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The Impact of Water on Girls' Formal Education: A Study of Kenyan Secondary Schools

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In Partial Fulfillment
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The Impact of Water on Girls' Formal Education: A Study of Kenyan Secondary Schools

In Partial Fulfillment of the Requirements for the Degree

MASTER OF ARTS

in

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Jennifer Emick
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Under the guidance and approval of the committee, and approval by all the members, this thesis has been accepted in partial fulfillment of the requirements for the degree.

Approved:

Thesis Advisor: Kathleen Kelly Janus — Date 10/15/12

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TERMS AND CONCEPTS:

Basic education: covers notions such as elementary and primary/secondary education. It is guaranteed to everyone without any discrimination or exclusion based notably on gender, ethnicity, nationality or origin, social, economic or physical condition, language, religion, political or other opinion, or belonging to a minority. Beyond pre-school education, the duration of which can be fixed by the State, basic education consists of at least 9 years and progressively extends to 12 years. Basic education is free and compulsory without any discrimination or exclusion. Basic education prepares the learner for further education, for an active life and citizenship. It meets basic learning needs including learning to learn, the acquisition of numeracy, literacy, and scientific and technological knowledge as applied to daily life (UNESCO, 2007).

Gender: the construction of a social category or 'status' of differentiation based on biological sex (Ridgeway).

Gender parity: (reflects *formal equality*) achieving equal participation of girls and boys in all forms of education based on their proportion in the relevant age groups in the population (UNESCO).

Gender equality in education: (equality of outcome) the right of boys and girls to experience the same advantages or disadvantages in educational opportunities such as attending school, receiving teaching and assessment methods and producing equal learning outcomes (UNESCO).

Provision of water: obligation on the part of the government to provide access to potable water to its citizens.

Improved water sources: water sources that, by the nature of their construction, are protected from outside contamination, particularly fecal matter. These sources include piped water, public tap, borehole, protected well or spring and rainwater (UNICEF/WHO).

Reasonable access to water: the availability of at least 20 liters a person a day from a source within one kilometer of the dwelling (UNICEF/WHO).

Secondary education: secondary education is a gateway to the opportunities and benefits of economic and social development (The World Bank).

Semi-arid and arid lands: sub-humid zones characterized by low erratic rainfall of up to 700mm per annum, recurring droughts and different associations of vegetative cover (International Institute for Sustainable Development).

Unimproved water sources: consist of unprotected dug wells, unprotected springs, tanker truck, cart with small tank/drum, bottled water and surface water (river, dam, lake, pond, stream, canal, irrigation channels) (UNICEF/WHO).

THIS STUDY IS FOR ALL THE GIRLS WHOSE ASPIRATIONS ARE BOUNDED,

AT A TIME WHEN THEY SHOULD BE BOUNDLESS;

AND ALL WOMEN WHOSE POTENTIAL IS LIMITED,

AT A TIME WHEN IT SHOULD BE LIMITLESS.

CHAPTER 1: INTRODUCTION

1.1 Objective Statement:

Strategic investment in the provision of water will increase the participation of girls in Kenya's educational system and decrease attrition rates throughout post-primary school.

1.2 Overview of the Study Problem:

The 21st century has seen great advancements in women's rights, but issues of gender inequality persist. Although women comprise over fifty percent of the global population, they remain grossly underrepresented in professional and political circles. In many countries, existing social structures and long-established gender stratification conspire to keep women in positions of inferiority. At the most basic level, gender inequalities are produced and reproduced through education. Thus, this study argues that educational systems serve as the gateway to social, political and economic equalization.

In Kenya, patriarchal mores and cultural perceptions have caused severe inequality. The current dearth of women in high-level decision-making positions is reflective of the nation's gender disparities in education. For much of Kenya's female youth, the educational experience is constrained by ascribed social roles that deliberately limit the agency of women and girls. Across the country, traditional gender roles manifest in practices that marginalize women and prioritize the male agenda. For this reason, greater emphasis is placed on boys' education in Kenyan society – as investing in girls is considered (by some) to be akin to *'watering someone else's garden'* (Chinese Proverb).

While myriad factors underlie Kenya's educational gap (between males and females), the way in which the deprivation of the human right to water impinges upon the right to education and gender equality remains largely unaddressed in academic literature. There are approximately 43 million people living in Kenya, of which about 17 million do not have access to clean water (World Bank, 2012). Only 52 percent of Kenya's rural population have access to improved water sources[1], and therefore the remaining 48 percent depend on unprotected sources to meet their water needs (WHO/UNICEF, 2010). Recurring and protracted droughts in the region coupled with sustained population growth have further stressed the country's water resources, causing people to travel farther for water and resulting in higher incidents of water-related conflicts.

Water collection, a task predominantly borne by young women, is a time-consuming and laborious activity that has broad developmental implications. Due to the lack of proximate water sources, the United Nations estimates that women and children in sub-Saharan Africa lose 40 billion hours per year collecting water[2]. Research on this issue, albeit limited, indicates that resource collection negatively affects the health, educational progression and economic potential of those engaged in such activities (Hemson, 2007).

Until this point, studies have predominantly focused on the extent to which resource collection undermines economic development, but have failed to draw the parallel correlation between water collection and female's access to equal representation

[1] Improved water sources are defined by UNICEF/WHO as water sources that, by the nature of their construction, are protected from outside contamination, particularly fecal matter. Unimproved water sources consist of unprotected dug wells, unprotected springs, tanker trucks, bottled water and surface water (river, dam, lake, pond, stream, canal, irrigation channels).

[2] Statistic from the waterproject.org (2011).

and participation in all facets of society. Moreover, while voluminous literature exists on the positive economic effects of investing in girls' education, less attention has been given to the fact that women possess the right to equal access to education and resources – not because it yields economic returns, but because women's rights are human rights. Despite this fact, both the right to water and the right to education remain fundamental human rights of which women are disproportionately deprived.

Compared to their male counterparts, Kenyan women experience lower enrollment rates, higher levels of attrition and poorer academic performance on national examinations due in large part to their responsibility to collect household water (Ndiritu and Nyangena, 2010). For young women, the opportunity cost of water collection is not only school enrollment and academic performance, but also the potential to fully develop the personal and professional skills essential for achieving gender equalization. Thus, this study contends that basic human rights for women can only be realized if there is equal and reasonable access to resources and, resultantly, education.

The following chapters provide an examination of the gender–education–resource nexus in which educational outcomes are shaped by both access to resources and gender. The implications of this research go on to illustrate how the attainment of gender parity in post-primary education is a fundamental step towards realizing substantive gender equality in Kenya.

1.3 Statement of the Problem:

More than 40 percent of all people globally who are without access to drinking water live in sub-Saharan Africa (UN JMP, 2012). In Kenya, the lack of access to

improved water sources in rural areas disproportionately impacts the lives of women and young [school-aged] girls. Poor public services forces families to rely on unimproved water sources such as unprotected wells and springs, surface water, or vendor provided tanker-trunk water, which is often not a viable option for the economically disadvantaged. The burden of water collection is therefore shouldered by individual family members, generally the women and children. Due to the significant time and energy associated with household water collection, young girls are often unable to attend school regularly.

A recent study by Wagura et al. (2010) examined this issue and found that children's school attendance is negatively affected by the scarcity of natural resources, particularly water. A related study, conducted by David Hemson (2007) in Durban, South Africa, revealed a range of developmental impediments and socio-psychological effects that are linked to resource collection. According to Hemson's research, the extensive investment of time spent on water collection has a measurable effect on children's participation in education. The results of Hemson's study confirmed that girls living in rural areas of South Africa are more likely than boys to be overburdened by resource collection.

An additional research project, undertaken in 2010, found that Kenya's attainment of parity in primary school enrollment has failed to translate into parity in academic achievement and progression through grade levels (Amunga et al., 2010). The project, conducted by Amunga et al., indicated that girls consistently register lower achievement in national examinations than boys. This is significant because Kenya uses a ranking system to determine pupils' admittance to the most competitive national and provincial

schools. Thus, girls' underrepresentation on the national merit list translates into their underrepresentation in both the top secondary schools and universities.

The current study builds upon the existing literature by framing the issue of gender inequality in education in a new way. Unlike past research, this study incorporates an analysis of how the deprivation of one right, the right to water, is directly linked to the deprivation of other rights, the right to education and gender equality. This study looks specifically at three aspects of Kenyan society that hinder the achievement of substantive gender equality and the realization of basic human rights for all: *regional inequalities in the provision of water resulting in communities with disparate access to water*; *socially constructed gender roles*; *gender-based discrimination in terms of water usage and access to water*.

1.4 Purpose of the Study:

Although the impact of water collection on the lives of women in sub-Saharan Africa is well documented[3], the academic community lacks studies that examine the impact of water on girls' academic enrollment and retention. Specifically, there have been only limited studies done on the correlation between water collection and female attrition rates at the secondary school level – the apex of fallout for female students. Hence, the purpose of this study is two-fold: (1) to evaluate the extent to which the formal education of girls is affected by the availability of potable water (2) to assess how water collection impacts girls' educational progression.

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[3] United Nations: Department of Economic and Social Affairs. "The World's Women 2010." *Trends and Statistic*. 2010.

Given the lack of research linking women's right to water and the realization of gender equality in education, this study serves as a baseline for future investigation. In this way, this study puts forth a specific, reproducible methodology that may be applied to a larger sample size, and, ultimately, the data may be used to guide investment decisions on educational development and gender equality.

1.5 Hypothesis:

I believe that access to proximate, potable water affects the enrollment and retention of females in secondary school.

1.5 Research Questions:

i. How does proximate access to potable water contribute to female enrollment and retention in Kenya's secondary educational system?
ii. In Kenya's public secondary schools, do we see an increase in the attrition rate among females as a result of water collection?

1.6 Significance to the field:

This study argues that the provision of water will create reliable access to water, which will in turn yield increases in the secondary school enrollment and completion rates of girls. Given that women and girls are commonly the primary (non-economic) resource collectors, the underlying logic of this study is that an improvement in the delivery of basic services, such as the installment of indoor plumbing and community wells in arid regions, will help mitigate the high drop out rates of school-aged females.

While scores of studies have been conducted to identify economic costs and gender bias as major determinants of schooling, a very limited amount of research has linked access to water and educational attainment. Addressing this gap in academic literature is crucial to breaking existing cycles of poverty, underdevelopment and environmental degradation. The significance of this study is therefore the production of unique research that extends the literature on gender inequalities in education by including resource collection work as a determinant of families' schooling decisions and students' academic progression.

Through this initial study, I highlight how the lack of adequate water infrastructure in Kenya's rural areas hinders women and girls' daily lives and opportunities for economic and social mobility. This research is intended to serve as a baseline for iteration and expansion, with the long-term goal of developing a greater understanding of the ways in which water development projects and the smarter provision of basic resources can be used as strategies for achieving gender equality in both education and civic participation.

1.7 Limitations of the Study:

This study faced several significant limitations. First, due to the U.S. State Department's travel advisory for Kenya (November 2011), and in accordance with the University of San Francisco's policies, I was required to conduct this study remotely. The study was redesigned in mid-March (2012) to accommodate the necessary logistical changes. As part of the study's redesign, a field researcher was brought on to undertake on-site data collection as well as to help coordinate the interview processes. I was

therefore removed from the subjects of the study. Secondly, the lack of related literary sources and empirical studies meant there was little data to form any sort of analytical comparison with the conclusions of this study. Thirdly, due to the study's limited time frame and lack of financial resources, the sample size is small. This study therefore serves as a preliminary assessment of the issue as it is difficult to authenticate the validity of its conclusions until additional research is conducted.

CHAPTER TWO: METHODS

2.1 Introduction:

The following research questions are addressed in this study:

i. How does proximate access to potable water contribute to female enrollment and retention in Kenya's secondary educational system?

ii. In Kenya's public secondary schools, do we see an increase in the attrition rate of female students as a result of water collection?

This study used a mixed-method design to incorporate both qualitative and quantitative data in its analysis of the research problem. The study used data collection tools such as questionnaires, interviews, focus group discussions and analyses of preexisting data to provide a qualitative description of how access to water affects girls' schooling as well as to quantify the educational costs associated with water collection.

The study included a questionnaire with close-ended items [quantitative], identification of subjects to study [quantitative], the use of interviews with selected subgroups [qualitative] and focus group discussions with subgroups [qualitative]. The data collection tools consisted of one pre-study questionnaire to identify the focus group; one questionnaire administered to the focus group; individual interviews with each participant; analyses of school reports. Qualitative data was analyzed descriptively following the inductive approach, which allowed for dominant and/or frequent themes to be drawn from the raw data. The quantitative data was analyzed using statistical software. Through triangulation, I increased the validity of the study's findings.

2.2 Setting:

The research took place in Laikipia County (see **Appendix D**), an area located in the Rift Valley province of Kenya and situated on the leeward side of Mt. Kenya. Laikipia County, which covers 9,462 km², has a population of nearly 400,000 and a poverty rate of more than 50 percent[4] (KNBS, 2010). Access to infrastructure in the region is extremely poor. Approximately 60 percent of households have improved water sources, however most of these homes are concentrated in the county's two main urban centers, Nanyuki and Nyahururu. Only 18 percent of households in Laikipia have electricity and a mere 6 percent of the county's total roads are paved (KNBS, 2010). According to Kenyan National Bureau of Statistics 2009/10 census data, 13 percent of the population has a secondary education.

The study was conducted in six secondary schools located in the arid and semi-arid areas of Laikipia County. Data was collected over a two-day period during a regular school week. The administration of the questionnaire, interviews and focus group discussion took place in an unused classroom of each school and did not interrupt normal class time. Selected parent participants were asked to come to the school to take part in an interview and questionnaire. The parent and teacher interviews also took place in an unused classroom at a pre-determined time during the same two-day period that the questionnaire was distributed to the students. The interview was performed using social media, was audio-recorded for accuracy, and lasted less than 30 minutes. Interviews did not interrupt with schooling and participants were free to opt out at any point in the study.

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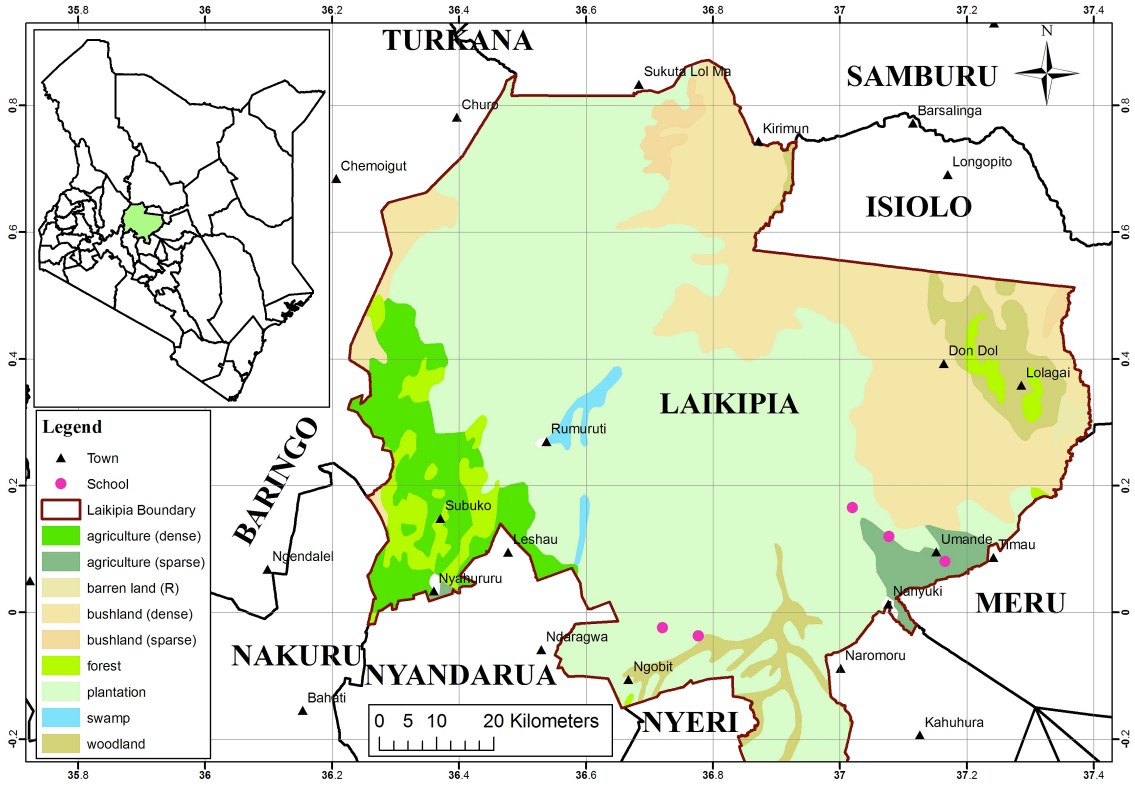
[4] All data except for poverty rate comes from the Kenya National Bureau of Statistics (2010). Data for poverty rate comes from the 2005/06 Kenya Integrated Household Baseline Survey.



Map of Laikipia County, Kenya; sample school locations indicated by purple dots.

2.3 Sample/Participants:

The study employed purposive sampling to select sample participants. This allowed for the systematic categorization of student, parent and administrative populations that live in areas that have acute water challenges. The participants were then limited to female students currently enrolled at the selected schools, teachers currently working at the schools and a parent or guardian of the female students involved in the study.

The target sample age of the female students was from 14 to 18 (secondary education is based on a four year system and begins around age 14), but included some variance due to the fact that many students (especially those from rural areas) experience

late admission into the educational system. The sample included girls from each grade level (the first through the fourth year). However, due to discrepancies in the number of students enrolled in each grade level at the different schools, the sample size from each grade level is not consistent across all six schools. The sample included 95 female students in total. The sample also included 11 teachers (no gender bias; each school represented), and 42 parents or guardians of the student sample (no gender bias; each school represented), though the conclusions presented in this study are based on the student sample, and are only supported by the data collected from the teachers and parents/guardians. The sample did not differentiate between ethnicities represented in the study and initial participant selection did not include any discriminatory criteria in regard to one's socioeconomic status.

2.4 Measurement Instruments:

This study employed four different measurement instruments (see **Appendix C**): questionnaires; interviews; focus group discussions; analyses of records. The questionnaires were used to gather data on each student's *frequency of water collection*, *household water source, time spent on household water collection, distance to household water source, distance to school and attendance rates* for the student sample population. Three separate questionnaires were used for the three sample groups: students; teachers; parents/guardians. While the structures of the questionnaires were seemingly identical, the perspective from which the questions were asked was changed to suit each participant group. The questionnaires were comprised of seven closed-ended questions (quantitative

data collection method) that were be used to gather data on each participant's time spent on travel to collect water and to get to school.

Interviews and focus group discussions served as the second and third measurement tools of this study (qualitative method). Interviews, which included four open-ended questions, were used to record the participants' feelings and opinions regarding the impact of water on girls' educational achievement, as well establish whether or not the participants viewed access to water and access to education as basic human rights or special privileges. Focus group discussions, which also included four open-ended questions, were used to establish *the primary causes for the gender gap in Kenyan secondary schools; the water-related challenges facing female secondary students; the parental view of the girl child's education in the home; the importance of female mentors on girls' educational aspirations.* For the questionnaire, interview and focus group discussion, coding was used to organize the data. The third measurement tool included analyses of preexisting data related to enrollment/completion/performance reports from the six participant schools. The school reports were collected by a field researcher and emailed to me (based in the United States) for analysis.

2.4.1 Validity/Reliability:

To increase the validity of the data, all interviews, questionnaires and focus group discussions were conducted in a similar setting (vacant classroom), during a normal school week. Additionally, a second researcher was used to do coding and check my inferences based on the specific instruments. Thus, consistency across research

environments, peer evaluation and triangulation were used to establish the validity and reliability of the study.

2.5 Procedures:

The data was collected through questionnaires, interviews and focus group discussions. The questionnaires were collected in the six schools. Students, teachers and parents/guardians were administered the questionnaire in a natural classroom setting. Mr. James Mathenge, the Head Research Scientist for the Kenyan Wildlife as well as the field researcher of this study, performed the administration of the questionnaire during a two-day period of time during the month of June. A total of 29 interviews (22 students; 10 parents; 7 teachers) were conducted during the same two-day period (June 26th – June 31st). I conducted interviews remotely through the use of social media. The interviews took place at the school, were individually conducted over the field researcher's mobile device, were recorded for accuracy and were done under the supervision of Mr. James Mathenge. Interviews with the students and teachers took place during non-class periods of a normal school day. The interviews with parents also took place at the school premises during the same time period. Prior to the administration of the interviews/questionnaires, the field researcher delivered written consent forms (see **Appendix F**), and I delivered verbal informed consent to all the participants involved.

2.6 Data Analysis:

Data was recorded and categorized in terms of emergent themes. Coding was used to organize data obtained through the questionnaires, interviews and focus group discussions into specific themes related to the two research questions. Using the categorized qualitative data, I interpreted synthesized measurements and drew out the major themes of the study. Using Excel software, I established correlations between the various statistical data collected from the questionnaires (see **Appendix B**). Finally, I cross-analyzed the data from the questionnaires, interviews and focus group discussions to determine if the findings were in corroboration.

CHAPTER 3: LITERATURE REVIEW

3.1 Introduction:

According to recent data produced by the WHO/UNICEF, 783 million people lack access to safe drinking water and improved water supplies[5] (WHO/UNICEF, 2012). Though the developed world enjoys essentially ubiquitous access to improved water supplies, the proportion of the population of sub-Saharan Africa living without access to safe drinking water remains just under 40 percent (WHO/UNICEF, 2012). Given the stark, global disparity in access to potable water, there is a need to investigate and quantify the cost of water collection on the development of human capital in areas with unimproved water supplies.

In recent years, two perspectives – health and economics – have dominated research on the implications of water collection activities, primarily with regard to women and children in sub-Saharan Africa. While this study does not deny the importance of such literature, it seeks to broaden the scope of future research to include the educational costs associated with water collection. Presently, there is a lack of studies that examine the relationship between access to water and educational development. Moreover, there have been no comprehensive studies on the linkage between water

[5] Access to an improved water source refers to the percentage of the population with reasonable access to an adequate amount of water from an improved water source, which include household connections, public standpipes, boreholes, protected dug wells, protected springs, and rainwater collections. **Unimproved water sources** are unprotected wells and springs, vendors and tanker trucks. Reasonable access is defined as the availability of at least 20 liters a person per day from a source within 1 kilometer of the dwelling (WHO/UNICEF).

collection duties that stem from the deprivation of the basic right to water, and female dropout rates in secondary school – the apex of fallout for girls in Kenya.

This literature review focuses on three areas related to the impact of water collection on the enrollment and retention of females in Kenyan secondary schools. The first section addresses research on the nature of water collection in rural areas and the opportunity cost associated with collection activities, particularly for young girls. The second section discusses socio-economic and cultural factors that contribute to the existing gender variance in educational attainment. Lastly, the third section looks at water-related policies and interventions that have been employed to improve educational development, as well as equalize men and women's water usage, water management and access to water.

3.2 Water Collecting and Opportunity Cost:

The confluence of population growth, changing weather patterns and a heightened demand for natural resources has resulted in greater expenses of time and energy associated with present-day water collection. Women and children, the primary water collectors of a family, spend a considerable portion of their day supplying water to their households – time that could otherwise be spent on social and educational development. Previous research has indicated that for young women and children the opportunity cost of water collection is school enrollment and academic performance. A study by Sorenson, Morssink and Campos (2011) considers a range of costs related to water collection activities, i.e. time spent, caloric expenditures and related health risks, in order to

measure progress towards the achievement of two Millennium Development Goals – increasing access to safe drinking water and seeking an end to poverty.

In this study, data on gender differences in access to water and water collection were compiled from 44 countries that participated in the Multiple Indicator Cluster Survey (MICS) program. This research sought to quantify the burden of water collection on women. In each country, a two-stage, stratified cluster sample was drawn. Utilizing large sample sizes (in the tens of thousands), researches gathered a pool of information on household water supplies. The variables measured in this study included time spent on water collection (in minutes), linear distance to water source, gender and age of household member/s responsible for water collection, average daily per capita domestic water consumption, household size, income and seasonal variations. The measurement instruments used to collect this data included the questionnaires, surveys and in-person interviews.

The purpose of this research study was twofold. First, data from the MICS program were used to monitor the situation of women and children in developing countries. Secondly, the research extended initial public health concerns about water quality and quantity to health and social considerations related to water collectors (Sorenson et al. 1525). Statistical tests were used to analyze the data and the resulting information was drawn upon to expound gender-specific water accessibility and use in the developing world. The results of the study indicated that in the 44 countries studied, there was a direct positive correlation between not having access to an improved water source and the percent of water collectors that were female. Thus, the data signifies that

women are the most common water collectors and that their daily time spent on collection activities is substantial.

The implications of this study are important for understanding how the task of water collection disproportionately affects the lives of women around the world. While incorporating additional factors not addressed in this research would provide a more comprehensive assessment of the costs of water collection, the conclusions are supportive of the societal and individual burdens borne by women who lack access to improved sources of water. Future studies on the impacts of water collection should include greater amounts of gender-disaggregated data as well as examine variables such as priorities in the allocation of domestic water and household sanitation practices to better estimate the complete costs associated with water collection.

Utilizing a different research approach, David Hemson (2007) concluded that children's water collection is one of the most common forms of child labor. Based in Durban, South Africa, Hemson's study investigated the ill effects that children suffered in terms of health and education due to the significant time spent and long distances traveled for water collection in remote rural areas. Findings from this research revealed negative effects associated with children's water collection that shared similar developmental impediments and socio-psychological impacts found in child laborers.

In this study, Hemson gave particular attention to the extent that water collection – a time consuming and laborious activity for adults and children alike – stifles the social and educational development of children. The most common negative effects experienced by the children participating in this research study included recurrent tardiness to school, frequent fatigue and inability to concentrate in class, little time for out of class studies

and delayed progress through grade levels. The results of this research were thus intended to prioritize the implementation of water projects to areas where large numbers of children still engaged in water collection activities. For this reason, the research sought to advance several policy areas: children's rights, provision of water to distant communities and educational development.

To conduct his study, Hemson employed both qualitative and quantitative measures in four sites, each one geographically and politically diverse, but all representative of a typical rural settlement in Southern Africa, for a seven-day period. Two features necessary for the selected sites were (1) no piped water source and (2) large numbers of children engaged in water collection. The research methods included participatory observation by fieldworkers, focus group discussions with children and adults, interviews with educators, household surveys, questionnaires and measurements of time and distance to water sources. Approximately 366 households were surveyed and 1,052 children within the age range 5-17 were interviewed (Hemson, 318).

An analysis of the data from all four sites indicated that children spent an average of 19.5 hours per week in domestic activities, with the collection of water taking up the largest proportion of that time (Hemson, 318). Out of the 1,052 children surveyed in this study, 100 percent reported having had collected water at some point in the past, 81 percent reported having had collected water within 7 days of when the survey was administered, and 110 participants recorded that they spent more than 28 hours per week collecting water. Furthermore, gender-specific analyses of the data showed that more than half of the water collectors within this research group were girls – with girls spending on average 55 minutes a day in water collection activities compared to 49

minutes spent by boys (Hemson, 317). These statistics strongly support Hemson's claim that water collection is *the* dominant domestic activity of children in remote rural areas of Southern Africa.

Applying a dual research approach, Hemson used a questionnaire and field observation to establish children's contribution towards total household water consumption. The calculated results indicated that children contributed 80 percent of the total volume of water consumed in a household, while mothers and other people contributed the remaining 20 percent (Hemson, 319). The most common times that children collected water were in the early morning before school, and often again after school. Taking into account that each water collection trip takes on average 55 minutes for girls and 49 minutes for boys, and that multiple trips are often undertaken in one day, we are able to better comprehend the significant amount of time and energy that is spent on the completion of one domestic chore.

According to Hemson's research, the extensive investment of time into domestic activities, particularly water collection, has a measurable effect on children's participation in education. Data compiled from a survey revealed that out of the proportion of the sample group that were both in school and responsible for water collection, 59 percent felt that collecting water caused problems in their schooling (Hemson, 320). The two primary problems cited were being late and absenteeism. Other problems mentioned by the sample group included insufficient studying time (reported by 73 percent), being tired in class (60 percent) and having poor morale due to a lack of time for washing (46 percent). It is important to note that the survey responses showed gender

variations – more girls than boys (53 percent of all cases) mentioned experiencing problems in schooling related to water collection.

The conclusions of this study point to the negative effects of collecting water. In this research, Hemson draws a correlation between water collection activities, which he argues is the most common form of child labor, and children's educational development. Hemson's examination of four villages without access to piped water and detailed measurements on the time spent on water collection shed light on an important area of research that has not yet received enough attention. Of the 19 hours and 31 minutes averaged by children in domestic chores per week, 15 hours and 58 minutes were spent in water collection (Hemson, 323). Data from this research, albeit based in South Africa, is one of the few studies that have presented the harmful effects of water collection on the education and health of girls and those who must undertake multiple water collection trips per day.

To place the problem of water collection and the associated opportunity cost in the proper context of the current study, it is necessary to look at related Kenyan literature. One relevant study, conducted by Simon Wagura Ndiritu and Wilfred Nyangena (2010), linked resource collection, such as water and fuel wood, to schooling attendance in rural Kenya. The results of this research support the hypothesis of a negative relationship between children working to collect resources and the likelihood that they will attend school. Moreover, the research confirmed that girls are more likely than boys to be overburdened by resource collection work in sub-Saharan Africa. In light of these findings, the stated recommendation of the study was immediate policy interventions focused on the provision of public amenities, such as water (Ndiritu and Nyangena, 18).

For this study, Ndiritu and Nyangena obtained cross-sectional data from 200 rural households drawn from 20 villages in Kenya's Kiambu District during the months of April and May 2007 (Ndiritu and Nyangena, 7). The site selections were grouped in three divisions and limited to areas where deforestation has caused water scarcity problems. Multistage sampling was used to select the sample villages. From each village, 10 households were randomly selected and interviewed. The data collected consisted of information on whether children participated in resource collection or school; socioeconomic profile of the households; sources of household income; sources of resources (water and firewood). Of the 200 households surveyed (1,154 individuals in total), 609 children aged 5-18 years were included in the analysis. This age range incorporated students from pre-school, primary and post-primary grade levels.

Through the use of surveys, the researchers gathered data on the children's time allocation for domestic chores, resource collection and schoolwork. The dataset also included information on the children's school progress and the effects of collection activities on schooling. Data indicated that out of the 609 children that made up the study's sample group, 19 percent were out of school and 81 percent were still in school. The data also revealed that children spent, on average, 8 hours in school and 1 hour collecting resources (mainly water) after school. The mean for children in school that collected water was 63 percent. Though, it is worth noting that women spent an average of more than 3 hours per day on resource collection. Of the children involved in resource collection, 9 percent reported that collection activities negatively affected their academic performance.

The main empirical findings of this study are supportive of the researchers' initial hypothesis – that is that children's school attendance is negatively affected by the scarcity of natural resources and the increased hours of collection work that result (Ndiritu and Nyangena, 21). Data generated by this research revealed that children involved in resource collection beyond a two-hour collection work threshold reduced the likelihood of a child attending school by an average of 21 percentage points. The statistical evidence put forward in this study was therefore significant in linking resource availability and collection activities to schooling and academic performance. In this way, the research established greater awareness of how improved provisions of resources, such as water, could be used as a strategy for boosting school attendance in Kenya. Looking at the big-picture, the implications of this research are potentially important for Kenya's future educational policy development, natural resource management, infrastructural investment and prioritization.

The three research studies reviewed in this section each address (from slightly different perspectives) the cost of water collection as an impediment to children's development, particularly with regard to educational development. This synthesized data therefore substantiates a negative correlation between the availability of water and educational attainment. Additionally, the data underscores the fact that more females may realize their basic right to education if reasonable access to water were ensured through the public provision of water. Although the studies of Hemson (2007), Ndiritu and Nyangena (2010), Sorenson, Morssink and Campos (2011), to a large extent, form the body of literature surrounding this problem, there are several weaknesses that limit the

transformation of these results into national policy decisions that prioritize investments in water delivery services.

These limitations include a lack of gender-disaggregated data on water collection and gaps in the literature with regard to omitted variables that. Including such data in future studies would strengthen the research on water collection because it would incorporate the water collector's own perception of the task. Several of the variables that must be incorporated into future research studies include an examination of priorities in water use, the health risks related to water carrying (i.e. neck and back injuries), along with the interpersonal aspects of water collection (i.e. social networking and women's support groups).

3.3 Gender Disparities in Educational Achievement:

According to the requirements put forth in the United Nation's Millennium Development Goals, countries are supposed to ensure that, by 2015, children everywhere, girls and boys alike, will be able to complete a full course of primary education (UN General Assembly, 2000). In addition, the action plan includes a special focus on guaranteeing girls' full and equal access to quality education.

While literature surrounding the challenges to girls' educational attainment is profuse, this section will review three dimensions specific to the problem in Kenya: gender and regional disparities in enrollment and academic achievement; factors affecting transition rates from primary to secondary schools; the role families have in shaping girls' education. A recent study by Jane Amunga, Amadalo Musasia and Maiya Julius, which explores the first dimension of the problem, found that despite the general increase

in enrollment across most regions of Kenya, the enrollment of boys still exceeds that of girls. The study further noted that near parity in enrollment has failed to translate into parity in academic achievement – as girls consistently register lower marks on national examinations compared to boys.

The purpose of the research conducted by Amunga et al. was to direct the attention of educational planners and policy makers to the issue of persistent disparities in girls' education. The study focused on results from the 2009 Kenya Certificate of Primary Education (KCPE) and the Kenya Certificate of Secondary Education (KCSE)[6] examination period. Analyses of the test results, considered the hallmarks of educational success in Kenya, revealed general performance trends in which boys regularly outperformed girls in terms of scoring – a confirmation of the lack of parity in performance. In 2009, results from the KCSE showed that among the top 100 national students, 73 were boys and only 23 were girls. This is significant because Kenya uses a ranking system that guarantees pupils' access to the top provincial schools – girls' underrepresentation on the national merit list translates into their underrepresentation in the top universities. Furthermore, the lower performance scores of girls in disciplines such as math and science means that they are not granted access to those courses in college. Consequently, the academic subjects most relevant to the labor market are closed off to the majority of Kenyan women.

The data put forth by Amunga et al. also indicated gender disparities in enrollment and academic attainment of pupils across the various regions of Kenya. In the

[6] The KCPE and the KCSE are exit exams, the former taken after 8 years of schooling and the latter after 4 years, that allow a student to progress on to the next stage of schooling as well as determine the classes a student is qualified for at either the secondary school or college level.

sample groups with stronger patriarchal influences, there was a marked divergence from the dominant national perspective on the value of girls' education. Additionally, in resource poor regions, the number of girls participating in post-primary education was considerably lower than the national average.

There were several limitations and weaknesses of this study. Among the weaknesses was the limited source of data used to measure educational achievement. Although KCPE and KCSE results are indicative of national academic performance, a range of factors such as test anxiety, learning disability, quality of teaching, availability of school counseling, domestic workload or menstruation could potentially affect a student's exam performance. Future studies should account for external variables that may contribute to students' test results and therefore their overall educational progression.

Research undertaken by Geoffrey Musera, Kikechi Werunga and Oliver Sindabi on factors affecting transition from primary to secondary schools provides a more comprehensive examination of why gender disparities in education persist. Results from this study, which was based in Kenya's Taita Taveta province, found that an average of 39.1 percent of the pupils from this district fail to transit to secondary schools every year – and the majority of those affected are girls. This is 9 percent higher than the 30 percent national mean of pupils not enrolling in secondary school (Musera et al., 131).

The researchers used a sample of 144 participants that consisted of 88 parents and 56 primary school head teachers. Random sampling was used to select the primary schools, purposive sampling was used to select the head teachers and snowball sampling

was used to select the parents. The data collection instruments included a questionnaire and interview. Descriptive and inferential statistics were used to analyze the data.

The results of the study cited a lack of funds to pay school levies, early marriages, distance to school and students' attitudes towards schooling as the principal reasons for non-transition (Musera et al., 130). Data on the sample group revealed that the monetary factor is the greatest contributor to low transition rates in the district – 49.5 percent of the parents rated monetary constraints as the leading cause for pupils' low transition between school levels. The factor rated as the second greatest contributor (11.6 percent) to low transition rates was early marriage. This statistic confirms other academic literature that argues that where poverty is severe, girls are sometimes perceived as an economic burden and are therefore married off at an early age. Other contributing factors included distance to school (8.2 percent) and lack of interest in schooling (6.3 percent).

The research also sought to determine the main socio-economic activities engaged by students who did participate in post-primary education. The results, which were gathered by asking the parents to rate the most and least desired activity their children were likely to engage in, revealed that male dominated duties such as cow herding comprised only 9 percent, while female dominated duties such as domestic chores made up more than 20 percent. This is noteworthy because it helps to explain why fewer girls transit from primary to secondary school. Given that nearly half the parents in this study rated monetary constraints as the leading contributor to low transition rates, the inference can be made that parents engage their children – primarily their daughters – in socio-economic activities rather than education in order to obtain higher economic returns.

While this research fills some of the gaps found in the study of Amunga et al., there are two major limitations. First, the study failed to include students in the sample and therefore discounts students' perceptions on factors that hinder their educational progress. The second limitation was the localized nature of the study. Future research should reproduce this study in multiple districts in order to account for a broader range of economic, social and cultural circumstances that would generate more generalized data.

As pointed out by Musera et al., parental views on education play an important role in shaping the schooling experience as well as the overall educational achievement of children. Offering an analysis exclusively on the role of families in girls' secondary education is the research put forth by Benta Abuya, Elijah Onsomu and Dakysha Moore. The study of Abuya et al. examined adolescent girls from two schools in Nairobi province to establish the role of families as either a risk or a protective[7] factor in girls' education. An analysis of the results showed that *constructed* gender roles and societal expectations greatly influenced the way parents treated their daughters in the sample population.

This study used a qualitative methodology to describe, explain and explore the educational experiences of young girls (Abuya et al., 83). The sample group included 20 female students who were in school, 14 teachers and 10 girls who had dropped out of school (a total sample size of 44 participants). The researches employed an interview-based approach to obtain from the participants. Coding facilitated data grouping and

[7] For the purpose of this study, the researchers defined risk as the presence of various life events and the effects of these life events on different groups. Protective factors are defined as those influences that modify, ameliorate, or alter a person's response to some environmental hazard that predisposes one to maladaptive outcome (Abuya et al., 2011).

descriptive analysis of the themes and patterns generated by the research. Categories such as ‘domestic chores’ or ‘monetary constraints’ were produced from the coding transcripts. These categories were then characterized by participants as hindering their progress, leading to their dropping out, or supporting their continuation in school.

The findings of this study established 8 prevailing risks within the family context that girls experienced in their pursuit of a secondary school education. The risks included gender discrimination; unconcerned parents or guardians; mother’s discounting their daughters; inadequate role modeling; weak rapport and communication; domestic and paid labor; and sexual harassment. The most common form of discrimination was the refusal of parents to give money to their daughters for schooling, forcing the girl to drop out. The findings also revealed that 75 percent of the in-school girls felt that their parents were not concerned about their needs to be able to perform well in school. For the female students in the sample, the basic and personal needs of most concern were sanitary towels, food and paraffin used to light lamps.

While the conclusions of this study found families to be a risk factor to girls’ education, certain family-based protective factors such as the existence of significant relations with family members other than parents or guardians fostered girls’ continued presence in school. The implication of this research on girls’ secondary education was the establishment of poverty intervention programs that called for the provision of basic needs to school-going children, with particular emphasis on the needs of girls, and the enforcement of strict measures that prohibit school administrations from charging excessive levies.

The results of this study were limited due to the small sample size and narrow perspective of the issue – the data represented an incomplete and potentially biased understanding of the problem. In order to produce a more inclusive overview of this problem, future research should be based on a larger sample that incorporates parental perspectives on girls' education.

The existing literature indicates that gender disparities persist in educational attainment due to a range of socioeconomic and cultural factors. The three research articles reviewed in this section provide a basis of support for the implementation of policies aimed at reducing impediments to girls' educational progression. Based on the conclusions drawn from these studies, policy-makers and educational planners may increase the retention rate of girls in the educational system by addressing some of the unmet needs that contribute to the high drop out rates of female students. However, the common weaknesses threaded throughout these studies limit the generalizability of the results. These limitations included small sample groups, which do not necessarily represent the whole population, and a restricted data pool used to measure educational achievement – the KCPE and KCSE.

3.4 Water-related Policies and Interventions:

Although there is little systematic data on the nature of water collection and its effects on girls' education, there is a growing literature on the benefits associated with improved access to household water. Research that contributed to this body of literature found that piped water reduced the work of women and girls and increased household incomes. A study conducted by Isabella Asamba, Ben Crow and Brent Swallow offered a

comparative analysis of the benefits derived from households with improved water supplies and the costs associated with those that obtained water from unimproved sources.

The research focused on seven communities in western Kenya with disparate water supplies – two with protected springs and piped homestead connections; two with protected springs but no homestead connections; three with unprotected springs. The study design involved a mixed-method approach – quantitative survey methods were used to quantify the impacts of improved water supplies and household water usage; qualitative methods were used to establish characteristics of the communities. A total of 119 households were interviewed in the 7 communities – 41 in communities with protected and piped supplies, 30 that used water from protected springs and 45 that used unprotected springs. Additionally, 37 informants were interviewed, including 10 district heads of government, head teachers of secondary schools, local chiefs and leaders of water management groups.

Results of this study showed that access to improved water supplies yields a range of benefits which include improved health, time savings, expenditure savings, improved productivity and income (Asamba et al., 532). Data on the household usage of water indicated that those without access to piped water used an average of 35L/capita/day (200L/household/day), while households with piped water used an average of 50L/capita/day (300L/household/day). The data also revealed that the average time spent on water collection activities in these 7 communities was 1 hour or less – though some households reported collection times of up to 4 hours. Households with piped water spent an average of 85 minutes less per day on water collection (1.5 hours per day of time

saving for women and girls) and reported 35 percent higher incomes than households without piped water (Asamba et al., 535). Furthermore, data showed that women's time poverty was reduced by access to homestead water.

Though the research by Asamba et al. may be used to direct future investment decisions towards the improvement of homestead access to improved water supplies, the study had several limitations. Among the limitations was the fact that no comparison was done on the communities before and after the introduction of household water supplies. Thus, a study inclusive of pre and post analyses of households would provide more robust estimates of the impacts of improved water access on time allocation and income generation.

Additional research, undertaken by Ben Crow, James Davis and Julio Miles, provided similar results on the beneficial impacts that improved water sources have on community livelihoods, with a particular focus on the enhanced livelihoods of women resulting from reduced time constraints. The study compared two water supply systems in two low-income settlements in Kenya – one with a publically provided piped water distribution system and the other with a market distribution system in which water was obtained illegally from utility mains. The research measured the amount of time (households) spent collecting water in each settlement and compared the variance in time allocation between the site with a piped water system and that without.

The study gathered quantitative measures of water collection times for 50 households, using qualitative methods (interviews and surveys) along with GPS data logging. The sample group consisted of 40 randomly selected households and a biased sample of 10 households that were selected for GPS coverage due to their knowledge of

water issues. Interviews, generally conducted with women, examined a range of questions such as where and when collectors travelled to get water, average length of time spent on collection, average amount spent on water and a series of questions about livelihoods, rent and income (Crow et al., 116). The GPS data was then used to establish precise measurements of distances and travel times involved in water collection.

While the conclusions presented in this research supported the initial hypothesis that piped water distribution systems benefit communities and enhance the lives of women, there were two key limitations to the study. One limitation was that the GPS tracking devices that were attached to the side of one jerry can per household did not account for multiple trips that could have been taken using alternative water containers. Also, GPS measurements could not distinguish between the time spent walking to the water source and time spent queuing or performing other tasks. Thus, the numerical data indicated precise collection times, however the data may have included other tasks performed along the collection route. Another limitation to this study was the fact that there was no data on the community with the piped water system prior to the introduction of the improved water source. Therefore, there is no conclusive evidence that piped water distribution systems reduce time spent on water collection. In order to establish stronger evidentiary support for the hypothesis, future studies must incorporate data collection on changes [a community] experienced as a result of the introduction of an improved water source.

The final pieces of literature included in this review are an extended case study and follow up study conducted by Elizabeth Were, Jessica Roy and Brent Swallow. The preliminary study focused on poverty and property right dynamics in five villages of

western Kenya. The researchers surveyed 30 households, from which a sub-location containing a range of water management regimes was selected for further investigation. The follow up research then explored the relationship between gender relations and collective action in three community water projects in the selected sub-location. The purpose of this follow up study was to emphasize the importance of gender relations, specifically the participation of women, in the management of community water resources. The resulting data found that successful water projects in the studied areas were largely dependent upon the involvement of both men and women in the management of water supplies.

In the follow up study, researchers used focus group discussions to investigate which factors facilitated and hindered collective action around local water management and distribution. The sample included groups that had succeeded in providing piped water to their communities and groups that remained reliant upon unprotected water sources. In addition, the researchers interviewed 30 adult women with homestead water connections and 39 adult women that used water from unprotected springs. Results indicated that a correlation existed between groups with the greatest percentage of female participation and water projects that had been successfully maintained. The data showed that while men occupied the leading roles related to project design and group formation, women played a significant part in mobilizing the men to protect community springs, raising fees necessary for project construction and maintenance and advocating for the appropriate allocation of water for domestic and agricultural use.

Although this study highlighted the need for a new framework to facilitate greater women's involvement in the management of Kenyan water resources, there were

weaknesses in the research design that limit the generalizability of these findings to other groups. One such limitation was the lack of data on other factors that could have contributed to the water project's success, such as the wealth of the community, access to resources necessary for construction, number of community members with prior knowledge on water development and percentage of women as a whole of the community. Future research would be strengthened by a more comprehensive examination of the sample groups involved and the particulars of each studied community.

3.5 Conclusion:

This literature underscores the need for further research on the specific ways that water collection impacts female's personal, educational and professional development. Due to the great expense of time and energy that goes into water collection, a task predominantly done by young school-aged women, the current study hypothesizes a negative correlation between females that collect water and their retention in secondary education. This study strengthens and extends the existing body of literature by providing a new framework for analyzing the implications of water collection in rural Kenya. Utilizing a human rights lens, this study draws attention to the significant impact that access to water has on female's educational development, and ultimately on the realization of gender equality in Kenyan society. The study aims to demonstrate that investments in the provision of water would not only increase the retention rate of girls in Kenya's educational system, but also ensure progress towards the achievement of basic human rights for all.

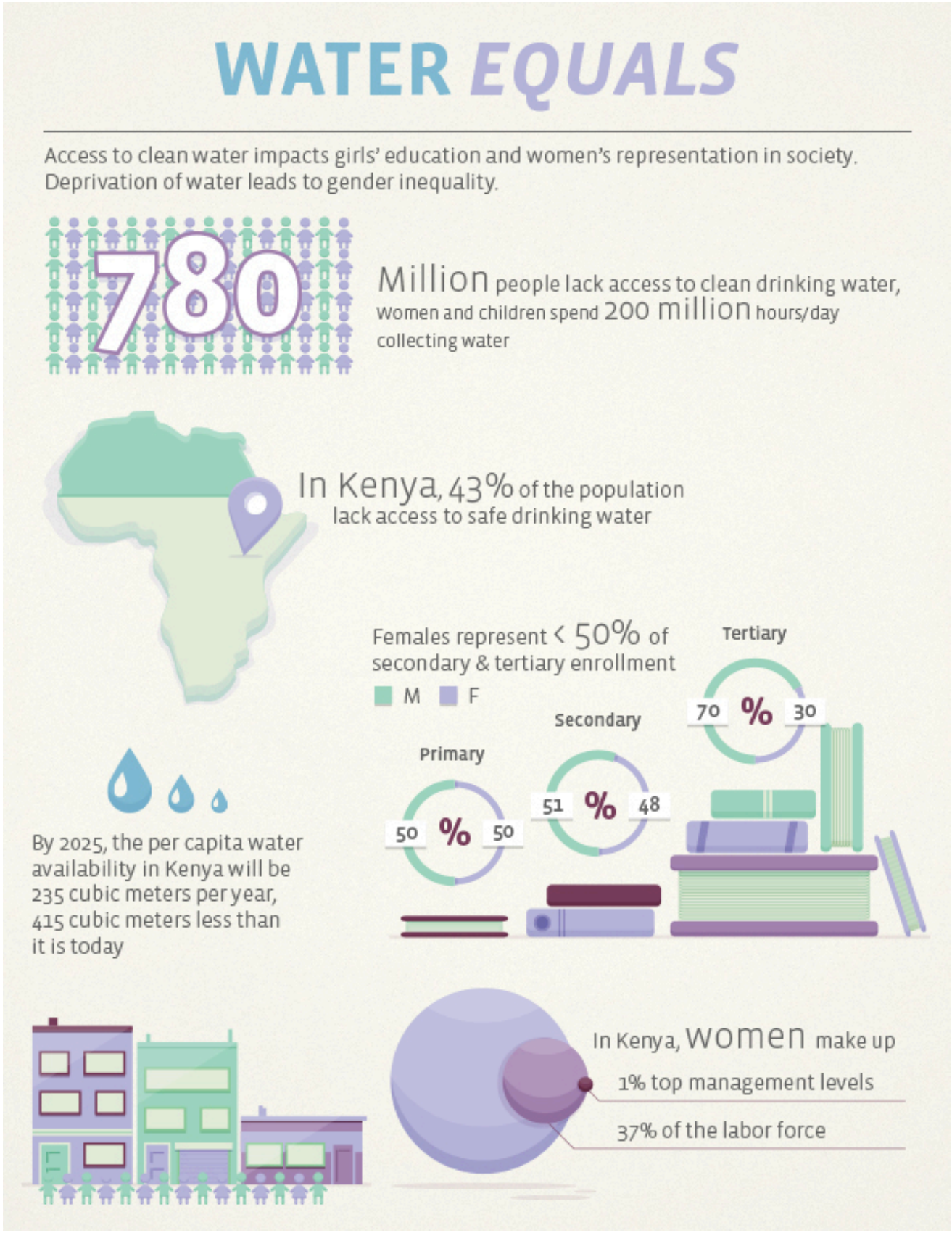
CHAPTER 4: HUMAN RIGHTS AND THE FEMALE AGENDA

4.1 Introduction

This study provides a unique perspective on one, specific factor contributing to gender inequality in education. In Kenya, proximate access to safe drinking water remains an elusive right for much of the nation's economically disadvantaged and rural populations. Across Kenya, the provisioning of basic resources generally follows socio-economic and gender lines – meaning that women, girls and the financially underprivileged are often denied the basic right to reasonable access to potable water.

Within these deprived groups, women and girls are regularly tasked with ensuring the procurement of non-economic (and in some cases economic) resources essential for life. From a human rights standpoint, the obligatory engagement in such time-intensive activities is an abuse of women's human right to water, education and equitable social representation. It is from this perspective that the following section brings into focus the interconnected nature of the deprivation of the right to water, the underrepresentation of females in post-primary education, and the persisting and pervasive gender inequities that exist throughout the different spheres of Kenyan society.

4.2 Why Water?


WATER EQUALS
Access to clean water impacts girls' education and women's representation in society. Deprivation of water leads to gender inequality.
780
Million people lack access to clean drinking water,
Women and children spend 200 million hours/day collecting water
In Kenya, 43% of the population lack access to safe drinking water
Females represent < 50% of secondary & tertiary enrollment
M
F
Primary
50 % 50
Secondary
51 % 48
Tertiary
70 % 30
By 2025, the per capita water availability in Kenya will be 235 cubic meters per year, 415 cubic meters less than it is today
In Kenya, women make up
1% top management levels
37% of the labor force

4.3 Water as a Human Right

> *"We shall not finally defeat AIDS, tuberculosis, malaria or any of the other infectious diseases that plague the developing world until we have also won the battle for safe drinking water, sanitation and basic health care."*
>
> - Kofi Annan, 7th Secretary-General of the UN (2005)

In 2010, the United Nations General Assembly officially recognized the human right to water and acknowledged that clean drinking water and sanitation are essential to the realization of all human rights (UN Resolution 64/292). Two years after the passing of this resolution, close to one billion people still do not have access to clean water. In Kenya, around 17 million people (43 percent of the population) lack access to safe drinking water (World Bank, 2010). In rural Kenya, the situation is even more acute, as close to 50 percent of the population rely on unprotected water sources (i.e. wells, ponds, rivers, rainwater) to meet their daily water needs (WHO/UNICEF, 2010).

Decades of recurrent drought, poor water management, water contamination, forest degradation, the rising demand for water and a subsequent spike in water usage for agriculture have deepened Kenya's current water crisis. Due to the country's critical shortage of clean water, Kenyans face heightened levels of food insecurity, an increased mortality rate, frequent eruptions of water-based conflicts, cholera epidemics, as well as extreme *time poverty*[8] associated with resource collection. Adding to this problem is the fact that Kenya's population continues to grow at an annual rate of 2.4 percent[9], and it is estimated that by 2025, the per capita water availability will be 235 cubic meters per year – 415 cubic meters less than it is today (Marshall, 32).

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[8] Time poverty, recognized as a development constraint, is the idea that individuals do not have enough time to rest after completing their work and domestic chores (Asamba et al., 529).

[9] Based on 2011 data from the CIA World Factbook.

Women are most affected by the issue of water scarcity, as they carry the burden on their backs, on their shoulders and on their heads. Because water is essential for life, women and young girls are forced to give up other activities, such as education, in order to ensure that the basic needs of the family are met. According to the UNICEF/WHO Joint Monitoring Programme for Water Supply and Sanitation, in a single day, women spend around 200 million work hours collecting water for their household – this lost productivity is greater than the combined number of hours worked in a week by employees at Walmart, United Parcel Service, McDonald's, IBM, Target, and Kroger (WHO/UNICEF, 2010). The result of such a time-intensive task is that millions of women are prohibited from achieving little more than survival. For Kenyan women, this reality is reflected in the continued underrepresentation of females in higher education, government institutions and high-level decision-making structures despite affirmative action policies and quota systems that have been put in place (by the male-dominated government) to redress the nation's gender inequities.

According to the current study, achieving substantive gender equality rests – in part – on the government's fulfillment of the human right to water. Because the provision of water would ensure that women and men could enjoy equal and reasonable access to safe drinking water, this study proposes that strategic investments in the provision of water, particularly in priority areas such as semi-arid and arid zones, would provide an effective means of boosting female participation in higher education and advancing the country's agenda for gender equality. The study therefore suggests that if the Kenyan government reprioritized the allocation of its development funds in such a way that prioritized the provision of basic services such as water, it would be better positioned to

fulfill other constitutionally guaranteed human rights – or obligations that it has to its citizens.

4.4 Education as a Human Right

> *"Education is a human right with immense power to transform. On its foundation rest the cornerstones of freedom, democracy and sustainable human development."*
>
> - Kofi Annan, 7th Secretary-General of the UN

> *"When a girl goes to high school, she's equipped, empowered and inspired to break the cycle of poverty that shackles her to hopelessness. And when you break the cycle of poverty, you spark a cycle of prosperity. You raise nations."*
>
> - Her Majesty Queen Rania[10]

Education is globally acknowledged as *the* most powerful tool for empowering women and girls. It advances their rights and self-development, which, in turn, advances humanity as a whole. Education equips individuals with the knowledge, skills, dignity and decision-making autonomy necessary to actively participate in society. Thus, access to education enables individuals to become influential social, economic and political leaders within their homes, communities and nation. On the other hand, those that are deprived of education are prohibited from fully participating in society and often suffer further abuses of their human rights.

Formally recognized as a human right in the Universal Declaration of Human Rights (1948), equitable access to quality education is essential for the realization of any other social, economic or political right (UNICEF). In spite of this, one in four children (a total of 32 million primary school-age children) in sub-Saharan Africa are not in school –

[10] Queen Rania of Jordan quoted at the 'Women in the World' summit in 2010.

this amounts to 45 percent of the global out-of-school population (UNESCO, 2010)[11]. Furthermore, a report put out by UNESCO indicated that out of 17 countries with more than 500,000 out-of-school children, nine are located in sub-Saharan Africa (UNESCO, 2010). The implication of such a large undereducated youth population is that 38 percent of sub-Saharan Africa's adult population is illiterate – of which women represent over 60 percent (UNESCO, 2010).

Numerous studies have called attention to the economic impacts of investing in girls' education, emphasizing that each one percent increase in the share of females with a secondary education generates 0.3 percent in per capita income growth (World Bank, 2010). Additional research has indicated that girls' wages can go up by 20 percent for every year of education past the fourth grade, and that educated women are, on average, more likely to marry later and have smaller families – approximately 3.9 children per woman rather than the average 5.3 for women without a secondary education (World Bank, 2010). A study undertaken by the Nike Foundation estimated that adolescent pregnancy costs Kenya's economy USD $500 million per year, whereas investing in girls' education has the potential to add USD $3.2 billion (roughly 1/3 of Kenya's GDP) to the country's economy (Nike Foundation, 2009).

While these studies are extremely important with regard to the economic development of a country, it is equally, if not more important to address education as an inalienable and universal human right. Through a human rights lens, it is clear that women deserve the right to education, not because it will yield high dividends, but because it is their right as humans. As the Committee on Economic, Social and Cultural

[11] Data refers to 2007. Figures come from UNESCO's 2009/10 Education for All Global Monitoring Report.

Rights states, "Education is both a human right in itself and an indispensible means of realizing other rights… it is the primary vehicle by which economically and socially marginalized adults and children can lift themselves out of poverty and obtain the means to participate fully in their communities" (Committee on CESCR, 1999).

The challenge of achieving gender equality must therefore incorporate a two-pronged approach that places as much value on the social progression of humanity as it does on the economic growth of a nation. Because women make up more than half of the population and hold more than 60 percent of the country's voting power, they account for the majority of Kenya's potential talent base (NDI, 2011). Accordingly, the nation's overall stability and competitiveness depends considerably on how it utilizes its female capacity across the political, economic and social spectrum. For this reason, educating women and entrusting them with power and legitimate authority should be seen as *both* an imperative for the advancement of human rights, as well as an investment in the economic development of a nation.

4.5 The Right to Equality and Prevailing Gender Inequities in Kenya

> *"Representation of the world, like the world itself, is the work of men; they describe it from their own point of view, which they confuse with absolute truth."*
> - Simone de Beauvoir[12]

In Kenya, the juxtaposition of traditional beliefs and progressive ideologies has created a social system that embraces modernism, but does so within the bounds of long-standing patriarchal structures. Although the Kenyan Constitution (2010) guarantees the

[12] This quote comes from Beauvoir's book *The Second Sex* (1989), which is regarded as a seminal work in feminist philosophy and marked the onset of second-wave feminism.

right to equality for both men and women, disparities in basic right – in access to and control over resources, in employment and earnings and in political voice disproportionately disadvantage women in relation to men (UN General Assembly, 2000). Furthermore, while recent history has seen great advancements in women's rights and economic development, the educational, professional and political aspirations of women and girls continue to be largely articulated within Kenya's male-dominated environment. As such, this study contextualizes the persisting gender inequalities within traditional social constructs, and points to the ways that these inequities play out across the various dimensions of Kenyan life.

In Kenya, patriarchy has sustained asymmetrical power relations, socio-cultural stereotypes and institutional biases against women since the colonial era. As a result, gender identity has come to be organized around a binary preoccupation of male dominance and female subordination. Gender (*defined here as a social status – in that it separates people into differentiated categories and roles*) has therefore produced an ordinal hierarchy between men and women in terms of access to resources, power and status (Ridgeway, 1).

Although this trend is changing, women commonly experience discrimination in the form of differential access to resources and political power relative to men. Economically speaking, the average monthly income of a Kenyan woman is about two-thirds that of a man (Post, 2011). In regard to property ownership, women hold less than 5 percent of Kenyan land titles, yet they perform 80 percent of the country's subsistence agriculture (Post, 2011). Concerning political leadership, women account for 22 of the 222-member parliament. With reference to cultural norms, customary law permits a man

to discipline his wife by physical means, and does not specifically criminalize spousal rape. Given this legal leniency, it is not surprising that over 80 percent of Kenyan women have suffered domestic violence – 70 percent of which having suffered sexual violence (Post, 2011).

As these numbers emphatically show, gender is a system of power that privileges certain groups of people and disadvantages others – the former being males and the latter females. In Kenya, this categorical imperative has produced a gendered social order in which human interaction is deeply embedded, and has subsequently been structured around. According to social constructionist [feminist] theory, inequality is at the core of this social order since differential valuation serves as a means to justify imbalances in the distribution of power, status and resources (Lorber, 29). In this way, interlinking systems of power and status operate in such a way that make men politically, economically and socially dominant, and position everyone else in a complex hierarchy of increasing disadvantage (Lorber, 25).

In the 21st century, ascribed statuses and gendered social roles remain the most important determinant of life choices and quality of life for many women and girls. Applying this logic to the current study's focus on girls' education in Kenya, we are able to see how [gender-based] divisions in access to resources, education, legal rights, labor and socio-cultural expectations disproportionately impact female's development along with their general position in society. Even with the gender provisions put forth in the 2010 Kenyan Constitution, transforming affirmative action policies and laws – or *formal equality strategies* – into common practice remains in the beginning phase.

Achieving substantive equality therefore requires a committed and collective effort to deconstruct Kenya's long-standing gender ideologies and institutional biases against women. Because such ideologies are naturalized through institutions, this study argues that both the advancement of women's rights and achievement of gender equality begin with equitable access to opportunities in education and educational outcomes. Additionally, this study maintains that equitable access to the range of opportunities presented outside of education is of similar importance to overcoming the discrimination and undervaluation of Kenya's women and girls. By recognizing the larger processes of gender inequality that exist beyond education, such as disparities in basic rights, access to resources, economic opportunities and political representation, this research underscores the need to establish a [more] balanced valuation of the social, economic and political potential of both women and men.

CHAPTER 5: BARRIERS TO GIRLS' FORMAL EDUCATION IN KENYA

5.1 Introduction:

Over the last decade, Kenya has made significant strides in education, achieving gender parity in primary school enrollment and sustained growth in secondary school enrollment. While this achievement is undoubtedly an important step towards creating a more educated and empowered public, the low enrollment and high attrition rates of girls at the secondary and tertiary level remains at the crux of the country's gender inequality.

In this chapter, factors contributing to the low enrollment and high attrition rates of females in Kenyan secondary schools are examined, along with the structure of the secondary school system. In the following chapter, one specific factor, the impact of water on girls' formal education, is discussed from the perspectives of the study's sample population.

5.2 Kenyan School System:

In 2003, the Kenyan government introduced free primary education (FPE) for all students in public primary institutions. This triggered rapid enrollment growth as more than a million new students were added to Kenyan primary schools in the months following the initiation of FPE. With the elimination of tuition for primary students, net enrollment of both boys and girls shot up to nearly 80 percent, marking a 22 percent increase in total enrollment in public primary schools from 2002 to 2005 (Nolan and Yakaboski, 4). However, as promising as this trend appears, it does not accurately represent the whole picture.

Since its independence, Kenya has struggled to expand its education sector utilizing a limited resource base. The result has been the development of an educational system that favors cost-effectiveness over equitable access for all. For many Kenyans, prohibitive fees in the form of transportation, educational material, uniform and lunch costs continue to exclude the economically disadvantaged despite the implementation of FPE. Given that an estimated 53 percent of rural and 63 percent of urban women live below the poverty line in Kenya, the cost of education is prohibitive for the female majority (World Bank, 2010). Take for example the school uniform requirement in Kenya; each uniform costing roughly the equivalent of $5 USD (Nolan and Yakaboski, 4). In a country where the annual gross national income (GNI) per capita is $770 USD, $5 USD is not a viable expense for many poorer income families – especially those with multiple children (UNICEF, 2011).

In addition to the obligatory fees associated with 'free primary education', classroom resources and educational quality have failed to keep pace with the spike in student enrollment. Consequently, the Kenyan school system faces enormous challenges with regard to access issues and equity concerns. So, despite an increase in primary participation, existing policies and costs continue to disproportionately encumber female students' progression through the education system (Nolan and Yakaboski, 4). Today, the core of the issue is not low levels of primary school enrollment, but is instead gender disparity in the high rates of grade repetition and dropouts at the secondary and post-secondary level.

5.3 Education Access Issues:

For Kenyans, limited and cost-related access issues correspond with decreasing participation rates as you move up the education ladder. Although the government implemented a cost-sharing program[13] for public secondary schooling in 2008, a bottleneck exists in the transition from the primary to secondary level. Moreover, the country's high-stakes exam culture and quota-based admissions system mean that access into the top public secondary schools is contingent upon students' Kenya Certificate of Primary Education (KCPE) exam scores, district of residence and ability to cover non-tuition expenses. Apart from the financial component, the KCPE serves as a further determinant of students' access into government-funded secondary schools, as well as their placement in either a national (considered the most prestigious aside from private), provincial or district school.

The hierarchal structure of Kenya's secondary schools helps to maintain educational inequities among children from different regional and socio-economic backgrounds. At the primary level, the performance gap between public and private schools leads to greater social stratification in the secondary system. This is due to the fact that national and provincial secondary schools admit only the top performing primary students, leaving the district and community-based harambee schools to absorb lower performing pupils and the financially constrained. For this reason, public funds are disproportionately distributed; the lion's share going to the schools' with the highest performing students – or the national and provincial schools.

[13] Under the free education program, the Kenyan government pays Sh10,265 ($122.28 USD) per student in public secondary school (Mutegi, 2011).

Disparities in instructive quality and resource allocation across the different types of government-funded schools perpetuate a system of exclusivity. Access issues, cost constraints and academic underperformance, compound these disparities, making it difficult for underprivileged children to gain admittance into the top national schools. According to the most recent data available on school participation in Kenya, the net enrollment ratio for primary participation was 83 percent for men and 84 percent for women. In spite of the achievement of gender parity in primary school enrollment, the net enrollment ratio for secondary participation indicated that only 51 percent of males and 48 percent of females were enrolled in 2010[14]. The numbers continue to drop off at the post-secondary level. The most recent data indicates that 30 percent fewer females than males reach the tertiary level in Kenya (UNESCO, 2010).

These numbers show a sequential decline in enrollment at post-primary levels of education. Not included in these statistics are the rising attrition and grade repetition rates, as well as the growing number of over-age enrollments that occur as you move up the educational ladder. This means that although Kenya has achieved substantial enrollment growth over the past five decades, net completion rates have not kept pace with this growth. Furthermore, due to a variety of social, economic and political factors, the enrollment and completion of boys still exceeds that of girls at the upper levels of education.

[14] These statistics, provided by UNICEF, are based on data from 2007-2010.

5.3.1 Education System in Kenya:

Introduced in 1985, the current system is comprised of eight years of primary schooling, leading to the Kenya Certificate of Primary Education (KCPE); followed by four years of secondary schooling, culminating with the Kenya Certificate of Secondary Education (KCSE); and four years of first-degree education at university. Progression from primary to secondary school, and from secondary to university is through selection on the basis of performance in the KCPE and KCSE national examinations.

Secondary School System: **8—4—4 system**

Government Funded (Public Funded Schools)	
National	Highly competitive
	Selection based on KCPE
	Prestigious and costly
	1 % of primary school leavers move into these schools[15]
	Boarding schools
Provincial	Recruit from within the province where the school is located using quotas[16]
	About 20% of KCPE candidates qualify
District	Days schools
	Least costly

Private
Highly expensive
Boarding schools

[15] Statistic from Nolan and Yakaboski, 2011.
[16] Ibid.

Harambee (Community Funded)
Do not receive full funding from government
75 percent of Kenyan secondary schools are *harambee*[17] funded
Absorb students that cannot afford or are academically under qualified to attend public funded schools
Less selective; less competitive

5.4 Barriers to Girls' Formal Education:

Despite the continued expansion of primary school participation in Kenya, low transition rates from primary to secondary school remain a major challenge for the country's educational development. Although the Kenyan government is committed to achieving the Education for All (EFA)[18] initiative by 2015, and the Millennium Development Goals (MDG)[19] by 2020, gender and regional imbalances continue to shape a system of higher education that is based on exclusivity. That female students make up less than 50 percent of overall secondary school enrollment, and a little over 30 percent of enrollment in public universities, illustrates the fact that issues of educational access disproportionately impact girls' academic progression.

The factors affecting girls' participation in post-primary education are numerous and varied. Studies on this issue have attributed the persistent gender gap in secondary

[17] *Harambee,* a Swahili word that means 'all pull together', is a concept of unity and community self-help.
[18] Education for All (EFA) is an international initiative launched in Jomtien, Thailand in 1990 to bring the benefits of education to "every citizen in every society" (World Bank).
[19] The Millennium Development Goals are eight goals that all 191 UN member states have agreed to try to achieve by the year 2015. The UN Millennium Declaration (2000) calls on world leaders to combat poverty, disease, hunger, illiteracy, environmental degradation and discrimination against women.

school enrollment to a number of cultural, environmental and socio-economic factors. In existing literature, commonly cited barriers to female's education include poverty, early marriage (bride wealth), high teenage pregnancy rates, family size, negative attitudes towards women's education, distance to school, child labor (domestic chores), sexual violence, and health issues (HIV/malaria).

In addition to these barriers, levels of parental education have also been shown to affect the value that a family places on girls' education. In Kenya, and throughout the world, it is not uncommon for girls to suffer discrimination within their own households. Though this trend is changing, higher value has historically been placed on boys' education. This is due to the belief that men yield a greater return on investment because girls, often married off at a young age, go on to live with their husband's family.

Various studies have indicated that higher levels of parental education generally have a positive influence on the academic participation of their children, regardless of gender. Moreover, educated mothers often serve as role models for their daughters. This is extremely important for developing the self-esteem and confidence of young girls who aspire to be educated in a largely male-dominated society.

In the current study, interviewees shared their perspective on some of the primary gender-related barriers that contribute to the high attrition rates among female students. In response to a question about the primary causes for the low retention of girls in secondary school, over 90 percent (27 out of 29 interviewees) listed distance to water and lack of school fees as having a major effect on girls' chances of completing their secondary schooling. Additionally, 62 percent of the sample population pointed to the issue of poor infrastructure, such as the lack of girl-friendly sanitation facilities, as a

leading cause of high absenteeism rates in female students. Because students are often unable to wash due to a scarcity of water at home, many girls miss school each month as a result of menstruation and a feeling of 'dirtiness'. In fact, past research has shown that more than 800,000 girls in Kenya miss a week of school per month (an estimated 84 days per year) in part due to the lack of sanitary supplies (ZanaAfrica Group, 2011). For this reason, and others that have not been mentioned here, girl students have a higher rate of absenteeism and are more likely than boys to fall behind in their studies.

In some parts of the country, socio-cultural expectations serve as an additional barrier to girls' education. Parents remove post-pubescent girls from their schooling in order to prepare them for marriage and motherhood. As a result, around one-third of Kenyan women (32 percent) are married by age 18, and the median age at fist marriage is 20 for women age 25–49 (Kenya Demographic and Health Survey, 2008/09). In the current study, over 60 percent of the sample group reported early marriage and pregnancy to be a significant determinant of a girl's educational progression as well as a primary cause of a female's decision to drop out of school.

Although studies have proven that education increases a woman's income earning potential, her decision-making autonomy, her control over fertility, her family's health, her participation in public life and the aggregate social well-being of herself and her community, many barriers to girls' formal education remain in place. It is against this backdrop that the next chapter examines some of the specific ways in which access to water serves as a barrier to girls' education in rural Kenya.

CHAPTER SIX: RESULTS

6.1 Kenyan Perspectives:

With regard to the current study population, more than 90 percent of the total participants (including the parents and educators) pointed to the lack of proximate access to water as a primary factor contributing to the gender gap in post-primary education. Drawing on numerous anecdotal data, this chapter discusses the correlation between Kenya's perennial water challenge and gender disparity from the perspective of each sample group. Included in this section are views and experiences of the sampled students, parents and educators.

6.1.1 Students:

Nearly half of the total student sample (45 percent) indicated that they spend more than 7 hours per week collecting water, and, out of the 63 percent that reported collecting water daily, the average time spent collecting water was approximately 3 hours per day. When asked what a typical day looks like, one girl provided a sober, but detailed response:

> Each day I rise before the sun. Mother and I dress in the dark hours, gather our water jugs and head out on the dirt path behind our house. We walk 3 kilometers to the nearest stream – it is nice that we do not have to wait in a queue to fill our jugs, which is common at the communal wells. When we get to the stream, we fill our jugs using a handheld cup – but first we always check if livestock are wading in the water upstream, because we do not want animal waste in our drinking water. My mom and I then help each other lift the piece of fabric attached to the jug to our foreheads. The walk home is always slower than the way to the stream, but I try to go fast. After two hours, we return home with the day's water. I then rinse, dress and begin my 2 kilometer walk to school…(Student from Mwituria Secondary School – Form 3, Age 17).

When asked about how this time-intensive activity affects girls' schooling, another female student responded as follows:

> If I no longer had to collect water for my family, I would have more time to read, study and be able to participate more in class. Water affects all parts of my life. If I do not go to collect water, I cannot wash my body or uniform. If I do not wash, I am afraid that the boys at school will think I am 'dirty'. So, when I do not have water, my self-esteem is low (Student from Mwituria Secondary School - Form 3, Age 17).

While a majority of the student sample population indicated that the lack of school fees, provisioning of parental and sibling care and early pregnancies have a negative effect on girls' education, a significant proportion said that the far distance from a household water source particularly impacts girls' education because water is linked to everything – personal hygiene, physical well-being and household food output. One interviewee remarked that:

> For the girl child, domestic chores are more valued than education because it means putting food on the table. Everyday, before I can begin my studies, I walk over 3 kilometers to the river to fill a 20 liter jerry can. Then I walk it home. Only then can I walk to school. School always comes after water collection (Student from Shiloh Naibor Secondary School - Form 1, Age 16).

When asked whether they view access to water and access to education as basic human rights or as privileges, over 90 percent of the female students responded that both access to water and access to education are their basic human rights. In addition, when asked how the deprivation of either of these rights affects the life of women, several students stated that [gender] equality in the classroom is a necessary step towards creating equality outside of school. This is relevant because it shows that the students are aware of their rights, and that they recognize the implications of achieving these rights.

Drawing by a student from Shiloh Naibor Secondary School – Form 1, Age 16

6.1.2 Parents:

Of the sampled parents, which included both mothers and fathers, more than 95 percent of the respondents indicated that, in their individual homes, access to water is an issue[20]. Moreover, the same number stated that the lack of proximate water disproportionately affects the education of girls. When asked about the specific ways that access to water impacts girls' education, a parent replied, *"Culturally, girls share in the [domestic] duties of the mother. The girl child must spend time and energy providing for her family's water needs, and because of this, she spends less time concentrating on school work."* Adding to this thought, another parent stated that, *"Improved access to water would mean that greater numbers of girl children would miss less class and perform better in their studies."*

[20] Note: 71 percent of the sampled parent participants were parents of students at harambee schools.

6.1.3 Educators:

Educators from both the harambee and district schools unanimously agreed that lack of access to water negatively impacts girls' education. Particularly, the majority of sampled teachers associated the high drop out rates among their female students with the reality that a girl's education is often a casualty of economic hardship or domestic need. During a discussion, one teacher stressed that, *"Poverty is part of the catchment area of the school. Here, resources are limited. Girls are expected to perform domestic tasks, and, in many cases, act as mothers to other siblings...girls' studies often come last."*

When asked about potential solutions to bridging the gender gap in secondary education, a teacher replied that, *"Bringing water closer to homes and schools would help more girls get and complete their education."* Building on this idea, the Head Master of Withare Secondary School stated, *"Improved access to resources would of course help the area's school system, but the attitude of the general public must also change to defeat the negative attitude towards the girl child and girls' education."*

Drawing by students from Kalalu Secondary School – Form 1 & 2, Ages 15 & 16

6.2 Data Analysis:

In this section, descriptive statistics and graphical summaries convey the quantitative results[21] of this study. These results were collected through the use of a close-ended questionnaire (see **Appendix C**). To analyze the data, responses to the questionnaire were first totaled, averaged and tabulated. This data was then categorized into groups based on four different measurement indicators: distance to water from household; household water supply; hours spent on water collection per week; distance to school from household. These indicators were chosen to establish a comprehensive picture of female students' proximity [access] to water, as well as determine their distances traveled and time spent on education and water collection per day. These data sets were arranged into six sample groups in order to summarize the results from each school (total sample size: 95 students). Data were then separated into two sample groupings: the harambee school sample (sample size: 47 students) and district school sample (sample size: 48 students).

This method of organization allowed for a comparative analysis of the two sample types (harambee schools and district schools) in the study. Risks and benefits associated with the two sample groups were drawn from the data to determine how the different school types impacted girls' education. Mean and standard deviation scores were then calculated using Microsoft Excel to determine the average female and male enrollment percentage and annual completion rate of the total sample. Lastly, graphical representations of the data were created to illustrate the study's findings (see below).

[21] Quantitative data pertains to the student sample only; total sample size of 95 female students.

The first item on the questionnaire asked students about the distance to their household water source (see **Appendix B**). Data collected from the harambee sample group indicated that 68 percent of the students traveled more than 1 kilometer to their household water source. In contrast, data collected on the district sample group revealed that 38 percent of the students had access to indoor plumbing (boarding students), and 73 percent lived within 1 kilometer of their household water source. Taken together, 47 percent of the study's total sample (95 students) and nearly 70 percent of the harambee sample were deprived of what UNICEF/WHO considers reasonable access to water – defined in the beginning of this study as living less than 1 kilometer from a safe household water source (UNICEF/WHO).

The second item on the questionnaire asked students about their household water supply (see **Appendix B**). For the harambee sample, 53 percent of the girls used a communal well and 17 percent used a river or stream as their primary water source. None of the students in the harambee sample had piped water in their homes. Data on the district sample showed that 38 percent of the students had indoor plumbing (boarding students), and the remaining 62 percent used a communal well, river or stream for household water. In total, more than 50 percent of the total sample relied on an unimproved water source as their primary household water source.

The third item on the questionnaire determined students' average number of hours spent on water collection per week (see **Appendix B**). Just under 80 percent of the harambee sample reported spending more than 7 hours per week on water collection, compared to the district sample, of which only 13 percent indicated that they spend more than 7 hours per week on water collection. An analysis of data on the total sample

showed that 45 percent of the students spend more than 7 hours per week collecting water, and of the 63 percent of students that reported collecting water daily, the average time spent on water collection per day was 3 hours.

The fourth item on the questionnaire established students' distance to school from their household (see **Appendix B**). A comparison of the two sample groups revealed that almost 50 percent of the harambee sample traveled more than 7 kilometers to school, while only 4 percent of the district sample traveled over 7 kilometers. This numerical disparity is due in part to the fact that two of the three district schools were boarding schools.

In addition to the four questionnaire items cited above, female and male enrollment percentages were analyzed to test the study's initial hypothesis that access to proximate, potable water affects the enrollment and retention of females in secondary school (see **graph 6.3.1**). Analysis of the enrollment data from the six sample schools indicated that the average female enrollment was 40 percent (M = 40, SD = 12.7), while the average male enrollment was 60 percent (M = 60, SD = 12.7)[22]. This finding is significant in that it not only confirms that girls are, on average, underrepresented in public secondary schools, but also that the semi-arid and arid region where the study took place had a wider gender disparity in enrollment than the national average; the net enrollment ratio for secondary participation indicated that 51 percent of males and 48 percent of females were enrolled in 2010 (UNICEF, 2010). Moreover, when analyzed by school type, the data indicated that the average enrollment in the harambee sample was

[22] It is important to note that the average enrollment percentage for both males and females have a large standard deviation and therefore have a high degree of variability.

34 percent female and 66 percent male, compared to the district sample that was 47 percent female and 53 percent male.

To test the second part of the study's hypothesis, data on the annual completion rates for males and females were also analyzed (see **graph 6.3.2**). However, due to a lack of data on the harambee sample group, these results represent only the district sample. Data collected on the district sample group showed that the average annual completion rate for females was 80 percent (M = 80, SD = 17.3), and for males it was 92 percent (M = 92, SD = 7.6). Though this result does not confirm the hypothesis, it supports the basic assumption that fewer girls are enrolling and completing secondary education compared to boys. Besides this, the mean annual completion rate for females had a wide standard deviation of 17.3, while the mean annual completion rate for males had a much narrower standard deviation of 7.6. Because the average annual completion rate of females had such a high degree of variation, it is difficult to accurately interpret this data.

The data presented in this study statistically demonstrate the negative relationship between the lack of proximate water and female enrollment. With the exception of two district schools, females were significantly underrepresented in the total student population. In four of the six schools, the percentage of female students was below 41 percent; in three out of the six schools, females made up less than 35 percent of the total student population. The results of the current study therefore imply that those deprived of reasonable access to water spend more time on water collection, and, as a result, fewer numbers of girls participate in secondary education. Another important point implied by the results is that female enrollment rates are lower in water scarce areas. Together, these findings validate the study's hypothesis and affirm my initial predictions that time spent

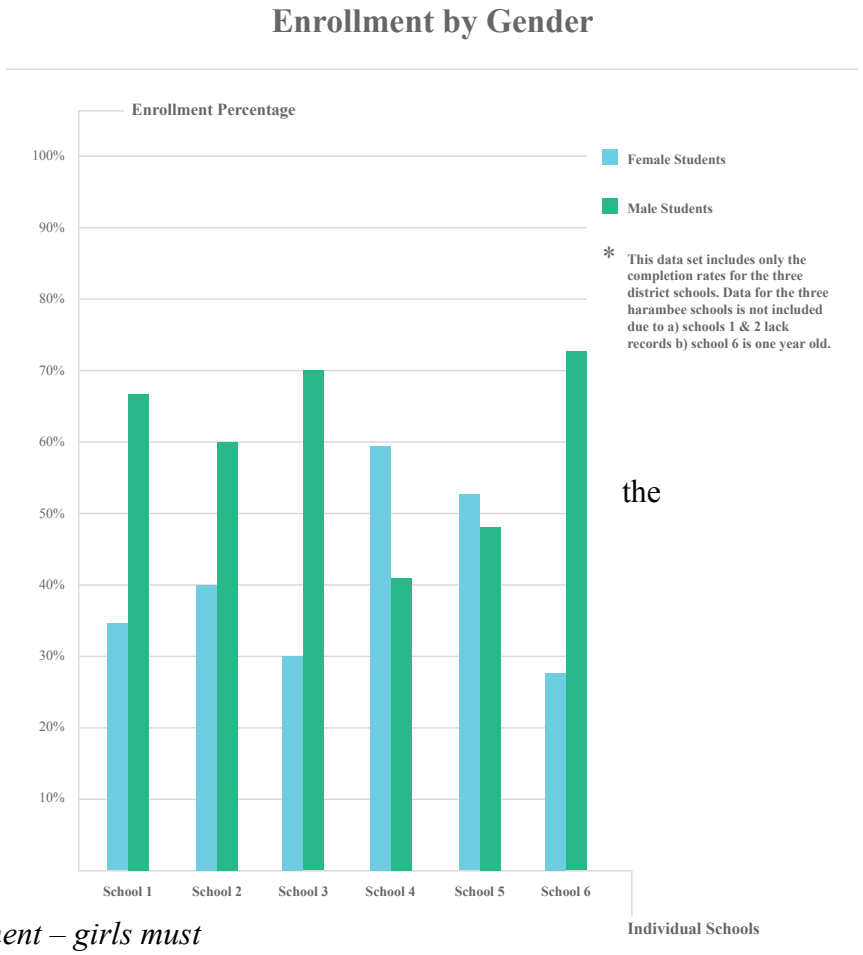
on water collection disproportionately impacts girls' education at the secondary school level.

6.3 Graphical Summaries

Graphical summaries of the collected data are illustrated below. The data represented in these graphs pertains directly to the study's two research questions and is reflective of each of the six sample schools (see **Appendix A** for school demographics). Specifically, the two graphs present gender-disaggregated data on the enrollment and completion rates of the sample schools.

6.3.1 Graph

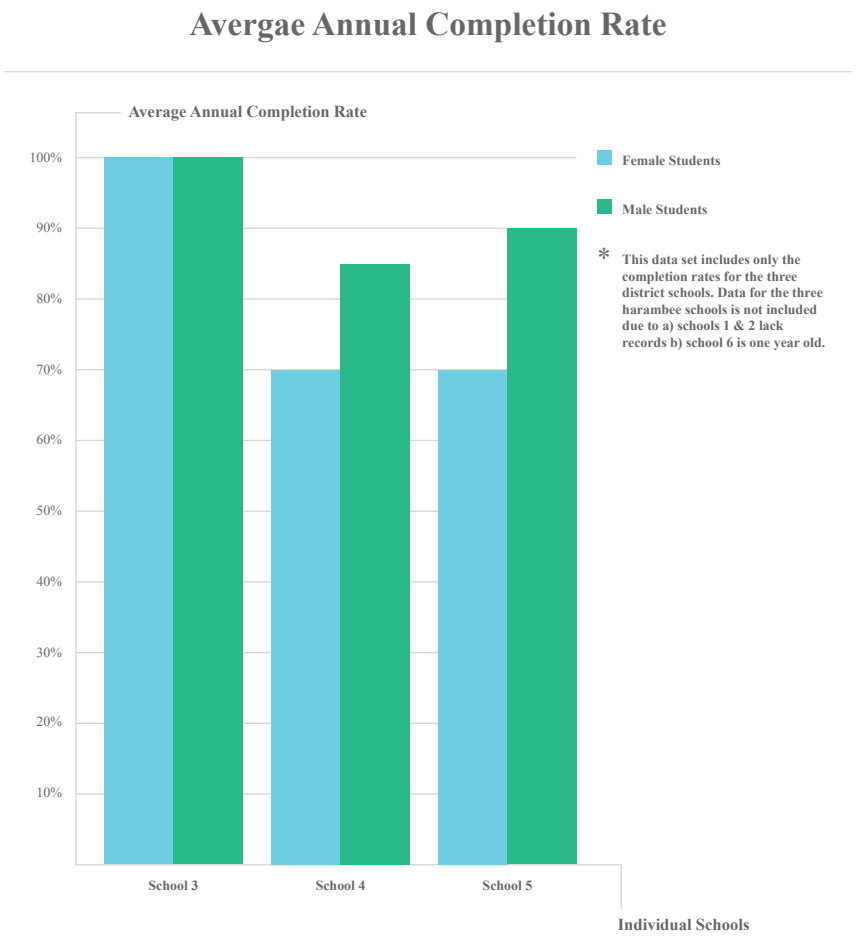
Graph *6.3.1* (see right) shows the total enrollment percentages of males and females in the study's sample schools. As illustrated, female students are largely underrepresented. When asked about the causes of such persistent gender inequality despite existing affirmative action policies, one teacher remarked that, *"Policy changes must go hand-in-hand with changes in the institutional environment – girls must*



be able to first recognize the opportunities that education brings, and then have the means to experience it in equal comfort as boys."

6.3.2 Graph

Graph *6.3.2* (see below) presents the average annual completion rate of male and female students from the three district schools in the study's sample. As indicated by the graph, male students, on average, have a higher completion rate than female students. As a result, pandemic secondary school dropout among females further narrows the funnel for women's equal participation in Kenyan society.



CHAPTER SEVEN: BRIDGING THE GENDER GAP IN EDUCATION

7.1 Observations:

This study set out to determine how proximate access to potable water contributes to female enrollment and retention in Kenya's secondary educational system. The study's aim was also to establish whether or not the sample schools saw an increase in the attrition rate of females at the post-primary level due to water collection. The results of this research found that proximate access to potable water does in fact affect girls' access to secondary education. More specifically, the study has shown that a lack of access to proximate water negatively affects girls' schooling because it necessitates the time-intensive task of water collection.

In regard to the second research question, the qualitative data revealed that water collection does contribute to female attrition in secondary schools. However, because of the shortage of quantitative data on completion rates for each of the sample schools, it was not possible to substantiate the relationship between water collection and overall female attrition rates at the secondary level.

The results of this study did find menstruation to be a significant factor contributing to higher rates of female absenteeism in the sample schools. Due to the lack of water for sanitary needs, girls regularly miss class in order to avoid being stigmatized as 'dirty'. A majority of the girl participants felt that the inadequate provision of sanitary supplies coupled with the lack of water for bathing were among the top barriers to realizing gender parity in secondary school. In general, therefore, it seems that reliable access to potable water would result in lower rates of female absenteeism.

7.1.1 Harambee vs. District Schools and the Impact of Boarding:

An additional finding to emerge from this study is that female enrollment proved to be higher in the district school samples than in the harambee school samples. While this trend was unanticipated, and therefore not included in my preliminary assumptions, it yielded a unique comparative assessment of harambee and district schools. Exploratory research on the risks and benefits associated with the two school types revealed that there is a case to be made for overcoming challenges of water scarcity through expanding girls' access to district boarding schools – especially in drought-prone areas. In talking to the teachers and parents from both district (boarding) and harambee (non-boarding) schools about possible solutions for bridging the gender gap in the secondary educational system, the respondents collectively advocated for an increase in the number of boarding schools along with the implementation of policies that facilitate broader access to these schools.

According to the study's teacher and parent participants, boarding schools reduce girls' exposure to risk and enhance their ability to concentrate on education rather than on domestic tasks. As graph *7.1.2* illustrates (see section below), Kenya is equatorial, meaning that, on average, there are 12 hours of daylight, and 12 hours of night each day throughout the year. The graph also shows that the study's student sample (exclusive of the sample's boarding students) spend approximately 10 hours in class, between 1 – 2 hours traveling to and from school, and an average of 3 hours collecting water each day. Therefore, the results of this study suggest that water collection, which is commonly undertaken after or before daylight hours, exposes children, especially preadolescent and adolescent girls, to the risk of sexual assault.

Interviews with the student, teacher and parent sample confirmed this suggestion. A number of the study's participants reported in the focus group discussions and individual interviews that the threat of sexual harassment against females not only has a negative impact on girls' sense of security, but also has a deterrent effect on parents' decision to send their female children to school.

Apart from security and increased time for education, further reasons cited for the support of boarding schools over harambee schools included the provision of daily meals and, in some cases, water and electricity. Moreover, boarding schools generally have a matron responsible for the discipline and guidance of the female students. From the perspective of several teachers interviewed in this study, boarding schools provide girls with an authoritative female figure that is sometimes lacking at home. To quote one of the teachers, *"The matron of the school serves as a counselor, confidant and disciplinary figure for the [female] students. This is important because many girls must act as the mother of their siblings at home. What is lacking for these young women is a female role model to look to for guidance"* (Teacher from St. Augustine Sirima Secondary School).

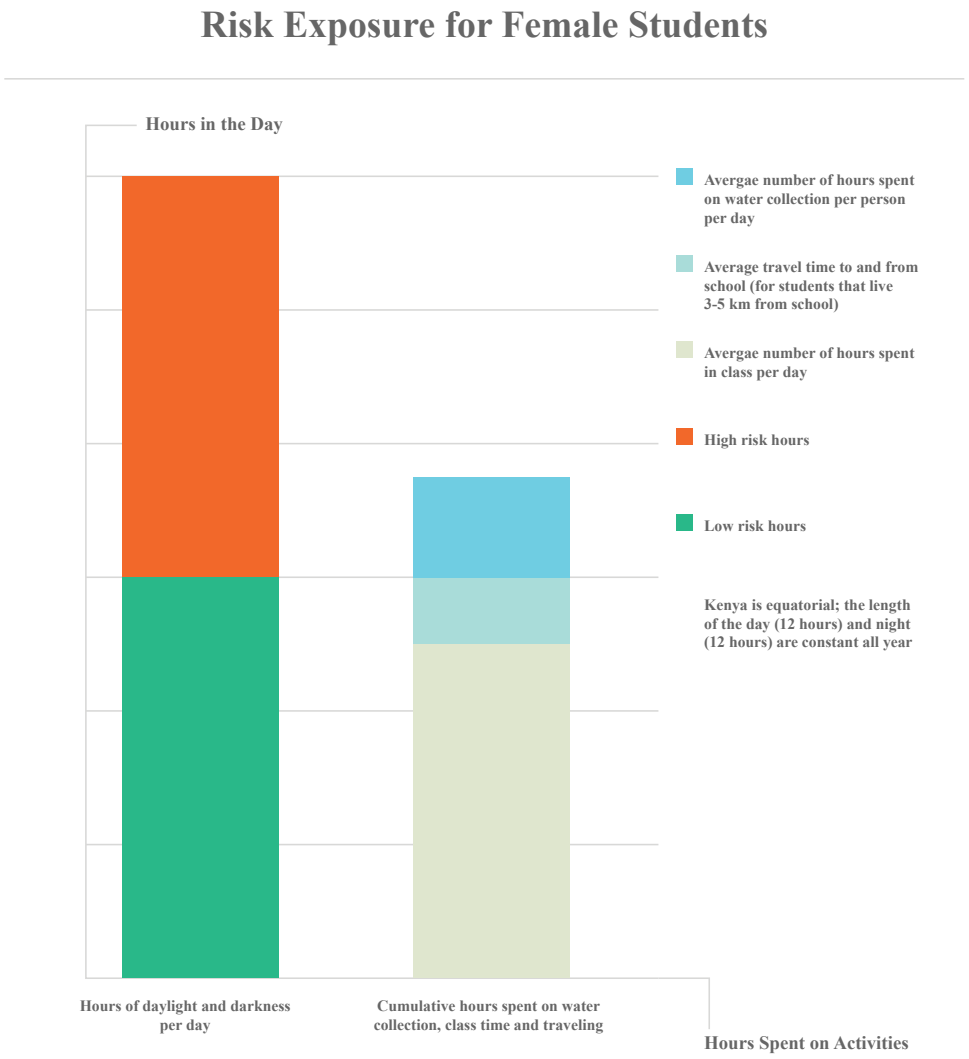
The results of this comparative assessment support the idea that broader access to boarding schools is one possible solution for creating greater gender parity in secondary school enrollment. The reduced risk exposure, increased time for education and provision of basic needs are reported benefits of Kenya's boarding schools. Yet, the higher school fees associated with boarding schools continue to prohibit the economically disadvantaged from gaining access. Given that agriculture and livestock keeping are the major economic activities of Laikipia County, most families have seasonal incomes that are highly vulnerable to climactic changes. Consequently, when the rains do not come,

families suffer from not only a shortage of water, but also from a decline in or absence of income and, subsequently, the inability to cover school fees. As the existing literature has pointed out, girl students are more likely to be pulled out of school than boys. So, although the results of this assessment have shown that boarding schools offer a wider range of benefits to female students than day schools, issues concerning access remain.

Taken together, the findings from the current study suggest a role for potable water accessibility in promoting girls' education. This research therefore makes several contributions to the current literature. First, the relevance of a proximate water source to girls' education is clearly supported by the results put forth in this study. Secondly, the present study adds substantially to our understanding of how the inadequate provision of sanitary supplies is one of the main factors linked to higher absenteeism rates among female students. Lastly, this study has shown that boarding schools offer a practical alternative for female students that minimize the impact of water collection activities.

7.1.2 Graph

Through interviews and focus group discussions, I found the threat of harassment and sexual assault to be a real concern among female students. As the data has shown, the majority of student participants collect water before and/or after school, during dusk hours, and live several kilometers from their household water source. When asked to describe the daily journey, many students remarked that they walk alone, through remote areas to collect water. As such, young adults and children, predominantly females, are vulnerable to assault by people and wild animals due to their increased exposure to risk.



7.2 Overview of the Legal Framework:

> *"The purpose of recognising and protecting human rights and fundamental freedoms is to preserve the dignity of individuals and communities and to promote social justice and the realisation of the potential of all human beings."*
> - The Bill of Rights: Chapter Four, Article 19 (2)

In order to place the issue of gender disparity in secondary education in the context of Kenya's legal framework, it is necessary to examine the human rights and education policy laid out in the Kenyan Constitution [2010]. Introduced in the new legal document are national values of governance that include, among others, human dignity, equity, social justice, inclusiveness, equality, human rights, non-discrimination and protection of the marginalized (Kamau, Mbote and Musembi, 2010). Moreover, the 2010 Constitution includes Kenya's first-ever Bill of Rights, which imposes a positive duty on the part the State and all State organs to observe, protect, promote and fulfill the rights and fundamental freedoms of all men and women.

Below are several of the Constitutional rights relevant to this research:

Economic and Social Rights:
Article 43 (1): every person has the right (d) to clean and safe water in adequate quantities (f) education.

Children's Rights:
Article 53: (b) every child has the right to free and compulsory basic education[23].

Application of Rights:
Article 55: The State shall take measures, including affirmative action programmes, to ensure that the youth (a) access relevant education and training (b) have opportunities to associate, be represented and participate in political, social, economic

[23] Secondary education is considered basic education under the new Constitution, and is therefore compulsory for all children.

> and other spheres of life (d) are protected from harmful cultural practices and exploitation.
>
> Article 56: The State shall put in place affirmative action programmes designed to ensure that minorities and marginalised groups (b) are provided special opportunities in educational and economic fields.

The above articles identify *access to water and education* as constitutionally guaranteed human rights – of which the State is the primary guarantor and distributor. However, as the results of the present study have indicated, the universal realization of these basic rights is a long way off. The disparate provisioning of water and limited access to competitive education throughout the country highlights two significant shortcomings of the State. Furthermore, while the education system has succeeded in producing an increasing number of people, educational standards have generally not improved and gender disparity continues to be an issue as you move up the educational ladder.

Hindering the widespread translation of policies into practice is the bureaucratic and centralized nature of the State. Human rights mechanisms fall under the exclusive purview of the national government, which suffers from resource constraints and a legacy of corruption. Consequently, substantive change in the form of greater access, equality and opportunity for all has been slowly implemented and sparsely achieved.

With regard to the new education policy, the Constitution's Bill of Rights includes the following loophole that underscores the government's stranglehold on distributive justice[24]:

> Article 20 (5) In applying any right under Article 43, if the State claims that it does not have the resources to implement the right, a court, tribunal or other authority shall be guided by the following principles—(a) it is the responsibility of the State to show that the resources are not available (b) in allocating resources, the State shall give priority to ensuring the widest possible enjoyment of the right or fundamental freedom having regard to prevailing circumstances, including the vulnerability of particular groups or individuals; and (c) the court, tribunal or other authority may not interfere with a decision by a State organ concerning the allocation of available resources, solely on the basis that it would have reached a different conclusion.

This section draws attention to a fundamental flaw in Kenya's existing human rights mechanisms. Given that Kenya is a developing country, governmental resource-constraints are likely to be a long-term reality. Presently, the Kenyan government, the prime implementer of its citizens' rights, has maintained the power to justly deny the provisioning of due rights based on a lack of sufficient resources for implementation. Thus, despite the progressive nature of the new Constitution, Kenya's current human rights mechanisms are structured around government priorities and what the State has identified as being 'essential' for the advancement of the common good. In my opinion, this centralized structure not only allows for a lack of government accountability, but also places too much responsibility on an already strained institution. The following section offers recommendations for policies and practices that are geared towards achieving the broader realization of gender parity in secondary education.

[24] In this study, distributive justice is defined as proportional equality; equal opportunities for all members of society.

7.3 Recommendations:

The findings of this study have a number of important implications for future policies and investment decisions related to gender equality and educational development in Kenya. One implication of the research is that children with proximate access to water will spend less time on water collection. The results of the current study confirm that water collection has a negative impact on girls' education. Therefore, the provisioning of water should be used to increase female enrollment and retention in Kenyan secondary schools.

Moreover, the local provisioning of water should become a priority of the Kenyan government, particularly in the country's arid and semi-arid areas. Drought-stricken regions and major agricultural zones should be prioritized, as the provisioning of water would help make farms more productive and, subsequently, yield greater economic benefits for families reliant on seasonal incomes. In this way, providing access to a reliable and safe water source would facilitate the development of human capital, at the same time that it would increase the economic productivity of a community.

Another important practical implication is the enhancement of Kenya's day schools. Given that boarding school fees are cost prohibitive for a significant proportion of the population, the Kenyan government should allocate funds for the improvement of its existing day schools. Through infrastructure development projects, the government should provide public secondary schools with proximate access to reliable and safe water, increased water storage areas and gender-segregated sanitation facilities. Other small-scale development projects include the provisioning of sanitation supplies and enhanced

safety measures for students that walk long distances to and from school in high-risk areas.

Because the Kenyan government has a limited resource-base as well as its own priorities for the allocation of public funds, some of the larger development projects should introduce grant-in-aid[25] or be outsourced to non-governmental groups in order to accelerate project completion. For smaller projects, community driven development (CDD[26]) programs would allow members of a community to address their own prioritized issues in the way they best see fit. One such example of this is the provisioning of bicycles for students that walk over a certain distance to and from school. School bicycles would minimize the amount of time spent walking and therefore reduce students' exposure to risk.

A final implication of this research is increasing access to Kenya's boarding schools through the wider disbursement of financial assistance in the form of grants and scholarships to academically gifted, but economically challenged students. The Kenyan government should facilitate greater access to boarding schools by targeting marginalized areas for academic training workshops and scholarship programs. Expanding educational opportunities to youth from disadvantaged backgrounds would not only empower more individual students, but would also develop the capacity of entire communities through the implementation and administration of academic workshops and scholar programs.

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[25] Grant-in-aid is the giving of federal funds to a state or local government to subsidize a public project.

[26] Community driven development is an initiative that provides direct funding for development with control of the development process and decision-making authority to disadvantaged community groups.

Furthermore, creating a more inclusive education system is key to achieving the social progress and national development objectives outlined in *Kenya Vision 2030*[27].

This study suggests a multifaceted approach to bridging the gender gap in Kenya's public secondary schools. In addition to the recommendations discussed above, this research offered an analysis of water-related policies and interventions that have been employed in Kenya to improve educational development and gender equality in water management (see **Chapter 3, Section 3.4**). The impact of these reviewed policies and interventions support the current study's objective of making investment in the provisioning of water a core strategy for lowering the attrition rate of young girls in Kenya's educational system. Moreover, this research emphasized the need to position women not only as targeted beneficiaries of development assistance, but as right-bearers and equal stakeholders of public resources. It is my belief that this reprioritization will create gender parity in access to social, economic and political opportunities, as well as substantive gender equality and the greater realization of basic human rights for all.

7.4 Limitations of the Study:

Although the findings of the current study support my initial hypothesis, a number of limitations need to be taken into account when considering the contributions and future applications of the research. First, this study did not include the surveying of any national or provincial secondary schools, but looked only at district schools, which represent the lowest tier of Kenya's publically funded schools, and community funded harambee

[27] *Kenya Vision 2030* is a national development strategy that was launched by President Mwai Kibaki in 2006 with the objective of transforming Kenya into a globally competitive, middle-income country inclusive of a high quality of life for all citizens by the year 2030 (Government of the Republic of Kenya, 2008).

schools. As a result, sampled schools were not representative of Kenya's entire secondary school system, but were purposively sampled.

Secondly, while an assessment of students' academic performance was consciously omitted from this study, academic performance is a key selection criterion of secondary school admittance at the national and provincial level. In addition, academic performance serves as an important indicator of the dynamics of gender equality within the education process (Subrahmanian, 9). The present study assessed the right to education, and therefore drew upon educational indicators that measured gender disparity (i.e. the disparity in access, measured by enrollment rates, and retention, measured by completion rates) within Kenya's public secondary schools. However, this study excluded an assessment of the quality of the schooling experience for both male and female students (i.e. content of education; male-female ratio in each classroom; methods of evaluation; learning environment). Future studies should therefore incorporate an assessment of academic performance in order to produce a more complete understanding of both the barriers to girls' access to education, as well as the barriers experienced throughout the education process that may affect girls' retention in the system.

Another limitation was the omission of specific cultural and socio-economic data pertaining to the study's sample population. For the purpose of this study, participants were not asked to disclose their ethnicity, social class or status. Although this information was not considered essential to the current study, cultural and socio-economic factors largely influence a child's learning experience and should thus be included in subsequent research projects.

Finally, the lack of data on student completion rates for the harambee school sample limited the scope of the study's findings. As a result, it is not possible to substantiate the second research question of this study. Due to these limitations, I believe that the data put forth in this research should be further evaluated.

7.5 Conclusion:

Three major conclusions can be drawn from this study. The first conclusion is that lack of proximate access to potable water disproportionately affects girls' educational development in Kenya. The second conclusion is that water collection is one factor contributing to the underrepresentation of females in Kenya's public secondary schools. The third major conclusion is that the human right to water is directly correlated with the human right to education – these rights are indivisible and essential to achieving gender equality in education by 2015 (Goal 3 of the Millennium Development Goals). Taken together, these conclusions substantiate the linkage between disparate access to water, disparity between males and females in post-primary education and the processes of gender inequality that are constituted across all spheres of Kenyan life.

This research has emphasized that access to water and education are recognized as basic human rights under both the Kenyan Constitution as well as the United Nations Universal Declaration of Human Rights (UDHR). In spite of this, the current study has consistently shown that access to and the enjoyment of these rights are not universally realized, with the greatest disparity being most visible among women and girls. As such, if one supports the notion that water and education are in fact basic human rights, policy and investment decisions must be aligned to turn this fundamental moral commitment

into a universal reality. This study has underscored this human rights imperative as an area for future research, policy reform and investment. Accordingly, this body of research should not be read as an overview of a relevant issue facing our global community. Rather, these data and words should be accepted as a global call to action for academics, philanthropists and aspiring change-makers to work collectively towards the advancement and realization of universal human rights and substantive human progress.

BIBLIOGRAPHY:

Abuya, Benta A., Elijah O. Onsomu, and Dakysha Moore. "Educational challenges and diminishing family safety net faced by high-school girls in a slum residence, Nairobi, Kenya." *International Journal of Educational Development* 32 (2012): 81-91. Print.

Amunga, Jane, Amadalo Maurice Musasia, and Maiyo Julius. "Gender and Regional Disparities in Enrollment and Academic Achievement in Kenya: Implications for Education Planning." *Problems of Education in the 21st Century* 23 (2010): 9-18. Print.

Asamba, Isabella, Ben Crow, and Brent Swallow. "Community Organized Household Water Increases Not Only Rural Incomes, but Also Men's Work." *Journal of World Development* 40 (2012): 528-541. Print.

Beauvoir, Simone De. *The Second Sex*. Vintage Books Edition, 1989. Print.

Central Intelligence Agency. "Africa: Kenya." *The World Factbook*. United States Government, 2011. Web. 17 Mar. 2012. <https://www.cia.gov/library/publications/the-world-factbook/geos/ke.html>.

Committee on Economic, Social and Cultural Rights. "'General Comment No. 13: The right to education (article 13)." *Economic and Social Council*. 1999. PDF file.

Davis, James, Ben Crow, and Julio Miles. "Measuring Water Collection Times in Kenyan Informal Settlements." *ICTD'12* (Mar. 2012): 114-121. Print.

Department of Public Information (DPI). "Resolutions." *General Assembly of the United Nations*. United Nations, 28 July 2010. Web. 26 Feb. 2012. <http://www.un.org/en/ga/64/resolutions.shtml>.

Ellis, Amanda, et al. "Gender and Economic Growth in Kenya Unleashing the Power of Women." *The World Bank: Directions in Development* (2007): 1-19. PDF file.

Glennerster, Rachel, et al. "Access and Quality in the Kenyan Education System: A Review of the Progress, Challenges and Potential." *Office of the Prime Minister of Kenya* (May 2011). PDF file.

Government of the Republic of Kenya. "The Popular Version." *Kenya Vision 2030*. 2007.

Hemson, David. "'The Toughest of Chores': Policy and Practice in Children Collecting Water in South Africa." *Policy Futures in Education* 5 (2007): 315-326. Print.

International Institute for Sustainable Development (IISD). "Arid and Semi-arid Lands: Characteristics and Importance." *Community Adaptation and Sustainable Livelihoods* 2012. *IISD*. Web. 22 Feb. 2012. <http://www.iisd.org/casl/asalprojectdetails/asal.htm>.

Kenya National Bureau of Statistics (KNBS). "Kenya Population and Housing Census Report." *KNBS*. Aug. 2010. Web. 22 Feb. 2012. <http://www.knbs.or.ke/>.

Kenya National Bureau of Statistics (KNBS), Ministry of Public Health and Sanitation, and U.S. Agency for International Development (USAID). "2008/09 Demographic and Health Survey." *Kenya Demographic and Health Survey*. 2010. PDF file.

Khosla, Prabha. "Water For African Cities." *Women & Environments International Magazine* 2006: 67-70. PDF file.

Levison, MM, et al. "You Cannot Prevent a Disease; You Only Treat Diseases When They Occur: Knowledge, Attitudes and Practices to Water-health in a Rural Kenyan Community." *East African Journal of Public Health* 2 (June 2011): 103-111. PDF file.

Lorber, Judith. *Gender Equality: Feminist Theories and Politics*. New York: Oxford University Press, 2010. PDF file.

Marshall, Samantha. "The Water Crisis in Kenya: Causes, Effects and Solutions." *Global Majority E-Journal* 2.1 (2011): 31-45. PDF file.

Musembi, Celestine Nyamu, Winfred Kamau, and Patricia Kameri Mbote. "Kenya's Constitution of 2010: Enhanced Prospects fro Gender Equality?" *UNIFEM Gender Audit*. 2010.

Musera, Geoffrey, Kikechi R. Werunga, and Oliver Sindabi. "Factors Affecting Transition Rates from Primary to Secondary Schools: The Case of Kenya." *Problems of Education in the 21st Century* 32 (2011): 129-138. Print.

Mutegi, Mugambi. "Kenya: Secondary Schools Raise Fees Ahead of First Term." *Business Daily (Nairobi)* 30 Dec. 2011. *All Africa*.

National Democratic Institute for International Affairs (NDI). "Democracy and the Challenge of Change: A Guide to Increasing Women's Political Participation." *National Democratic Institute*. 2011. Print.

Ndiritu, Simon Wagura, and Wilfred Nyangena. "Environmental Goods Collection and Children's Schooling: Evidence from Kenya." *Environment for Development* (Aug. 2010). PDF file.

Nike Foundation. "The Girl Effect: Not Just about Girls: Engaging Men and Boys is Key to Girls' Ability to Achieve their Full Potential." *The Global Gender Gap Report*. 2009.

O'Reilly, C.E., et al. "The Impact of a School-based Safe Water and Hygiene Programme on Knowledge and Practices of Students and Their Parents: Nyanza Province, Western Kenya." *Epidemic Intelligence Service* (Jan. 2007): 1-12. PDF file.

Post, Dianne. "Vurugu – Violence Against Women Looks the Same Worldwide." *National Organization for Women* (Apr. 2011). PDF file.

The Republic of Kenya. *The Constitution of Kenya*. National Council for Law Reporting, 2010.

Ridgeway, Cecilia L. *Framed by Gender: How Gender Inequality Persists in the Modern World*. Oxford University Press, 2011. PDF file.

Sorenson, Susan B., Christiaan Morssink, and Paola Abril Campos. "Safe Access to Safe Water in Low Income Countries: Water Fetching in Current Times." *Social Science and Medicine* 72 (2011): 1522-1526. Print.

Subrahmanian, Ramya. "Gender Equality in Education: Definitions and Measurements." *International Journal of Educational Development* (2005): 1-17. PDF file.

UNESCO. "Education For All Global Monitoring Report." *Education For All*. 2007. PDF file.

The United Nations General Assembly. "United Nations Millennium Declaration." 8 Sept. 2000.

UNICEF. "Kenya Statistics." *United Nations Children's Fund*. 2011/12. Web. 2 Feb. 2012. <http://www.unicef.org/infobycountry/kenya_statistics.html>.

UNICEF, and WHO. "Progress on Drinking Water and Sanitation 2012 Update." *WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation* (2012): 3-59. *JMP*. Web. 24 Mar. 2012. <http://www.wssinfo.org/fileadmin/user_upload/resources/JMP-report-2012-en.pdf>.

United Nations: Department of Economic and Social Affairs. "The World's Women 2010." *Trends and Statistic*. 2010. PDF file.

United Nations Educational, Scientific and Cultural Organization (UNESCO). "Education Profile: Kenya." *UNESCO Institute for Statistics*. 2009. Web. 2 Jan. 2012. <http://stats.uis.unesco.org/unesco/TableViewer/document.aspx?ReportId=121&IF_Language=eng&BR_Country=4040&BR_Region=40540>.

U.S Agency for International Development (USAID). "Reports: Kenya." *USAID*. 2012. Web. 3 Jan. 2012. <http://kenya.usaid.gov/>.

Wagura, Simon, and Wilfred Nyangena. "Environmental Goods Collection and Children's Schooling." *Environment for Development* (2010): 1-23. Print.

Waititu, Annabell. “Global Warming and Conflicts over Water in Eastern Africa.” Institute of Environment and Water. Nairobi, Kenya. 9 Mar. 2009. PDF file.

WaterAid America. “Clean Water Empowers Women.” *WaterAid*. 2012. Web. 2 Jan. 2012. <http://www.wateraidamerica.org/what_we_do/where_we_work/tanzania/clean_water_empowers_women.aspx>.

The Water Project, Inc. “Statistics of the Water Crisis.” *The Water Project*. 2011. Web. 2 Jan. 2012. <http://thewaterproject.org/water_stats.asp>.

Were, Elizabeth, Jessica Roy, and Brent Swallow. “Local Organisation and Gender in Water Management: A Case Study from the Kenyan Highlands.” *Journal of International Development* 20 (2008): 61-81. Print.

The World Bank. “Kenya: Data .” *The World Bank*. 2010. Web. 24 Mar. 2012. <http://data.worldbank.org/country/kenya/>.

The World Bank Group. “Kenya: Data.” *The World Bank*. 2012. Web. 2 Jan. 2012. <http://data.worldbank.org/country/kenya>.

World Health Organization (WHO), and United Nations Educational, Scientific and Cultural Organization (UNESCO). “Progress on Sanitation and Drinking-Water: 2010 Update.” *WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation* (2010): 2-55. PDF file.

Yakaboski, Tamara, and Katelyn Nolan. “The Kenyan School Systems’ Impact on Public Higher Education Access: Examination of Growth, Access, and Challenges.” *Journal of International Education and Leadership* 1.1 (2011). PDF file.

ZanaAfrica Group (AFZA). “Sanitary Pads: Problems, Solutions.” 20011. Web. 24 Mar. 2012. <http://www.zanaa.org/why-we-exist/why-sanitary-pads/>.

Appendix A

School Demographics (total of six schools in the sample)

School	School Name	Type	Total Pop.	% Female	% Male	Sample Size
1	Mwituria Secondary School	Harambee	113	34	66	20
2	Withare Secondary School	Harambee	55	40	60	21
3	St. Augustine Sirima Secondary School	District	355	30	70	18
4	Muramati Secondary School	District	220	59	41	10
5	Kalalu Secondary School	District	410	52	48	20
6	Shiloh Naibor Secondary School	Harambee	26	27	73	6

School	Type	Avg. Annual Completion Rates	Water Source
1	Harambee	No Data	2 10K Tanks; River; Borehole
2	Harambee	No Data	1 10K Tank
3	District	Total: 100%	Tapped Water
4	District	Female: 70% Male: 85%	Rain Harvesting; River
5	District	Female: 70% Male: 90%	1 10K Tank; Tapped Water (untreated)
6	Harambee	No Data	River

School	Grade Levels (Forms)	Average Class Size	Average # of Academic School Days	Geographic Coverage Area
1	1 - 4	28	198 (66 per/term)	20 acres
2	1 - 3	22	Unknown	11 acres
3	1 - 4	50	Unknown	9 acres
4	1 - 4	35	Unknown	16 acres
5	1 - 4	55	195	Unknown
6	1	26	Unknown	Unknown

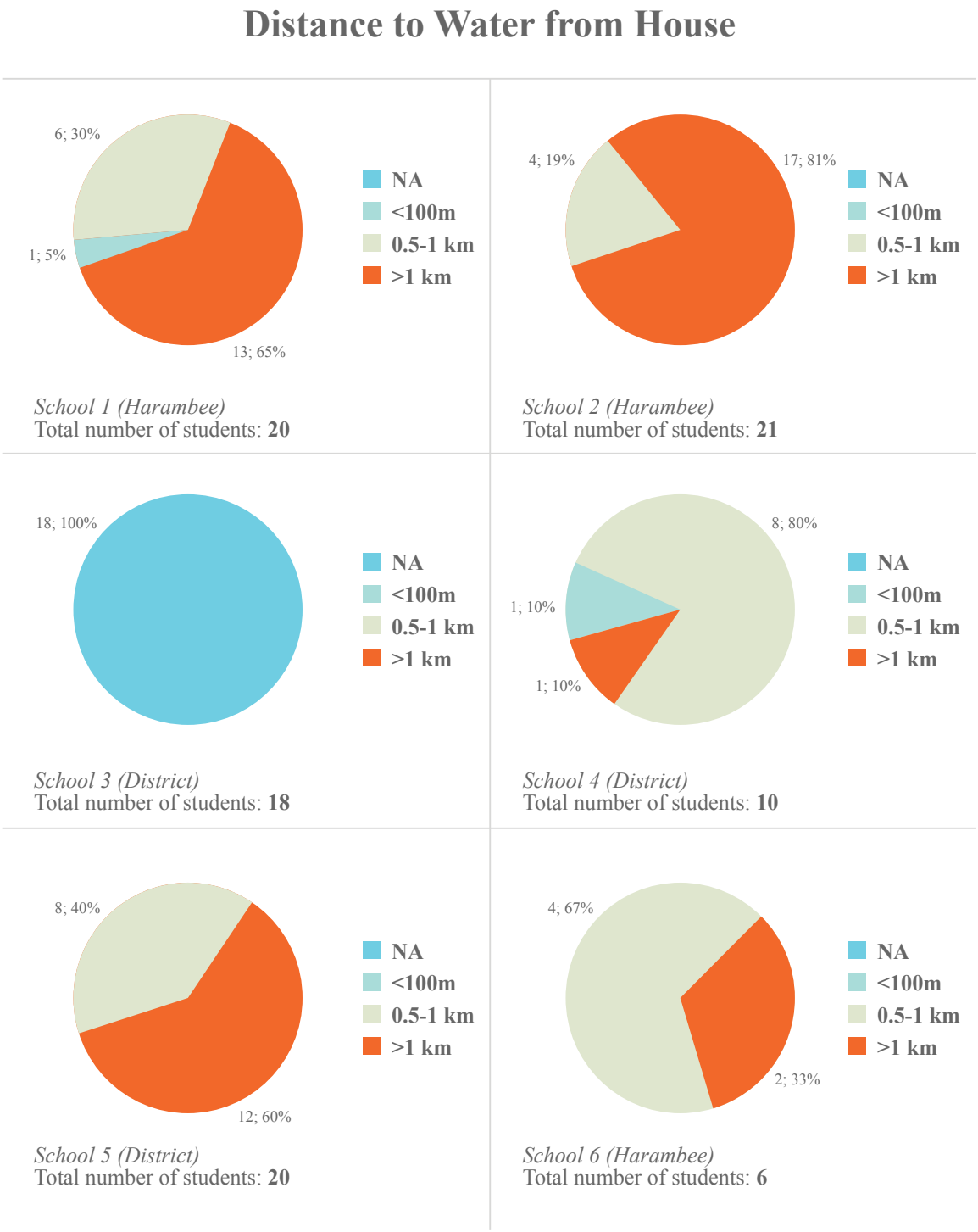
Appendix B (i)

Data Collection: Distance to H20 from House

School 1		**School 2**	
Number of students	Distance to H2O from house	Number of students	Distance to H2O from house
0	NA	0	NA
1	<100 meters	0	<100 meters
6	½ - 1 km	4	½ - 1 km
13	>1 km	17	>1km
School 3*		**School 4**	
Number of students	Distance to H20 from house	Number of students	Distance to H20 from house
18	NA	0	NA
0	<100 meters	1	<100 meters
0	½ - 1 km	8	½ - 1 km
0	>1 km	1	> 1 km
School 5		**School 6**	
Number of students	Distance to H20 from house	Number of students	Distance to H20 from house
0	NA	0	NA
0	<100 meters	0	<100 meters
8	½ - 1 km	4	½ - 1 km
12	> 1 km	2	> 1 km

* School 3 has tapped water; all students are boarders.

Appendix B (ii)



Appendix B (iii)

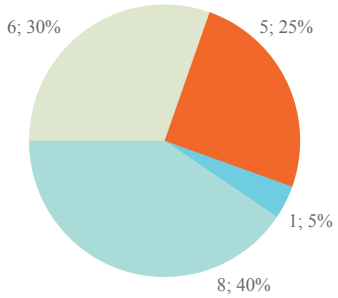
Data Collection: Distance to School from House

School 1		**School 2**	
Number of students	Distance to school from house	Number of students	Distance to school from house
1	<1 km	0	<1 km
8	1-2 km	2	1-2 km
6	3-5 km	3	3-5 km
5	>5 km	16	>5 km
School 3*		**School 4**	
Number of students	Distance to school from house	Number of students	Distance to school from house
18	Boarder	4	Boarder
0	<1 km	1	<1 km
0	1-2 km	3	1-2 km
0	3-5 km	2	3-5 km
0	>5 km	0	>5 km
School 5		**School 6**	
Number of students	Distance to school from house	Number of students	Distance to school from house
5	<1 km	0	<1 km
4	1-2 km	5	1-2 km
9	3-5 km	0	3-5 km
2	>5 km	1	>5 km

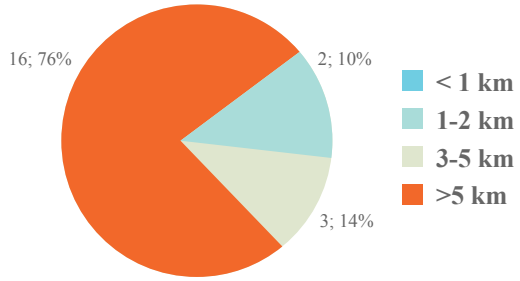
* School 3 & 4 are boarding schools; all students at school 3 are boarders.

Appendix B (iv)

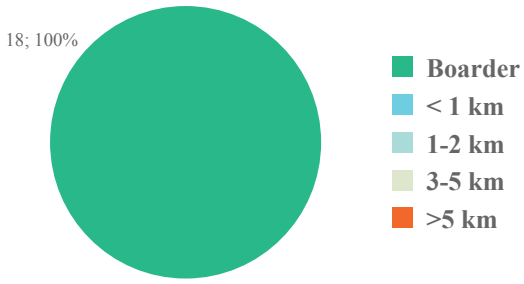
Distance to School from House



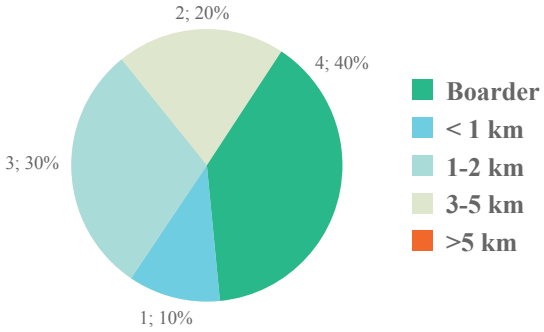
School 1 (Harambee)
Total number of students: **20**



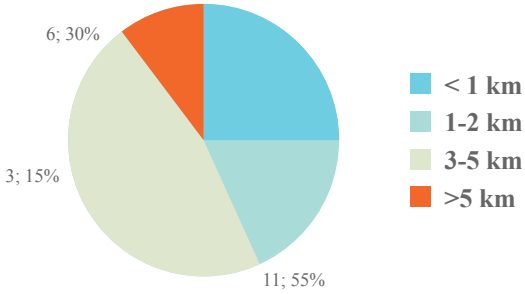
School 2 (Harambee)
Total number of students: **21**



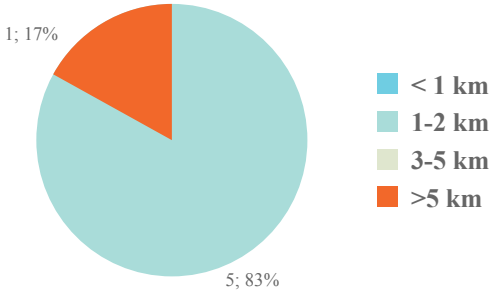
School 3 (District)
Total number of students: **18**



School 4 (District)
Total number of students: **10**



School 5 (District)
Total number of students: **20**



School 6 (Harambee)
Total number of students: **6**

Appendix B (v)

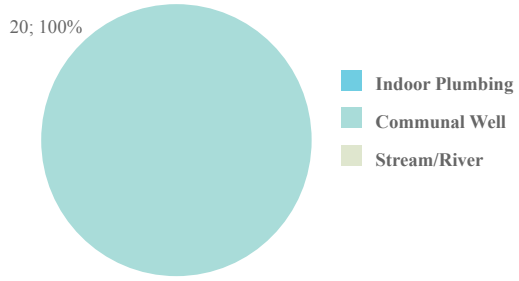
Data Collection: Household Water Supply

School 1		**School 2**	
Number of students	**Household water supply**	**Number of students**	**Household water supply**
0	Indoor plumbing	0	Indoor plumbing
20	Communal well	5	Communal well
0	Stream/river	16	Stream/river
School 3*		**School 4**	
Number of students	**Household water supply**	**Number of students**	**Household water supply**
18	Indoor plumbing	0	Indoor plumbing
0	Communal well	0	Communal well
0	Stream/river	10	Stream/river
School 5		**School 6**	
Number of students	**Household water supply**	**Number of students**	**Household water supply**
0	Indoor plumbing	0	Indoor plumbing
1	Communal well	0	Communal well
19	Stream/river	6	Stream/river

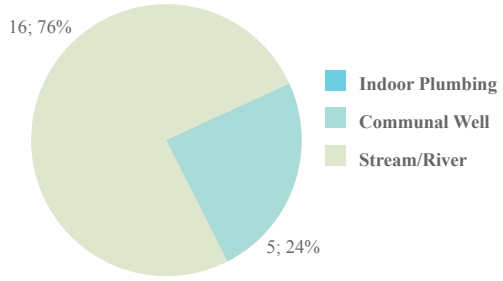
*School 3 has tapped water; all students are boarders.

Appendix B (vi)

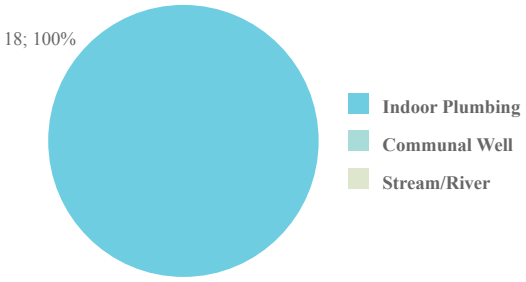
Household Water Supply



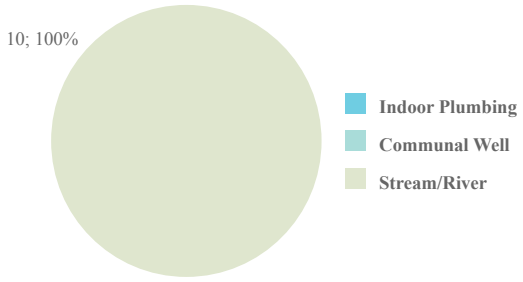
School 1 (Harambee)
Total number of students: **20**



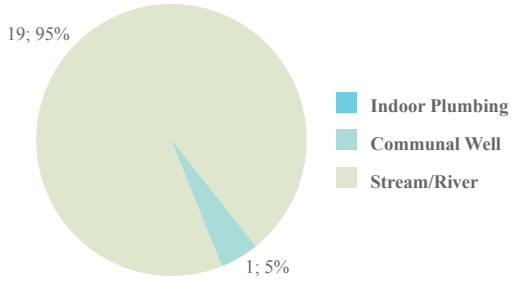
School 2 (Harambee)
Total number of students: **21**



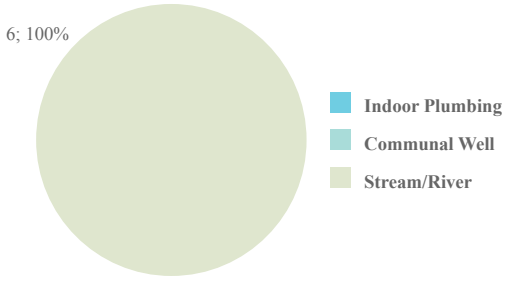
School 3 (District)
Total number of students: **18**



School 4 (District)
Total number of students: **10**



School 5 (District)
Total number of students: **20**



School 6 (Harambee)
Total number of students: **6**

Appendix B (vii)

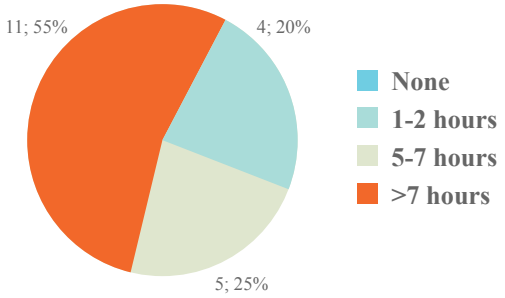
Data Collection: Hours Spent on Water Collection (per/week)

School 1		**School 2**	
Number of students	**Hours spent on H20 collection per week**	**Number of students**	**Hours spent on H20 collection per week**
0	None	0	None
4	1 - 2	0	1 - 2
5	5 - 7	1	5 - 7
11	> 7	20	> 7
School 3*		**School 4**	
Number of students	**Hours spent on H20 collection per week**	**Number of students**	**Hours spent on H20 collection per week**
18	None	0	None
0	1 - 2	2	1 - 2
0	5 - 7	8	5 - 7
0	> 7	0	> 7
School 5		**School 6**	
Number of students	**Hours spent on H20 collection per week**	**Number of students**	**Hours spent on H20 collection per week**
0	None	0	None
11	1 - 2	0	1 - 2
3	5 - 7	0	5 - 7
6	> 7	6	> 7

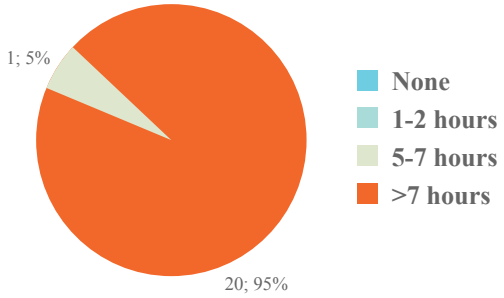
*School 3 is a boarding school; all students are boarders.

Appendix B (viii)

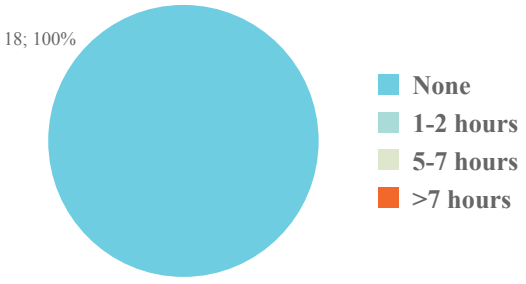
Hours Spent on Water Collection (Per Week)



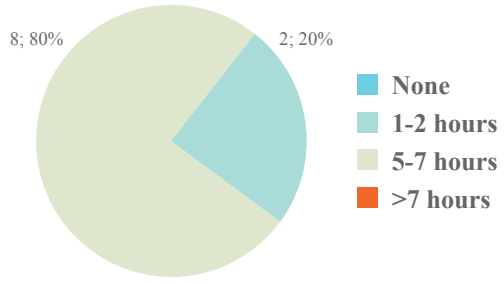
School 1 (Harambee)
Total number of students: **20**



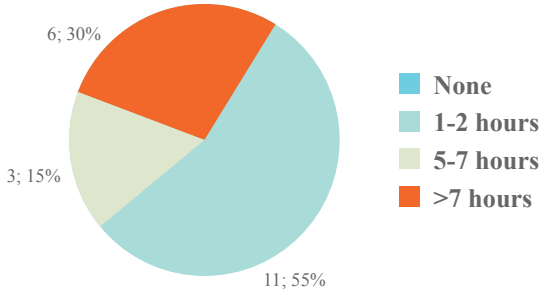
School 2 (Harambee)
Total number of students: **21**



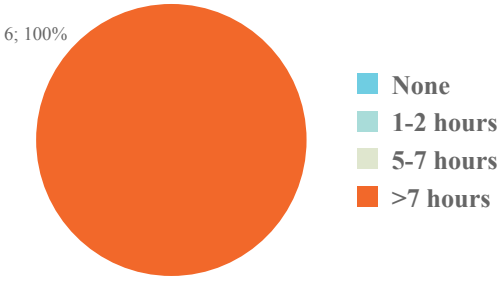
School 3 (District)
Total number of students: **18**



School 4 (District)
Total number of students: **10**



School 5 (District)
Total number of students: **20**



School 6 (Harambee)
Total number of students: **6**

Appendix B (ix)

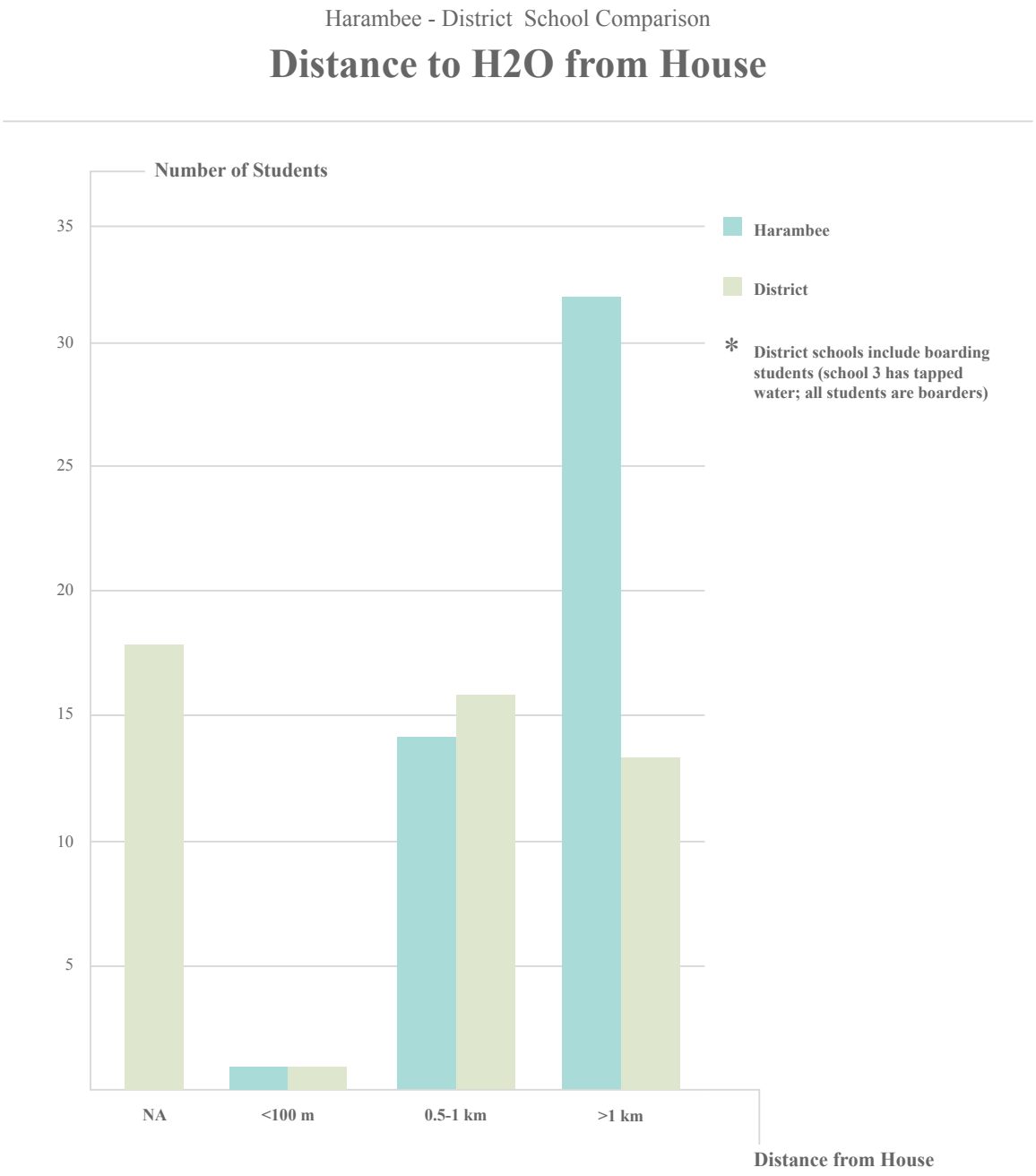
District—Harambee Comparison: Distance to H20 from House

Harambee Schools		**District Schools**	
Number of students	Distance to H2O from house	Number of students	Distance to H2O from house
0	NA	18	NA
1	<100 meters	1	<100 meters
14	½ - 1 km	16	½ - 1 km
32	>1 km	13	>1km

Totals for both school types:

Number of students	**Distance to H20 from House**
18	NA
2	<100 meters
30	½ - 1 km
45	> 1 km

Appendix B (x)


Harambee - District School Comparison
Distance to H2O from House
Number of Students
35
30
25
20
15
10
5
NA
<100 m
0.5-1 km
>1 km
Distance from House
Harambee
District
* District schools include boarding students (school 3 has tapped water; all students are boarders)

Appendix B (xi)

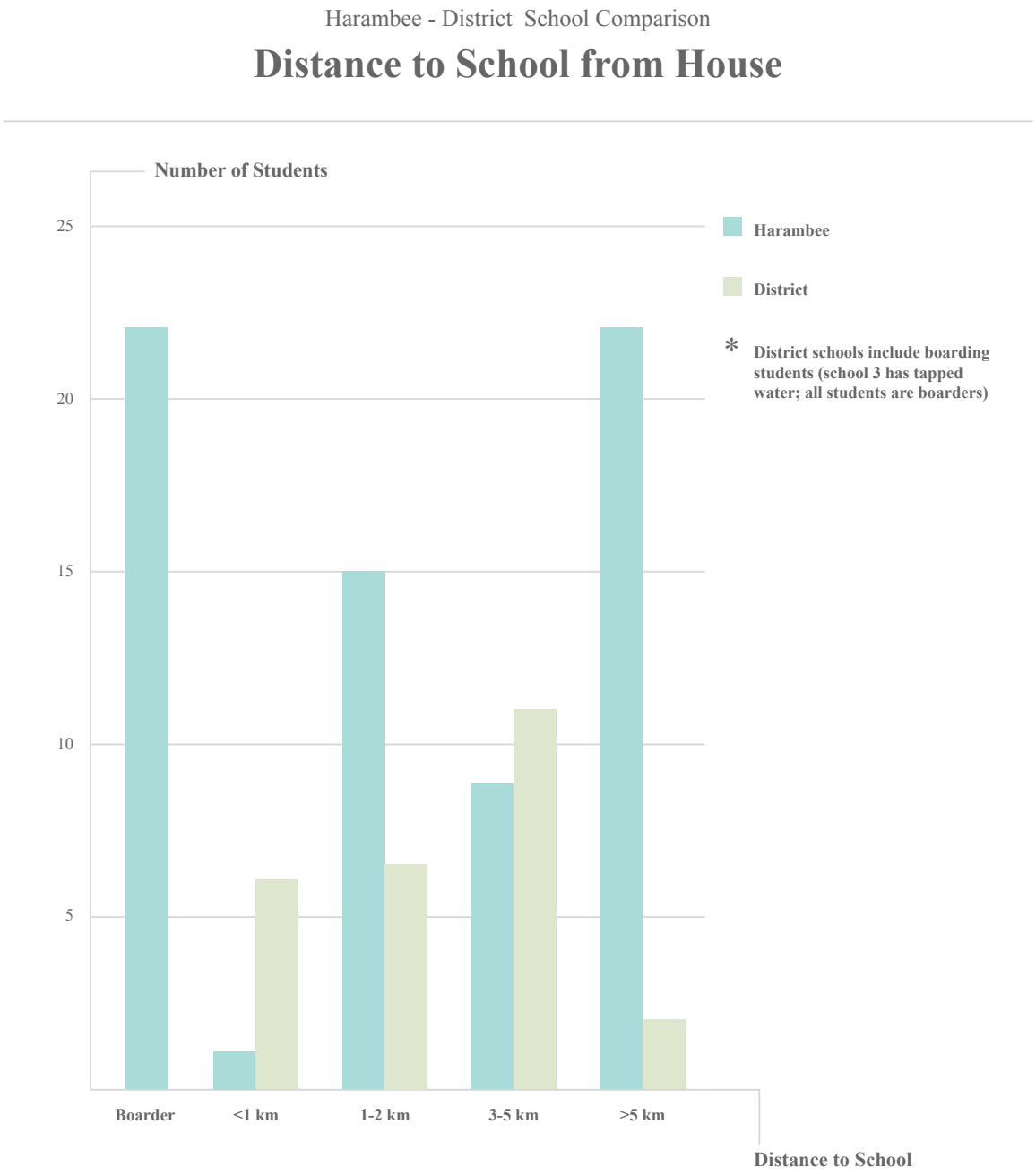
District—Harambee Comparison: Distance to School from Home

Harambee Schools		**District Schools**	
Number of students	**Distance**	**Number of students**	**Distance**
1	<1 km	6	<1 km
15	1 - 2 km	7	1 - 2 km
9	3 - 5 km	11	3 - 5 km
21	>7 km	2	>7 km
0	Boarders	22	Boarders

Totals for both school types:

Number of students	**Distance**
7	<1 km
22	1 - 2 km
20	3 - 5 km
24	>7 km
22	Boarders

Appendix B (xii)



Appendix B (xiii)

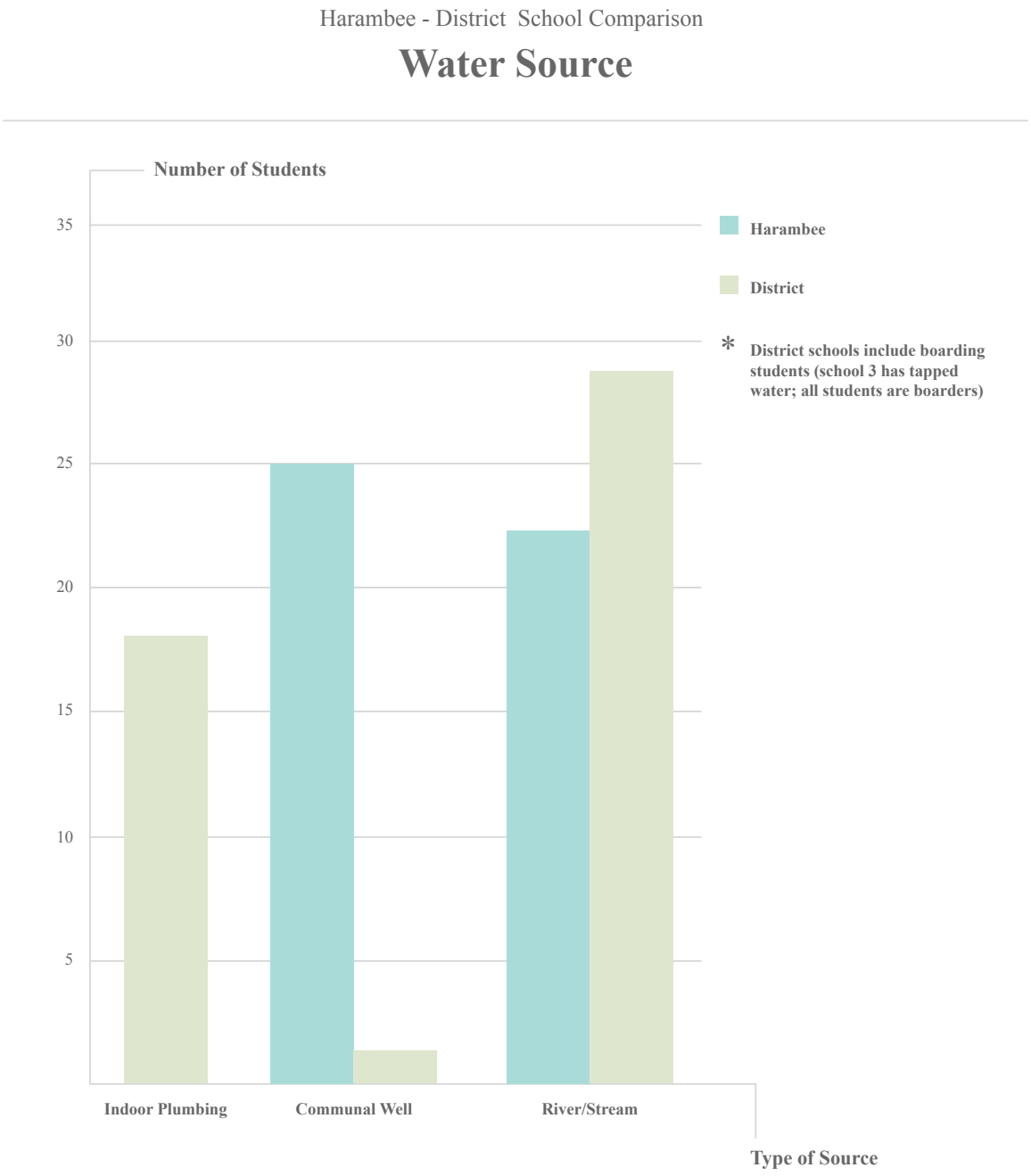
District—Harambee Comparison: Household Water Supply

Harambee Schools		**District Schools**	
Number of students	Household water source	Number of students	Household water source
0	Indoor plumbing	18	Indoor plumbing
25	Communal well	1	Communal well
22	River/stream	29	River/stream

Totals for both school types

Number of students	Household water source
18	Indoor plumbing
26	Communal well
51	River/stream

Appendix B (xiv)



Appendix B (xv)

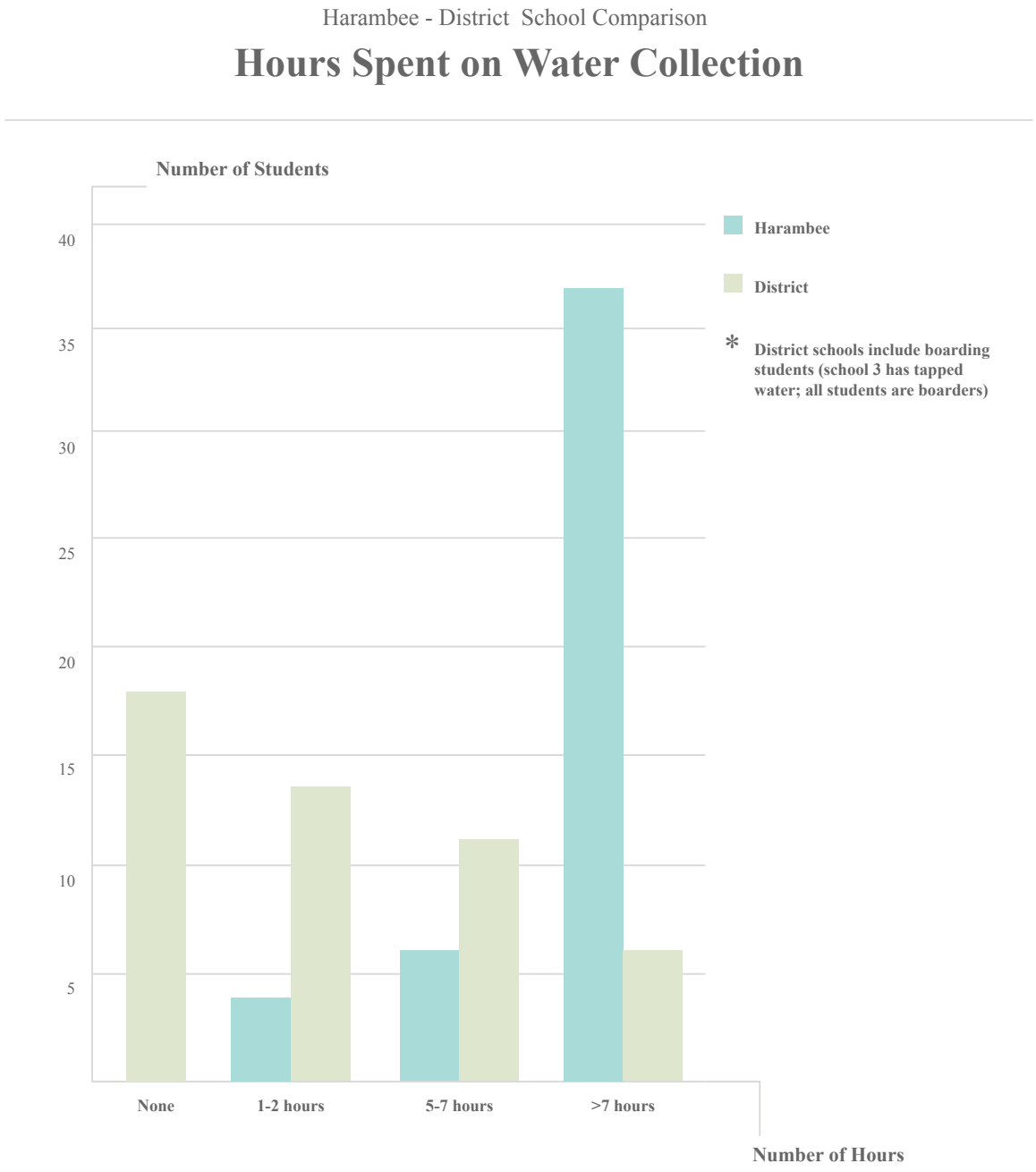
District—Harambee Comparison: Hours Spent on Water Collection (per/week)

Harambee Schools		**District Schools**	
Number of students	Hours	Number of students	Hours
0	None	18	None
4	1 - 2	13	1 - 2
6	5 - 7	11	5 - 7
37	>7	6	>7

Totals for both school types

Number of students	Hours
18	None
17	1 - 2
17	5 - 7
43	>7

Appendix B (xvi)



Appendix C (i)

Measurement Instrument: Research Questionnaire

1. How often do you spend collecting water?
    - Never
    - Once a week
    - Several times a week
    - Daily

2. What is your household water supply?
    - Indoor plumbing (municipally delivered)
    - Communal well
    - Commercially delivered (truck jerry can fill station)
    - Stream or river

3. Average time spent per week in water collection activities?
    - None
    - One to two hours
    - Five to seven hours
    - More than seven hours

4. How far is the water source from your house?
    - Not applicable (indoor plumbing)
    - Source less than 100 meters
    - Source up to a half kilometer
    - Half kilometer to one kilometer
    - Over one kilometer

5. How far do you live from school?
    - Less than one kilometer
    - One to two kilometers
    - Three to five kilometers
    - Over five kilometers

6. Mode of transportation to school?
    - Walking
    - Biking
    - School bus
    - Personal transportation

7. Are there any occasions where you miss school due to water related factors?
    - Never
    - A few times
    - Often

Appendix C (ii)

Measurement Instrument: Interview Questions for Students

Name:_____

Age:_____

Name of School:_____

Grade Level:_____

Academic Performance:_____

1. What are the primary causes of absenteeism? How does access to water factor in?

2. In your opinion, what are the main reasons young women drop out of school?

3. Do you want and plan to go on to university?

4. Do you think improving access to water at home and at school would help young women's ability to get and complete their education?

Appendix C (iii)

Measurement Instrument: Focus Group Discussion

1. What are some of the major barriers to girls' education?

2. If you no longer had to collect water, how do you think your daily life would change? Do you think your education would be affected?

3. What are some of the water-related challenges you face at home and at school?

4. Do you consider access to water & access to education human rights or privileges?

5. In your home, is your education encouraged or discouraged by your family members?

6. Do you feel that having female role models and mentors is important for female students?

Appendix C (iv)

Measurement Instrument: Interview Questions for Parents

Name:_____

Age:_____

Name of Daughter:_____

Level of Education:_____

1. In your opinion, what are the main reasons young women drop out of school?

2. Do you believe that a lack of access to water negatively affects girls' education? If so, in what ways?

3. Do you think improving access to water at home and at school helps young women's ability to get and complete their education?

Appendix C (v)

Measurement Instrument: Interview Questions for Teachers

Name of School:

1. In your opinion, what are the main reasons young women drop out of school?

2. Do you believe that a lack of access to water negatively affects girls' education? If so, in what ways?

3. Do you think improving access to water at home and at school helps young women's ability to get and complete their education?

4. What types of solutions do you see for overcoming the gender disparity in the post-primary enrollment and retention of girls?

5. Given that access to water and education are basic human rights, do you believe that this idea is supported and promoted by the government [in practice, not just public policy]? [*Since barriers such as prohibitive fees, regional disparities in the provision of resources and competitive entry into national schools still hinder many children's progression into higher education*].

Appendix C (vi)

Measurement Instrument: School Profile

School Overview*:*

Name of school:

Grade levels:

Number of classes per grade:

Average class size:

Average number of academic instructional days:

Geographic coverage area:

Student Demographics*:*

Total student population:

Percent of male/female of total population:

Average annual completion rates:

Approximate number of students that continue on to college:

Overall scholastic performance:

Infrastructure*:*

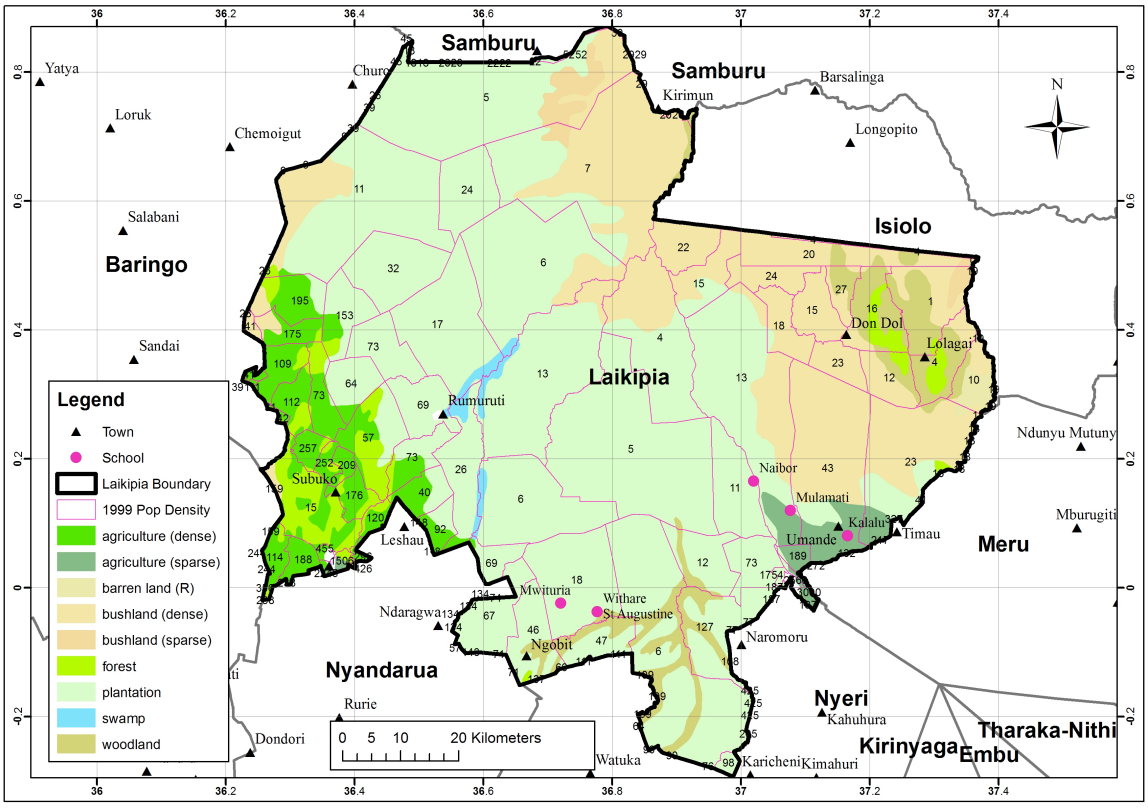
Provision of drinking water

Sanitation facilities:

Electricity:

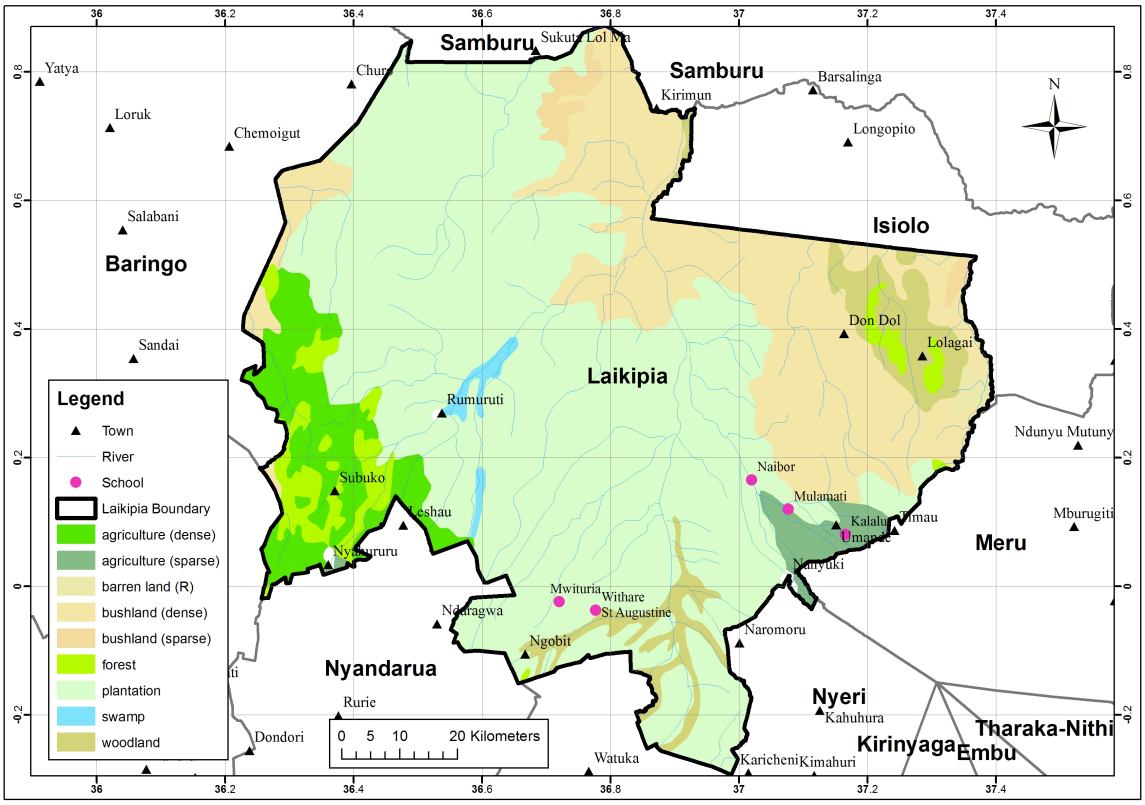
Appendix D (i)

Maps of Laikipia County: Land Use



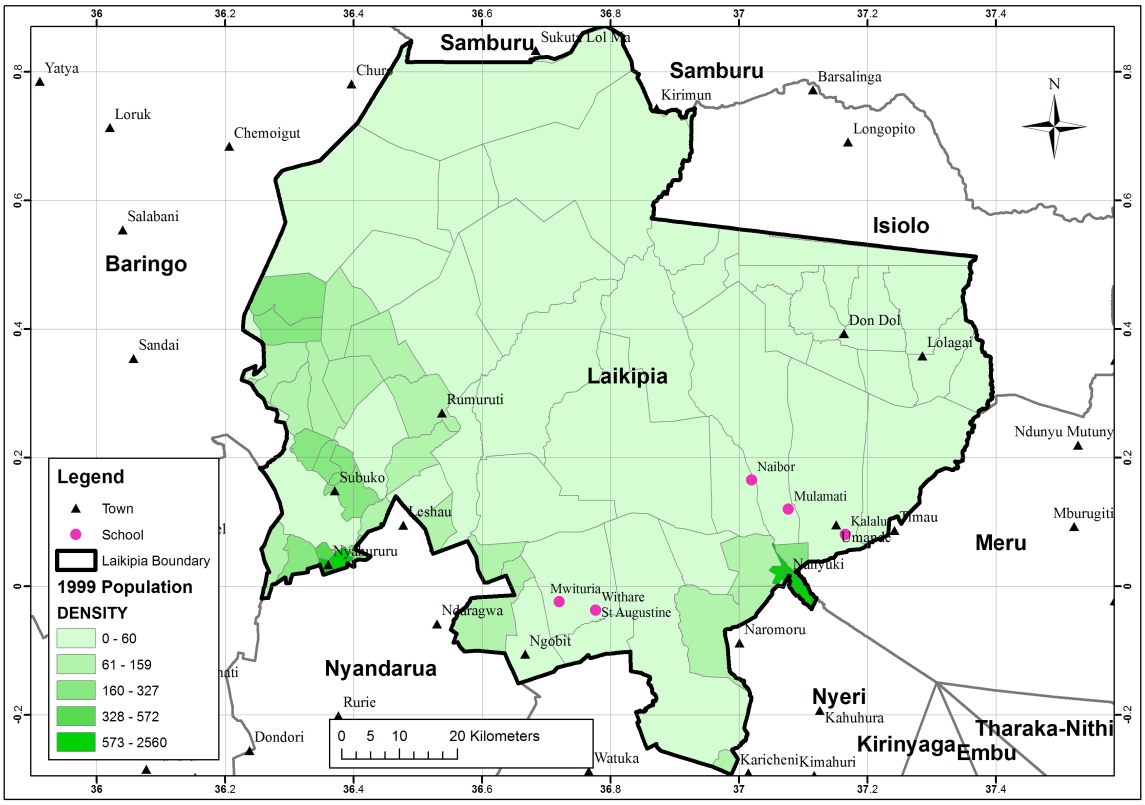
Appendix D (ii)

Maps of Laikipia County: Major Rivers



Appendix D (iii)

Maps of Laikipia County: Population Density

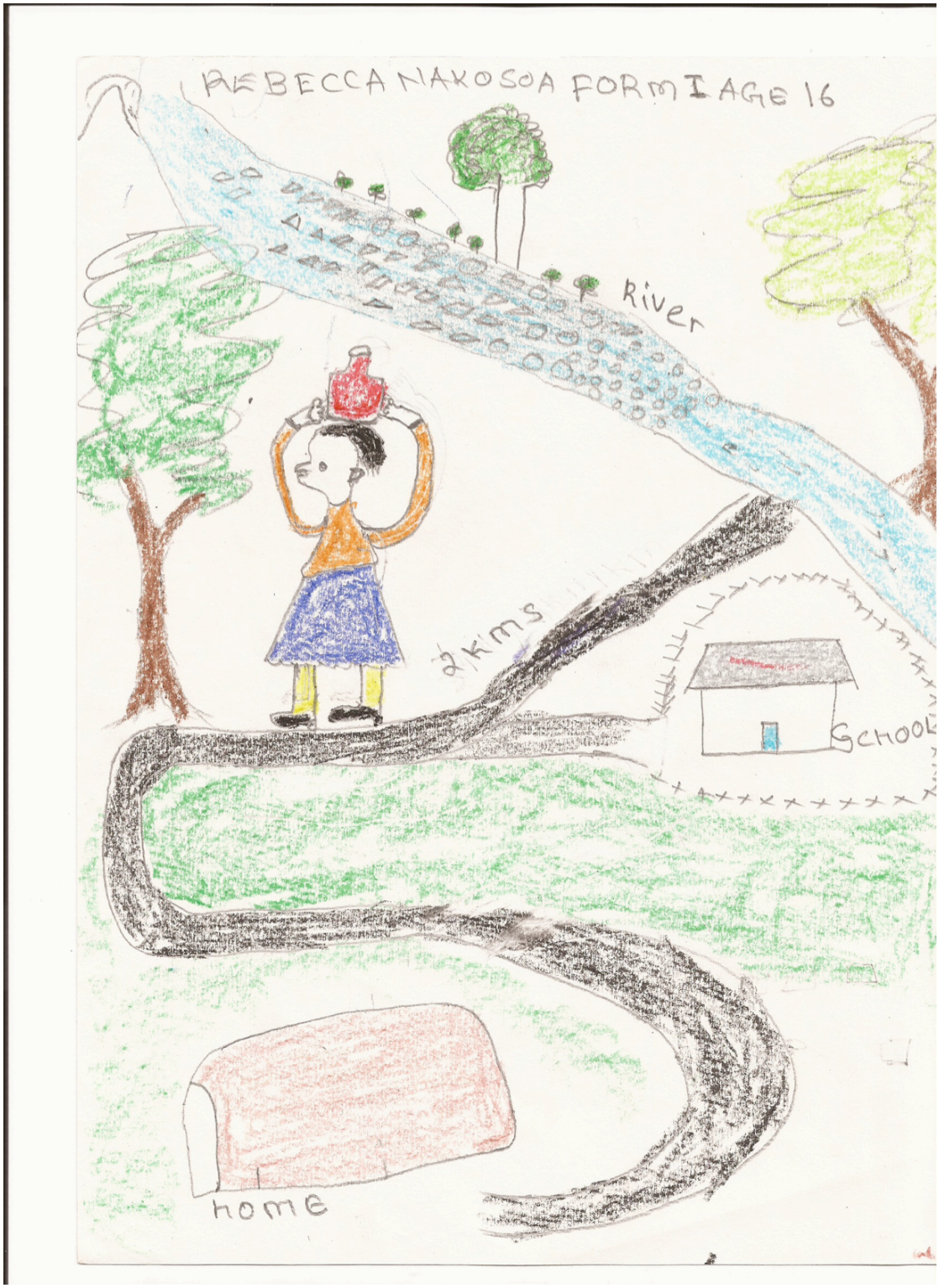


Appendix E (i)

Student Drawings of Household Water Supply

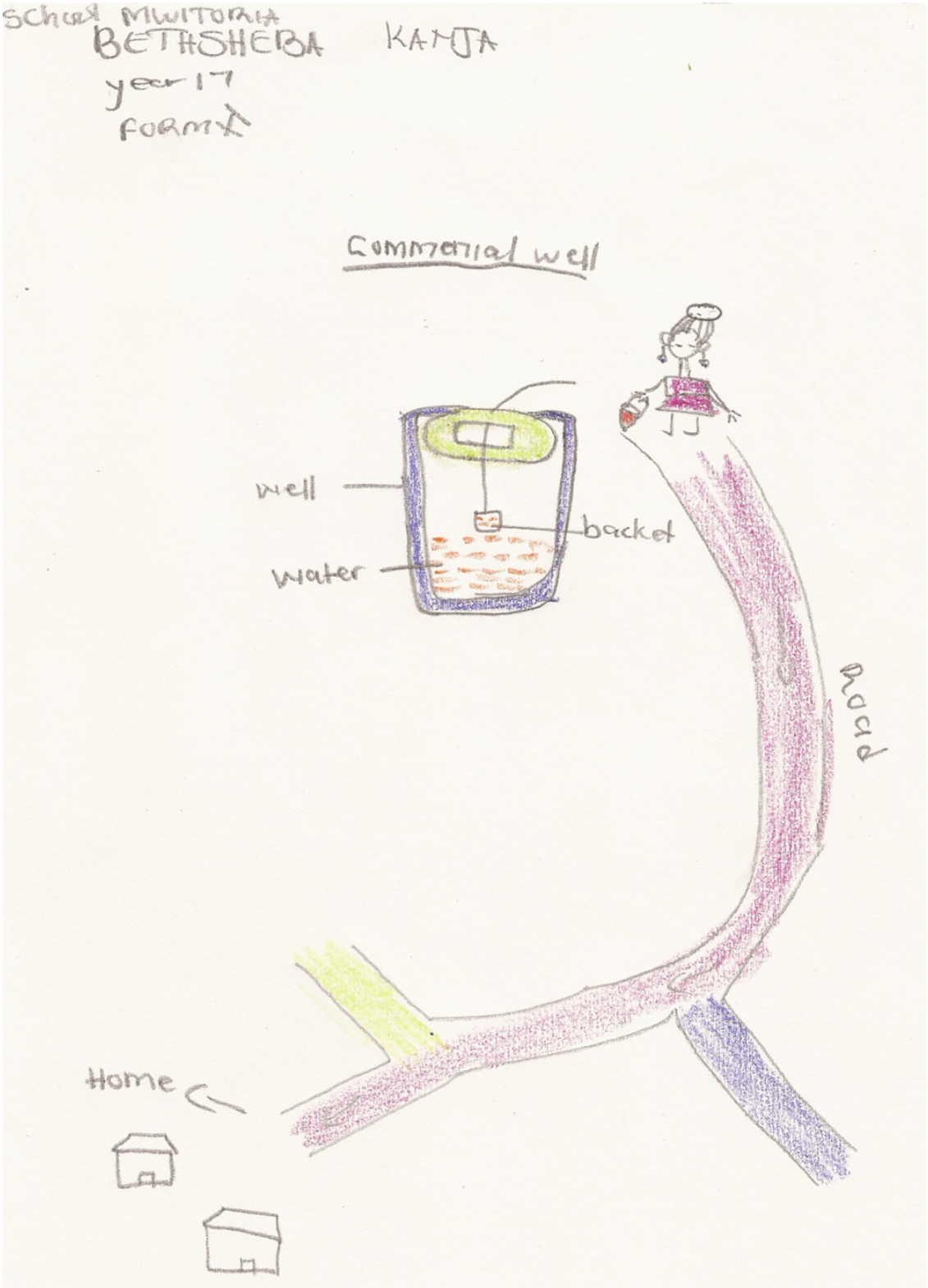
Appendix E (ii)

Student Drawings of Household Water Supply



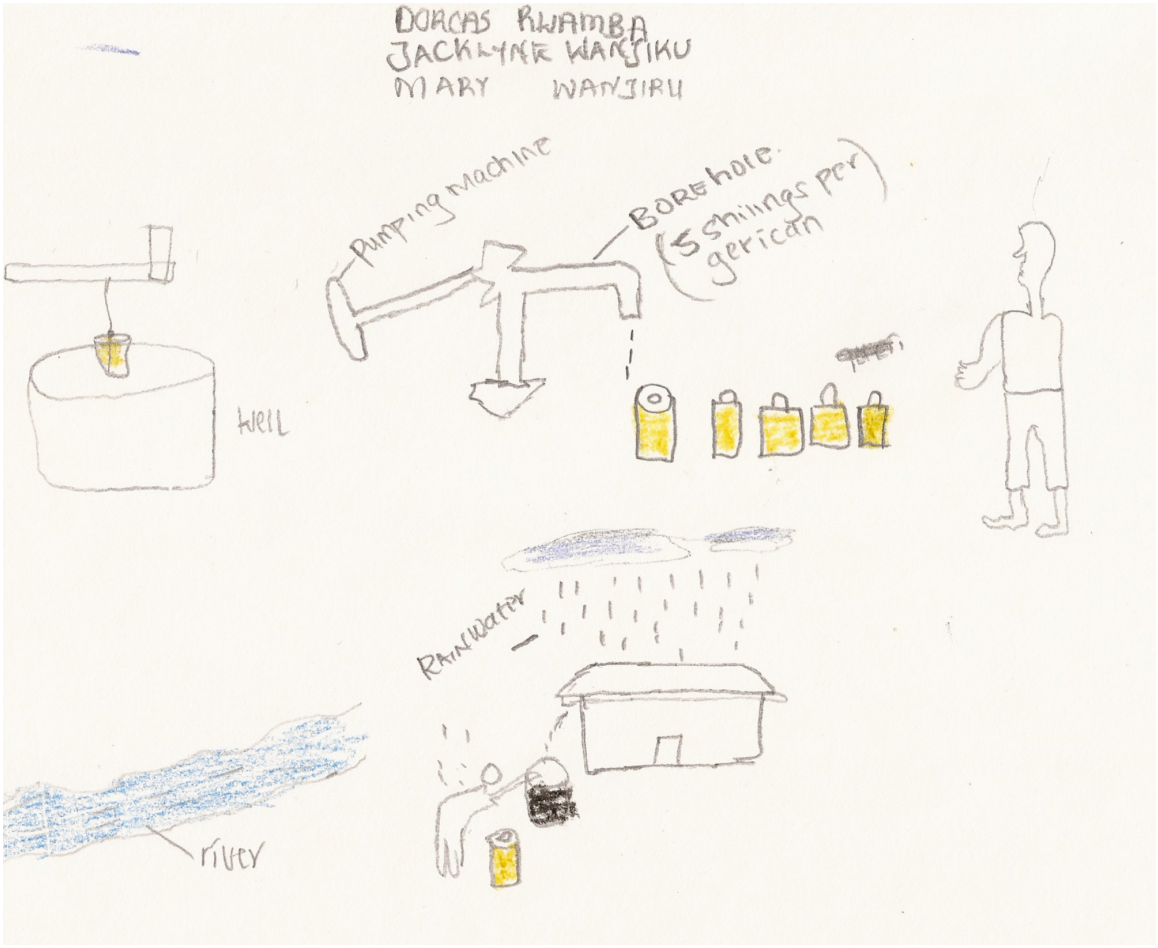
Appendix E (iii)

Student Drawings of Household Water Supply



Appendix E (iv)

Student Drawings of Household Water Supply



Appendix F (i)

Consent Cover Letter for Sample Schools

To Whom It May Concern:

My name is Jennifer Emick and I am graduate student of International Studies at the University of San Francisco in California, USA. I am doing a study on the impact of access to water on young women's enrollment and retention in secondary school. In order to carry out this study, I need to survey female secondary students from several different schools in Kenya. Your daughter's school,_____, is one of the schools that has granted me approval to conduct this research.

Your daughter is being asked to participate in this study because she was randomly selected from the school's female population.

I would much appreciate if your daughter could participate in my research study. The full extent of her participation would involve the completion of a brief questionnaire, interview and focus group discussion. Copies of the questionnaire, interview and focus group discussion are attached to this consent form for your review.

It is possible that some of the questions asked may be uncomfortable for your daughter to answer, but she is free to decline to answer any question or discontinue her participation in the study at any time.

Although there is no direct benefit to your daughter for her participation, the likely benefits of this study include a familiarization of issues surrounding water, and an increased understanding of the challenge of gender equalization. Moreover, this study will enable cross-cultural dialogue between Kenyan students and an international student from America.

There will be no costs to you or your daughter for taking part in this study, nor will there be any compensation. However, as a small gesture of appreciation, I have a small gift for each student participant that includes a pencil, notepad and pencil sharpener.

If you have questions about my research, please contact me through a written note that can be delivered to your daughter's school.

Your daughter's participation in this study is voluntary. You are therefore free to decline consent for her participation or allow her to withdraw from the study at any point.

Thanking you in advance for your support on my most noble academic project.

Sincerely,

Jennifer Emick

Appendix F (ii)

INFORMED CONSENT FORM
UNIVERSITY OF SAN FRANCISCO
CONSENT TO BE A RESEARCH SUBJECT

Purpose and Background: Jennifer Emick is a graduate student in the Master of Arts in International Studies program at the University of San Francisco. The purpose of this research is to determine the extent to which access to potable water affects female academic achievement at the secondary level of Kenya's public school system. I am being asked to participate in this study because I am a female student at the_____ Secondary School.

Procedures: If I agree to be a participant in this study, the following will happen:

I will conduct a questionnaire that will be administered at my school by a field researcher. The questionnaire will be used to gather data on my *time spent on household water collection, distance to household water source, distance to school, time spent traveling to and from school, mode of transportation and attendance rates*. I will also be interviewed using social media by the lead researcher who will be based in the USA. The Skype/phone interview will be conducted at my school and will not interrupt with my schooling. Jennifer Emick, the lead researcher, will request the ability to audio record the interview to ensure accuracy in her research. I have the option to participate in the interview but decline Jennifer's request to record the audio. I also have the choice to discontinue the study at any time, skip questions that cause discomfort as well as preserve complete anonymity in the final report.

Risks and/or Discomforts:

1. It is possible that some of the questions on academic performance and reasons for absenteeism may make me feel uncomfortable, but I retain the capability to decline to answer any questions or to discontinue participation at any time.

2. Participation in this study will also include a minimal loss of time.

3. Participation in this study may mean a loss of confidentiality. Study records [audio recordings, notes, consent forms] will be kept as confidential as possible by the lead researcher. All sensitive data will be coded and secured in a computerized file that will be accessible only by password. All physical data will be kept in a secured box. Only study personnel will have access to the files and documents.

Benefits: The potential benefits I will obtain from this study include a familiarization of issues surrounding water and sanitation, greater public health awareness and an increased understanding of the challenge of gender equalization.

Costs: There will be no financial costs as a result of my taking part in this study. The only costs I will experience include the time and effort associated with the questionnaire and interview.

Payment/Reimbursement: Due to the fact that this research will cost nothing to conduct, I will not be reimbursed for my involvement. However, I will receive a small gesture of appreciation from Jennifer Emick that includes a pencil, notepad, stickers and pencil sharpener.

Questions: I have talked to Jennifer Emick, the lead researcher, or Mr. James Mathenge, the field researcher, and have had all my questions answered. If I have further questions about the study, I may call Jennifer Emick's personal cell at +001-408-476-0648 or by email at Jennifer.emick@yahoo.com; Additionally, I may contact Mr. James Mathenge, who is based in Kenya, at +254-711-434518 or by email at james.mathenge@gmail.com.

If I have any questions, comments or concerns about my participation in this study, I should first contact Jennifer Emick by either phone or email. I also have the option to contact the IRBPHS directly, the institutional review board concerned with the protection of volunteers in research projects. I may reach the IRBPHS office by calling +001-415-422-6091, by e-mailing IRBPHS@usfca.edu, or by writing to the IRBPHS at the address provided below.

Department of Psychology
University of San Francisco
2130 Fulton Street
San Francisco, CA USA 94117-1080

Consent: I have been given a copy of the "Research Subject's Bill of Rights" along with a copy of this consent form to keep. PARTICIPATION IN RESEARCH IS VOLUNTARY. I am free to decline to be in this study, or to withdraw from it at any point.

My signature below indicates that I agree to participate in this study.

Subject's Signature Date of Signature

Signature of Person Obtaining Consent Date of Signature

Appendix F (iii)

PARENTAL CONSENT FORM

Purpose and Background: Jennifer Emick is a graduate student in the Master of Arts in International Studies program at the University of San Francisco. The purpose of this research is to determine the extent to which access to potable water affects female academic achievement at the secondary level of Kenya's public school system.

I am being asked to allow my daughter to participate in this study because she is a female student at the _____Secondary School.

Procedures: If I grant my consent for my daughter's participation, I am aware that she will experience the following:

She will conduct a questionnaire that will be administered at her school by a field researcher. The questionnaire will be used to gather data on the *time spent on household water collection, distance to household water source, distance to school, time spent traveling to and from school, mode of transportation and attendance rates*. She will also be interviewed using social media by the lead researcher who will be based in the USA. The Skype/phone interview will be conducted at her school and will not interrupt with her schooling. Jennifer Emick, the lead researcher, will request the ability to audio record the interview to ensure accuracy of her research. My daughter will have the option to participate in the interview but decline Jennifer's request to be audio recorded. My daughter will also have the choice to discontinue the study at any time, skip questions that cause discomfort as well as preserve complete anonymity in the final report.

Risks and/or Discomforts:

1. It is possible that some of the questions on academic performance and reasons for absenteeism may make my daughter feel uncomfortable, but she retains the option to decline to answer any questions or to discontinue her participation at any time.

2. Participation in this study will also include a minimal loss of time.

3. Participation in this study may mean a loss of confidentiality. Study records [audio recordings, notes, consent forms] will be kept as confidential as possible by the lead researcher. All sensitive data will be coded and secured in a computerized file that will be accessible only by password. All physical data will be kept in a secured box. Only study personnel will have access to the files and documents.

Benefits: The potential benefits my daughter will obtain from this study include a familiarization of issues surrounding water and an increased understanding of the challenge of gender equalization.

Costs: There will be no financial costs as a result of my daughter's participation in this study. The only costs she will experience include the time and effort associated with the questionnaire and interview.

Payment/Reimbursement: Due to the fact that this research will cost nothing to conduct, my daughter will not be reimbursed for her involvement. However, she will receive a small gesture of appreciation from Jennifer Emick that includes a pencil, notepad, stickers and pencil sharpener.

Questions: I have talked to Jennifer Emick, the lead researcher, or Mr. James Mathenge, the field researcher, and have had all my questions answered. If I have further questions about the study, I may call Jennifer Emick's personal cell at +001-408-476-0648 or by email at Jennifer.emick@yahoo.com; Additionally, I may contact Mr. James Mathenge, who is based in Kenya, at +254-711-434518 or by email at james.mathenge@gmail.com.

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San Francisco, CA USA 94117-1080

Consent: I have been given a copy of the "Research Subject's Bill of Rights" along with a copy of this consent form to keep. PARTICIPATION IN RESEARCH IS VOLUNTARY. I am free to decline to be in this study, or to withdraw from it at any point.

My signature below indicates that I agree to participate in this study.

Subject's Signature Date of Signature

Signature of Person Obtaining Consent Date of Signature

Appendix F (iv)

KENYA WILDLIFE SERVICE

18th May 2012

KWS/MRS/5002

The

Institutional Review Board For The Protection Of Human Subjects
University Of San Francisco
2130 Fulton Street
San Francisco, Ca 94117

Dear Members of the Committee,

RE: JENNIFER EMICK RESEARCH STUDY: The Impact of Water on **Women's** Education In **Kenya's Secondary Schools**

Kenya Wildlife Service is a conservation organisation charged with the mandate of conservating fauna and flora both in and outside the protected areas. We are also charged with the conservation of five important water towers in the country one of which(Mt Kenya), is the study site to be focused by the above named student.

This is to inform you that we have studied this research proposal which outlines the great need for such study in this conservation area. This organization collaborates with several instituions of learning ranging from primary, secondary and at tertiary levels in our conservation education programme and it is through this programme that we have made the institutions aware of the study and the intended outcome which is positively awaited by all stakeholders.

In view of the above, i write to inform you that this organization together with the learning instituions we are collaborating with, have permitted the above named student to undertake the proposed study within our areas of jurisdiction. We are aware that Ms. Emick intends to conduct her research by administering a written survey to students, teachers and other KWS staff within the conservation circles concerning water availability and by girl child. In addition this office will guide the day to day activities of the student during the entire period of the research to ensure maximum success and also act as translator and intermediate between the student and other study subjects in the study areas selected.

I am responsible for all research affairs within Mountain conservation Area where the study will be conducted and thereby authorize Ms.Jennifer Emick to conduct her research within our areas of jurisdiction.

We look forward to further working with your students on conducting research on various matters affecting the conservation of natural resources. Please contact our office in case of further queries on the following numbers +254 711 434 518 or my email at jmathenge@kws.go.ke or james.mathenge@gmail.com

Yours Sincerely,

James Mathenge
Ag. Senior Research Scientist- Mountain Conservation Area.

Appendix G

DonsApps
STUDENT/ALUMNI

Jennifer Emick <jlemick@dons.usfca.edu>

Application Approved #12-080

Terrence Patterson <irbphs@usfca.edu> Mon, Jun 25, 2012 at 5:42 PM
To: Jennifer Emick <jlemick@dons.usfca.edu>

June 25, 2012

Dear Ms. Emick:

The Institutional Review Board for the Protection of Human Subjects (IRBPHS) at the University of San Francisco (USF) has reviewed your request for human subjects approval regarding your study.

Your application has been approved by the committee (IRBPHS #12-080). Please note the following:

1. Approval expires twelve (12) months from the dated noted above. At that time, if you are still in collecting data from human subjects, you must file a renewal application.

2. Any modifications to the research protocol or changes in instrumentation (including wording of items) must be communicated to the IRBPHS. Re-submission of an application may be required at that time.

3. Any adverse reactions or complications on the part of participants must be reported (in writing) to the IRBPHS within ten (10) working days.

If you have any questions, please contact the IRBPHS at (415) 422-6091.

On behalf of the IRBPHS committee, I wish you much success in your research.

Sincerely,

Terence Patterson, EdD, ABPP
Chair, Institutional Review Board for the Protection of Human Subjects
---
IRBPHS ˆ University of San Francisco
Counseling Psychology Department
Education Building ˆ Room 017
2130 Fulton Street
San Francisco, CA 94117-1080
(415) 422-6091 (Message)
(415) 422-5528 (Fax)
irbphs@usfca.edu
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http://www.usfca.edu/soe/students/irbphs/