. National Poverty Eradication Plan(NPEP)(1999) notes that the poor cannot compete in the new liberalized world and they might sink deeper into poverty and hence we require to have some special programmes to help them to get to the level to compete with the rest of the population. Bourdieu in Inglis and Thorpe(2012) further notes that the poor find it difficult to gain capital to make them compete in different development fields since they entered those fields poorly equipped with capitals in the first place.

The family burden the women have to carry of taking care not only of their children but also husband and grandchildren too has left them feeding from hand to mouth with very little to save as financial capital to invest in business. Most of the women also said they do not have time for themselves. Breaking the intergenerational poverty cycle might be a bit hard given the fact that they are very few government primary and secondary schools in Mathare village 1 and even though there exists private schools, the urban poor because of financial constrain might not be able to access them. This means that there is a high probability that in future their children and grand children households might also face the same financial constrains to water access brought by lack of education . The study showed that even though some children manage to be educated and get out of Mathare village 1,they actually represent a very small percentage and the rest remain in the same resident and get married to equally poor if not less poor husbands and the circle continues.

## CHAPTER 5

### 5.0 Conclusion

Poverty is very common in the informal settlement, however not everyone living in the informal settlement are poor. Mathare village one has available water with no water rationing but money is the determining factor that will ensure a person gets accessible to it and also determines the quantity one can have per day. All the water connection in this area are illegal and its quality varies from time to time. Due to the state of insecurity in this place, no water inspection by service providers is done putting the residents health at risk of consumption of contaminated water. The woman have the sole responsibility in the household for fetching the water, however the husband assist by giving money to buy the water, even though they do not specify which amount goes for water.

Urban centre poverty is multifaceted and intergenerational. It includes being poor in many aspects: education, water, sanitation, income, asset, voice, environment and lack of security. Even though a person might have a source of income and can have easy access to water and education, this is not a guarantee for her security. The women languishing in poverty are the ones depending on their husbands for income ,while for example widows often are able to start up small businesses and keep their earnings.

The study has shown that there are linkages between water accessibility and urban poverty. The urban poor are faced with different challenges in regard to water accessibility that includes quality, quantity, pricing, water storage, safety and time taken to access water. The poor lack of assets and most especially income is a great hindrance to water access. They are faced by another challenge of access to health centers in case they are affected by water borne diseases like typhoid and cholera. On the other hand water vendors have also used the same water to create wealth hence creating a class structure between the poor and the rich women.

There is need to try to include all stakeholders in urban planning but at the same time being aware of the influence of ethnicity ,class and gender. Nevertheless in order to ensure sustainable provision of water access in the informal settlement might require revision of the Water Act(2002) and the Kco(2010).This can be followed by planning, implementation and evaluation of water provision infrastructure. In addition to this, poverty and environmental concerns are intertwined and need to be addressed at the same time.

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## Appendices

### **Appendix 1: Interview schedule for the women.**

Average income per month(ksh) below5000() 5000-10000() over 10000()

- a, Tell me how is the water situation in this area.
- b, Where do you get water? Do you have some storage facilities?
- c, How many jerry cans of water does your family use per day?
- d, How many days do you get water? Who decides this?
- e, How does water rationing affect you?
- f, What kind of job do you do?
- g, How much of this money goes to water buying?
- h, How safe do you think is the water you take?
- i, Have you heard any health issues arising from unsafe water? How did you handle it?
- j, What is your husband wife role in ensuring water security in the household?
- k, Do you know of any government policies about water?
- l, what should the government /water providers do to improve the water situation in this informal settlement?
- m, You as a person do you have any initiative to improve this situation?
- n ,How was the water situation in this area five years ago compared to now?
- o, What do we mean by poverty? Can you classify yourself as being poor?
- p, How are Women , men and children affected by the water situation?
- q, Generally speaking what do you think should be done to improve the informal settlements?
- r, What do you think can be done to eradicate poverty in kenya generally.

## **Appendix 2: Interview schedule for water vendors**

- a, Explain briefly what you do.
- b, what are the policies in regard to water provision?
- c, How is the water security situation in the slums?
- d, Why is this so?
- e, What do you think can be done to make the situation better?
- f, How do you treat the water before supplying it to the people?
- g, Explain briefly the steps you took for connecting the water pipe from the main pipe.
- h, How else can the situation be handled?
- i, How is the pricing of water? Do people pay this money?
- j, How are the water vendors in kiosks work with Athi Water?
- k, What should the people do to improve this situation?
- l, What should the government do?
- m, What do you do to make the situation better?
- n, Explain briefly the linkage between water security and poverty in informal settlements.
- o, How is the water security in other middle income estates? Why do you think this is so?
- p, Comment briefly on the water catchment area(Mau)? Do you think this is the source of the problem? How can it be improved?
- q, How are the water policies linked to this whole situation? What can be done better?