

Effect of Socio-economic Factors on Access to Improved Water Sources and Basic Sanitation in Bomet Municipality, Kenya

¹E.C. Koskei, ²R.C. Koskei, ³M.C. Koske and ⁴H.K. Koech

¹Department of Education and Arts, Kabarak University 20157, Kabarak, Kenya

²Department of Agricultural Education and Extension,

³Department of Geography,

⁴Department of Environmental Science, Egerton University 536-20115, Egerton, Kenya

Abstract: The study presents data collected in an assessment on the effects of socioeconomic factors on access to improved water sources and basic sanitation in Bomet municipality. Bomet municipality is one of the areas in Kenya where water borne diseases such as intestinal worms, diarrhea and bilharzia are most prevalent. This study was conducted to determine the relationship between socioeconomic factors and access to improved water and basic sanitation. A Multi-stage random sampling method was used to obtain the sample. The questionnaire was the main instrument for data collection. Analysis of data was done using the SPSS. Chi-Square test at 5% level of significance was used to analyze socioeconomic factors that determined household access to improved water and sanitation. The findings show that households' characteristics such as occupation and education level of the household head have a strong impact on the type of water source used by household as indicated by significance level of 0.01. The study also confirms that the type of toilet facility used by household was significantly influenced by the marital status of household head as indicated by significance level of 0.02. There is need for inclusive growth, basic education and women empowerment in order to achieve the Millennium Development Goals (MDGs).

Keywords: Basic sanitation, improved water sources, socioeconomic factors, waterborne diseases

INTRODUCTION

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 source, such as a household connection, public standpipe, borehole, protected well or spring and rainwater collection (World Bank, 2013). Though essential for human life, access to drinking water represents a day to day struggle for hundred's and thousand's citizens who live mainly in developing countries (Herischen *et al.*, 2002; Chapitiaux *et al.*, 2002; UN-Water/WWAP, 2006). In this regard and according to UN Environment Programme (UNEP), 300 million people in Africa still do not have reasonable access to safe drinking water and nearly 230 million people defecate in the open (Vidal, 2012). While Kenya has launched broad ranging water sector reform and has stepped up investment in Water supply, Sanitation and Hygiene (WASH), the country still faces considerable challenges in reaching the water and sanitation Millennium Development Goals (MDGs). 13 million Kenyans lack access to improved water supply and 19 million lack access to improved sanitation (USAID, 2011). Waterborne diseases represent a real public health problem in the country: WASH-related diseases and associated conditions (e.g., s anaemia, dehydration and

malnutrition) are the number one cause of under-five hospitalization, mortality and over 50% of hospital visits (USAID, 2011). Bomet municipality is one of the areas in Kenya where waterborne diseases such as intestinal worms, diarrhea and bilharzia are most prevalent (Ministry of State for Planning, National Development and Vision 2030, 2008). This will inevitably decline the attainment of sustainable development since health is regarded as the pillar for sustainable development.

Basic sanitation is considered the lowest-cost technology ensuring hygienic excreta disposal and a clean and healthful living environment both at home and in the neighborhood of users. It involves use of improved sanitation facilities such as public sewer connection; septic system connection; pour-flush latrine; simple pit latrine; ventilated improved pit latrine and private facilities (World Bank, 2013). Only private facilities are considered to be improved (WHO/UNICEF, 2006). In urban areas in developing countries though, many households share a toilet or use a public facility. This proportion is less than 20%, but in Kenya, the Demographic Health Survey 2003 found that over 63% of the urban households shared an improved toilet facility (WHO/UNICEF, 2006). About 85% of households in Bomet Municipality lack access to basic sanitation (Ministry of State for Planning,

National Development and Vision 2030, 2008) hence people have no choice but to rely on public or shared toilets or practise open defecation anywhere they find convenient and accessible.

Insufficient water supply and sanitation is very often associated with an unsustainable exploitation of natural resources (WHO/UNICEF, 2006). According to Allain (1994), demographic factors contribute heavily to shape water requirements. Population growth has been found to be a direct determinant of increases in water demand for domestic uses (Gleick, 2003). Another key demographic factor is change in the geographic distribution of population, which modifies the spatial pattern of demand for domestic uses. Urbanization, in particular, through increased population density and the concentration of demand, can make the latter a serious constraint on local resources (Allain, 1994). Urban poverty also contributes to the lack of adequate water and sanitation in poor households (Dungumaro, 2007). Lawrence *et al.* (2002) noted that socioeconomic status is a significant determinant of household access to water and basic sanitation in households. Other variables closely connected with the availability of water and adequate sanitation include, among others, household size and gender of the household head (Dungumaro, 2007). Increasing access to improved drinking water and ensuring adequate sanitation facilities is one of the Millennium Development Goals that Kenya along with

other nations worldwide has adopted (United Nations General Assembly, 2001).

The burden of caring for family members who are ill with waterborne diseases and going for water often falls disproportionately on female members of the household (KNBS, 2010) hence limiting their time on other activities such as education, income generating and food-related activities, such as preparing food and feeding young children (Bergeron and Esrey, 1993). Again, sickness forces children to miss school and can damage their ability to learn (Carter *et al.*, 1997). Improving access to water supply and sanitation is essential for socio-economic development, poverty reduction and for human dignity (Bhargava, 2006). These services will contribute both directly and indirectly to income generation, health, education and MDG number seven which calls for ensuring environmental sustainability through halving the proportion of people without access to safe drinking water and basic sanitation between 1990 and 2015. This study therefore investigates the relationship between socioeconomic factors and access to improved water and basic sanitation in Bomet municipality, Kenya.

STUDY AREA

The survey was conducted in Bomet Municipality located in Bomet County in Rift Valley Province, Kenya (Fig. 1). It lies between $0^{\circ} 39'$ and $1^{\circ} 02'$ south of

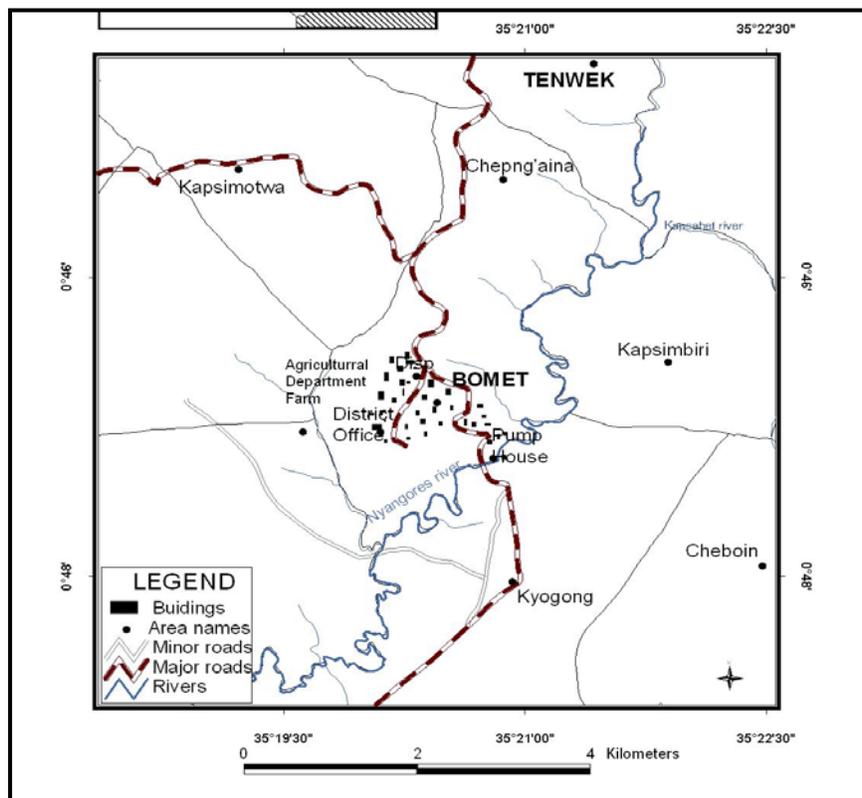


Fig. 1: Location of the study area (Source: Survey of Kenya (2007)

the Equator and between longitudes 35° 00' and 35° 32' east of prime meridian (33° East of the Greenwich meridian). It is characterized by gentle topography that gives way to flatter terrain in the south (Ministry of State for Planning, National Development and Vision 2030, 2008). The overall slope of the land is towards the south; consequently, drainage is in that direction and the altitude rises to 2018 M above sea level. The main river in the district, River Nyangores, flows from southwest Mau forest and proceed southwards through Tenwek in Bomet Municipality. The lower parts of the district and the surrounding areas depend on water pan and dams. The soils are generally fertile with altitude, temperatures and rainfall as the main determinants of farming practices in each area. The area experiences two rainy seasons; the long rains, which occur from March to May and the short rains, which occur from August to October. Apart from November and December, all the months have mean rainfall of between 1100 mm and 1500 mm (Ministry of State for Planning, National Development and Vision 2030, 2008).

Bomet is one of the fastest growing towns in Kenya and is also the largest urban centre within the Mara river basin. Rising birth rates and natural growth of the urban population in the region along with rural to urban migration occasioned by rural poverty have contributed to the growth. The population of those currently living in the area is estimated at 76,694 people. The municipality has a population density of 419 persons km² and the average household size is six (Ministry of State for Planning, National Development and Vision 2030, 2008). The population of Bomet municipality rose by 134% in 10 years between 1999 and 2009. According to the District Development Plan (2002-2008), rural absolute poverty in the District stands at 62% compared to urban absolute poverty of 25%. The effect of this is continued high dependency on natural resources for livelihoods due to a corresponding lack of access to alternative sources. This effectively leads to environmental degradation. Rapid urbanization and increased migration into urban areas within the District have resulted in urban decay, loss of environmental quality and health deterioration, water pollution, loss of biodiversity and encroachment of fragile ecosystems (NEMA, 2011). In both urban and rural areas, access to safe drinking water and basic sanitation is a critical environmental and health concern.

METHODOLOGY

Multistage random sampling technique was used to obtain the sample. Stage 1 was the division of the study area to various zones based on the distance from the

Central Business District (CBD). Seven zones were created. The second stage involved listing of all households within the different zones out of which simple random sampling was used to select a sample of 22 households. 151 households were selected for the study. Random sampling was done following a method described by Franzel and Crawford (1987). This technique is used as follows; a researcher starts from the estimated centre of a study area and proceeds in different directions using the available routes in the study area. The selection of routes is based on probability sampling procedures so as to remove bias and to make it possible get valid conclusions (Arye *et al.*, 1972). Three different routes (roads) were used to transect each selected area. The data were obtained from households through personal interviews by use of a semi-structured questionnaire. The study focused mainly on household heads for interviewing to ensure uniformity of data collection process. A structured interview-administered questionnaire was designed to carry out a survey about demographic characteristics and household access to water and sanitation among 151 residents. This involved questions on their level of education, economic background, age, gender, marital status, type of toilet facility, as well as their source of drinking water. The data collected was analyzed using chi-square test. Chi-square tests were conducted to determine if a significant association existed between socioeconomic factors and the types of water sources and type of toilet facilities used by the households. The survey information was represented using tables.

RESULTS AND DISCUSSION

Cross tabulations were run between the types of water sources used by the households and demographic characteristics of the households' heads. The socio economic factors studied included education level, income level, gender and age. The results of cross tabulation are presented in Table 1.

The results (Table 1) show that there was a significant association between household heads education and type of water source used by households in Bomet municipality. The type of water source used by households was significantly influenced by the level of education of household head ($\chi^2 = 10$, $df = 2$, $p < 0.01$). Only 10% of the respondents with tertiary education used non-improved sources. Most of the households (60%) whom their heads had acquired only primary education used unimproved water sources because low educational attainment leads to low incomes and economic status of households is closely linked with the affordability of services such as water.

There was a significant association between occupation of household head and type of water source

Table 1: Relationship between socio-economic factors and access to improved water sources in Bomet municipality

Demographic characteristic	Households main source of domestic water				
	Non-improved source (%)	Improved source (%)			
Age					
20-35 years	30	47			
36-50 years	43	37			
51-65 years	18	8			
66-80 years	9	8			
Source of income					
Wage employment	14	31			
Self employment	40	28			
Business	25	34			
Crop sales	21	7			
Education level					
primary	60	41			
secondary	30	30			
tertiary	10	29			
Gender					
male	71	75			
female	29	25			
Chi square -test		Independent variables			
Dependent variable		Education level	Source of income	Age	Gender
Water source used	(χ^2)	10.05	13.16	6.15	0.26
by household	df	2	3	3	1
	Significance	0.01	0.00	0.11	0.6

used by households in Bomet municipality. The type of water source used by households was significantly influenced by occupation of household head ($\chi^2 = 13, df = 3, p < 0.00$). Only few (14%) of the employed respondents used unimproved water sources. Most households (86%) whom their heads were unemployed used unimproved sources because poor households might not have private wells for domestic purposes, resources to buy safe water or treat unsafe water and domestic help to bring water from other improved sources. Occupation influences the households income and hence the amount of funds available to spend on water. People may be “water poor” not because there is no safe water in their area, but because they are “income poor” (Lawrence *et al.*, 2002).

There was no significant association between genders of household head in Bomet municipality in relation to domestic water source variations. The type of water source used by households was not influenced by the gender of household head ($\chi^2 = 0.26, df = 1, p < 0.6$). The type of water source used by households was also not influenced by the age of household head ($\chi^2 = 6, df = 3, p < 0.11$).

To find out the role played by socioeconomic factors on access to sanitation, cross tabulations were run between the types of toilet facilities used by the households and households’ heads background characteristics. The socio economic factors studied included household size, education level, income level, gender, marital status and age. The results of cross tabulation are presented in Table 2. The results (Table 2) indicate that; there was a significant

association between household heads marital status and type of toilet facility used by households in Bomet municipality. The type of toilet facility used by households was significantly influenced by the marital status of household head ($\chi^2 = 24, df = 12, p < 0.02$). Most of the married respondents used improved sanitation facilities; VIP latrine (71%) and flush/pour flush latrine (86%). Only few (14%) of the separated respondents used flush/pour flush latrine. None of the single and widowed respondents used improved facilities. The separated and single heads in the study site were all females. An extensive literature that focuses on the close link between poverty and household headship by gender suggests that female-headed households have limited access to resources (KNBS, 2010; Mbugua, 1997; Oppong, 1997; World Bank, 1991). While women have needs for safe and healthy sanitation, they may not have the money, resources, power, or confidence to ensure that their needs are met (UNDP, 2005).

There was no significant association between gender of household head and the kind of toilet facility used by the household in Bomet municipality. The type of toilet used by households was not influenced by the gender of household head ($\chi^2 = 1.48, df = 4, p < 0.83$). There was no significant association between level of education of household head and type of toilet facility used by household in Bomet municipality. The type of toilet used by households was not influenced by the level of education of household head ($\chi^2 = 6.72, df = 12, p < 0.88$). There was no significant association between occupation of household head and type of

Table 2: Relationship between socio-economic factors and type of toilet used by households in Bomet municipality

Back ground characteristic	The kind of toilet facility members of the household used					
	VIP latrine (%)	Pit latrine (%)	Hanging latrine (%)	Flush/pour flush (%)	Open pit (%)	
Education level						
Primary	57	69	25	29	50	
Secondary	14	38	75	29	25	
Tertiary	29	22	0	42	25	
Marital status						
Single	15	12	0	0	0	
Married	71	80	100	86	100	
Widowed	14	8	0	0	0	
Separated	0	0	0	14	0	
Major occupation						
Unemployed	57	81	100	57	100	
Employed	43	19	0	43	0	
Gender						
Male	86	6	75	57	75	
Female	4	94	25	43	35	
Household size						
Below 3 members	29	19	25	43	0	
4 to 7 members	42	58	50	29	75	
8 to 11 members	29	18	25	28	25	
11 members and above	0	5	0	0	0	
Chi square-test	Independent variables					
Dependent variable		Education level	Marital status	Major occupation	Household size	Gender
Type of toilet used	(χ^2)	6.72	24.46	6.76	6.72	1.48
	df	12	12	4	12	4
	Significance	0.88	0.02	0.15	0.88	0.83

(n = 151) Degrees of freedom (df); Pearson chi-square (χ^2)

toilet facility used by household in Bomet municipality. The type of toilet used by households was not influenced by the occupation of household head ($\chi^2 = 6.76$, $df = 4$, $p < 0.15$). There was no significant association between household size and type of toilet facility used by households in Bomet municipality. The type of toilet used by households was not influenced by the size of household ($\chi^2 = 6.72$, $df = 12$, $p < 0.88$).

CONCLUSION

The study suggests that the type of water source used by household was significantly influenced by occupation of household head. Economic status of households is closely linked with the affordability of services such as water (Kimenyi and Mbaku, 1995). Thus households with no reliable source of income are likely to use water from unimproved source. Especially, it has emerged from the study that the household expenditure (proxy of household welfare) is the fundamental factor, which compels households to rely on unimproved sources. Thus, authorities should grant special attention to poorer households when implementing strategies for population access to safe and reliable water. The government should promote inclusive and sustainable human development and work to reduce poverty in all its dimensions. Inclusive growth is also essential for the achievement of the Millennium Development Goals (MDGs) (UNDP, 2013). Moreover, the level of education of household head significantly influenced the type of water source used by households. There is need for basic education. Providing basic education locally will have a

tremendous leverage effect; it will equip the future people of Bomet with the means to fight their poverty and manage water and sanitation better. The study also suggests that the type of toilet facility used by households was significantly influenced by the marital status of household head. Male-headed households are more likely to adopt private improved toilet facility as main method of excreta disposal, compared with female-headed households. There is need to empower women through financial awareness and education because they are a pathway to achieving the Millennium Development Goals and sustainable development.

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