Journal of Environment and Earth Science
ISSN 2224-3216 (Paper) ISSN 2225-0948 (Online)
Vol.15, No.3, 2025

Assessment of improved latrine ownership among heads of households in Lindi District Council, Tanzania

Irene Aurelia Tarimo [1], Adam O. Karia[2]
[1]Department of Physical Sciences and Environmental Studies, Faculty of Science, Technology and Environmental Studies, Open University of Tanzania
[2]Water Institute, P.O. Box 35059, Dar es Salaam,
Corresponding Author: irene.tarimo@out.ac.tz

Abstract
Improved sanitation is essential for public health, environmental sustainability, and socio-economic development. In rural Tanzania, however, many communities still face significant barriers to owning improved latrines, particularly in low-income settings such as Lindi District Council. This study assessed the ownership of improved latrines among households in Lindi and explored the underlying perceptions influencing their adoption. Four focus group discussions were conducted with purposively selected participants, stratified by latrine ownership status. Using the framework method for content analysis, the findings revealed that a lack of knowledge and technical information was the primary barrier to adoption, mentioned by 94% of participants. Cultural taboos, reported by 91%, also hindered ownership, although they did not specifically differentiate latrine types—basic pit latrines were generally considered acceptable. Ownership levels remained low, averaging only 50% even in the more economically advantaged wards studied. Inappropriate perceptions, limited awareness, and weak enforcement of sanitation laws by village leaders contributed to low improved latrine coverage. The study recommends targeted community sensitization, education campaigns, and capacity-building initiatives. In addition, increasing access to water through rainwater harvesting and groundwater development, alongside infrastructure support such as solar lighting, may enhance adoption and improve overall sanitation outcomes.

Keywords: Improved**,** latrines**,** ownership**,** Households in communities
DOI: 10.7176/JEES/15-3-08
Publication date: July 30th 2025

Introduction

Globally, about one-third of the total population has access to basic sanitation, equating to approximately 2.5 billion people worldwide who lack "improved sanitation facilities," defined as "separating human waste from human contact in a hygienic way." Examples of improved sanitation facilities include pit latrines, pour/flush toilets, composting toilets, and toilets connected to sewers or septic tanks (World Bank, 2016 and CDC Archive, 2015). According to a joint monitoring program by the WHO and UNICEF (2023), 2 billion people worldwide lack even basic sanitation services. Within that group, 673 million people must defecate outdoors without access to a toilet. The impact of this on people's health is severe, and the social and economic problems it causes make life extremely difficult. The United Nations has identified 17 sustainable development goals, with Sustainable Development Goal #6 aiming to achieve universal access to clean Water, Sanitation, and Hygiene (WASH) by 2030.

The UN and UNICEF Joint Monitoring Program (JMP) monitors the global sanitation crisis. This includes tracking water, sanitation, and hygiene issues, as well as progress in affected areas through a program known as WASH. This initiative, along with other monitoring programs, collects and publishes information to raise awareness. Outreach employs a process that empowers people living with unsafe water to tackle the issue themselves. This community-led development approach works in conjunction with the methodology of Participatory Human Development. When individuals engage in their own improvement, they learn to continue improving independently.

Rachael Sorcher, the Latrines Project Field Operations Research and Advocacy intern at Outreach International, has studied sanitation projects and their impact on communities. Her most recent findings are published in this exploration of community-led latrine projects, which she created under the guidance of Elene Cloete, Outreach's Director of Research and Advocacy.

Open defecation is the situation whereby people have no choice but to defecate in the open ground. That situation contributes to fecal contamination of the environment, which is one of the leading causes of diarrhea. These habits result in the deaths of more than 800,000 children under age five every year Worldwide. And about 80% of diseases in developing countries are caused by unsafe water and poor sanitation, which includes

inadequate facilities (CDC Archive, 2015). Safe sanitation, good hygiene, and a safe water supply could save 1.5 million children annually. Insufficient waste disposal accelerates the spread of disease that lives in soil, food, and water. Water, sanitation, and hygiene-related diseases, which include diarrhea, cholera, hepatitis, and dysentery or bloody diarrhea, are some of the primary causes of illness and death in these settings, especially among young children. Every 20 seconds, a child dies as a result of poor sanitation. In addition, poor sanitation is associated with other diseases such as intestinal worms, trachoma, schistosomiasis, and contributes to malnutrition in children (Ibid.).

In the urban neighborhood known as Kosovo Village in Nairobi, Kenya, 95% of residents use communal or shared facilities for defecation, where untreated human waste drains directly into a nearby river. During storms, fetid and polluted waters overflow the riverbanks, drainage channels, and neighborhood paths, forcing residents to wade through them. The lack of proper treatment also contaminates drinking water and increases the risk of disease. The houses in Kosovo Village are densely packed, compounding the contamination risk from unsafe sanitation practices (WRI, 2019) as shown in Figure 1.

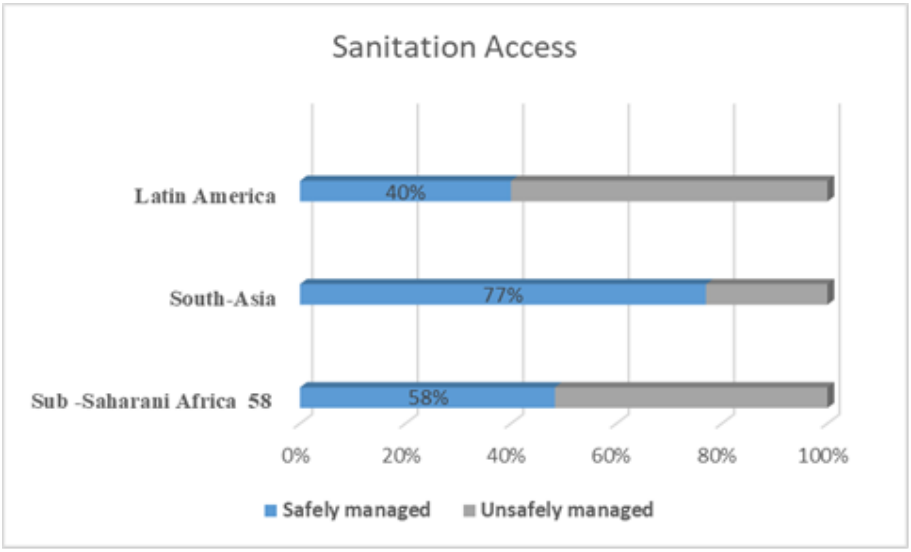

Fig. 1: Solving the Urban Sanitation Crisis in the Global South (2019): **Source**: Modified from Untreated and Unsafe

Good hygiene practices are essential for protecting both individual and community health. One critical practice is sanitation, which involves providing facilities and services for the safe management of human excreta [1] from the toilet to containment and storage, as well as treatment onsite or transport to offsite for treatment (WHO & UNICEF, 2017). An improved latrine refers to a water carriage latrine, ventilated improved pit latrine, ecological latrine, pour-flush latrine, or pit latrine with a washable floor and a complete superstructure (Ibid.).

Access to improved latrines is a significant component of enhanced sanitation, as it reduces the potential risk of human exposure to enteric pathogens [7]. Open defecation is practiced by 70% of the population in Sub-Saharan Africa [2, 5]. It is estimated that 631 million Africans cannot access improved latrine facilities. Deaths associated with a lack of or the use of unimproved latrine facilities are estimated at 2.4 million, and 4.2% of these deaths could be avoided through improved latrine facilities [4]. Poor sanitation is linked to the transmission of diseases such as cholera, diarrhea, dysentery, hepatitis A, typhoid, and polio, and exacerbates stunting. Inadequate sanitation is estimated to cause 432,000 diarrheal deaths annually and is a significant factor in several neglected tropical diseases, including intestinal worms, schistosomiasis, and trachoma [3, 7]. Yet, little attention has been directed toward improved sanitation in Africa. Poor sanitation causes diarrheal diseases, and other diseases related to inadequate sanitation are killing more children under five each year than HIV, TB, and malaria combined [3,4].

Sub-Saharan Africa, including Tanzania, is the most heavily affected. For instance, approximately 60 percent of Kenyans have access to safe drinking water, and 29 percent have access to basic sanitation. In Kenya, 9.9 million people drink directly from contaminated surface water sources, and an estimated five million practice open defecation (USAID, 2023). USAID supports market-based solutions to improve the quality of household sanitation and hygiene products, including for menstrual hygiene management. USAID also supports research to

identify and pilot innovative approaches to end open defecation in traditionally hard-to-reach communities. Working with communities, businesses, and county governments, USAID is strengthening water security, increasing and improving access to water services, and improving sanitation and hygiene (Ibid.).

Lindi District Council has low coverage of improved latrines at the household level (12.2 %) in the Lindi region. This situation increases rates of open defecation, which contributes to the potential chance of enteric pathogens contaminating sources of water, food, and the environment, which are responsible for most diarrheal diseases. Understanding the reasons for improved latrine ownership is fundamentally important for designing appropriate approaches to enhance community members' adoption of improved latrines. Thus, this study assessed the ownership of improved latrines among households in Lindi District Council, Tanzania.

In Tanzania, there is a gradual increase in the coverage and use of improved latrines. According to the Demographic and Health Survey (DHS), latrine usage consists of 19% improved, 16% shared facilities, 55% unimproved, and 10% of households lacking any latrine [6]. Meanwhile, a report from the National Sanitation Campaign (NSC) shows an improvement in households with improved latrines from 19% (2016) to 49.6% (2018), along with a decrease in households without latrines from 10% (2016) to 4.5% (2018) (NSMIS, 2018). The NSC is implemented nationwide using the Community Led Total Sanitation (CLTS) approach to foster a sense of disgust and shame regarding open defecation and its negative consequences on the community due to the ingestion of enteric pathogens. The campaign aims to raise community awareness and ultimately change behaviors concerning household ownership and the use of improved latrines to prevent outbreaks of diseases related to improper sanitation. The goal of the campaign was for every household to have an improved latrine.

Lindi Region in Tanzania adopted NSC in 2012 using CLTS. The implementation performance report of December 2018 indicated regional coverage of 36.9% of improved latrines, 58.4% of households have traditional or unimproved latrines, and 4.7% do not. The coverage performance differs according to the council within the region. Lindi District Council has performed the lowest with 12.2% coverage of improved latrines, while Nachingwea District Council leads with 60% coverage of improved latrines (NSMIS, 2018). Therefore, Lindi District Council is lagging in efforts to achieve the NSC target and SDG 6.2, access to adequate and equitable sanitation and hygiene for all, and end open defecation by 2030 [7]. Reasons, perceptions, and assumptions on latrine ownership of the community members in the Lindi District Council are unknown. Understanding perceived reasons and assumptions on ownership of improved latrines is critical for designing appropriate interventions to enhance the adoption of improved latrines.

Contamination of human excreta with water, food, and soil related to the use of unimproved latrines can lead to the transmission of diarrheal diseases, which increase morbidity and mortality, particularly in young children. This may result in the spread of diseases such as helminth infections, enteric fevers, and trachoma [2] in Ethiopia. High coverage of improved latrine ownership and practical use has been shown to reduce the transmission of enteric pathogens and intestinal parasites, including soil-transmitted helminths and agents of diarrhea, thereby decreasing morbidity and mortality rates, especially among children [8,9]. In Southern Ethiopia, a lack of security and privacy, reduced school attendance, and loss of basic human dignity are potential consequences associated with the absence of improved latrines affecting women and girls [2].

If no intervention is made, the situation will persist, and the rate of open defecation will rise as most households will continue to use unimproved latrines or forgo them altogether. This issue will adversely affect human health, social and economic development, and educational opportunities, particularly for girls. This study investigates community members' perceptions of ownership of improved latrines in the Lindi District Council.

Research methods

The study area

The study was conducted in Lindi Region, which has a population of 1,194,028 [2022] census, specifically at the District Council in Southern Tanzania. Lindi District Council has an estimated population of 947,379 and an average household size of 5.6 in 2022. The main ethnic group is Mwera, and others include Makonde, Yao, and Makua. The majority are subsistence farmers, and few are involved in livestock keeping, fishing, and petty cash business.

Study design: The study utilized a qualitative design to explore the perceptions of household heads regarding the ownership of improved latrines. This design is justified as it exposes the prevailing cultural norms.

Participants selection

Particpants were purposively selected with assistance from the Village Executive Officers from both of the villages under the study area.

Data collection methods and tools

Separate Focus Group Discussions (FGDs) were conducted with heads of households who owned improved latrines and those who did not or had no latrines. Four environmental health workers were trained as research assistants for FGDs. Three were responsible for taking notes, and one was responsible for audio recording the group discussions. The lead author, RS, moderated the FGDs in Kiswahili, Tanzania's national language. Four FGDs were conducted, two in each ward, one for those owning improved latrines and the other for those owning unimproved or no latrine. The latter group was mixed because having less than an improved latrine carries the same risk of fecal contamination as open defecation. The participants were clustered based on the ownership status of the latrine. At the end of each FGD, the Principal Investigator and researcher assistants met to review the notes and discuss any emerging themes. Repeated listening of recorded information was done to check the notes' correctness and make necessary remedial action as per the tape recorder to ensure no missing information. Data were summarized after each FGD based on the tape recorder and notes.

Separate focus group guides were developed for the two groups based on previous studies and the study objectives. Topics included community perceptions of ownership of improved latrines, barriers to ownership, community perceptions related to sanitation campaigns, law enforcement in relation to ownership of improved latrines, and the public health aspect.

Data analysis

Data were summarized and translated from Swahili to English. Initial interpretation consisted of familiarizing with the data and reviewing notes, and open coding was conducted. A framework method for content analysis (Claus Kippendorff and Cothari, 2004)was performed, and descriptive findings were reported. Themes were created based on emerging codes, the interview guide, and the study objectives. A constant comparative analysis was conducted between those owning improved latrines and those owning unimproved or no latrines. Quotes presented are used to show dominant views.

Ethical considerations

Ethical approval was obtained from the National Institute for Medical Research (NIMR) Ethical Committee. Permission to enter the community was sought from the regional and district authorities in the Lindi Region. Participation was voluntary, and all participants provided written informed consent. For those who were illiterate, an impartial witness, the village leader, oversaw the consent process, and the participant’s thumbprint was used to sign the informed consent. The study team maintained confidentiality.

Results

Thirty-eight heads of households participated in the four focus group discussions (FGDs), each consisting of 8 to 11 participants. Among the 38 heads of households, 22 were male. The majority of participants were Muslim, approximately 95% (n=36), while about 91% (n=35) had completed primary education. Additionally, around 87% (n=33) were in union, and participants were aged between 40 and 61 years (n=20), as shown in Table 1.

Education level

Education level of any stakaeholders like household leaders and the community members at large is very important indicator of the awareness of the sustainable developments for any activities done by that particular society. Figure 2 gives the educational level of the participants in this study which help in the decision making processes and practices of owning the improved latrines in the haoseholds.

Table 1: SOCIO DEMOGRAPHIC CHARACTERISTIC OF FGD'S PARTICIPANTS (N=38)

Variable	Frequency	Percentage
Sex		
Male	22	57.9
Female	16	42.1
Age category		
18 – 39	13	34.2
40 – 61	20	52.6
62 and above	5	13.2
Marital status		
Union	33	**86.8**
Not in union	5	13.2
Religion		
Christian	2	5.3
Muslim	36	**94.7**
Education level		
Secondary and above	2	5.3
Primary education	35	**91.1**
No formal education	1	2.6
Monthly income (TShs)		
≥10,000	17	44.7
< 10,000	21	55.3
Ward of residence		
Mvuleni	20	52.6
Nahukahuka	18	47.4

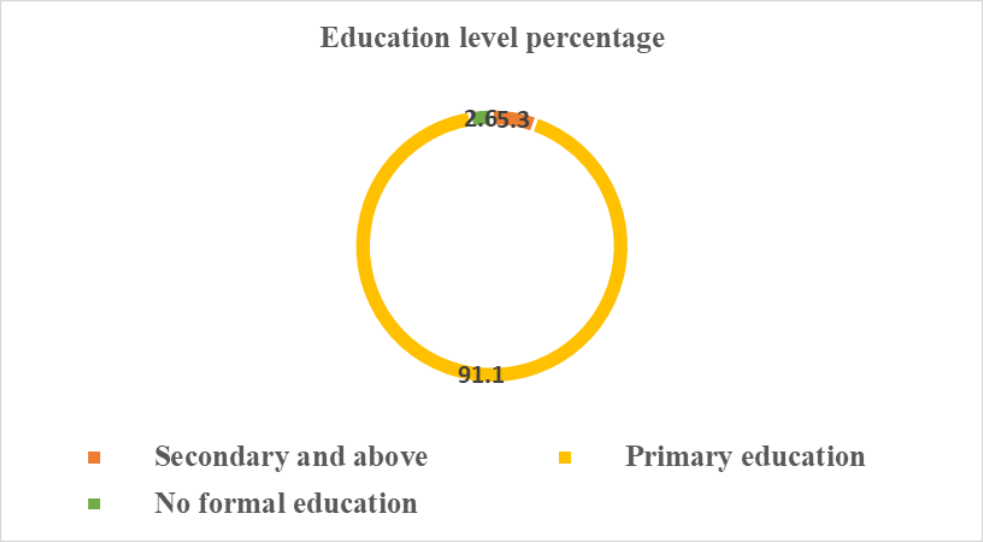

Figure 2: Education Level of the Participants

Six main themes emerged from the data: (i) Community perceptions of improved latrines, (ii) Barriers to owning improved latrines, (iii) Perceptions of the sanitation campaign, (iv) Enforcement of sanitation law, (v) Public health aspects and (vi) Suggestions for the improvements of the latrines condition.

Theme 1: Community perceptions of improved latrines

Views on improved latrines

Most participants who owned unimproved latrines viewed them as normal, having used them for generations. Others saw improved latrines as being only for those with high incomes, feeling they could not afford them due to their low income. Meanwhile, those who owned improved latrines expressed concerns about a lack of understanding among community members regarding the importance of latrines, which led to many households having unimproved latrines. The common belief was that improved latrines should be constructed with block cement from the pit to the superstructure, requiring more financial resources.

Those who owned improved latrines were asked what motivated them. Some discussed experiencing embarrassment when guests, relatives, and friends visited their homes in the past, before having improved latrines. Others gave their experiences of travelling to different places like Kilimanjaro, or hotels, allowing them to learn from others the importance of latrines. However, others adopted improved latrines simply after being selected to be a leader in the village and a good model to fellow community members. Some of those who own improved latrines commented that the importance of enhanced latrines in relation to public and environmental impacts was the main factor influencing them to own improved latrines.

Open defecation

Some households practice open defecation as they do not own latrines. Some participants explained that even for those who owned unimproved latrines, sometimes they practice open defecation, because most of those latrines do not provide privacy. "*...here in our village, people commonly see it when bathing. That's why most people do not take baths during the day until night, and even some time during the day, you might be forced to go to the farm to have a place to defecate instead*—some who do not own a latrine reported to use a neighbor's latrine.

Shame and disgust

Many of those who own improved latrines feel disgust toward households without them. Community members who do not have improved latrines view those who do as wealthy. However, some individuals without improved latrines noted that since most households primarily have unimproved latrines, ownership is typical and carries no shame. Furthermore, women face greater challenges with unimproved latrines or no latrines at all, as they spend most of their time at home and lack privacy. "The majority of community members owned unimproved traditional latrines, so people do not feel a difference and take for granted that this is just normal, but for us women, this situation is difficult. We cannot use most of our latrines comfortably during the day due to a lack of privacy."

Knowledge of latrine construction

Participants raised concerns about the lack of proper information and technical aspects related to improving latrines, both from those with improved latrines and those who owned unimproved ones. Participants without improved latrines felt that only people with higher incomes could afford such facilities. Moreover, especially among those with unimproved latrines, there was a belief that if latrines are built with a complete superstructure, they won't last long due to the soil conditions in the study areas. They contend that a type of 'soil cockroaches' inhabits latrine pits, feeding on the cement slabs. Ultimately, this leads to the collapse of the latrines, as they described. Others pointed out that the fumes emitted from the pit latrines also harm them, contributing to their eventual collapse. Those who owned improved latrines expressed that, in addition to the absence of adequate information on constructing these latrines, the rising costs of repeated construction due to the frequent collapse of pit latrines was a significant barrier to owning improved facilities.

Theme 2: Barriers to owning improved latrines

Participants from all groups reported that the lack of education regarding the construction and use of improved latrines was the primary barrier preventing households from owning improved latrines in their community. While participants stated that culture, beliefs, and taboos are not barriers to the ownership of improved latrines, they noted that their culture does not emphasize the importance of latrine quality.

Another barrier identified was the low income of community residents. Concerns about financial constraints were noted among both groups, though perspectives differed. Those with unimproved latrines or none believed that owning improved latrines requires a higher income. In contrast, those who owned improved latrines asserted

that income isn't the issue; instead, it's a lack of awareness regarding the importance of improved latrines. They pointed out that during harvest season, people receive money from cash crops, and that prioritizing latrine construction is essential. It is indeed possible to build in phases as funds become available. “I believe most of us don’t know about improved latrines. However, to some extent, the issue of financials can also contribute to some level. But if you have a good house, why not a latrine? Previously, most of the houses had no iron sheet roofing, but now it is possible with an improved latrine.

Theme 3: Perceptions of the sanitation campaign

Participants were asked about their understanding of the National Sanitation Campaign, which was implemented in the region at the time of the study. Most of them had very little knowledge about the ongoing sanitation campaign. Participants in both groups lacked understanding of issues related to the campaign. Most were discussing the slogan “Usichukulie poa nyumba choo.” Their perception was that the campaign was intended for those living in urban areas and not for villagers. They noted that nothing was happening regarding the campaign because even the Village Local Governments had not informed them about it. However, they agreed that the campaign aims to keep the environment clean and prevent diseases associated with poor environmental conditions. Participants were asked if triggering had been done in their community, whether they participated in the exercise, and what their reaction was to it. Unfortunately, participants in both groups had no information on triggering, so this was the first time they had heard of it.

Theme 4: Enforcement of sanitation law

Most participants were aware that there is a law governing sanitation issues. They mentioned that the penalty is TZS 50,000 for those who contravene, equivalent to 21 USD. However, it was revealed that there are difficulties in enforcing the law and the bylaws. Those with improved latrines noted that there is currently no law enforcement in their villages, contributing to significant resistance to adopting improved latrines. They stated that village authorities should enhance the enforcement of sanitation laws and regulations. Yet, in many cases, leaders do not have enhanced latrines themselves, which makes law enforcement challenging. They further suggested that external support should be provided for implementing the law because community leaders are familiar with the community members, making it difficult to enforce the law. Those with unimproved or no latrines respond that no one pays attention to them, including authorities, and the law has convicted no one in the village.

Theme 5: Public health aspect

Most participants in all groups noted that improper or inadequate latrines may contribute to the spread of diseases related to poor feces disposal. Although some had misconceptions about sanitation and diseases, such as links with malaria, community members generally demonstrated a fair level of understanding regarding the negative impact of improper feces disposal.

Theme 6: Suggestions for the improvement of household latrines

Nearly all groups suggested that community members can adopt improved latrines if efforts are made to educate them. The community lacks knowledge about improved latrines; therefore, awareness strategies should convey appropriate messages and simple technologies for latrine improvement that community members can easily accept and afford. Those who owned improved latrines felt it would not be taken seriously if community members sensitized and mobilized others to adopt upgraded versions. Consequently, they recommended that district and regional levels support efforts to provide education, raise awareness about the importance of improved latrines, and enforce laws and regulations.

Discussion

This study aimed to assess and explore perceptions of ownership status regarding improved latrines among households in the rural areas of the Lindi District Council. It examined an existing gap caused by a lack of adequate and proper information and technical knowledge about improved latrines. Financial constraints have prevented these communities from choosing the appropriate type of latrines to own.

There was a lack of awareness of and proper information regarding improved latrines, which prevented community members from adopting improved latrines. Latrines are constructed just as a traditional routine practice without considering their quality. Similarly to this study, the Kagera, Tanzania community constructed latrines without much thought or understanding of the appropriate latrines to construct [11].

According to local culture, people should have a latrine. However, they agree that their culture does not emphasize the quality of latrines. Therefore, having a pit latrine is considered sufficient. This contrasts with other studies in which strong cultural beliefs, norms, and taboos exist around latrines, including prohibiting

certain family members or children from sharing a latrine. In other places, such as certain tribes in India and the Maasai in Tanzania, it is unacceptable for an adult to be seen by a child going to defecate [12,13,14].

In Kagera, Tanzania, culture prohibits children's feces from mixing with adult latrines. Instead, children's feces are disposed of on banana stems. This implies that community members do regard children's feces as significant to public health; therefore, strategies are needed to raise awareness that children's feces pose an equal public health risk, just like adult feces. However, a deeper understanding of cultural beliefs and taboos requires more insight and observation to comprehend the practice of latrine adaptation. Children's feces should be handled with the same sanitary disposal methods as adult feces.

Income was identified in both groups as a barrier to owning improved latrines. Those with unimproved latrines believed that constructing improved latrines required a high income. Similarly, a study in Ethiopia [15,16] indicated that individuals with a high income were more likely to own improved latrines compared to those with lower incomes. However, this perception did not seem to be the primary obstacle to ownership. Instead, community members placed little importance on latrines, and it was common for households to have unimproved latrines. Conversely, those who owned improved latrines believed that income was not the barrier; rather, they cited a lack of knowledge and insufficient prioritization as the main challenges. Studies conducted in Kagera and Benin [11,17] found that a lack of adequate education regarding improved latrines hinders improved latrine ownership.

Community members were somewhat knowledgeable about the negative health impacts associated with using unimproved latrines or open defecation. However, some incorrectly identified malaria as one of the diseases related to poor sanitation or a lack of latrines. Similarly, in Zambia, communities associated the risk of diarrhea and HIV transmission with open defecation and the use of unimproved latrines [9].

Education provided by community members was perceived as challenging because educators were close friends or family with people in the community. It was suggested that external individuals from the District and Regional levels provide the education. This observation aligns with the findings in Kagera [11], where community members felt that the role of educating and raising awareness among fellow members on issues related to ownership of improved latrines rests solely with health workers. Ownership of improved latrines is directly linked to community education; studies indicate that the prevalence of owned improved latrines increases with higher education levels [13,15,18].

None of the participants, nor anyone they knew, had been penalized for not having a latrine or for owning an unimproved latrine. Enforcement was challenging since some village leaders responsible for enforcing laws and regulations do not own improved latrines themselves. Similar findings were observed in Kagera [11], where some village leaders gain popularity by not enforcing environmental laws to win votes. Additionally, leaders tend to focus on issues that benefit them politically instead of addressing latrine promotion.

Although most participants were aware of laws governing sanitation and the associated penalties, they do not take them seriously. This implies that merely knowing the law does not motivate community members to act accordingly. A similar trend was observed in a study in Kenya; most respondents understood sanitation laws and recognized that contaminating the environment with fecal matter was illegal, but their knowledge did not translate into practice in Kagera [14]. Strengthening law enforcement is necessary, including support from the district and regional levels.

This study had limitations because reported income may have been under- or over-reported. Often, income is inconsistent and comes from various sources, making it difficult to quantify a monthly average income. Additionally, some participants may have under-reported their income in hopes of qualifying for a subsidy, while others may have over-reported to avoid feelings of shame.

Conclusions

A lack of sufficient knowledge and affordable, accessible technology for community members to improve household latrines requires immediate intervention to enhance the current WASH situation. Strategies aimed at educating and raising awareness about the ownership of improved latrines are vital for fostering positive change among community members. The misconceptions surrounding improved latrines within the community largely stem from inadequate information and guidance provided by relevant authorities. Efforts to address existing gaps must incorporate strategies that enhance education, raise awareness, and provide ongoing guidance and enforcement of sanitation laws and regulations. This is essential for achieving SDG target 6.2 and NSC targets focused on ensuring every household has an improved latrine. There is a significant lack of multisectoral

collaboration, particularly at the ward level, along with understaffing that hinders ongoing follow-up on daily implementation to support the community in adopting improved latrines.

Recommendations

Sanitation initiatives such as Community-Led Total Sanitation have focused on ending open defecation and increasing access to latrines and toilets in many countries. Tanzania-Lindi Region will need the support.

Initiatives supported by UNICEF and other partners in developing countries are increasing access to water and sanitation in schools; however, there is a need to expand these efforts in rural areas of Tanzania.

Interventions to improve lighting, such as implementing a Solar Light Program initiative, may lead to safer conditions for nighttime use of latrines, allowing women and children to have "open defecation free" environments.

Explore and map groundwater potential to enhance households' ability to utilize this data for making decisions regarding the increased ownership of improved latrines in rural areas, such as in Lindi.

New approaches that surpass the traditional "Do-It-Yourself" model are required through the support of research like this one, which identifies and pilots innovative methods to eliminate open defecation in communities.

Acknowledgements
The researcher would like to extend heartfelt thanks to the research assistants from the Lindi Region Health Department, Mr. Richard Shaban, the Local Government Authorities, household leaders, and all the participants who made the outcome of this work a reality. May God bless them all.

References

1. WHO & UNICEF. Progress on Drinking Water, Sanitation and Hygiene Update and SDG Baselines. 2017.
2. Godana W, Mengistie B. Exploring Barriers Related to the Use of Latrine and Health Impacts in Rural Kebeles of Dirashe District, Southern Ethiopia: Implications for Community Lead Total Sanitation. Heal Sci J [Internet]. 2017 [cited 2019 Jan 24];11(2). Available from: www.hsj.gr/archive.
3. Bartram J, Cairncross S. Hygiene, Sanitation, and Water: Forgotten Foundations of Health. PLoS Med [Internet]. 2010 Nov 9;7(11):e1000367. Available from: https://dx.plos.org/10.1371/journal.pmed.1000367.
4. Anteneh A, Kumie A. Assessment of the impact of latrine utilization on diarrhoeal diseases in the rural community of Hulet Ejju Enessie Woreda, East Gojjam Zone, Amhara Region. Ethiop J Heal Dev. 2010 Dec;24(2):110–8.
5. Montgomery AA, Elimelech M. Millions suffer from preventable illnesses and die every year. 2007.
6. MOHCDGEC. Tanzania demographic and health survey. 2015;
7. JMP. Key Facts from JMP 2015 Report The report marks the 25th anniversary of the WHO/UNICEF Joint Monitoring Programme. It is the final report on access to drinking water and sanitation ahead of the MDGs. There has been significant progress. A: Drinking water. 2015;1–4.
8. Alemu F, Kumie A, Medhin G, Gasana J. The role of psychological factors in predicting latrine ownership and consistent latrine use in rural Ethiopia : a cross-sectional study. BMC Public Health. 2018;18(229):1–12.
9. Thys S, Mwape KE, Lefèvre P, Dorny P, Marcotty T, Phiri AM, et al. Why Latrines Are Not Used: Communities' Perceptions and Practices Regarding Latrines in a Taenia solium Endemic Rural Area in Eastern Zambia. Gyapong M, editor. PLoS Negl Trop Dis [Internet]. 2015 Mar 4;9(3):e0003570. Available from: https://dx.plos.org/10.1371/journal.pntd.0003570.
10. Thomas J, Mr H, Young D. A REVIEW OF SANITATION AND HYGIENE IN TANZANIA [Internet]. 2013 [cited 2019 Jan 24]. Available from: https://assets.publishing.service.gov.uk/media/57a08a2fed915d3cfd000628/tanzania-

sanitationreview.pdf

11. Bwire B. Breaking shit taboos: CLTS in Kagera, Tanzania. Particip Learn Action [Internet]. 2010;61(1):91-96 %@ 1357-938X. Available from: http://www2.susana.org/docs_ccbk/susana_download/2-871-participatory-learning-and-action.pdf#page=93.

12. Shakya HB, Christakis NA, Fowler JH. Social network predictors of latrine ownership. Soc Sci Med [Internet]. 2015;125:129–38. Available from: http://dx.doi.org/10.1016/j.socscimed.2014.03.009

13. Thitu* A, Augustine MKA. Factors Influencing Latrine Coverage among the Maasai of Ildamat Location Factors Influencing Latrine Coverage among the Maasai of Ildamat Location Kajiado District. Res Gate. 2017;6(July).

14. Bashweka B J. Exploration into the Factors Affecting the Coverage of Household Latrines in Kagera, Tanzania Background information [Internet]. Vol. 4, Texila International Journal of Public Health. 2016 [cited 2019 Jan 24]. Available from: http://www.texilajournal.com/thumbs/article/Public Health_Vol 4_Issue 4_Article_37.pdf

15. Awoke, Muche. A cross sectional study: latrine coverage and associated factors among rural communities in the District of Bahir Dar Zuria, Ethiopia. BMC Public Health [Internet]. 2013;13:99. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emed11&NEWS=N&AN=23374236.

16. Kema K, Mkuwa S, Kagonji I, Temu F, Ilako F, Mkuye M. Factors affecting the utilisation of improved ventilated latrines among communities in Mtwara Rural District [Internet]. Vol. 13, Pan African Medical Journal. 2012 [cited 2019 Jan 24]. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3587023/pdf/PAMJ-SUPP-13-1-04.pdf

17. Jenkins MW, Curtis V. Achieving the “good life”: Why some people want latrines in rural Benin. Soc Sci Med. 2005;61(11):2446–59.

18. Zeleke DA, Gelaye KA, Mekonnen FA. Community-Led Total Sanitation and the rate of latrine ownership. BMC Res Notes [Internet]. 2019;12(1):10–4. Available from: https://doi.org/10.1186/s13104-019-4066-x

19. (WRI, 2019). Jillian Du, Victoria A. Beard, David Satterthwaite, Diana Mitlin and Suzan, A. We're Underestimating How Many People Lack Sanitation Services—and Ignoring the Best Solution for Many Cities. World Resources Institute. Available at https://www.wri.org/insights/were-underestimating-how-many-people-lack-sanitation-services-and-ignoring-best-solution (Accessed on 25th May 2024).

20. (CDC, 2015). Centers for Disease Control and Prevention. CDC 24/7: Saving Lives, Protecting PeopleTM. Available at https://archive.cdc.gov/www_cdc_gov/globalhealth/stories/wtd.htm PLoS One. 2021; 16(1): e0245289. Published online 2021 Jan 11. doi: 10.1371/journal.pone.0245289 Exploring barriers to the adoption and utilization of improved latrine facilities in rural Ethiopia: An Integrated Behavioral Model for Water, Sanitation and Hygiene (IBM-WASH) approach.

21.AigganTamene, Conceptualization, Datacuration, Formalanalysis, Investigation, Methodology, Resources, Validation, Writing – original draft, Writing – review & editing1,* and Abel Afework, Supervision, Writing – original draft2 Susan Horton, Editor. Available at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7799797/ (Acessed on 25/05/2024).

22. Autreach International (2023). Solving the Global Sanitation Crisis. Available at https://outreach-international.org/blog/solving-the-global-sanitation-crisis/ (Accessed on 25/05/2024).

23. USAID (2023). Kenya Water, Sanitation and Hygiene (WASH). Fact Sheet, USAID.GOV/KENYA. Available at: https://www.globalwaters.org/sites/default/files/water_sanitation_and_hygiene_fact_sheet_.pdf (Acessed on 11 June, 2024).