SFD Report

Kasungu
Malawi

Final Report

This SFD Report - Intermediate - was prepared by WaterAid Malawi

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SFD Report for Kasungu Municipality, Malawi, 2018

Produced by: WaterAid Malawi

Authors' names: WaterAid Malawi

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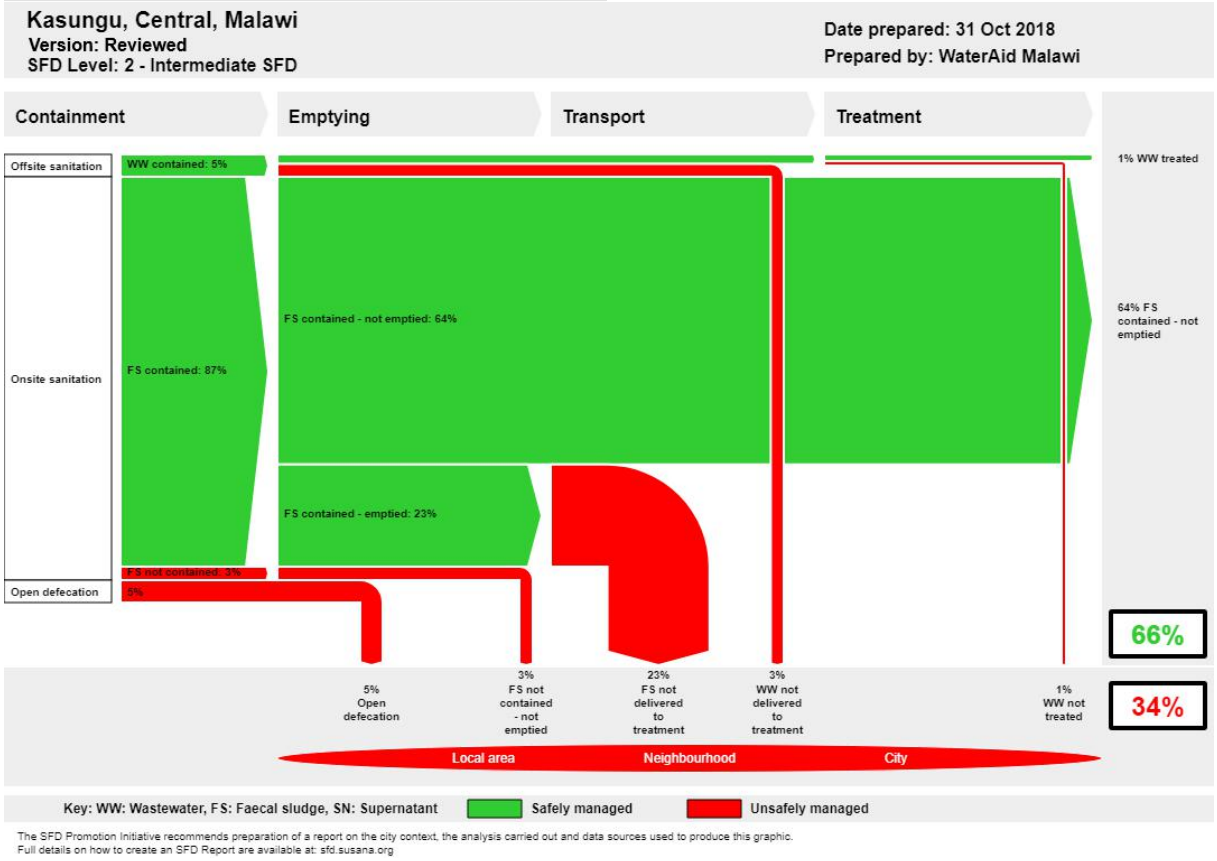
1. The SFD Graphic



The SFD Promotion Initiative recommends preparation of a report on the city context, the analysis carried out and data sources used to produce this graphic.
Full details on how to create an SFD Report are available at: sfd.susana.org

2. Diagram information

SFD Level:

Intermediate

Produced by:

WaterAid Malawi acknowledges the contribution of Lawrence Kamzati, the consultant who was engaged to conduct the assessment for the SFD and Kasungu DHO, Municipal Council and MATAMA.

Collaborating partners:

The following organisations/institutions played a significant role in the production of the SFD for Kasungu Municipality: Kasungu Municipal Council, Central Region Water Board, Mineral and Appropriate Technologies for Malawi (MATAMA).

The research team also had support from the following institutions and organisations; Malawi Prison Services - Kasungu, Kasungu Teachers Training College, Chayamba Secondary School, Kasungu Agriculture Development Division, Kasungu Secondary School, MSH, Press Trust, SSDI, Vision Workers, Kasungu Girls CBO, Miracle Service and Sanitation Entrepreneurs and Masons.

Status: Final Report

Date of production: 31st October, 2018.

3. General city information

Kasungu municipality is approximately 130 kilometres north-west of the capital of Malawi, Lilongwe. It has total population of 77,619 (NSO & ICF, 2017). Kasungu has a humid subtropical climate with an average rainfall of 763 mm per year and average temperature ranges between 9°C and 32°C. The township is within the Lilongwe, Kasungu Plain with undulating topography (KUMC, 2018).

Kasungu municipality is a major business hub in Malawi's Central Region, where people who sell tobacco leaves at Chinkhoma service station come to seek accommodation. As such, the population swells up during the day, except on Sundays when most shops are closed. During the tobacco selling season, the population also increases as farmers flock to the town to sell or collect proceeds from their tobacco and other products (KUMC, 2018).

The municipality has a high population density of 2,188 people per square kilometre (NSO, 2008). The majority of the residential areas are informal settlements, which that occupy 64 percent of the land. The remainder of the area is occupied by traditional housing (19 percent), high density housing (four percent), medium density housing (nine percent) and low density housing (14 percent) (KUMC, 2018).

4. Service outcomes

Kasungu Municipality has five sanitation systems: toilets that discharge directly into a decentralised foul/separate sewer (5 percent); septic tanks connected to soak pits (18 percent); lined pits with semi-permeable walls and open bottoms and no outlet or overflow (five percent); septic tanks connected to soak pits, where there is a significant risk of ground water pollution (one percent); unlined pits with no outlet or overflow, where there is a low risk of groundwater pollution (66 percent) and open defecation (five percent) (KII Aug, 2018a; KII Aug, 2018i; FGD Aug, 2018a).

Emptying services are provided by the municipality using a vacuum tanker, and by private service providers using a gulper, two buckets and two spades. While the tanker transports sludge from septic tanks to the disposal sites, private providers just transfer the sludge to a pit dug next to the filled pit latrines (KII Aug, 2018h; KII Aug, 2018k).

The sewerage system conveys sewage to oxidation ponds where treatment occurs. The municipality does not have sludge a treatment plant (KII Aug, 2018a).

Most of the portable water is supplied by CRWB, Kasungu zone. About 84 percent of residents in the township get their water from this board through taps. The remaining 16 percent get water from boreholes, springs and rainwater (KUMC, 2018). According to the groundwater pollution risk decision matrix of the SFD calculation tool, the groundwater pollution risk is low if the percentage of users drinking water produced from groundwater is between one percent and 25 percent. Considering other parameters, the overall risk of ground water pollution is low.

Figure 1: Sewage flow from burst pipe (Kamzati, 2018)

According to the SFD, 66 percent of the excreta from the population are considered to be safely managed, while 34 percent is considered unsafely managed. The majority of the safely managed proportion is from households using unlined pits (in areas where there is a low risk of groundwater pollution) that are never emptied. The households cover and seal pits as they become full and construct replacements. In the medium- to long- term, for example as the population and population density increases, this practise may not be sustainable and improved sanitation management services may well be required.

5. Service delivery context

In Malawi, laws are made by the parliament giving power to city councils and local assemblies to regulate pit latrine sludge through local by-laws. According to Water Research Commission (2015), Malawi has no specific legislation on faecal sludge management.

In line with the National Sanitation Policy, a zero-subsidy approach is adopted and applied by all implementers. The only exception is vulnerable people (GoM, 2008). This provision continues to widen the gap of faecal sludge management due to low income status.

The main institutions responsible for sanitation are the Ministry of Agriculture, Irrigation and Water Development, city assemblies and the Ministry of Health and Population. However, water supply and sanitation are also provided by private sector, civil society organisations and international donors, which have set up and fund their own water and sanitation projects (Water Research Commission, 2015).

The Malawi Bureau of Standards (MBS) is a statutory organisation established by a 1972 Act of Parliament (Chapter 51:02), which is assigned the responsibility of preparing and promulgating the national standards (Malawi Standards, 2015).

At district level, Kasungu municipality has several plans relating to with water, sanitation and hygiene. These include the 2012-2017 Urban Development Plan, 2011-2016 Strategic Plan and 2014-2020 KUMC WASH Strategic Plan.

In Malawi, donors contribute approximately 80 percent of funding to the WASH sector. The national budget allocation was a very small proportion (0.08 percent) of the total budget in the 2014/15 fiscal year. Funding focuses on development of water infrastructure, and there is no budget allocation for sanitation and hygiene. There are no clear and coordinated plans for financing the Sector Investment Plan and the National Sanitation Master Plan (WaterAid, 2016).

Although it is an obligation for each household to own a sanitation facility, most urban poor

people who cannot afford to construct a pit latrine rely on shared toilet facilities within the community, because the municipality follows a provision in the NSP that prohibits household subsidies for sanitation services (KII Aug, 2018a). Currently, the municipality does not have by laws for faecal sludge management.

As a measure to reduce inequity, the NSP has a provision that allows the promotion of targeted subsidies for improved sanitation facilities for vulnerable and disadvantaged people such as orphans (GoM, 2008).

Many residents in Kasungu do not hire the municipality vacuum tanker to empty faecal sludge because the service charge is not affordable for most of the urban population. For instance, the cost for emptying using a 6,000-litre municipal tanker is K 45,000 (US$ 61) per trip. For this reason, the emptying service is mainly used by commercial institutions and a few residents in high income locations (KII Aug, 2018h).

Sanitation issues in Malawi are monitored by the M&E framework that was developed by the MoAIWD under the guidance of the Ministry of Economic Planning and Development (MEPD), which developed the M&E master plan for the country (GoM, 2008).

In response to the rapid increase in population, Kasungu municipality is planning to construct a centralised sewerage system in Belele, at an estimated cost of MKW 472,541,300 (US$ 644,668) (Eales & Gibson, 2017).

The National Sanitation Policy has a provision that strengthens service providers by training artisans and sanitation promoters in the production and marketing of sanitation hardware, respectively, in the private sector (GoM, 2008). However, there is no provision for private-sector engagement in faecal sludge management.

6. Overview of stakeholders

The main stakeholders are outlined in Table 1.

Kasungu municipal council is responsible for faecal sludge management as mandated by the Local Government Act of 1998. At the same time, the Waterworks Act (1995) mandates the urban Water Boards to provide sewerage services within their areas of jurisdiction.

In addition, the municipality allows private service providers to offer sanitation services such as pit emptying within the municipality.

Table 1 Key Stakeholders

Key Stakeholders	Institutions / Organisations /
Public Institutions	Municipality of Kasungu, Prison Services, Kasungu Teachers Training College, Chayamba Secondary School, Kasungu ADD, Kasungu Secondary School, Central Region Water Board.
Non-governmental Organisations	MATAMA, MSH, Press Trust, SSDI
Private Sector	Vision Workers, Kasungu Girls CBO, Miracle Service Scientantion, masons
Donors	WaterAid
Others	Mzuzu University, Lilongwe University of Agriculture and Natural Resources, University of Malawi.

9. Process of SFD development

Data was collected through unstructured key informant interviews (KII), focus group discussions (FGD) and observations of sanitation system technologies. The informants were purposively selected to collect the data that was required to fill the gaps in the information gathered during the desk review.

The key informants were selected from key stakeholders in the municipality's faecal sludge management. Ideally, the focus group discussions were meant to collect enough data on faecal sludge management for triangulation. The observations allowed the researcher to take photos at faecal sludge management sites, which were used to cross-check the data gathered from the KII and FGDs. The SFD was produced using the SFD graphic generator and shared with WaterAid Malawi as the stakeholder that collaborated in the data collection.

10. Credibility of data

The main data sources include published national policies. However, documents for the Kasungu Municipality were not available for online public access. Therefore, a field visit was necessary to collect data on sanitation services. Furthermore, the visit provided access to unpublished reports on service outcomes and the opportunity to get information about plans for the sanitation sector from the municipality.

Reservations about the accuracy of the data relate to the percentage of people using onsite

technologies such as septic tanks and lined pit latrines, which were estimated based on the available documents, KIIs and FGDs.

11. List of data sources

- Eales, K., and Gibson, J. 2017. Assessment of Sanitation Service Delivery in Kasungu Municipality, Malawi. Lilongwe: WaterAid Malawi.
- FGD Aug, 2018a. Discussion with community at Gundani location in Kasungu Municipality.
- Government of Malawi. 1995. Waterworks Act. The Government Printer: Zomba, Malawi.
- Government of Malawi. 1998. Local Government Act Cap 22:01. The Government Printer: Zomba, Malawi.
- Government of Malawi. 2008. *National Sanitation Policy*. The Government Printer: Zomba, Malawi.
- Kasungu Municipal Council (KUMC). 2018. Kasungu urban socio-economic profile 2018 – 2023. Unpublished.
- KII Aug, 2018a. Interview with Wales Kazonde, WASH Coordinator of Kasungu District.
- KII Aug, 2018h. Interview with Grace Chirwa, Chief Executive Officer (CEO) at Kasungu Municipal Council.
- KII Aug, 2018i. Interview with Martin Kazanga, Director of Planning and Development (DPD) at Kasungu Municipal Council.
- KII Aug, 2018k. Interview with Barnes Saka, WASH Officer at MATAMA.
- Malawi Standards. 2015. *Promoting standardization and quality assurance in Malawi*. Blantyre: Malawi Bureau of Standards
- National Statistical Office (NSO) [Malawi] and ICF. 2017. *Malawi Demographic and Health Survey 2015-16*. Zomba, Malawi, and Rockville, Maryland, USA. NSO and ICF.
- WaterAid. 2016. Towards WASH for all. Malawi country program strategy 2016 – 2021
- Water Research Institute. 2015. The status of fecal sludge management in eight southern and east african countries. WRC Report No. KV 340/15 ISBN 978-1-4312-0685-8. Northcliff: WRC

SFD Kasungu, Malawi, 2018

Produced by: WaterAid Malawi

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This Executive Summary and the SFD Report are available from: www.sfd.susana.org

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Abbreviations

ADD	Agriculture Development Division
CBO	Community Based Organisation
CEO	Chief Executive Officer
DEC	District Executive Committee
DHO	District Health Office
DSC	Department of Statutory Corporations
EIA	Environmental Impact Assessment
EMA	Environment Management Act
FGD	Focus Group Discussion
GoM	Government of Malawi
HMIS	Health Management Information Systems
KII	Key Informant Interviews
KUMC	Kasungu Municipal Council
MATAMA	Mineral and Appropriate Technologies for Malawi
MBS	Malawi Bureau of Standards
MEPD	Ministry of Economic Planning and Development
M&E	Monitoring and Evaluation
MITC	Malawi Investment and Trade Centre
MGDS	Malawi Growth and Development Strategy
MoAWID	Ministry of Agriculture and Water Development
MSH	Management Sciences for Health
NEP	National Environmental Policy
NGO	Non-Governmental Organisation
NSP	NSP National Sanitation Policy
NSO	National Statistical Office
NWP	National Water Policy
ODF	Open Defecation Free
SEP	Socio Economic Plan
SFD	Shit Flow Diagram
SSDI	Support for Service Delivery Integration
TTC	Teachers Training College
VDC	Village Development Committee
WRA	Water Resources Act
WRC	Water Research Commission

1 Town context

Kasungu Municipality (KUMC) is a town in Kasungu District in the Central Region of Malawi. The town occupies 35.48 square kilometres and has a high population density of 2,188 people per square kilometre. KUMC was projected to have a population of 77,619 people by 2018, growing at a rate of 6.5 percent per annum (NSO & ICF, 2017). However, the population of KUMC is projected to fluctuate upwards by 10 percent in any given year due to the presence of schools, hospitals and prisons as well as the peaking of the tobacco selling season, which brings in people from outside the district (KUMC, 2018).

The town has a humid subtropical climate, with a rainy season that lasts from November to April and a dry season that lasts from May to October. Temperatures range between 9ºC and 32ºC. Annual rainfall averages around 763 millimetres, with most of the rain falling between December and March and peaking in February (KUMC, 2018).

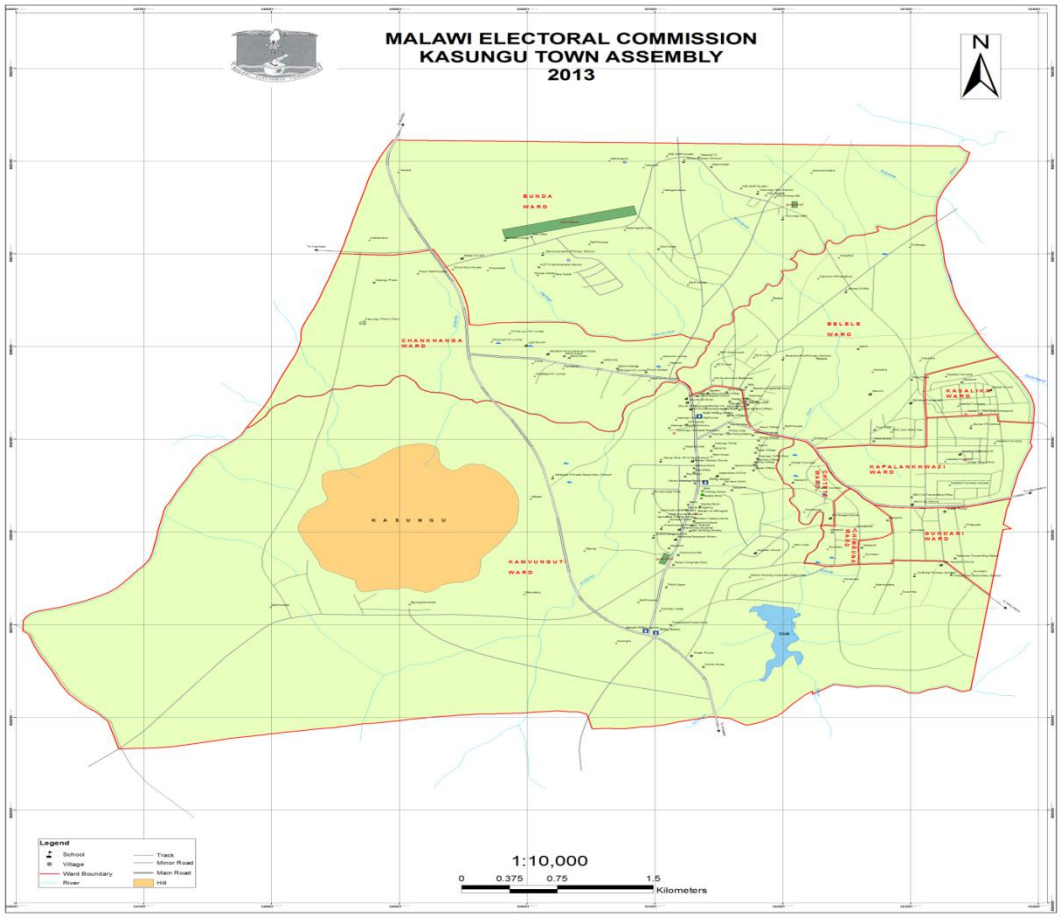

Figure 1: Map of Kasungu Municipality

KUMC is located within the Lilongwe, Kasungu Plain at a height of 1,342 meters above sea level (Figure 1). It lies approximately 130 kilometres north-west of Lilongwe, the capital city of Malawi, and has a topography that is generally undulating. Its landform includes Kasungu Mountain located to the west of the Central Business District (CBD), and Kasungu-Chipala to the north-north east. The ground generally slopes from southwest to the northeast with

slopes ranging between 2º and 5º (KUMC, 2018). The township has two main rivers, the Chitete and the Chankhanga. The Chitete flows from southern part of the town and it is joined by the Kabvunguti stream, which flows from the southwest. At the confluence of these two is Kabvunguti Dam. The dam, which belongs to the Central Region Water Board, was constructed to supply water to the township residents. About three kilometres downstream, the Chitete is then joined by the Chankhanga River whose catchment is Kasungu Mountain (KUMC, 2018).

The majority of residents in Kasungu municipality rely on small businesses for their livelihoods while the remaining few work at public and private institutions. The most common businesses in town are retail shops, wholesalers, and small-scale enterprises such as second-hand clothes shops, barbers, hairdressing salons and restaurants in the local markets. Kasungu is also the central business district for tobacco, which is the main cash crop for Kasungu District.

2 Service Outcomes

2.1 Overview

This chapter will discuss the faecal waste flow through the sanitation chain from containment to safe disposal or reuse.

Since Kasungu was elevated from town to a municipality, there has been ever-growing demand for modern sanitation technologies. According to KII Aug (2018a), Kasungu municipality sanitation technologies in use for capture in KUMC include basic pit latrines (39 percent or 30,271 people), improved latrines (32 percent or 24,838 people) and water closets connected to septic tanks or sewer system (24 percent or 18,629 people). Figure 2 provides a summary of containment technologies in use.

According to a 2017 study by WaterAid, 56 percent of toilets surveyed in KUMC fall within the WHO/UNICEF definition of improved toilets (flush toilets and improved pit latrines) (Eales & Gibson, 2017); 39 percent use basic pit latrines, and five percent (3,881 people) defecate in the open. KUMC does not have data on the number of households with water closets connected to septic tanks or sewer system. As such, this study uses the population connected to water supply inside their dwelling unit (19,006) as a proxy for the proportion of population using water closets, i.e. 24 percent. This means 32 percent have improved latrines.

Figure 2: Photos (a) household basic latrine, (b) school flush toilet, (c) improved latrine at hospital and (d) pit latrine at waiting mothers

The next step was to separate the 24 percent (19,006) into population groups that are connected to a decentralised sewer system or a septic tank. To do this, the study used data from a 2017 WaterAid study, which determined the number of people connected to a sewer system at household level at 817 (Eales & Gibson, 2017). The study then added this number to additional data collected from residents of the institutions that have sewer systems such as patients and students. The total population with a sewer connection was therefore 3,881. From this, we deduced that the number of people using septic tanks is 15,125. Therefore, five percent of Kasungu's population have a sewer connection and 19 percent have a septic tank.

It can therefore be concluded that 95 percent of faecal matter is Kasungu in captured in some way with only five percent lost through open defecation. This however, does not take into account that people defecate in the open when in transit and away from home for work even if they use a toilet at home. The actual proportion that is not captured is therefore higher than five percent, although precise statistics are not available.

2.1.1 Offsite sanitation

- **Transport**

Regarding off-site sanitation systems, the municipality has sewerage conveyance systems that use pipe networks linking residences, hospitals and education institutions to oxidation ponds. Faecal sludge from these sewerage systems is ideally supposed to be transported into the ponds through the pipes. However, damage to the ageing infrastructure means that only 42 percent of the sludge makes it to the ponds; the rest flows in the open or seeps into the ground from blocked manholes or sewer pipes (KII Aug, 2018a; KII Aug, 2018d; KII Aug, 2018e).

- **Treatment**

Sewage is treated using biological processes that render the effluent safe for disposal into the environment. The systems consist of oxidation ponds that allow microorganisms to act on the sewage in the presence of oxygen. Of 42 percent of faecal sludge that is delivered to the treatment sites, 70 percent is treated (KII Aug, 2018a; KII Aug, 2018d; KII Aug, 2018e).

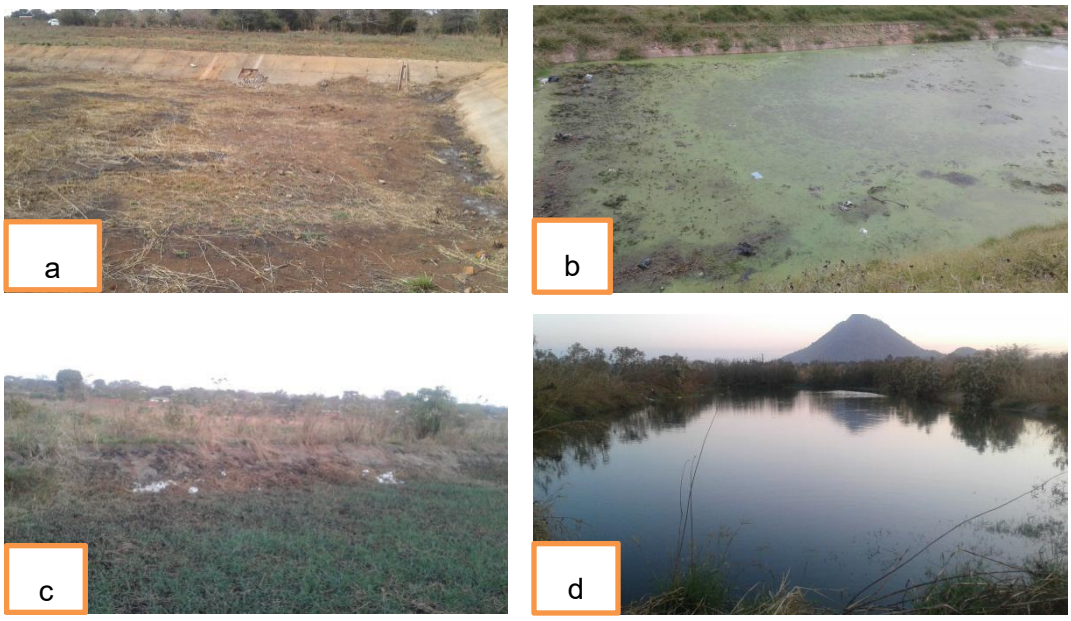

Figure 3: Photos (a) Chayamba pond (b) Hospital pond (c) TTC pond and (d) ADD pond

Chayamba Secondary School sewage treatment facility has five ponds. At the treatment facility, flow to the ponds for long periods was observed, and there was no screen for solid waste at the head works (Figure 3). Signs of vandalism to pipeline that delivers effluent to the ponds were also noted. This was attributed to farmers, who collect faecal matter to use as fertiliser on their food crops. There also evidence of excavation in broken pipes, resulting in spillage of sewage on the surrounding ground (Eales & Gibson, 2017).

The hospital system also has five ponds (Figure 3). Very little effluent was observed flowing and the head works had screens that appeared to be cleared periodically but unsafely disposed. However, solids materials were observed in the ponds and no effort was made to remove the waste. Flow was limited between the ponds, which impaired the biological processes within them. It was clear that operation and maintenance was not carried out as evidenced by the state of the connecting channels. Furthermore, the primary pond had cracks that could result in leakage (Eales & Gibson, 2017).

The treatment systems at the Teachers Training College (TTC) and the Agriculture Development Division (ADD) have four ponds. At the TTC, there was no flow into the treatment ponds for quite some time and no screening facility for solid waste. It was also noted that the pipe transporting sewage to the ponds was blocked and it was spilling sewage continuously upstream, 200 metres away from the first pond. The connecting channels between the ponds were overgrown because the ponds had not been receiving sewage for some time. The terrain of the area makes spillage flowing into the local river systems that run

through the town likely. There is higher likelihood of contamination in the rainy season if the pipe is not maintained (Eales & Gibson, 2017).

The pond system at ADD was the only one that appeared to be working at all, despite the solid build up at the entry point of the first pond. The ponds were receiving flow from the sewer system though it was not flowing at the time of the visit. The area surrounding the pond was heavily overgrown, making it difficult to do more observations. The survey team also observed a pile of nappies disposed of at the edge of the pond (Eales & Gibson, 2017).

Kasungu municipality does not have a faecal sludge treatment plant, therefore, all the sludge from septic tanks is disposed of directly at the municipality's disposal site (KII Aug, 2018j), where it remains untreated.

- **End use/ disposal**

According to KII Aug (2018d; 2018e), communities surrounding the sewage treatment ponds also scrape sludge from the dry oxidation ponds to use as manure on food crops and vegetable gardens in Chayamba.

2.1.2 Onsite sanitation

- **Containment**

There are six main types of containment systems in Kasungu Municipality, as shown in Table 1 and Table 2.

Table 1: Summary of the containment situation in KUMC

SFD Defined in selection grid	Containment Technology	Percentage of Population
T1A1C4	Discharge directly into decentralised foul/separate sewer;	5%
T1A2C5	Septic tank connected to soak pit	19%
T1A5C10	Lined pit with semi-permeable walls and open bottom, no outlet or overflow	5%
T1A6C10	Unlined pit, no outlet or overflow	63%
T2A6C10	Unlined pit, no outlet or overflow, where there is a significant risk of groundwater pollution	3%

Table 2: SFD Selection Grid for Kasungu

List A: Where does the toilet discharge to? (i.e. what type of containment technology, if any?)	List B: What is the containment technology connected to? (i.e. where does the outlet or overflow discharge to, if anything?)									
	to centralised combined sewer	to centralised foul/separate sewer	to decentralised combined sewer	to decentralised foul/separate sewer	to soakpit	to open drain or storm sewer	to water body	to open ground	to 'don't know where'	no outlet or overflow
No onsite container. Toilet discharges directly to destination given in List B				T1A1C4	Significant risk of GW pollution / Low risk of GW pollution					Not Applicable
Septic tank					Significant risk of GW pollution / T1A2C5					
Fully lined tank (sealed)					Significant risk of GW pollution / Low risk of GW pollution					
Lined tank with impermeable walls and open bottom	Significant risk of GW pollution / Low risk of GW pollution	Significant risk of GW pollution / Low risk of GW pollution	Significant risk of GW pollution / Low risk of GW pollution	Significant risk of GW pollution / Low risk of GW pollution	Significant risk of GW pollution / Low risk of GW pollution					Significant risk of GW pollution / Low risk of GW pollution
Lined pit with semi-permeable walls and open bottom	Not Applicable									Significant risk of GW pollution / T1A5C10
Unlined pit										T2A6C10 / T1A6C10
Pit (all types), never emptied but abandoned when full and covered with soil										Significant risk of GW pollution / Low risk of GW pollution
Pit (all types), never emptied, abandoned when full but NOT adequately covered with soil										
User interface failed, damaged, collapsed or flooded										
Containment (septic tank or tank or pit latrine) failed, damaged, collapsed or flooded										
No toilet. Open defecation	Not Applicable							T1B11 C7 TO C9		Not Applicable

- **Emptying**

Kasungu municipality has several ways of emptying raw sludge, including vacuum tanker, gulper and spades and buckets. Service providers include KUMC, Kasungu Girls Community Based Organisation, Vision Workers and Miracle Services Scientantion (Eales & Gibson, 2017).

Demand for pit emptying services in Kasungu is not very high because residents and institutions choose to empty when the containment system is full, overflowing or malfunctioning (KII Aug, 2018h). Kasungu municipality has a 6,000-litre vacuum tanker (Figure 4) that is used for emptying septic tanks (KII Aug, 2018j).

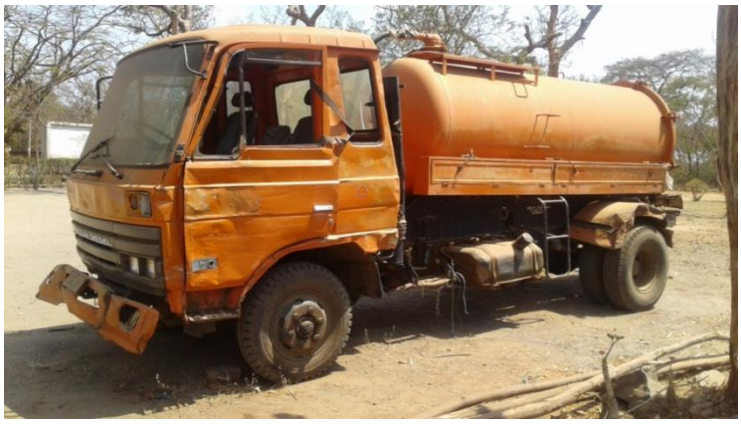

Figure 4: Picture of a municipal vacuum tanker

According to KII and focus group discussions, faecal sludge contained in septic tanks connected to a soak pit; septic tanks connected to a soak pit, where there is a significant risk of ground water pollution; lined pits with semi-permeable walls and an open bottom were 95 percent emptied, while unlined pits are not emptied at all (KII Aug, 2018a; KII Aug, 2018i; FGD Aug, 2018a).

- **Transport**

There are two types of transport systems involved in faecal sludge management in Kasungu municipality: a vacuum tanker and an open pick-up truck that is used to carry drums filled with faecal sludge to the disposal site.

All sludge emptied from septic tanks connected to soak pits using the vacuum tanker is transported and delivered to the sludge disposal site (KII Aug, 2018i; KII Aug, 2018j).

Similarly, all sludge emptied from septic tanks connected to soak pits, where there is a significant risk of ground water pollution, is transported and delivered to the sludge disposal site (KII Aug, 2018j).

Faecal sludge emptied from lined pits with semi-permeable walls and open bottoms was transferred to a pit dug next to the full pit latrine to create room for reuse (KII Aug, 2018k; KII Aug, 2018o; FGD Aug, 2018a).

- **Treatment**

Kasungu municipality does not have a faecal sludge treatment plant at the sludge disposal site. Therefore, sludge is just transported to the disposal site where it is not treated.

- **End use/ disposal**

All the sludge that is transported from 95 percent of emptied septic tanks connected to soak pits and 95 percent of emptied septic tanks connected to soak pits with significant risk of groundwater pollution is disposed of at a sludge disposal site located 13 km from the town (KII Aug, 2018i). This site is not managed and it was observed that the raw sludge was disposed of in the open where it is collected by local farmers to fertilise their food crops (KII Aug, 2018j). This confirms observations from a recent WaterAid study that the communities surrounding the sludge disposal site were sneaking out to collect sludge for manure to be used in their gardens (Eales & Gibson, 2017).

2.2 SFD Matrix

Table 3 shows the SFD matrix for the city. It outlines a summary of the flow of faecal sludge from containment to disposal, as discussed in section 2.1

Table 3: SFD Matrix for Kasungu

Kasungu, Central, Malawi, 31 Oct 2018. SFD Level: 2 - Intermediate SFD
Population: 77619
Proportion of tanks: septic tanks: 100%, fully lined tanks: 100%, lined, open bottom tanks: 100%

System label	Pop	W4b	W5b	F3	F4	F5
System description	Proportion of population using this type of system	Proportion of wastewater in sewer system, which is delivered to decentralised treatment plants	Proportion of wastewater delivered to decentralised treatment plants, which is treated	Proportion of this type of system from which faecal sludge is emptied	Proportion of faecal sludge emptied, which is delivered to treatment plants	Proportion of faecal sludge delivered to treatment plants, which is treated
T1A1C4 User interface discharges directly to a decentralised foul/separate sewer	5.0	42.0	70.0			
T1A2C5 Septic tank connected to soak pit	19.0			95.0	0.0	0.0
T1A5C10 Lined pit with semi-permeable walls and open bottom, no outlet or overflow	5.0			95.0	0.0	0.0
T2A6C10 Unlined pit, no outlet or overflow, where there is a 'significant risk' of groundwater pollution	3.0			0.0	0.0	0.0
T1A6C10 Unlined pit, no outlet or overflow	63.0			0.0	0.0	0.0
T1B11 C7 TO C9 Open defecation	5.0					

2.2.1 Risk of groundwater contamination

The township lies on gneiss formations belonging to the basement complex. The gneiss is mainly composed of metamorphosed rock of sedimentary and igneous origins known collectively as the Malawi Basement Complex. The rocks form “residual mountains”, popularly known as inselbergs, of which Kasungu Mountain is an example (KUMC, 2018).

The dominant soil type is lateritic. These are sandy loam soils reddish in colour. In some areas there are river and dambo colluviums, red clay and pure sandy soils. These are well-drained soils. These soils vary in thickness. According to staff at water department, the mean water table is greater than 15 metres in depth (KII Aug, 2018q).

Most potable water is supplied by CRWB, Kasungu zone. About 84 percent of residents in the township get their water from this board through taps. The remaining 16 percent get water from boreholes, springs and rainwater (KUMC, 2018). According to the groundwater pollution risk decision matrix of the SFD calculation tool, the groundwater pollution risk is regarded as low if the percentage of the population using groundwater for drinking is between one percent and 25 percent. Considering other parameters indicated in Table 4, the overall risk for ground water pollution is low.

Table 4 shows the information that was used for the groundwater pollution risk decision matrix of the SFD calculation tool for Kasungu municipality where there is no access to the public water supply network.

Based on the decision matrix, the risk was determined for four containment systems employing infiltration of faecal sludge in the area without access to a public water supply network. The four systems were septic tanks connected to soak pits; lined pit with semi-permeable walls and open bottom, no outlet or overflow; unlined pit, no outlet or overflow; and unlined pit, no outlet or overflow, where there is a significant risk of groundwater pollution.

Table 4: Information gathered to assess risk of groundwater pollution

Item	Estimates in the study area	Source of estimates
Rock type in unsaturated zone	Sandy, silt and clay	(KUMC, 2018)
Depth to groundwater table	> 10 m	(KII Aug, 2018q)
Percentage of sanitation facilities that are located < 10 m from groundwater sources	Less than 25%	(KII Aug, 2018a)
Percentage of sanitation facilities that are located uphill of groundwater sources	Less than 25%	(KII Aug, 2018a)
Percentage of drinking water produced from groundwater sources	Between 1% and 25%	(KUMC, 2018)
Water production technology	Boreholes, wells, springs	(KUMC, 2018)

2.3 SFD Graphic

Figure 5 shows that 92 percent of the excreta are contained at the containment or household level. This includes the five percent of contained excreta that discharges directly into a decentralised foul/separate sewer (W3); 19 percent of excreta contained in septic tanks connected to soak pits with low risk of groundwater pollution (F2); five percent of excreta contained in lined pit with semi-permeable walls and open bottom, no outlet or overflow; and 63 percent of excreta contained in unlined pits with no outlet or overflow. The 8 percent of the excreta that is not safely managed at containment level includes the three percent of excreta contained in unlined pit, no outlet or overflow, where there is a significant risk of groundwater pollution; and five percent of open defecation. As indicated, separate sewer systems; septic tanks connected to soak pits; lined pit with semi-permeable walls and open bottom, no outlet or overflow and unlined pits with no outlet or overflow accounted for safe containment in areas not connected to the public water supply networks. On the contrary, unlined pits with no outlet or overflow, where there is a significant risk of groundwater pollution were unsafe containment.

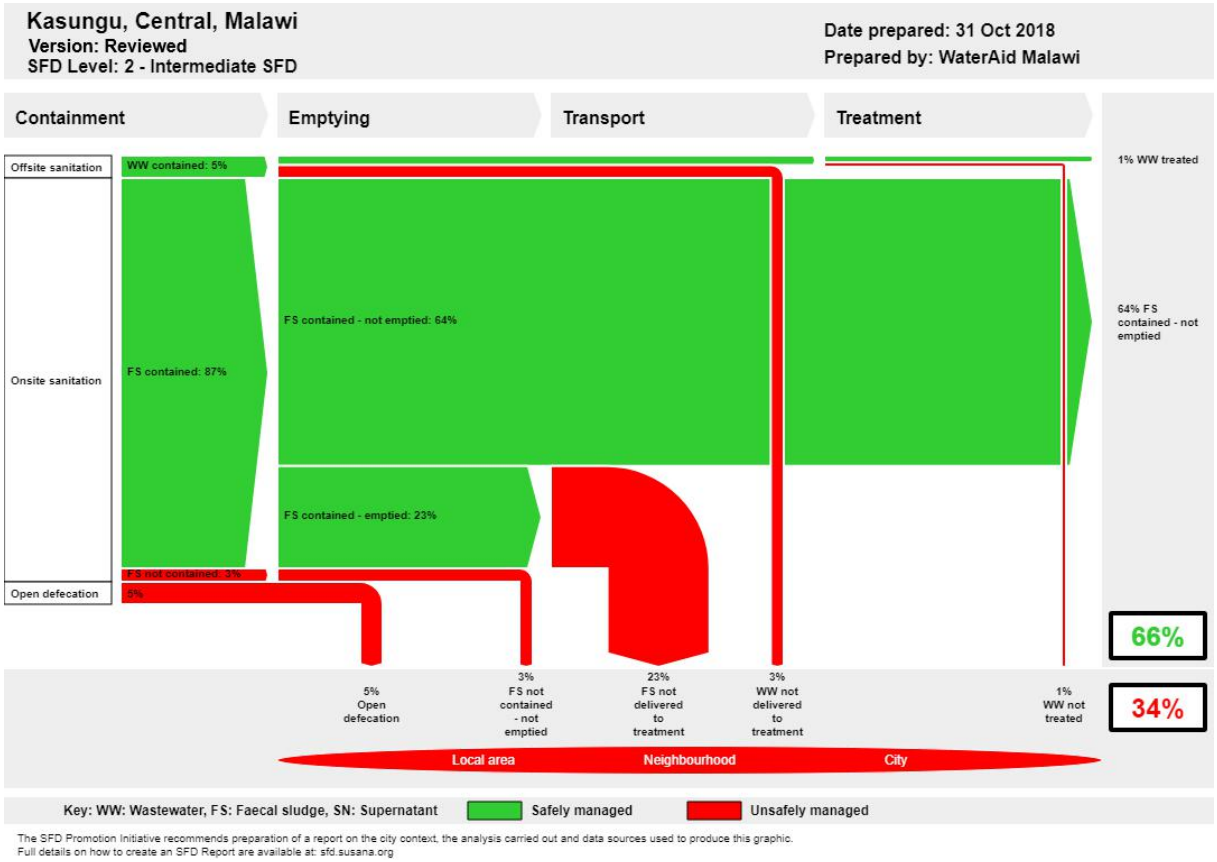

Figure 5: SFD Graphic for Kasungu

This may imply that there is a low risk of ground water pollution since 92 percent of faecal sludge is safely contained. In addition to that, most of the residents (84 percent) in the municipality do not rely on groundwater for drinking, which in any case poses a low risk of contamination. The risk of groundwater pollution decision matrix indicated that there is significant risk if the population using groundwater sources is greater than 25 percent. In addition, the rock in the unsaturated layer is composed of sand, silt and clay, which allows little contamination of microorganisms in the groundwater. Furthermore, the water table is deeper than 10 metres, which allows little or no contamination to groundwater through infiltration of microorganisms from contaminated water. It has also been reported that only 25 percent of pit latrines are less than 10 m away from groundwater sources (KII Aug, 2018a).

With regard to emptying, 23 percent (F3) of excreta is safely emptied, originating from both septic tanks connected to soak pits and lined pits. There is a section in the municipality which has households who claim to have septic tanks that have not been emptied for more than ten years. This was attributed to interrupted water supply and the use of an alternative pit latrine constructed within the household compound (FGD Aug, 2018b). This has to be taken into consideration in order to understand the SFD properly.

In contrast, 64 percent of the faecal sludge is not emptied which originates from both safe and unsafe containment. The faecal sludge that was emptied from safe containment system originated from septic tanks connected to soak pits (T1A2C5); lined pits with semi-permeable walls and open bottom, no outlet or overflow (T1A5C10); and unlined pits, no outlet or

overflow. While the faecal sludge not emptied from unsafe containment system originated from the 100 percent unlined pits, no outlet or overflow, where there is a significant risk of groundwater pollution (T2A6C10) located in peripheral areas of the municipality.

Concerning transport, the sewage transported to decentralised treatment ponds in a contained manner is 5 percent (T1A1C4). 42 percent of the contained 5 percent managed to reach the treatment ponds. The remaining 58 percent spilt to the open ground through blockages before reaching an inlet to the ponds (KII Aug, 2018a; KII Aug, 2018d; KII Aug, 2018e). On the other hand, 100 percent of emptied sludge (23 percent) is transported but is not delivered to the treatment plant.

Regarding treatment, 70% percent of sewage is treated at the treatment ponds (KII Aug, 2018a; KII Aug, 2018d; KII Aug, 2018e). Contrary, 100 percent of faecal sludge transported using vacuum tanker is just disposed at an open sludge disposal site. In other words, the municipality does not have a sludge treatment plant. However, the municipality is planning to develop new centralised wastewater treatment plant at Belele that will possibly improve and increase wastewater treatment.

Overall, the Kasungu SFD presented in Figure 5 shows that 34 percent of excreta is unsafely managed, mainly originating from FS in septic tanks (T1A2C5) and lined pits (T1A5C10) which is emptied but not delivered to treatment.

In contrast, 66 percent of the excreta flow is safely managed. The majority of this 66 percent (except for 1 percent from safely managed wastewater in offsite systems) is attributable to excreta that remains in onsite containers such as unlined pits (T1A6C10), which are in areas where there is a low risk of groundwater pollution. The households cover and seal pits as they become full and construct replacements. As circumstances change, for example the population and population density increases over the medium- to long-term, this practise may not be sustainable and improved emptying, transport and treatment services may be required.

2.4 Certainty/uncertainty levels of associated data used for the SFD Matrix

Kasungu municipality did not have well segregated quantitative data regarding faecal sludge management. Particularly, there was no updated data for septic tanks and other improved sanitation system. For this reason, part of the SFD relied on assumptions and key informant interviews.

The most uncertain part of the SFD report is the emptying of faecal sludge in both septic tanks and lined pits. It was mentioned during FGD that some septic tanks and pits were never emptied since construction (FGD Aug, 2018b).

3 Service delivery context

3.1 Policy, legislation and regulation

3.1.1 Policy

In Malawi, laws are made by the parliament and give power to city councils and local assemblies to regulate pit latrine sludge through local by-laws. According to the Water Research Commission (2015), Malawi does not have specific legislation on faecal sludge management. However, the following national policies and regulations support pit latrine emptying as a sector in Malawi.

- Environment Management Act (1996), which regulates the handling, storage, transportation, classification, importation, exportation and destruction of waste, and monitoring of waste disposal sites, but makes no reference to pit latrine emptying.
- National Environmental Policy (2004), which sets national priorities for management, sustainable use and protection of the environment, but makes no reference to pit latrine emptying.
- National Water Policy (2005), which provides overall national guidance on water, sets minimum distance from a groundwater source to pit latrines and waste disposal facilities, but makes no reference to pit latrine emptying.
- National Sanitation Policy (2008), which provides overall national guidance on sanitation but makes limited reference to pit latrine emptying.
- Malawi Growth and Development Strategy (2012), which sets a national focus on actions and activities to introduce ventilated improved pit latrines to address sanitation goals, but makes no reference to pit latrine emptying.
- Water Resources Act (2013), which regulates the storage, treatment, discharge and disposal of waste that may pollute water, and sets fines for breach of these regulations, but makes no reference to pit latrine emptying.

In keeping with national sanitation policy, a zero-subsidy approach was adopted and applied by all implementers. The exception is vulnerable people, who will be given subsidies when ODF status is achieved in the area where they live (GoM, 2008). This provision continues to widen the gap in faecal sludge management because the majority of people living in small towns do not prioritise faecal sludge management due to their low-income status.

In terms of institutional set up, the Ministry of Agriculture, Irrigation and Water Development (MoAIWD) leads the water and sanitation sector. The ministry is responsible for the oversight of the water sector, including water resources management, irrigation, and water supply and sanitation. Urban and small-town water supply is the responsibility of the two urban water boards (Lilongwe and Blantyre) and the three regional water boards (Northern, Central, and Southern). The water boards report to the ministry on technical matters and to the Department of Statutory Corporations (DSC), which is under the Office of the President and Cabinet, on policy issues such as financial, administrative and managerial oversight (GoM, 2005).

The 1998 Local Government Act puts city councils in charge of sanitation services. At the same time, the Waterworks Act (1995) mandates urban water boards to provide sewerage services within their areas of jurisdiction.

Kasungu Municipal Council is headed by a mayor elected by open ballot from the nine elected ward councillors of the municipal council (Figure 6). The council also has a member of parliament whose area of jurisdiction includes the municipality, chiefs, religious leaders and representatives of interest groups such as the business community, women groups and youth. The Chief Executive Officer (CEO) leads the Council Secretariat, which is made up of directorates of administration, engineering, finance, planning and development, commerce and trade, and health and parks, which are responsible for planning and coordinating routine activities. The council is mandated to make by-laws to govern its operations and raise funds for basic services for its inhabitants (KUMC, 2018).

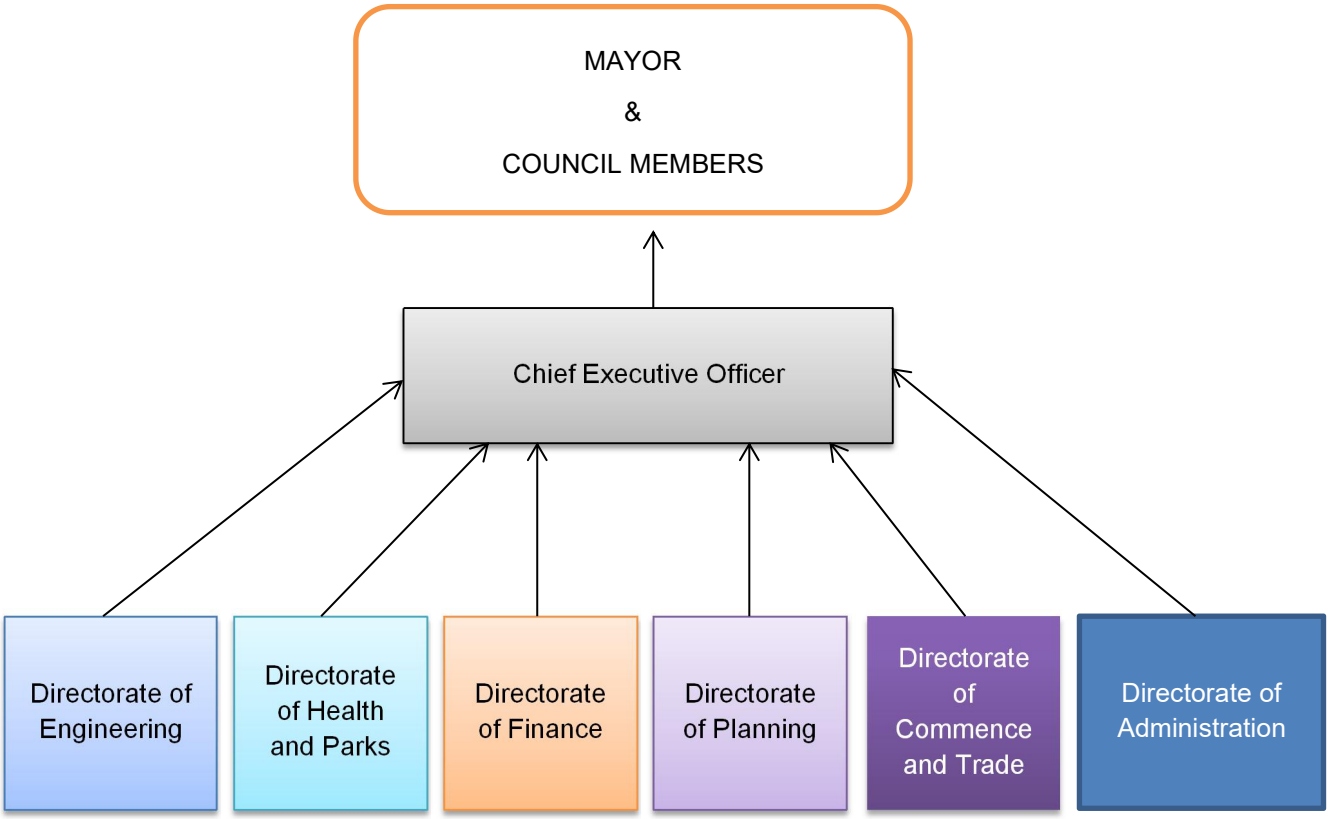

Figure 6: Formal Administrative Structure

3.1.2 Institutional roles

The main institutions responsible for sanitation are the Ministry of Agriculture, Irrigation and Water Development, city assemblies and the Ministry of Health and Population. However, water supply and sanitation are also provided by the private sector, civil-society organisations and international donors, which set up and fund their own water and sanitation projects (Water Research Commission, 2015).

3.1.2.1 Ministry of Agriculture, Irrigation and Water Development

The ministry is responsible for providing policy direction and coordinating sanitation and hygiene sub sector programmes. It also promotes private sector participation and investment in the delivery of water supply and sanitation services. It also promotes the provision of

septic tank and latrine emptying equipment in cities, municipalities and towns, as well as rehabilitation of existing and construction of new sewerage facilities/systems. Additionally, it facilitates rehabilitation and construction of sewerage facilities to cater for additional wastewater resulting from new water supply interventions (GoM, 2008).

3.1.2.2 Local Government (District, Town, Municipal and City Assemblies)

The roles of local government in sanitation include planning and co-ordinating the implementation of water and sanitation programmes at local assembly level in collaboration with relevant water utilities; conducting sanitation audit at community and household level to establish baselines on improved sanitation coverage and hygiene practices; providing and maintaining adequate numbers of improved sanitation facilities including urinals, toilets or latrines and hand washing facilities in all public places; and transferring management of sewage systems and works to water boards in line with the 1995 Water Works Act (GoM, 2008).

3.1.2.3 Ministry of Health

The responsibilities for the Ministry of Health include ensuring proper management and disposal of health care wastes to ensure public health safety and avoid pollution of the environment; promoting separation of health care waste at source into hazardous and non-hazardous waste using appropriate and internationally accepted colour codes; maintaining, rehabilitating and constructing sewerage systems and improved on-site sanitation facilities for health facilities with reticulated water supply systems; promoting health and hygiene education in water and sanitation services; and monitoring and providing guidance on drinking water quality (GoM, 2008).

3.1.2.4 Water Utilities

The roles of the water utilities include planning, designing, rehabilitating and constructing infrastructure for wastewater collection, treatment and disposal in their respective water areas in collaboration with local assemblies; collecting, transporting, treating and disposing of or recycling and re-using wastewater and promoting improved on-site sanitation services; collaborating with local authorities to promote hygiene and improved sanitation in low-income urban communities; developing and enforcing waterworks by-laws on the construction, delivery and connection of facilities for water supply and waterborne sanitation services in their water areas; ensuring adequate provision of wastewater treatment and disposal facilities for all new city, municipal, town and market centre water supply programmes and projects; and monitoring water quality within the water supply systems and promoting catchment management and pollution control (GoM, 2008).

3.1.2.5 Non-Governmental Organisations and Civil Society Organisations

These organisations assist in the provision of water supply and sanitation services in rural areas and to low income groups within urban centres. They also liaise between rural low-income communities and government/donors and other cooperating partners through local governments. They assist in sensitising communities on water and sanitation (GoM, 2005). Furthermore, they ensure integration of water supply, improved sanitation and hygiene education in all community-based water supply and sanitation programmes and projects; provide training in improved sanitation technologies and hygiene promotion to extension staff

working on their water and sanitation programmes; and promote recycling of organic liquid and solid wastes for production of organic fertilizers and biogas wherever applicable (GoM, 2008).

3.1.2.6 Private Sector

The roles of the private sector in sanitation are to invest in improved sanitation services and water resources development; provide capacity for consulting and contracting services in the water, sanitation and related industries; conduct research, develop and promote local manufacturing capacity for sanitation and water related services and technologies; collect, process, analyse and disseminate relevant data and information to all stakeholders within the water and sanitation sector in accordance with national guidelines and standards; and provide septic tank and pit latrine emptying services and sludge disposal (GoM, 2008).

3.1.3 Service provision

With respect to sanitation, city councils are currently in charge of sanitation services under the 1998 Local Government Act. At the same time, the 1995 Waterworks Act mandates urban water boards to provide sewerage services within their areas of jurisdiction. Despite having the mandate, no water boards provide sewerage services and ownership of all sewerage assets remains with the city councils. The Government of Malawi has decided to keep city sewerage systems as a city council responsibility until the water boards develop the necessary capacity to operate the systems.

Sanitation entrepreneurs provide private services such as septic tank and pit latrine emptying, construction of improved pit latrines and casting of sanitation platforms (Sanplat). In addition, sanitation and beautification agencies exist, which manage public toilet facilities.

Kasungu municipality has faecal sludge management services that are provided by the council, private providers and sanitation beautification agencies. In practice, the council provides the sewerage, septic and tank emptying services, while the private providers are involved in pit latrine emptying and construction of lined pit latrines that can be easily emptied. These services are accessible but are only affordable to middle to high income households and commercial institutions. The beautification agencies run the public toilets, which are accessible and affordable to people of all income levels.

3.1.4 Service standards

In Malawi, standardisation is guided by the Malawi Standards which are championed by the Malawi Bureau of Standards. The Malawi Bureau of Standards (MBS) is a statutory organisation established by a 1972 Act of Parliament (Chapter 51:02). It has the responsibility of preparing and promulgating national standards with a view of helping local industry deliver quality products and services, enabling them to compete effectively in world markets (Malawi Standards, 2015). On wastewater and faecal sludge management, the bureau has issued the following standards:

"MS 682-1:2002 WATER QUALITY – SAMPLING

Part 1 – Guidance on the design of sampling programmes and sampling techniques (23 p)

This part sets out the general principles for providing guidance on, the design of sampling programmes and sampling techniques for all aspects of sampling water (including waste

waters, sludges, effluents and bottom deposits). It does not include detailed instructions for specific sampling situations, which are covered in the various other parts of MS 682. Also, it does not include microbiological sampling, which is covered in ISO 19458.

MS 682-13:2013 WATER QUALITY - SAMPLING (16P) V

Part 3: Guidance on sampling sludges from sewage and water treatment work. (16p)

This part of gives guidance on the sampling of sludge from wastewater treatment works, water treatment works and industrial processes. It is applicable to all types of sludge arising from these works and to sludge of similar characteristics, for example septic tank sludge. Guidance is also given on the design of sampling programmes and techniques for the collection of samples."

3.2 Planning

3.2.1 Service targets

The Government of Malawi (GoM) has recently developed a medium-term strategy called the Malawi Growth and Development Strategy (MGDS III) – replacing MGDS II, which expired in 2016 – to create strong a basis for economic recovery and growth (GoM, 2017). The strategies are aligned towards the achieving the United Nations Sustainable Development Goals (SDGs), which are global agenda for inclusive and equitable growth, and the 2063 African Union Agenda.

Among the six priority areas highlighted in the MGDS III, sanitation issues were addressed in the Health and Population priority area. Regarding sanitation, the government plans to: provide and promote the use of improved and accessible sanitation facilities in all public places; promote adoption of safe water and sanitation practices at individual and household levels; and improve the management and disposal of both liquid and solid waste. No direct reference is made to faecal sludge management (GoM, 2017).

The Ministry of Irrigation and Water Development 2006-2011 Strategic Plan indicated that DWSS and Water Boards should be responsible for rehabilitating existing and constructing new sewerage systems; constructing improved sanitation facilities for low income urban communities; establishing and updating sanitation coverage databases; and monitoring and evaluation (GoM, 2006). At district level, Kasungu municipality has several plans that address the issues of water, sanitation and hygiene. These include the 2012-2017 Urban Development Plan, 2011-2016 Strategic Plan and 2014 - 2020 KUMC WASH Strategic Plan .

3.2.2 Investment

The Government of Malawi is determined to encourage trade and investment in the country as a way of attaining economic growth and development. To achieve this, the government established the Malawi Investment and Trade Centre (MITC) to act as a trade and inward investment promotion agency, promoting Malawi as an ideal destination for trade and investment in Africa and beyond. the MITC operates as a one-stop service centre for business start-ups, as mandated by the 2012 Investment and Export Promotion Act.

There are various sanitation investment options in Malawi, which include emptying services for both solid waste and liquid wastes, cleaning services and so forth. However, the 2012 Act does not include sanitation in its priority investment sectors (GoM, 2012).

There are various guidelines for investment in Malawi. One is that the prospective investors are required to invest at least US$ 50,000 to obtain an investment certificate from the Malawi Investment and Trade Centre (MITC) (GoM, 2012).

In Malawi, donors contribute approximately 80 percent of funding to the WASH sector. The national budget allocates just 0.08 percent to the total budget to the sector in the 2014/15 fiscal year. The funding focuses on development of water infrastructure; there is no budget for sanitation and hygiene. In the absence of any clear and coordinated plan for financing the Sector Investment Plan and the National Sanitation Master Plan and framework to quantify contributions from non-governmental organisations (NGOs) and private companies, actual investment in the WASH sector is difficult to trace. In 2012/13, the budget allocation to the water sector at district decreased to 0.34 percent, falling to 0.25 percent the following year. (WaterAid, 2016).

In the recent Malawi investment project plan, Kasungu municipality was considered in terms of water supply through the Central Region Water Board. The estimated cost of the investment is US$ 48,401,500 (GoM, 2016). Regarding sanitation, the municipal council has budgeted K 95,000,000 (US$ 129,604) for the construction of a fence at the municipal sludge disposal site (KII Aug, 2018).

3.3 Equity

3.3.1 Current choice of services for the urban poor

Malawi has a range of sanitation services for the urban areas, most of which are provided by the councils and private service providers. The country has centralised and decentralised sewer systems, septic tanks, other improved latrines and simple pit latrines (NSO, 2016). National Sanitation Policy (2008) requires each household in Malawi to own a sanitation facility of some kind to reduce the potential transmission of water-borne and sanitation related opportunistic diseases.

Similarly, Kasungu municipality has decentralised sewer systems that are used in public institutions. The rest use on-site sanitation facilities regardless of their economic status. Septic tanks are used in commercial areas and high-income residential areas. In middle-income areas, improved pit latrines are used, while simple pit latrines are most common in low-income areas (KII Aug, 2018a).

Although it is an obligation for each household to own a sanitation facility, most poor people in urban areas who cannot afford to construct a pit latrine rely on sharing toilet facilities with neighbours in the community. This is because the municipality follows a provision in National Sanitation Policy (2018) that prohibits subsidies for household sanitation services. These facilities are maintained by the owners (KII Aug, 2018a).

3.3.2 Plans and measures to reduce inequity

As a way to reduce inequity, the Nation Sanitation Policy has a special provision that allows the promotion of targeted subsidies for improved sanitation facilities for vulnerable and disadvantaged people at the household and community level (NSP, 2008). In line with this, the policy ensures that the implementation of sanitation and hygiene related activities, communities and extended families caring for orphans are assisted and empowered with the resources, services and skills to construction and maintain improved sanitation facilities.

In Kasungu municipality, communities organise themselves to construct pit latrines for the most vulnerable people such as orphans and the elderly. Regarding the construction of improved pit latrines, communities are now using village banks to acquire latrines such as fossa alterna that can be emptied as well as produce manure (FGD, 2018a).

3.4 Outputs

3.4.1 Capacity to meet service needs, demands and targets

Most residents in Kasungu municipality do not participate in faecal sludge management. Although there is no data on faecal sludge management, an interview with the municipal council's secretariat and community members revealed that few people are currently using the sanitation services (KII Aug, 2018h; FGD Aug, 2018).

The main reason for not emptying pits is the high service charges, which most of the population cannot afford. For instance, the cost for emptying using the 6,000-litre municipal tanker is K45,000 (US$ 61) per trip, while the average household income is US $135. For this reason, the emptying service is largely used by commercial institutions and a few residents in high-income locations (KII Aug, 2018h).

Similarly, poor residents cannot afford the K 25,000 (US$ 34) charged by masons to empty a pit latrine or the K45,000 (US$ 61) fee charged by private service providers to empty a septic tank. In any case, most of the residents who do make use of emptying services prefer private service providers to the municipal service because the private service providers allow customers to pay the service charge in instalments. The municipality emptying service requires payment of the service charge in advance (FGD, 2018a).

3.4.2 Monitoring and reporting access to services

Sanitation issues in Malawi are monitored by the M&E framework that was developed by the MoAIWD under the guidance of the Ministry of Economic Planning and Development (MEPD), which developed the M&E master plan for the country (NSP, 2008). However, specific monitoring roles were distributed to various stakeholders as follows:

- MoAIWD: establish a national MIS and supporting databases on sanitation and hygiene practices; and collect, process, analyse and disseminate relevant data and information to all stakeholders within the sanitation sub-sector.
- Water utilities: establish MIS and supporting databases on water supply and improved sanitation; and collect, process, analyse and disseminate relevant water supply and sanitation data and information to all stakeholders.

- Ministry of Education: conduct inspections of sanitary facilities at learning institutions to ensure compliance with stipulated design standards, public health norms and environmental safety guidelines.
- Ministries Responsible for Natural Resources (Minerals, Forestry, Fisheries, Environment, and Tourism): ensure compliance to effluent discharge standards and guidelines at all industrial premises including conducting pre-investment EIA.
- Ministry of Health: conduct sanitary inspections in public and private institutions; ensure proper colour coding of facilities used for receiving, collecting and transporting health care waste.
- Local government (districts, towns, municipalities, city assemblies): conduct sanitation audits at community and household level to establish baselines on improved sanitation coverage and hygiene practices; and establish MIS and supporting databases on improved sanitation, hygiene practices and coverage of potable water supply.

In Kasungu municipality, the district assemblies form an integral part of the monitoring process. Members of the Village Development Committee (VDC) and the District Executive Committee (DEC) work hand-in-hand to ensure that projects being implemented under the NSP are properly monitored (KII Aug, 2018h).

Annual monitoring reports are produced and made available to the public for inspection and information. In addition, annual sanitation and hygiene conferences take place during 'Sanitation Week', providing an avenue for the annual review of progress and problems with the implementation plan (NSP, 2008).

3.5 Expansion

3.5.1 Stimulating demand for services

Kasungu municipality is growing fast. In response to the increase in demand for sanitation facilities and services, the municipality is planning to construct a centralised sewerage system in Belele. The budget for the sewer installation and pond upgrade is MKW472,541,300 (US$ 644,668) (Eales & Gibson, 2018).

3.5.2 Strengthening service provider roles

The National Sanitation policy has a provision that strengthens service providers by training artisans and sanitation promoters in the production and marketing of sanitation hardware respectively in the private sector (NSP, 2008). However, there is no provision for private-sector engagement on faecal sludge management.

The utility bodies recently sent the zone manager for Kasungu to Japan to strengthen his capacity to manage the sewer systems. Interestingly, in Kasungu management of the sewer systems, which requires significant competencies, remains the responsibility of the municipal council (KII Aug, 2018p).

4 Stakeholder Engagement

Kasungu Municipality was contacted in advance to seek permission for this study. A follow up email was sent to verify the study and arrange the first meeting with all the stakeholders that outlined the procedures for the study. Twelve key informant interviews (KIIs) were arranged with the main stakeholders in faecal sludge management. The key stakeholders were from the municipality, hospital, education institutions, Central Region water board, NGOs and service providers. All interviews were conducted at the respondents' work places.

4.1 Key Informant Interviews

The interviews were conducted using an unstructured questionnaire. A few interviews were done jointly with individuals from the same institution, in order to gather the much-needed data. For instance, the Chief Executive Officer required the presence of the Director of Planning and Development, Director of Public Works and the Director of Finance. Similarly, the Kasungu District WASH Coordinator required the presence of HMIS Data clerks. The informants were purposively selected to collect the data that was required to fill the gaps in the information gathered during the desk review. The key informants were selected from key stakeholders in the municipality's faecal sludge management.

4.2 Focus Group Discussions

Focus group discussions were purposively arranged in two locations within the municipality: one where pit latrines were prevalent (Gundani) and another where there were a moderate number of septic tanks (Kasalika). These two areas were chosen because much had already discussed during the KIIs about locations that had larger numbers of septic tanks (for instance Kapalankhwazi). Ideally, the focus group discussions were meant to collect enough data on faecal sludge management for triangulation. Each focus group consisted of ten people. To allow each group to speak freely on household water and sanitation issues, there were separate groups of men and women.

4.3 Observations

At every institution that was visited, observations were made to gather visual evidence on the status of the sanitation facilities. The visits allowed the researcher to take photos at faecal sludge management sites, which were used to cross-check with the data provide during the KIIs and FGDs. The observations included visiting household toilets, public latrines, institutional toilets, faecal sludge disposal sites, septic tanks, sewer pipes, oxidation ponds and groundwater water sources. The researcher also visited the municipal faecal sludge disposal site to get a clear picture of how sludge is disposed and managed at the site.

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Moses Kalenga,

Ellen Bolokonya

WaterAid

Gift Luwe

Annie Msosa

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KII Aug, 2018c. Interview with Agness Kaumba and Esther Kaonga, Nurse Midwives for Kasungu District Hospital Waiting Homes.

KII Aug, 2018d. Interview with Alexis F. Bwanthi, Head teacher at Chayamba Secondary School.

KII Aug, 2018e. Interview with Lauden Chimangeni, Principal at Kasungu Teachers Training College.

KII Aug, 2018f. Interview with Precious Kalola, Deputy Head teacher at Kasungu Secondary School.

KII Aug, 2018g. Interview with Samuel Mbera, Inspector at Kasungu Prison.

KII Aug, 2018h. Interview with Grace Chirwa, Chief Executive Officer (CEO) at Kasungu Municipal Council.

KII Aug, 2018i. Interview with Martin Kazanga, Director of Planning and Development (DPD) at Kasungu Municipal Council.

KII Aug, 2018j. Interview with Moses Zimba, Director of Public Works (DPW) at Kasungu Municipal Council.

KII Aug, 2018k. Interview with Barnes Saka, WASH Officer at MATAMA.

KII Aug, 2018l. Interview with Bannet Dzonzi, toilet beautification agent at Kasungu Depot.

KII Aug, 2018m. Interview with Gift Khayiza, toilet beautification agent at Kasungu Tarven.

KII Aug, 2018n. Interview with Bentry Banda, private service provider at Gundani in Kasungu.

KII Aug, 2018o. Interview with Tendai Banda, private service provider and secretary for Kasungu Girls CBO.

KII Aug, 2018p. Interview with Moses Kalenga, Zone Manager at Central Region Water Board (CRWB).

KII Aug, 2018q. Interview with Ellen Bolokonya, Chemist at Central Region Water Board (CRWB).

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7 Appendix

7.1 Appendix 1: Stakeholder identification

Name of organisation	Name of contact person	Position	Influence (high/moderate/low)	Interest (high/moderate/low)
Kasungu District Hospital	Wales Kazonde	WASH Coordinator of	high	high
Kasungu Municipal Council	Grace Chirwa,	Chief Executive Officer	high	high
Kasungu Municipal Council	Martin Kazanga	DPD	high	high
Kasungu Municipal Council	Moses Zimba	DPW	high	high
MATAMA	Berness Saka	Project Officer	high	high
TTC / ADD	Lauden Chimangeni	Principal	high	high
Chayamba Secondary School	Alexis F. Bwanthi	Head teacher	high	high
Kasungu Prison	Samuel Mbera	Inspector	high	high
CRWB	Moses Kalenga	Zone Manager	high	high