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Research Paper

Progress and slippage of sanitation and hygiene targets in Malawi: is SDG6.2 achievable?

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ABSTRACT

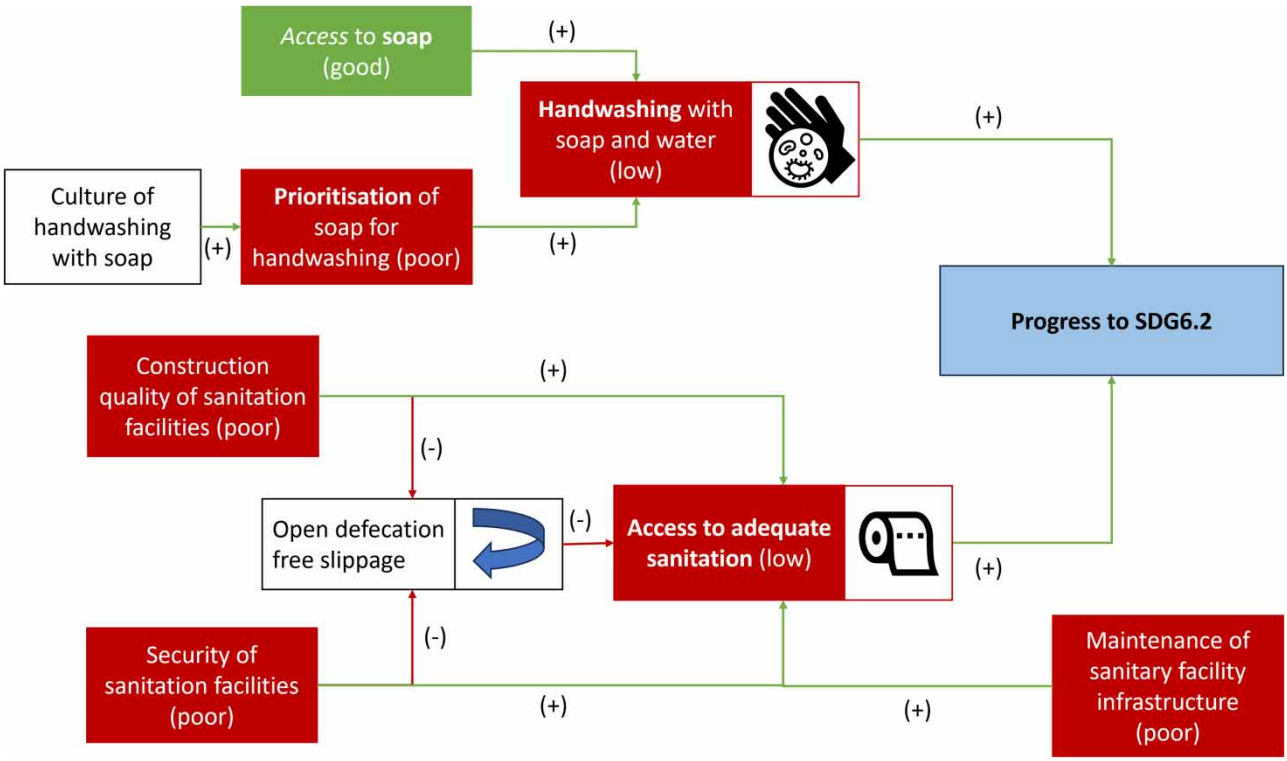
Sustainable Development Goal (SDG) 6 aims to achieve 'access to adequate and equitable sanitation and hygiene for all and end open defaecation' by 2030. We present an in-depth investigation of sanitation and hygiene practices of 939 Malawian households in two districts, previously declared open defaecation-free (ODF). We evaluated whether ODF status was maintained by evaluating access to sanitation and hygiene. We found that 17% returned to open defaecation, and faeces were observed in around 10% of the households. We suggest that ODF status is not enough; work is required to maintain progress and consideration of construction quality is critical. Another barrier to SDG 6.2 was that only 7.9% of households had handwashing facilities with soap and water, with soap as a major limitation. However, most households (82%) had soap available for washing suggesting that soap is not being prioritised in handwashing.

Key words: handwashing, hygiene, open defaecation, sanitation, sustainable development goals

HIGHLIGHTS

- The ODF status was not maintained in two surveyed districts, evidencing slippage.
- Sanitation facilities are not providing sufficient security.
- There is a low level of access to handwashing facilities with soap.
- Low access to soap for handwashing may be due to insufficient prioritisation of soap for handwashing.
- We propose a shift from 'intervention-based' to 'managed' investments in sanitation and hygiene infrastructure.

GRAPHICAL ABSTRACT



ABBREVIATIONS

NSO	National Statistical Office
DHS	Demographic Health Survey
HCC	Healthcare Centre
SDG	Sustainable Development Goal
MIS	Malaria Indicator Survey
WHO	World Health Organisation
UNICEF	United National's Children's Fund
VIP	Ventilated Improved Pit-latrines
ODF	Open Defaecation-Free
CLTS	Community-Led Total Sanitation
WASH	Water Sanitation and Hygiene

1. INTRODUCTION

Access to sanitation and hygiene resources is a cornerstone of public health to limit diarrhoeal disease. The importance of sanitation and hygiene is emphasised in Sustainable Development Goal (SDG) 6 (UN General Assembly 2015). SDG6.2 aims 'by 2030, to achieve access to adequate and equitable sanitation and hygiene for all and end open defaecation, paying special attention to the needs of women and girls and those in vulnerable situations.' (UN General Assembly 2015). To achieve SDG6, the rate of development in Water, Sanitation, and Hygiene (WASH) services in Africa needs to significantly increase, an estimated 20 and 42 times increase required to ensure access to safely managed sanitation basic hygiene services by 2030 (WHO & UNICEF 2022). A lack of access to appropriate sanitation and hygiene facilities is a significant public health concern.

WASH provision is an essential component of controlling water-borne disease outbreaks and preventing deaths (Back *et al.* 2018; WHO 2023). Women and children are disproportionately impacted by poor WASH access (Wayland 2019; Ghosh & Sarkar 2023). Women often risk sexual harassment when travelling to a defaecation site (Cairncross *et al.* 2010). Where

private and separate sanitation facilities are supplied, school enrolment rates increase, and dropout rates decrease in pubescent and menstruating young women (Fischer 2006).

Community-Led Total Sanitation (CLTS) has been widely promoted to improve sanitation and hygiene practices. CLTS is a behaviour change encompassing a series of participatory activities that communicate the negative consequences of open defaecation (OD) taking action towards becoming open defaecation-free (ODF) (Chambers & Kar 2008; Venkataramanan *et al.* 2018; Tribbe *et al.* 2021) by encouraging communities to design and build their own sanitation facilities based on locally available materials and conditions. Additionally, CLTS is traditionally combined with a broader environmental hygiene component (Maulit 2014). Initially promoted in Bangladesh in 1999, CLTS has since spread to countries across the world, mostly in Asia and Africa (Zuin *et al.* 2019). While the concept of CLTS promotion is a global phenomenon, cultural and community perceptions of sanitation and hygiene practices are central in ensuring long-term and sustainable change (Tribble *et al.*, 2021). Evaluating local-level adoption of CLTS is therefore critical for effectively informing national-level policy and practice alongside enriching global knowledge on the most effective promotion of sanitation and hygiene behaviour change. Ensuring long-term improvements in sanitation and hygiene provision requires consideration of the maintenance of progress made, alongside the reduction in OD. Preventing communities from slipping back to OD is a priority (Cavill *et al.* 2015; Ngwale & DeGabriele 2017; Pasteur 2017). Slippage results from behavioural change and attitudes around OD, as well as damage to sanitary facilities from natural hazards and depreciation over time (Jerneck *et al.* 2016).

Malawi has a high burden of inadequate sanitation and hygiene. Poor access to WASH is reported to contribute to the deaths of 3,000 children aged below 5 years of age each year in Malawi (Moon *et al.* 2019; Dinala *et al.* 2020) and is a major factor in the high level of growth stunting and malnutrition (Doctor & Nkhana-Salimu 2017). Insufficient sanitation has economic consequences; a 2012 report found that Malawi lost approximately $57 million from poor sanitation annually, accounting for 1.1% of the national GDP in 2012 (Worldbank 2012). CLTS was introduced in Malawi in 2008 and has since become a cornerstone of the government's strategy for promoting access to sanitation and hygiene (Ministry of Health & Population 2018; Taulo *et al.* 2018). The promotion of sanitation in Malawi, including through concerted CLTS efforts across the country, has resulted in over a 20% reduction in the percentage of the population practising OD from 1992 to 2018 (Hinton *et al.* 2023). However, challenges remain to ensure the provision of sanitary facilities keeps pace with population growth (Hinton *et al.* 2023). Furthermore, an increased frequency of extreme weather events due to climate change will further threaten Malawi's WASH infrastructure (Otto *et al.* 2022). As such, Malawi serves as a particularly pertinent context in which to examine the long-term sustainability and success of CLTS.

Alongside improving access to sanitation, CLTS encourages the adoption of improved hygiene practices. Handwashing is an effective intervention to reduce preventable child deaths and illnesses (Maulit 2014). Handwashing with soap was linked to a 48% reduction in diarrhoeal disease (Cairncross *et al.* 2010). Within Malawi, access to handwashing facilities with soap and water is low, with estimates that 8% of the population have access to a handwashing facility with soap and water (UNICEF undated; WHO & UNICEF 2021a, 2021b). This study investigates whether CLTS, resulting in ODF status, successfully increased handwashing access. Personal hygiene such as body and face washing also contributes to disease prevention (Bartram & Cairncross 2010). Access to bath shelters/bathrooms for bodily washing has not been widely documented in the Malawi Census, and DHS surveys (NSO & Macro international 2016; NSO 2018) or in the Malawi Malaria Indicator Survey (MIS) (NMCP & ICF 2018). Bathing is important not only for hygiene but also for cultural and religious practices (Rusca *et al.* 2017). This study explores access to bathing facilities to develop a holistic picture of sanitation and hygiene access within Malawi.

The objective of this research was to examine the access to, and maintenance of, adequate and equitable sanitation and hygiene in Malawi. Focusing on case studies that were previously declared ODF examines the danger of ODF slippage and the consequences for ensuring sustainable and long-term improvement to sanitation and hygiene (Tribble *et al.*, 2019). Through a survey of over 900 households across two Districts in Malawi, we examined access to both sanitation and hygiene facilities following CLTS intervention, investigating a range of metrics including provision of sanitation facilities, handwashing, and bathroom usage. We compare these results with data from DHS surveys (NSO & Macro international 2016). We addressed the research questions: (1) What are the major limitations to ensuring equitable access to sanitation and hygiene in Malawi under SDG6.2 (UN General Assembly 2015)? and (2) What are the challenges for maintaining progress to ensure continued access to sanitation and hygiene under SDG6.2 (UN General Assembly 2015)?

2. MATERIALS AND METHODS

2.1. Study area

Malawi is a country in South-Eastern Africa with a population of almost 20 million (NSO 2022; World Bank data undated). The population is rapidly growing, anticipated to reach 54 million by 2070 (Kc & Lutz 2017; Riahi *et al.* 2017). The Government of Malawi estimated in 2020 the percentage of the population with access to safely managed sanitation was 35.2%, with a development plan to reach 100% access by 2060 (NPC 2020). In 2020, it was estimated that 65.5% of the urban population had access to safely managed sanitation services, and the Government aims to reach 100% by 2042 (NPC 2020). This necessitates significant investment in sanitation infrastructure (Hinton *et al.* 2023).

The current population of Malawi is predominantly rural, with 17.1% in urban areas in 2019 (NPC 2020). Malawi's development plan (NPC 2020) anticipates that by 2063, 60% of the population will be living in urban settings. A large proportion of the urban population resides in informal settlements with inadequate housing; 60% is recorded as living within slums in 2020 (NPC 2020). The Government of Malawi aims to reduce this to 10% by 2063 (NPC 2020).

Progress has been made in ending OD in Malawi (Hinton *et al.* 2023). The Ministry of Health classifies traditional authorities as ODF if they have evidence of having eliminated OD within the entire sub-district region. By 2021, over 138 traditional authorities were reported to have achieved ODF status (Nzangaya 2021). This study focuses on assessing the sanitation and hygiene status in two Districts of Malawi Districts A and B (references withheld for anonymity purposes). Both Districts have undergone several waves of CLTS programming before being declared ODF in 2018.

2.2. Study design

Household surveys were conducted between 5 and 25 July 2019. Surveys were conducted in Districts A and B drawing from the cluster sampling strategy used by the UNICEF Multiple Indicator Cluster Surveys (UNICEF 1995). The first step was to select, in consultation with the District Environmental Health Officers, and the District Water Development Officers, a set of Health Facility service area of 10 Healthcare Centres (HCCs), six in District A and four in District B. The next step was to divide the service area into smaller segments based on the population estimates from the group village heads (GVHs). Enumerators were then assigned different starting points within these clusters and requested to select consecutive households until their assigned individual quota was reached. In total, 733 households in District A and 206 households in District B were surveyed; this equates to less than 1% of households across the two districts but represents a sizable proportion of the households in the GVHs directly surrounding the selected HCCs. For reference, the 2015/16 DHS survey reported 0.66% of households relative to the number of households reported in the 2018 census (NSO and & Macro International, 2016; NSO 2018).

Households were interviewed using a questionnaire based on the Malawi ODF Status Assessment Form and core questions from the UNICEF-WHO Joint Monitoring Programme Household Survey (WHO & UNICEF undated). The interviews were conducted in Chichewa by trained NGO workers, in collaboration with District and Area Environmental Health Officers, and District Water Development Officers. Data were collected using mobile-based forms which were checked and validated. Some enumerators used paper forms before transferring the data onto the mobile form. To ensure data validity, interviewers were given a list of observations, which they used to confirm the responses from the interviewee (e.g., visiting the handwashing station to collect evidence of the use of soap, paying attention to the wetness of the area, presence of soap, and absence of web or dust). Random spot checks were also conducted by researchers to ensure consistency in the interviewers' recorded information. Informed verbal consent of study participants was obtained prior to participation. Before proceeding with the questionnaire, the interviewers provided background information on the survey (e.g., objectives, anonymity, length of the interview, etc.) and specified that the respondent could decide to not respond, skip a question, or stop the interview at any time.

2.3. Data analysis

Data sets were cleaned to remove duplicate responses and any surveys conducted outside of the specified survey window. The percentage of the population with access to handwashing, sanitary, and bathroom facilities was calculated. Where available, this data was compared to the Government of Malawi estimates from DHS (NSO & Macro International 2016) reports. Field observations, thick descriptions, and quotes were used for triangulation purposes (Creswell & Clark 2004).

3. RESULTS

3.1. OD and toilet provision

The level and type of sanitary provision were compared to official Government of Malawi census estimations, Table 1. Districts A and B reported that pit-latrines without concrete slabs were the most common type of sanitary facility (76.5 and 76.7% in Districts A and B, respectively). Both districts reported below 1% of the population using flush toilets, eco-toilets, or other forms of sanitary facilities. The second most commonly listed sanitary facility was households with no sanitary facility/practising OD. District A reported a higher level of OD (17.6%) than District B (12.6%); both higher than the 2018 Census estimations of 6.1 and 5.2% for Districts A and B, respectively. District A reported 4.8% and District B reported 10.7% of the population using pit-latrines with concrete slabs.

Observation of faeces was an indication of OD. District A reported that 71 households (9.7%) had observable faeces while District B reported that 27 households (13.1%) had observable faeces. The percentage of households with observable faeces around the property was higher than the 2018 Census estimation for OD.

The nature of the sanitary facility was evaluated to determine whether sufficient privacy and security were provided by sanitary facilities, Figure 1. 62.3% of facilities in District A offered privacy, 22.8% offered security, 67.0% had a roof, 18.7% offered both privacy and security, and 16.5% offered privacy and security while also having a roof. District B reported that 64.1% of facilities offered privacy, 32.0% offered security, 61.7% had a roof, 30.1% offered both privacy and security, and 24.3% offered privacy and security while also having a roof. The nature of the construction of the facility by the District and Healthcare Centre is summarised in Figure 1. Within District A, 22.5% of households reported the sanitary facility was shared with other households, 59.6% reported it was not shared and 17.9% gave no response. Within District B, 18.9% of households reported the sanitary facility was shared, 67.5% reported that the facility was not shared and 13.6% provided no response.

3.2. Handwashing facilities

Households were surveyed to determine whether a handwashing facility was available. Figure 2 summarises the number of households surveyed and the number of people with access to handwashing facilities. A summary of the data is found in the Supplementary Material, Tables A and B. Table 2 summarises the access to handwashing facilities and comparison to the DHS 2015/16 data. In District A, 733 households were surveyed while 206 households were surveyed in District B. The 2015/16 DHS survey (NSO and & Macro International, 2016) observed 1,179 and 473 households in Districts A and B, respectively. The access to handwashing facilities and cleansing agents was summarised. Cleansing agents other than soap included locally available materials such as ash, mud, and sand.

3.3. Washing/bathroom usage

The access to washing/bathroom facilities by households (733 in District A and 206 in District B) is summarised in Table 3. Overall, 91.9% (863) of households had a washing/bathroom facility. The use, facilities and level of privacy and security of all facilities were evaluated.

Table 1 | Survey results for the presence and type of sanitary facilities used by households in Districts A and B compared to the Government of Malawi 2018 census (NSO 2018)

	Percentage of households with sanitary facility (%)			
Type of sanitary facility	District A 2019	District B 2019	Census 2018 District A	Census 2018 District B
Flush toilet	0.1	0.00	0.7	0.5
Pit-latrine With concrete slab	4.8	10.7	5.4	4.5
Pit-latrine without concrete slab	76.5	76.7	80.7	84.6
Eco-toilet/composite	0.8	0	4.6	3.5
Other	0.1	0	2.6	1.7
None/Open defaecation	17.6	12.6	6.1	5.2

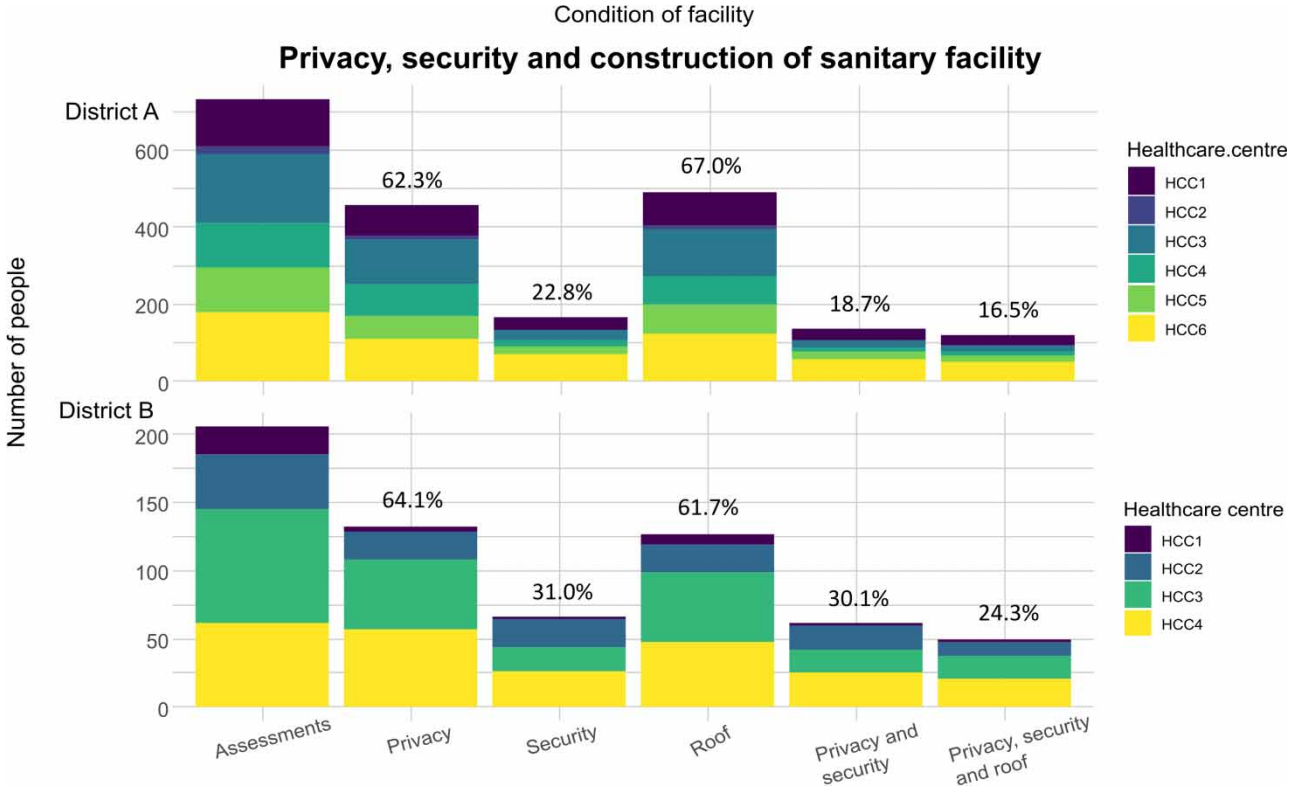


Figure 1 | The number of households with a roof and with sanitary facilities providing privacy, security in Districts A and B. The surrounding HCC households are also shown.

4. DISCUSSION

OD is a major public health risk (Chambers & Kar 2008), significant investment has been undertaken in Malawi to successfully reduce the level of OD (Hinton *et al.* 2023). CLTS has been adopted as one of the techniques to promote improvements in sanitation and hygiene and reduce OD, on a community level, recognising the community-wide implications of poor sanitation and hygiene. The significance of whole community access to sanitary facilities was echoed by stakeholders: 'The number of households with no toilets is still significant though is a small figure. Water sources will still be contaminated because members from those households will still be defaecating in the bush.' (Personal Communication 18/03/2019). Through a CLTS programme, behavioural change and structural improvements can result in communities reaching ODF status. However, the challenges of meeting the sanitary requirements of a growing population make consideration of how OD improvements are maintained just as important as continuing with progress to eliminate OD. In this survey of 939 households that had previously been declared ODF, 17% were reported to now have no toilets/practising OD and faeces were observed in around 10% of households. *This suggests that improvements in ending OD have been short-lived and slippage should be monitored on a regular basis* (Chambers & Kar 2008; Haq & Bode 2008; Starkl *et al.* 2013). Rejection of sanitation infrastructure can contribute to slippage in OD, with constructed latrines not being used (Gupta *et al.* 2016). This is particularly the case for children who may be fear of a child falling into latrine pits (personal correspondence; Chinoko 2023). High rates of latrine collapse further emphasise the significance of infrastructure maintenance and appropriate construction (Kalumbi *et al.* 2020; Hinton *et al.* 2023). The consequence of latrine collapse was emphasised in communication with stakeholders; 'Some toilets collapsed due to heavy rain which puts [leaves] some households to have no toilets' Personal communication (18/03/2019).

To minimise the risk of collapse, as well as improve hygiene, the Government of Malawi National Policy recommends that pit-latrines are fitted with a concrete slab (Nakagiri *et al.* 2015). SDG target 6.2 (UN General Assembly 2015) specifies access to an 'improved' sanitation facility. This includes flush-latrines (to piped sewer systems or septic tanks), Ventilated Improved Pit-latrines (VIP), pit-latrines with a slab and composting/composite toilets (World Bank Databank, undated) (NSO & Macro

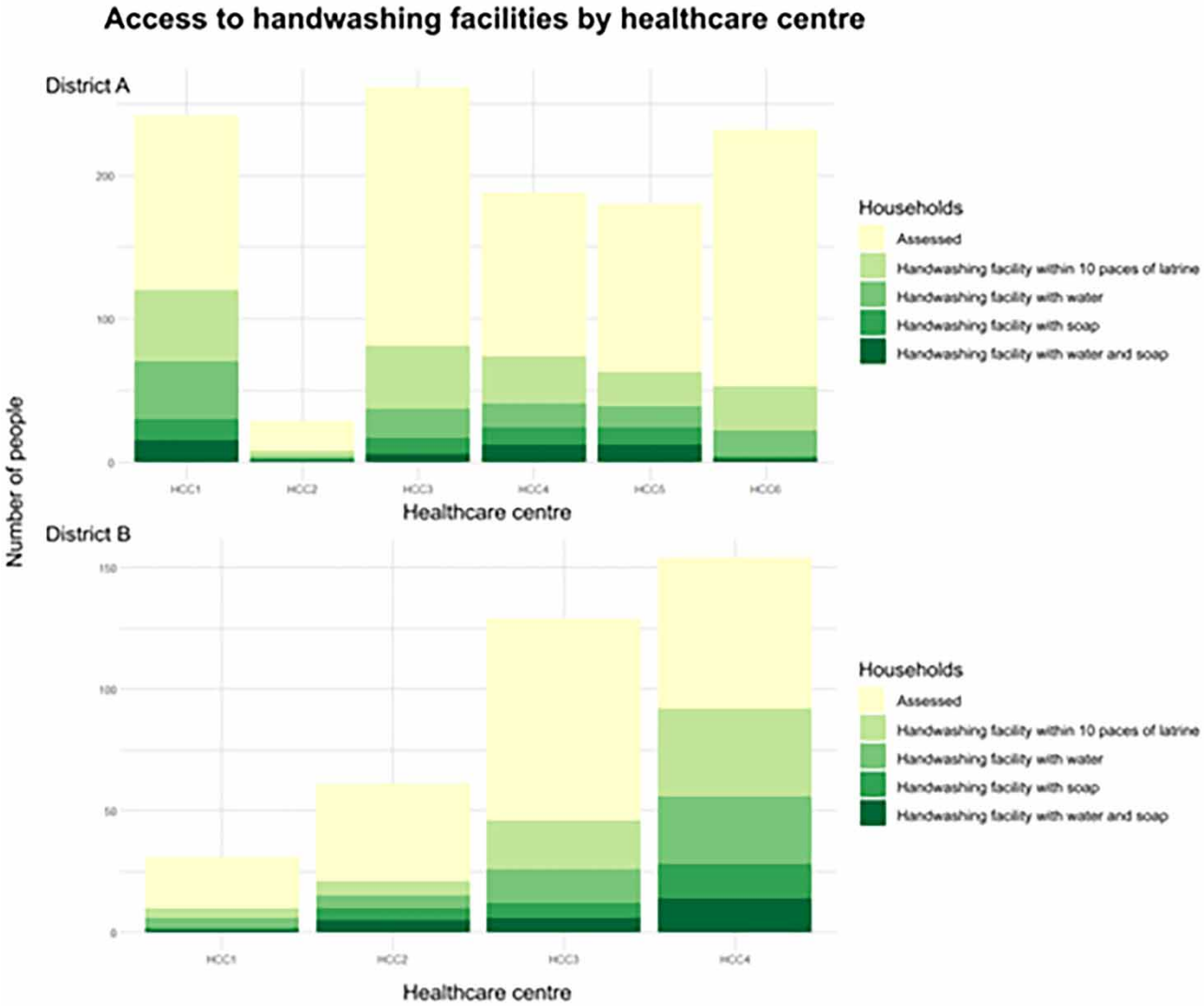


Figure 2 | The access to handwashing facilities at households surrounding Healthcare Centres (HCC) in Districts A and B. Households were assessed for the presence of handwashing facilities within 10 paces of a sanitary facility/ latrine and the provision of soap and water at facilities.

Table 2 | The extent of households with handwashing facilities in Districts A and B from the survey presented in the paper and the 2015/16 Government of Malawi DHS survey (NSO & Macro International 2016)

	Number of households with facility[a]		Percent of households with facility (%)[a]			
Type of facility	District A 2019	District B 2019	District A 2019	District B 2019	District A DHS 2015/16 Survey	District B DHS 2015/16 Survey
Hand washing facility	186	66	25.4	32.0	84.9	78.9
Handwashing facility with water	112	51	15.3	24.8	37.5	23.1
Handwashing facility with soap	53	26	7.23	12.6	6.9	4.0
Handwashing facility with water and soap	48	26	6.55	12.6	6.4	3.1

[a]Facility within 10 paces from the nearest sanitation provision.

Table 3 | The provision of bathroom facilities in Districts A and B

	No. of households with facility		Percentage of households with facility (%)	
Facility	**District A 2019**	**District B 2019**	**District A 2019**	**District B 2019**
Bathroom facility	675	188	92.1	91.3
Evidence being used	653	170	89.1	82.5
Sufficient water for bathing	563	178	76.8	86.4
Soap available	628	139	85.7	67.5
Bathroom offer privacy	518	138	70.7	67.0
Bathroom offer security	175	61	23.9	29.6

International 2011). We observed that in both districts there were more households with no access to sanitation facilities than households with sanitary facilities constructed to the recommended standard to meet SDG6.2; 5.7% of households in District A and 10.7% in District B had access to sanitary facilities that would be classed as improved while 17.6 and 12.6% had no sanitary facilities in district A and B respectively. The level of access to improved sanitation is consistent with other studies in Malawi (NSO and & Macro International, 2016; NSO 2018; Hinton *et al.* 2023; World Bank Databank, undated). Furthermore, SDG6.2 specifies that sanitary facilities to be a private (non-shared) facility (UN General Assembly 2015; Hutton & Chase 2016). Many of the households surveyed were observed to be sharing facilities with neighbours or facilities (such as schools), thus not meeting SDG 6.2. Poor construction quality and inadequate maintenance of sanitary infrastructure threaten Malawi's progress to meeting SDG6.2 with many of the available sanitary facilities at high risk of collapse, thereby resulting in high risks of ODF slippage. Recognising sanitary interventions as long-term investments (WaterAid 2021) is required to increase investment into high-quality sanitation infrastructure and, alongside behaviour change, improve the long-term sustainability of progress to SDG6.2.

Meeting SDG6.2 also involves consideration of meeting 'the needs of women and girls and those in vulnerable situations' in sanitary and hygiene provision (UN General Assembly 2015). Women and girls are at particular risk when inappropriate privacy and security are provided in sanitary and hygiene facilities (Fischer 2006; Wayland 2019). As such, we evaluate the level of privacy and security of both bathroom and latrine facilities were evaluated. The majority of households had use of bathroom and latrine facilities offering privacy (70% of bathrooms and 63% of latrines), while fewer households had facilities offering security (25% of bathrooms and latrines). Ensuring facilities are constructed with appropriate security and privacy must be another construction consideration in meeting SDG6.2

Hygiene practice is an important investigation in evaluating progress to SDG6.2 Handwashing is a central hygiene practice, providing a simple, cost-effective method of limiting the spread of infectious diseases (Freeman *et al.* 2014); handwashing with soap can reduce diarrhoeal disease risk by 42–47% (Curtis & Cairncross 2003). However, progress on handwashing has been particularly lacking in Sub-Saharan Africa, according to the World Health Organisation (WHO) if a step change in progress is not achieved, Sub-Saharan Africa could end the 15-year SDG period (2030) with the same access to hand hygiene as they started (WHO & UNICEF 2021a, 2021b). It is a challenge to quantify the level of handwashing; asking people if they wash their hands has been shown to be an ineffective measure of handwashing practice (WHO & UNICEF), rather measures of handwashing report the existence of adequate handwashing facilities with soap in households (UN 2018; WHO & UNICEF 2021a, 2021b). SDG6 indicator 2.1b reports on the availability of handwashing facilities, specifically measuring 'the proportion of the population with handwashing facilities with soap and water at home' (UN 2018).

Our results support previous studies on handwashing access in Malawi. Overall, 27% of households had access to handwashing facilities within 10 paces of a latrine; this is similar to the DHS2015/16 Survey which estimated that 20% of households were reported to have a fixed handwashing facility while 63% were reported as having mobile handwashing facilities in the DHS 2015/16 survey (NSO & Macro International 2016).

To achieve a basic service level of hygiene, households require access to a handwashing facility with soap and water (WHO & UNICEF 2021a, 2021b). Overall, only 7.9% of households met this basic service level of hygiene, a similar level to the DHS 2015/16 survey (NSO & Macro International 2016), with soap being a major limiting factor in appropriate handwashing facilities.

Another facet of hygiene is access to washing facilities and bathrooms. We consider bathrooms as spaces used for washing, often (though not necessarily) separate from latrine facilities. Having access to adequate bathroom facilities for washing is not a defined indicator under SDG6.2, and is as such less reported than other facets of sanitation and hygiene, but is important in ensuring access to adequate hygiene (with significant cultural and social weight) (Rusca *et al.* 2017). Overall, 92% of households reported having a bathroom facility with 79 and 82% of households having sufficient water and soap for bathing respectively. The high availability of soap for use in bathing is particularly stark when contrasted with the limited availability of soap in handwashing; 8.5% of households surveyed had handwashing facilities with soap. This suggests that access to soap is not the only limitation to soap usage in handwashing.

The prioritisation of water and soap resources for handwashing and bathing should be considered within the social, cultural, and religious context (Mtungila & Chipofya 2009; Rusca *et al.* 2017; Kalumbi *et al.* 2020). A survey of hygiene practices in Malawi found that 24 and 11% of people ranked bathing and handwashing as the most important hygiene practise respectively (Rusca *et al.* 2017). Similarly, treated water was the most common type of water used for bathing, untreated water was mostly used in handwashing (Rusca *et al.* 2017). Our results suggest that bathing may be a greater priority for resource use (soap) than handwashing, despite the hygienic significance of handwashing. It is worth noting that both Districts surveyed within this study are majority Christian (NSO 2018). Previous studies within Malawi have highlighted the differences in attitudes to hygiene among religious groups in Malawi (Rusca *et al.* 2017; Kalumbi *et al.* 2020) with some indication of a higher emphasis on bathing practises within Muslim than Christian communities (Rusca *et al.* 2017). Bathing may also be a greater priority for soap usage due to its importance in the appearance of cleanliness. Rusca (2017) observed that 'Everyday hygiene practices are pursued as means to project an image that is often equated with dignity and considered part of good citizenship. The fear of appearing dirty or unclean is a strong motivation for households to prioritise certain practices over others. This is particularly evident for brushing teeth, doing laundry, cleaning the surroundings of the house, and bathing' (Rusca *et al.* 2017). Progress towards SDG6.2 in promoting soap use in handwashing should not only increase access to soap but also highlight the importance of such hygiene practices.

The Government of Malawi is currently reviewing its Sanitation Policy through the new Ministry of Water and Sanitation. This offers a unique opportunity to reflect on published work and metrics from the past two decades and set a new vision and direction to address the challenges of SDG6 and Malawi 2063. Given many of the rural investments by the third sector have been 'project based', it may be wise to consider policy interventions that guide the third sector to move away from 'intervention' based investments to 'managed investments' (WaterAid 2021) and regular monitoring and reinvestment. There is also a need to consider governance structures that will enhance routine monitoring and management by Local or District municipalities, maintenance of existing infrastructure to reduce stranded investments (Kalin *et al.* 2019), and perhaps Sanitation and Hygiene management partnerships that might include co-investment support by the third sector or donors.

5. CONCLUSIONS

For Malawi to reach SDG6.2, 'access to adequate and equitable sanitation and hygiene, and to end opening defaecation', many facets of sanitation and hygiene must be implemented together, with ongoing efforts to make sure gains are not lost while access is also improved (Hinton *et al.* 2023). To evaluate progress and slippage in the path to SDG6.2, we evaluated over 900 households in two communities previously declared ODF, we observed that 17% of the population had no access to sanitary facilities or were practising OD. *This suggests that communities that have previously been declared ODF may not be able to maintain this status without continuing support.* Particular attention should be paid to ensuring appropriate construction of sanitary infrastructure to minimise the risk of collapse.

While we estimated that only 8.5% of households had handwashing facilities with soap, we found that soap was available in the bathrooms/washrooms of 82% of households, suggesting soap was not prioritised for handwashing. To improve the level of basic hygiene, promoting a culture of handwashing with soap, alongside improving access, must be a key priority (Curtis *et al.* 2001; Jumaa 2005; Whitby *et al.* 2007). A more in-depth barrier analysis will be necessary to truly understand the limitations of handwashing practises in Malawi and work to deconstruct such barriers.

SDG6.2 also specifies that sanitation and hygiene facility access should pay special attention to the needs of women and girls and those in vulnerable situations (UN General Assembly 2015). Ensuring the provision of sanitary and hygiene facilities with appropriate privacy and security is a particularly important factor in access to sanitation and hygiene for women and girls (Fischer *et al.* 2006; Cairncross *et al.* 2010; Hulland *et al.* 2015; Raj *et al.* 2019). The minority of households had use

of bathrooms and latrine facilities offering security (25% of bathrooms and latrines). Challenges of security and privacy must be considered in sanitary provision and construction.

The current review of the Government of Malawi Sanitation Policy offers a unique opportunity to address the challenges of SDG6 and Malawi 2063. New policy interventions may include a move by the third sector away from 'intervention' based investments to 'managed investments' with regular monitoring and reinvestment (WaterAid 2021). The new policy might also consider a need for mechanisms that enhance monitoring and management by Local or District municipalities, perhaps supported initially by the third sector or donors.

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CONSENT

Informed consent was obtained from all subjects involved in the study. All data collected were in line with the Ethics of Government of Malawi and was agreed with each participant.]

DATA AVAILABILITY STATEMENT

Data cannot be made publicly available; readers should contact the corresponding author for details.

CONFLICT OF INTEREST

The authors declare there is no conflict.

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