

Gender Differences and Deficiencies of Water and Sanitation Facilities Provisioning and Management in East African Universities

Kebirungi Harriet¹, Livingstone S. Luboobi², Kabonesa Consolata², Kimwaga Richard Joseph³, Majaliwa Jackson-Gilbert Mwanjalolo², Laituri Melinda⁴

Abstract

During the past two decades, East African Universities (EAUs) have experienced ten-fold growth in student enrollments, which has mounted pressure on the aged water and sanitation facilities. This study examined the gender responsiveness in the provisioning and management of water and sanitation facilities at Makerere University (MAK), Uganda and University of Dar es Salaam (UDSM), Tanzania. The study focused on the status, access, utilization, and students' perceptions of provisioning and management of water and sanitation facilities. A cross sectional gender focused research design was adopted. Qualitative and quantitative methods were used for data collection. For determination of the status of water and sanitation facilities at both universities, geospatial analysis was performed in ArcGIS 10.1 using geo-referenced toilet and water facility information. The current levels of access to and utilization of water and sanitation facilities at MAK and UDSM are deficient and create gender differences. Female students and those with special needs are the most affected. This status may have serious implications on students' health, socio-economic wellbeing and academic performance. There is need to develop and implement a gender responsive framework and create gender awareness on appropriate use and stakeholders' rights to water and sanitation facilities in EAUs.

Keywords: Gender, water and sanitation, provisioning and management, policy, East African Universities

Introduction

One of the most compelling daily needs of human beings is access to and utilization of water and sanitation facilities (Kebirungi et al., 2015b). Inability to access a clean toilet facility and water affects human beings in various ways. It is associated with health problems including diarrhea, urinary tract infections, worm infestation, lymphatic filariasis, bowel complications and malnutrition (Bartram and Cairncross, 2010; Grimes et al., 2015 and Kebirungi, 2017). For example, the annual costs of illnesses attributed to inadequate water and sanitation facilities is estimated at \$177million in Uganda and \$206 in Tanzania (Kebirungi et al., 2015b). Inadequate water and sanitation facilities provisioning and management also leads to mental stress, stigma and conflicts (House and Cavill, 2015; Roosen et al., 2015). It can also lead to risks of violence, for example, when someone is assaulted or raped on the way to a distant toilet facility at night. All these can negatively affect the academic performance of students (Chambers et al., 2016; Kebirungi, 2017). Whereas all students have a right to adequate water and sanitation facilities, females and those with special needs have different requirements due to biological factors (Kebirungi, 2017). For example, female students take longer in the toilet, use more water and need more visits to the toilet during menstruation (Kebirungi et al; 2015a; Kebirungi, 2017). Female students also have more need for privacy, are more susceptible to urinary tract infections and more vulnerable to violence (O'Reilly, 2016).

¹ Kyambogo University, P.O. Box. 1, Kampala, Uganda.

² Makerere University, P.O. Box. 7062, Kampala, Uganda.

³ University of Dar es Salaam, P.O. Box. 35091, Dar es Salaam, Tanzania.

⁴ Colorado State University ESS 1476, Fort Collins, CO 80523

Whereas boys have different areas for urination and defecation, female students use the same room for both functions in addition to changing sanitary towels (Kebirungi, 2017). Due to these biological differences, the recommended toilet ratio in educational institutions for girls is 1:30 whereas that of males is 1:60 (Kebirungi et al; 2015a; The Sphere Project, 2004).

Similarly, persons with disabilities have special requirements regarding access to and utilization of water and sanitation facilities. For instance, their toilets require extra equipment for safety and require routine attention to cleanliness and the facilities need to be located nearer to them (Kebirungi et al, 2015b; Kebirungi, 2017). The provision of functional, adequate and gender-responsive water and sanitation facilities to its users is an obligation of governments and line ministries and departments (UN General Assembly, 2010.; Government of Uganda, 1995; Tanzania’s Constitution, 2014; The Republic of Uganda, 2007; Tanzania’s National Women and Gender Development Policy, 2000; and The Republic of Uganda, 1999). In the context of EAUs, managers have the obligation to fulfill, protect and respect the needs of water and sanitation users (students). On the other hand, students are expected to be empowered to claim their water and sanitation needs and rights (Kebirungi, 2017).

To-date, most studies on water and sanitation facilities in educational institutions have focused on primary and secondary schools (Jasper et al., 2012; Kebirungi, 2017; WHO/UNICEF, 2012). There is limited information about access to and utilization of water and sanitation facilities in Universities from the gender perspective. Therefore, this study sought to establish the gender responsiveness in the provisioning and management of water and sanitation facilities at the two East African Universities. The specific objectives were;

- I. To determine the gender responsiveness of the status of water and sanitation landscape in the two East African Universities.
- II. To assess male and female students’ perspectives of access to and utilization of water and sanitation facilities in the two East African Universities
- III. To assess gender responsiveness of provisioning and management of water and sanitation facilities in the two East African Universities.

Methodology

The study was carried out at two East African Universities (EAUs) namely; Makerere University (MAK) in Uganda and University of Dar es Salaam (UDSM) in Tanzania from 2012 to 2015 as shown in Figure 1.

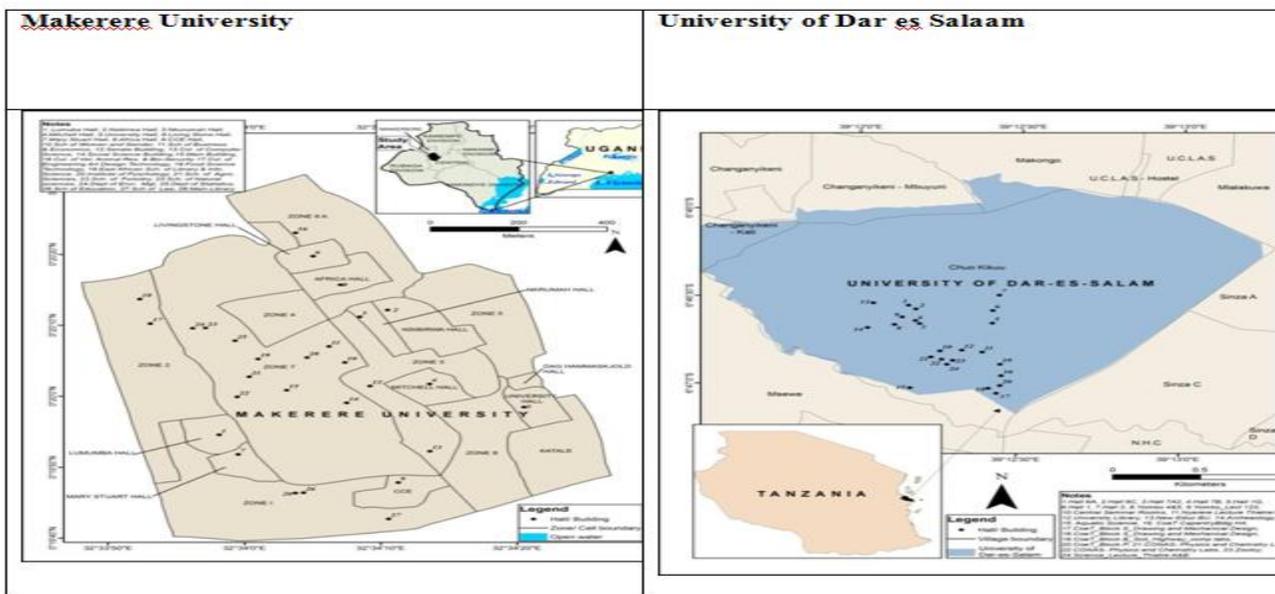


Figure 1: Map Showing Location of the Study Area

These two public Universities gained University status in the 1970s. They were the first Universities to implement gender mainstreaming programs in the East African region in 1980s and early 1990s. The study focused on water and sanitation facilities located in halls of residence and lecture theatres and targeted registered students at the studied Universities as show in table 1 below.

Table 1: Shows Registered Students by Sex at MAK and UDSM

Institution	Academic Year	Registered Students		Total
		Male	Female	
Makerere University	2013/2014	19,716	15,039	34,755
University of Dar es Salaam	2012	13,654	7,848	21,502
Total		33,370	22,887	56,257

Source: Makerere University. (2013-2014). Fact Book, and University of Dar es Salaam. (2010/2011 -2014-2015). Five Year Rolling Strategic Plan. Dar es Salaam.

This study used a cross-sectional gender focused research design was used to collect data from the sampled populations at the two Universities. Data was obtained from a range of key University stakeholders (management and male and female students). Spatial data collected was subjected to geospatial modeling tools (Bailey, 1994; Mokashi et al. 2017; Stewart, 2008; Warmbui, 2013).

The study involved interviews with 701 students, 88 key informant interviews, 44 focus group discussions and site visits in Makerere University and University of Dar es Salaam. Spatial analysis was done using the Etrex 10 Geographical Positioning System (GPS) to determine distance to the nearest toilet and capacity of water storage systems. The water requirement per toilet was derived from the number of users and the standard water requirement per toilet visit. Thereafter the water deficit per toilet was determined as the difference between the water requirement per day and the available amount of water. Data from key informant interviews and focus group discussion was analyzed qualitatively by content analysis along themes of major variables of the study. A five-step analytical framework was adopted and used to analyze the collected data (Morrill et al., 2000; Newman, 2002). The first step consisted of organization and categorization of the data into themes from a gender perspective. The second step was to establish the inter-connectedness of themes. The third step consisted of corroboration or legitimization of observations, by evaluating alternative explanations and disconfirming evidence. Searching for negative cases was the fourth step; and the last step was reporting the findings from a gender perspective.

Quantitative data collected using questionnaires was coded and then entered in excel and imported in Statistical Package for Social Scientists (SPSS) version 17.0 for analysis. Pearson Product Moment correlation and chi-square tests were run to provide a standardized, absolute measure and establish relationships/associations between water and sanitation facilities (access and utilization) and other parameters (e.g. adaptation measures, gender). ArcGIS 10 was used to develop a geospatial database of each university. GIS layers were generated for each of the following parameters: toilet per student, distribution, and water and storage facility distributions using simple krigging (interpolation) extended to the boundaries of each University. These maps were reclassified using adhoc classes and frequencies of different classes and were plotted using histograms. Geospatial tools were also used to complement perception and studies.

Results

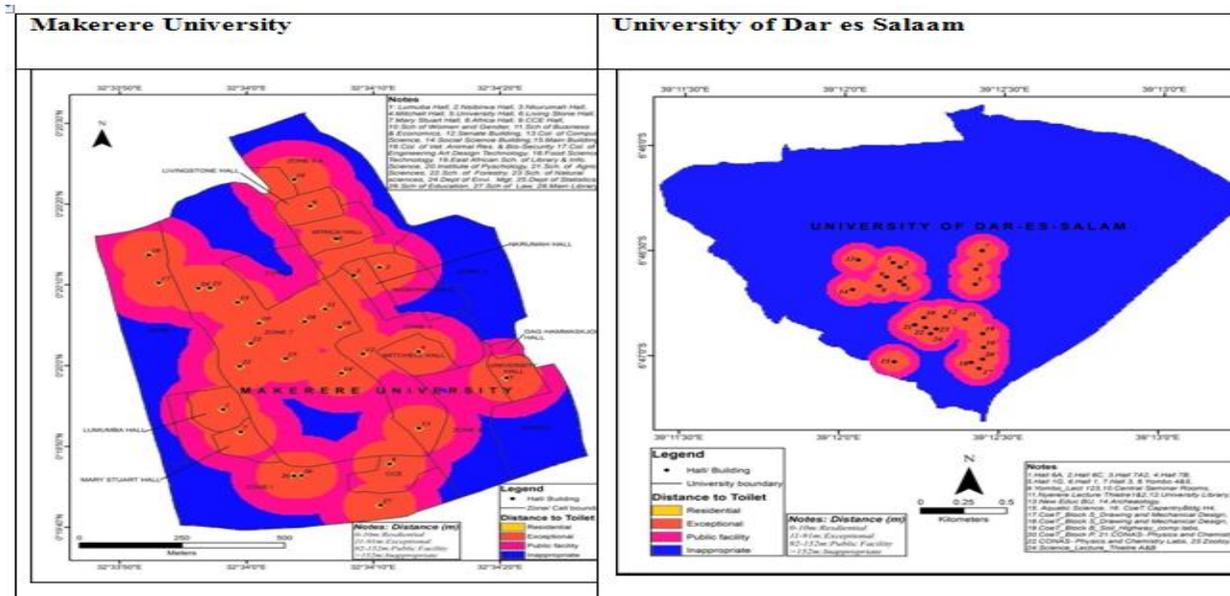
This section presents results on the determination of gender differences in the status of water and sanitation facilities in terms of availability, acceptability, accessibility and utilization. These dimensions not only influence and affect each other but they also impact gender related needs and interests of access to and utilization of water and sanitation facilities in EAUs. The study established that the current levels of access to and utilization of water and sanitation facilities in Makerere University and the University of Dar es Salaam are deficient and create gender differences. Female students and those with special needs are the most affected.

Gender issues in water and sanitation facilities in EAU

Location of Toilets

At UDSM, most of the northern part of the University had adequate water and sanitation facilities for both male and female students. However, most parts of the southern and south-eastern were below the number of water and sanitation facilities required for females. The College of Engineering and Technology (CoET) had adequate numbers of toilets for both male (1 to 60) and female (1 to 30) students respectively. Figure 2 below shows distance to toilets and water facilities at MAK and UDSM

Figure 2: Distance to Toilets and Water Facilities at MAK & UDSM



In line with the standard plumbing codes, location of toilet facilities was categorized according to distance from the users as follows: residential (0-10m), exceptional (11-91m), public (92-152m) or inappropriate (more than 152m) (The Sphere Project, 2004). Overall, 84.4% of the toilet facilities in UDSM and 28.2% at MAK were located at inappropriate locations and therefore not gender responsive. Only 0.14% of the facilities at Makerere and 0.67% of those at UDSM were in residential locations. The toilets at exceptional locations were 8.19% at UDSM and 40.22% at MAK. Toilets in public locations were 8.27% at UDSM and 30.9% at MAK as indicated in figure 3 below.

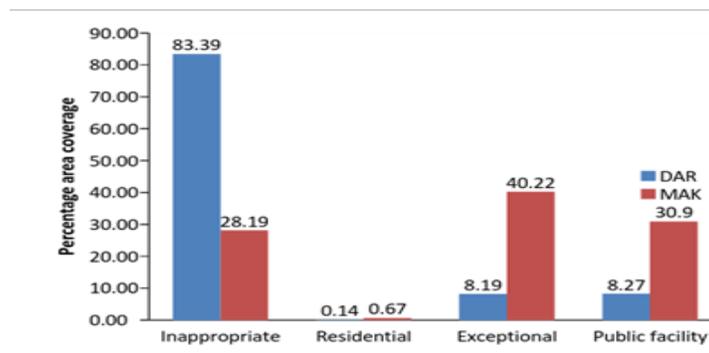


Figure 3: Toilet distribution at Makerere University and University of Dar es Salaam

Long distances to water and sanitation facilities compromises the safety of mostly female students and those students with special needs, especially at night. Female respondents categorically stated that they lived in fear of being raped when they go to a toilet or water source far from their halls of residence at night. It also creates a hygiene crisis when the fear of violence prevents a student from going out to fetch water or use the toilet.

Person to Toilet Ratio

Areas with a ratio of toilet per person at UDSM (34%) and MAK (16%) were below the number of toilets required for female students. In addition, 63% and 67% at UDSM and MAK respectively had inadequate toilets for both male and female students and, only 3.4% and 17% represented below number of toilets required for males as indicated in figure 4 below.

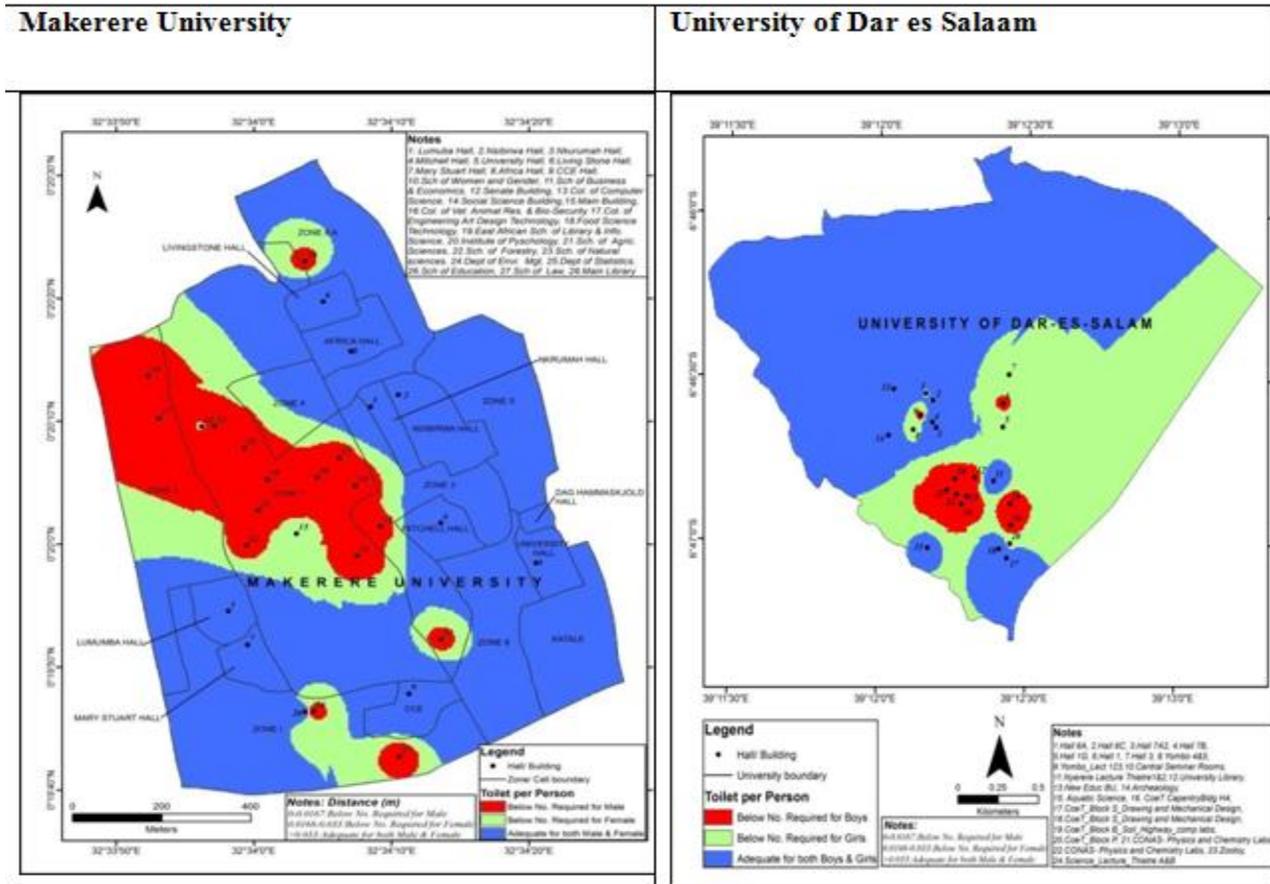


Figure 4: Person per toilet at MAK & UDSM

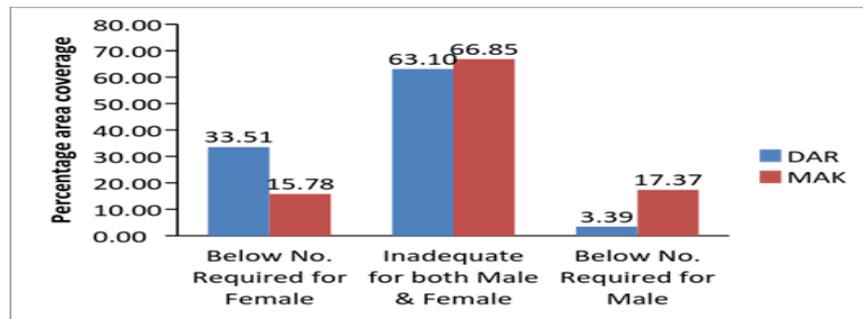


Figure 5: Ratio of person per toilet at Makerere University and University of Dar es Salaam

Due to biological differences, the various water and sanitation facilities inadequacies namely; long distance, overcrowding and water deficiency affect female students more compared to their male student counterparts. There were gender inequalities in the availability, acceptability and accessibility of water and sanitation facilities at the two Universities. Stakeholders cited a number of factors causing these inequalities. These included lack of prioritization of gender needs for water and sanitation facilities, lack of gender-specific water and sanitation policies and stakeholder (Universities) participation in water and sanitation policy development for example, the water policies (Uganda, 1999 and Tanzania, 2002), do not highlight institutions of higher learning as major stakeholders in policy development and

dissemination. Other factors included expansion of student numbers without regard to gender issues, gender inequalities in the distribution of financial resources for higher education, lack of gender-aggregated data on water and sanitation, increased demand for higher education, lack of gender-responsive sanitary materials and student practices. For example, the Makerere University's strategic framework 2007/08 – 2017/18 and the University of Dar es Salaam's, five year rolling strategic plan 2010/2011 -2014-2015 are both silent on issues relating to water and sanitation provisioning and management.

Observed Status of Toilets

Majority of the toilets in the halls of residence and lecture theatres at the two Universities were not functioning adequately due to insufficient water supply. A toilet may be physically present but when there is no water it becomes unusable. The shortage of toilets was compounded by insufficient water supply. Most toilets had signs of inadequate maintenance such as stench and waste water on the floors, leading to less usage. Blockages, broken pipes and leakages, resulting from overload of aged facilities, and increased number of students also affected usage of water and sanitation facilities. A key informant from USDM stated: "A room in the hall of residence that was designed to accommodate two students is now being occupied by 8-12 students" These unsanitary conditions put the health of students at risk. Indeed, this study established that hygiene-related diseases like urinary tract infections, typhoid, skin rash/itching and diarrhea were among the most common diseases affecting especially female students at the two Universities as indicated in the table2 below.

Table 2: Shows Diseases related to Water and Sanitation Deficiencies at UDSM and MAK by Gender between 2012-2014

Diseases	University of Dar es Salaam			Makerere University		
	Total	Male	Female	Total	Male	Female
Urinary tract infections	2053	650	1403	1190	427	763
Typhoid	650	333	317	9	6	3
Skin rash/itching	822	439	380	442	174	268
Diarrhoea	238	136	102	116	59	56

Source: Diagnostic Reports from Medical records at UDSM and MAK

Gender Issues in Access to Water

The results show that most areas at MAK (97%) and UDSM (99.8%) are highly deficient in water. However, Areas with adequate quantities of water and sanitary facilities are Africa (female) and Nsibirwa (male) halls of residences at MAK. At UDSM areas with slight deficiency are around College of Engineering and Technology (CoET) and the new buildings housing the Faculty of Education, Aquatic Sciences and Archeology. According to the Human Rights Based Approach (UN, 2014) to water and sanitation, humans have daily water needs and such a deficiency is a violation of the students' rights. It also has serious health, social, academic and economic implications. This has disproportionately higher effects on female students and those students with special needs (Kebirungi et al, 2015a; Kebirungi, 2017).

Besides human rights concerns, water shortage can be costly for an academic institution; for example, the University of Dar es Salaam spent huge sums of money hiring trucks to deliver water to students' halls of residence and administration blocks. At least 40 trucks of water were expected to be delivered daily at a cost of Tsh 60,000 (\$30) per truck, amounting to Tsh 2, 400,000 (\$1,200) per day. This cost covered transport only because the University was already paying a monthly bill of Tsh5b (\$2.3m) at the source of water. In case of water scarcity in the city, the price increased to Tsh100, 000(\$46) per truck amounting to 40,000,000 equivalent to \$ 18, 349 per day. Moreover, water delivery by trucks raised other concerns, for example making false declarations on the number of trucks delivered and fetching water from unclean sources. After the water is delivered so expensively, further losses are often incurred due to broken pipes or leaking taps. Figure 6 below shows the percentage area coverage under each water deficiency categories at MAK & UDSM.

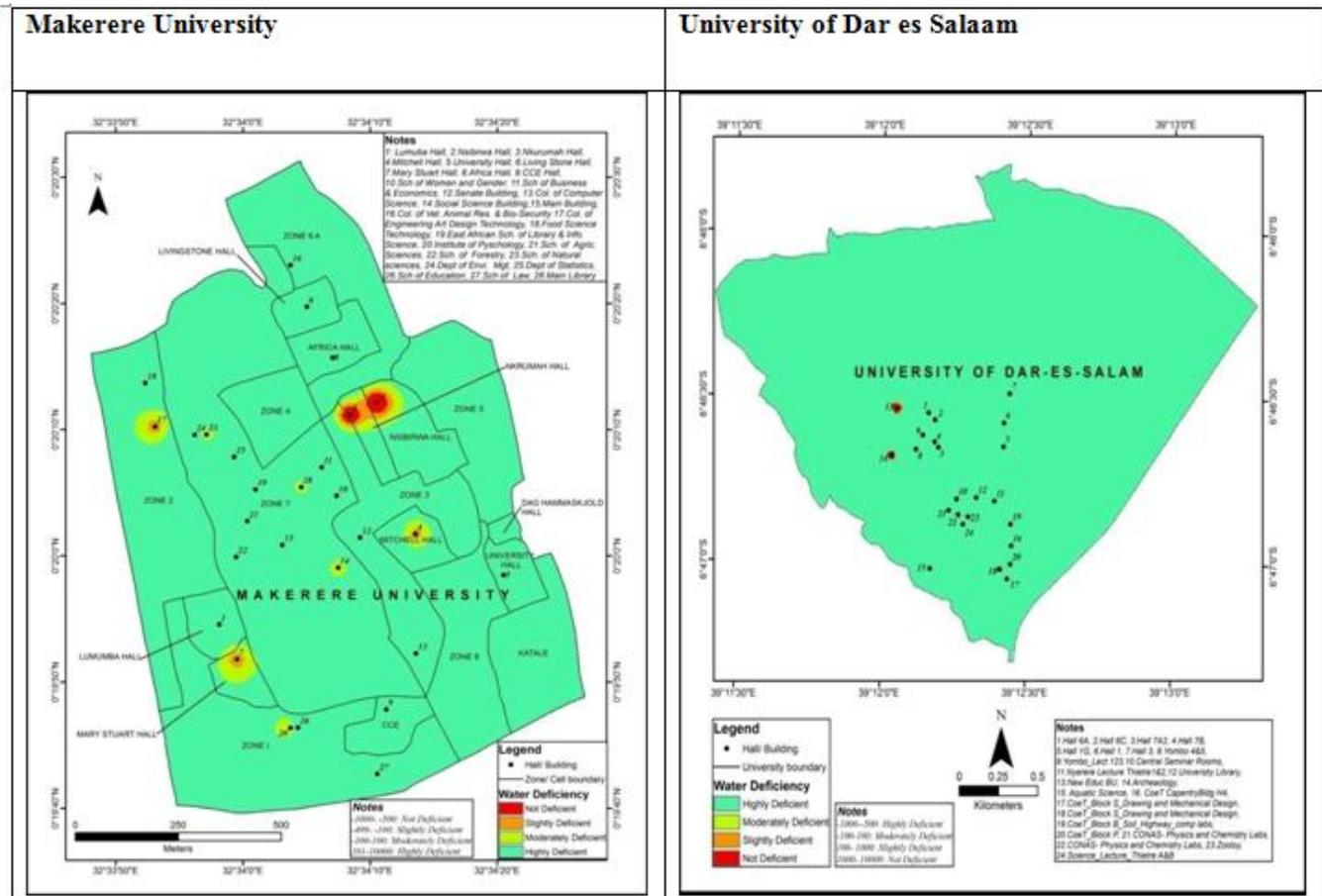


Figure 6: Percentage area coverage under each water deficiency categories at MAK & UDSM

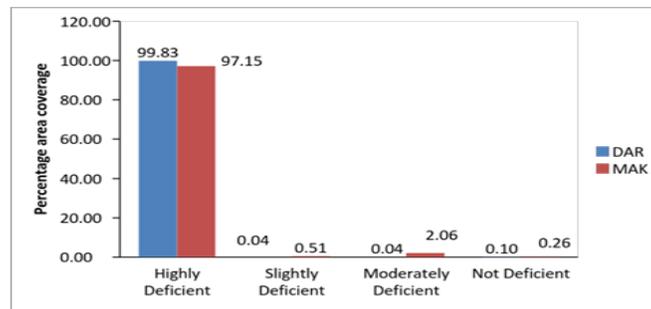


Figure 7: Percentage area coverage under each water deficiency categories at MAK & UDSM

Students' Perceptions on Access to and Utilization of Water and Sanitation Facilities

At both Universities, female students and those students with special needs had less access to water and sanitation facilities in halls of residence and lecture theatres. At Makerere University, for instance, 39.8% females compared to to 51.5% males students had access and utilized toilets in the halls of residence. Similarly, at USDM, access to and utilization of toilets was 30.3% for females and 58.6% for males. Similar gender differences were reported on access to and utilization of toilet facilities in the lecture theatres.

Toilet design also affected utilization. Whereas most toilets were originally of the sitting type, most students preferred the squatting type. At Makerere University, 65.7% of male and 76.8% of female students reported that the sitting type of toilets was not convenient for use. Similar results are reported at University of Dar es Salaam, with 76.7% male and 85.6% female. Most students argued that the sitting type of toilet poses health risks particularly when they are shared. Students also reported shortage of water for washing and bathing.

During water scarcity, student’s located water for bathing and washing in other places such as mosques or water and sanitation facilities located near lecture theatres or moved to other halls of residences. Female students expressed fear that they might be raped on their way to distant water and sanitation facilities especially at night.

At both MAK and UDSM, there were gender differences in the reported availability of water, handwashing basins and soap in the halls of residence and lecture theatres. For instance, at MAK halls of residence, 42.9% male and 35.4% female students reported availability of water, handwashing basins and soap. However, at UDSM halls of residence, male students had lower access to the aforementioned facilities than females, with 38.5% and 44.8% respectively. The situation was somehow in lecture theatres with 20.5% male and 24.7% female students at MAK reporting presence of water, handwashing basins and soap while at UDSM 98.1% of males and 99% of females reported absence of water, handwashing basins and soap in lecture theatre. Generally, the percentage difference between male and female students on availability of water, hand washing basins and soap in halls of residence and lecture theatres was minimal as indicated in the figure below.

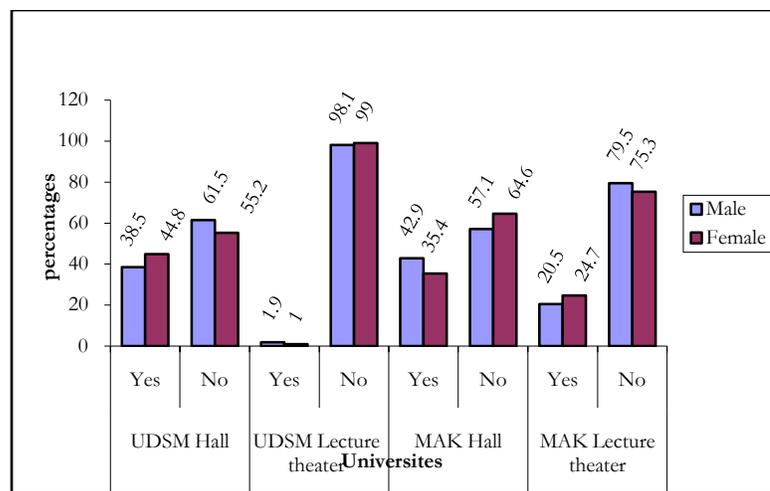


Figure 8: Students’ Perceptions on Water, Hand Washing Basins and Soap by Sex

Perceptions of Students with Special Needs

Most buildings at the two Universities did not have water and sanitation facilities for students with special needs such as toilets, bathrooms or urinals. Therefore, those students with special needs moved from their halls of residence or faculties to those that had the right facilities for them to urinate or defecate. Unfortunately, sometimes they moved all the way only to find the toilets locked up.

Representatives of students with special needs complained that they were excluded from the planning, budgeting and management of water and sanitation facilities. As a result, the various decision-making organs do not adequately capture or address their special needs and concerns. This limits their levels of access to and utilization of water and sanitation facilities.

Adaptation Measures by Students

Despite the glaring deficiencies, most students were not aware that water and sanitation is a human right (UN, 2010). They also considered it a taboo issue. Therefore, in most cases they developed adaptation mechanisms rather than raise the issue for discussion. For example, some dealt with the situation by moving to other blocks, halls of residence, faculties or restaurants with cleaner facilities. This involved postponing urinating or defecating until such a time when they would be in the place with cleaner toilet facilities. They used measures such as walking up and down, dancing and tightening their muscles to postpone use of the toilet until specific hours like mid-morning when they have just been cleaned. This practice of resisting nature’s call can have negative impacts on a female student’s health later in life. For example social isolation and urinary incontinence leads to stress, urinary incontinence among women, defined as “involuntary leakage on effort or exertion, or on sneezing or coughing” This lowers women’s self esteem and wellbeing (Kari, 2004).

In the absence of toilets designed for students with special needs, they sought the help of other students to access and use the ordinary toilets. Others devised means of struggling on their own to use the toilets.

When toilet seats were dirty, some students opted to step on them instead of sitting. Others defecated on the floor, outside the toilet or in a nearby bush. For short calls, some students stood at a safe distance and aimed their urine, a practice commonly referred to as 'posting' or 'sending'. Unfortunately, this practice makes the toilet dirtier. In the female halls of residence, students covered the toilet seat with tissue to protect themselves. Others poured disinfectants before sitting on the toilet. Male students in particular fear that as they sit, their dangling genitals might touch the soiled toilet. Female students dropped used sanitary towels in the toilet, floor or cistern or dropped them on water reservoir tanks when they found the collection bins full. In response to water scarcity, at the University of Dar es Salaam, some students carried their towels and showered at the teaching and learning faculties or used places of worship like the mosque. When students skipped bathing due to water scarcity, they resorted to heavy use of perfumes to disguise their body odor.

Female students skipped lectures when they were unable to bathe, especially during their menstrual periods. At both Universities, some students opted to leave the halls of residence and rent or commuted from homes. In search of adequate water and sanitation, some female students reportedly entered sexual relationships and left halls of residence to co-habit with men. Other coping mechanisms included fetching water from other halls, buying water, storing in jerry cans and fetching from unhygienic sources as indicated in the picture below.



Picture1: Students fetching water from unhygienic source at Hall 7 UDSM, May, 2013

Coping Mechanisms adopted by University Managers

The university managers, on the other hand, had a number of adaptation mechanisms including buying water and rationing it and locking some toilets. Unfortunately, these measures only aggravated the water and sanitation inadequacies and made student's lives more difficult.

Conclusion

The studied Universities were constructed by the colonialists who by then prioritized males' education; however, female enrollment has increased overtime. Despite the increase in female enrolment, most water and sanitation facilities in EAUs are still constructed or configured without necessarily taking into account the gender differences and practical gender needs of male and female students and the needs of students with special needs.

Overall, at MAK and UDSM, the provisioning and management of water and sanitation facilities remains inadequate and not gender responsive. This deficiency mostly affects female students and those with special needs. Students and managers were aware of the problem but hardly discussed it. This was attributed to lack of gender awareness creation and networking among stakeholders, lack of gender responsive participatory planning and budgeting, inadequate allocation of funds for water and sanitation facilities, inadequate and gender-insensitive water supply and sanitation facilities, gender neutral culture of operation and maintenance of water and sanitary facilities and human resource challenges at both universities.

Implications and Policy Recommendations

Deficient water and sanitation facilities pose a threat to the health, social, economic and academic wellbeing and performance of students at the two East African Universities. These threats are more felt by female students and those with special needs. Addressing these threats is a constitutional, policy and human rights obligation of the administration of higher institutions of learning. Therefore, to make water and sanitation facilities adequate and gender responsive, the following recommendations are made. There is need to create gender awareness and walk the talk on appropriate use and stakeholders' rights to water and sanitation facilities in higher education institutions. Creating awareness on appropriate use of water and sanitation facilities would save the Universities huge sums of money by reducing wastage, breakdown and maintenance costs. The savings would be channeled to other strategic investments that would address global, national; University and societal needs. Water and sanitation awareness should be embedded in students' orientation and ongoing University activities and academic programs.

Equally important is to create awareness on gender responsive planning, budgeting and management of water and sanitation facilities supported by adequate financial resources. There is need for EAUs to develop and implement a framework for enhancing participatory and gender responsive planning, budgets and management of water and sanitation facilities. This should be done through identification of gender gaps in existing policies on water and sanitation policies in higher educational institutions. Inclusion of females in water and sanitation professionals in decision making at all levels of University functions is likely to contribute to promotion of equity and equality in the distribution of those resources. Existing national water and sanitation policies should be customized to fill the gender, water and sanitation policy gaps at EAUs. Governments should raise awareness about the various policies that support the provisioning of gender-friendly water and sanitation policies. The Universities need to effectively utilize the expertise available in the faculties to solve or prevent water and sanitation challenges. Currently there appears to be a disconnect between the expertise in the faculties and the administration, which needs to be addressed so that the Universities can benefit from their own innovations. For example, at UDSM experts can design a system that captures rooftop runoff rain water for flushing the toilets and irrigation to save the University costs on water.

Furthermore, governments should institutionalize the utilization of expertise at the Universities. Where governments have utilized university-based experts, most often it has been at individual rather than institutional level. Institutionalization would strengthen synergies between the Universities and government institutions for better result-oriented innovations. There should be continuous monitoring of the status, access to and utilization of water and sanitation facilities to promote efficiency, environmental health, students' welfare and academic performance, particularly for female students and those with special needs. East African Universities should adopt and operationalize the various policy and regulatory instruments that cater for the provision of water and sanitation as a human right. These include the Sustainable Development Goals, national constitutions and national policies on gender, water and sanitation.

Acknowledgement

This policy brief has been possible with support from Kyambogo University and with financial support from Makerere University Sida - Bilateral Research Programme.

References

- Bailey, K. D. (1994). *Methods of Social Research*, Fourth Edition, Maxwell Macmillan, Canada, Toronto.
- Bartram J., & Cairncross, S. (2010). Hygiene, Sanitation, and Water: Forgotten Foundations of Health. *PLoS Medicine* 7: 11. doi: 10.1371/journal.pmed.1000367.
- Chambers, R., & Myers, J. (2016). Norms, knowledge and usage. *Institute of Development Studies*, Issue No. 7
- Grimes, J. E. T., Croll, D., Harrison, W. E., Utzinger, J., Freeman, M. C., & Templeton, M. R. (2015). The roles of water, sanitation and hygiene in reducing schistosomiasis: A review. *Parasites & Vectors*, 8:156. doi: 10.1186/s13071-015-0766-9 (accessed 12/10/2015)
- Government of Uganda. (1995). *Constitution of the Republic of Uganda*.
- House, S., & Cavill, S. (2015). 'Making Sanitation and Hygiene Safer: Reducing Vulnerabilities to Violence', *Frontiers of CLTS: Innovations and Insights* Issue 5, Brighton: IDS International Conference on Water and the Environment in Dublin. (1992)

- Jasper, C., Le, T-T., & Bartram, J. (2012). Water and sanitation in schools: A systematic review of the health and educational outcomes. *Int. J. Environ. Res. Public Health* 9: 2772–2787. Doi: 10.3390/ijerph9082772
- Kari Bø. (2004). Urinary Incontinence, Pelvic Floor Dysfunction, Exercise and Sport. *Sports Med* 2004; 34 (7): 451-464
- Kebirungi, H. (2017). Gender Responsiveness of Provisioning and Management of Water and Sanitation Facilities in East African Universities: A Case of Makerere University, Uganda and University of Dar es Salaam, Tanzania. A Thesis submitted in fulfillment of the requirements for the award of the Degree of Doctor of Philosophy in Women and Gender Studies of Makerere University, Uganda. Unpublished.
- Kebirungi, H., Kabonesa, C., Kimwaga, R J., Majaliwa J G M., and Luboobi S L. (2015a). A gender perspective of the status of water and sanitation landscape in East African Universities. *Global Journal of Human-Social Sciences (B)*: Vol. 15 Issue 4 Version 1.
- Kebirungi, H., Kabonesa, C., Luboobi, S L., Kimwaga, R., and Majaliwa, J G M . (2015b). Gender perspectives of student's perceptions to access and utilization of water and sanitation facilities in East African Universities. *International Journal of Recent Scientific Research*, Volume 7 (11)ISSN: 0976-3031
- Makerere University. (2013-2014). Fact Book, Kampala- Uganda.
- Makerere University, (2007): Makerere University Strategic Framework 2007/08 – 2017/18; Repositioning Makerere to Meet Emerging Development Challenges, Kampala.
- Mokashi, M. S., Okeke, P., & Mohan, U. (2017). Study on the Use of Geographic Information Systems (GIS) for Effective Transport Planning for Transport for London (TfL). In *Proceedings of the International Conference on Data Engineering and Communication Technology* (pp. 719-728). Springer Singapore.
- Morrill, W. L., & Weaver, D. K. (2000). Host plant quality and male wheat stem sawfly (Hymenoptera: Cephidae) fitness. *Journal of Entomological Science*, 35(4), 478-482.
- Newman, K. S. (2002). "Qualitative Research on the Frontlines of Controversy" *Sociological Methods and Research* 31 (2): 123-130.
- O'Reilly, K. (2016). From toilet insecurity to toilet security: creating safe sanitation for women and girls. *Wiley Interdisciplinary Reviews: Water*, 3(1), 19-24.
- Roosen, S. P., Sackeim, H. A., Krishnan, K. R. R., Pollock, B. G., Alexopoulos, G., Lavretsky, H. (2015). Old-Old Depression Study Group. Antidepressant pharmacotherapy in the treatment of depression in the very old: a randomized, placebo-controlled trial. *American Journal of Psychiatry*.
- The Republic of Uganda. (1999). The National Water Policy. Ministry of Water and Environment - Directorate of Water Development, Kampala-Uganda
- The Republic of Uganda. (2007). The Uganda Gender Policy. Ministry of Gender, Labour and Social Development, Kampala, Uganda. www.mglsd.go.ug/uploads/2013/07/policies/Uganda-Gender-Policy.pdf
- The Sphere Project. (2004). Humanitarian Charter and Minimum Standards in Disaster Response. <http://www.sphereproject.org>
- UN General Assembly. (2010). 'Resolution adopted by the General Assembly [without reference to a Main Committee (A/64/L.63/Rev.1 and Add.1)] 64/292. The human right to water and sanitation', available at: http://www.un.org/en/ga/search/view_doc.asp?symbol=A/RES/64/292 (accessed 8 October 2014).
- United Republic of Tanzania. (1977) Revised (2014). The Constitution of the Republic of Tanzania
- United Republic of Tanzania. (2000). National Gender and Development Policy. Ministry of Community Development, Gender and Children. Dar es Salaam, Tanzania.
- United Republic of Tanzania. (2002). National Water Policy. Ministry of Water and Livestock Development. Dar es Salaam, Tanzania.
- University of Dar es Salaam. (2010/2011 -2014-2015). Five Year Rolling Strategic Plan. Dar es Salaam.
- University of Dar es Salaam. (2004). Gender Equality Policy. University of Dar es Salaam
- Warmbui, J. (2013). An introduction to feminist research. Nairobi: University of Nairobi.
- WHO, and UNICEF.(2012). Progress on drinking water and sanitation: Joint Monitoring Program Update. ISBN:9789280646320 [Retrieved from <http://www.who.int/water-sanitation-health/publications/2012/jmp-report/en/20/06/2013>]