SFD Report

Kakuma
Kenya

Final Report

This SFD Report - Intermediate - was prepared by
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SFD Report Kakuma, Kenya 2018

Produced by: GFA Consulting Group GmbH

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This Executive Summary and SFD Report are available from:

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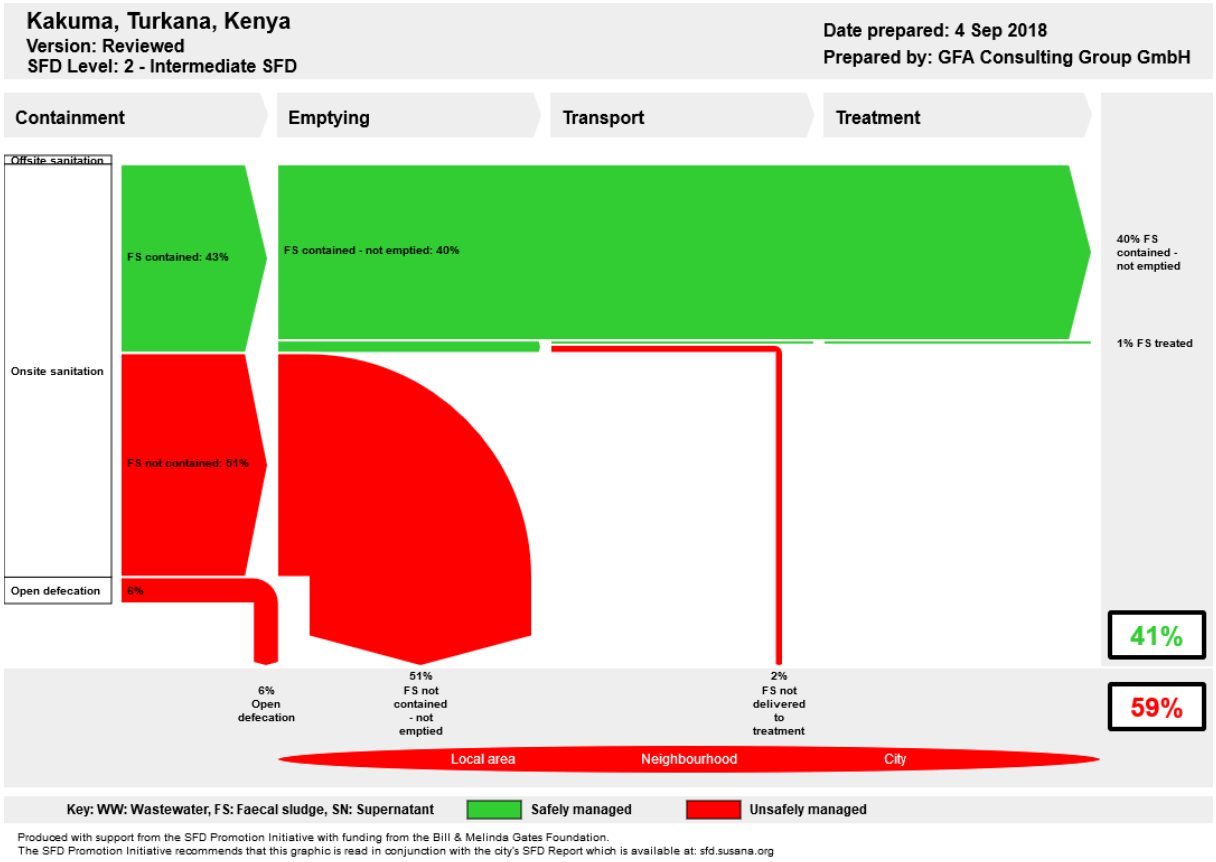
1. The SFD Graphic



Produced with support from the SFD Promotion Initiative with funding from the Bill & Melinda Gates Foundation.
The SFD Promotion Initiative recommends that this graphic is read in conjunction with the city's SFD Report which is available at: sfd.susana.org

2. Diagram information

SFD Level:

This is an Intermediate level SFD report.

Produced by:

This SFD report was produced by GFA Consulting Group GmbH.

Collaborating partners:

- Sanivation
- Norwegian Refugee Council (NRC)
- GIZ Programme Support to Refugees, especially Voluntary Returnees and Host Communities in Kakuma (GIZ / SRHC)
- Turkana-West Sub-County
- Kakuma Ward Administration

Status: This is a final SFD report

Date of production: 18/09/2018

3. General city information

The SFD graphic and report covers Kakuma town and Kakuma refugee camp. Kakuma town is located in northern Kenya, in the north-western part of Turkana County approximately 123 km north of the county capital Lodwar and about 100 km east from the border to South Sudan. Kakuma town is located on the eastern bank of Tarach River. In 2018, the town population is around 58,878 inhabitants. This projection is based on an annual population growth rate of 6,61% (Turkana County Government, 2013).

Kakuma refugee camp is located on the north-western bank of Tarach River and can be subdivided into four settlement sections, namely Kakuma I, II, III and IV. The population density within the camp is approximately 12,000 to 13,000 persons per km², which is about 1,000 times that of the host Turkana community (Sanghi et. al, 2016). Kakuma I, established in 1992, stretches along the riverbank and is restricted by the Lodwar-Lokichoggio highway to the South. Kakuma I has grown naturally over the years and is now the most congested zone of the camp, whilst Kakuma IV, established only in 2014, is less densely populated. In July 2018, Kakuma camp hosted 147,744 refugees (UNHCR, 2018). The population size within the camp is highly dependent on and fluctuates with the security situation in the neighbouring countries, foremost South Sudan (Sanghi et. al, 2016)

4. Service outcomes

The SFD graphic and this report describe both the situation in the refugee camp as well as in the town. It is important to note, that there is no integrated data on sanitation coverage and technologies used for the Kakuma refugee camp and the town, and hence two separate data sets were combined.

According to UN-Habitat (2017), the sanitation facilities used in Kakuma town are unlined pit latrines (67%) of which 15% are shared latrines. Partly lined pit latrines are used by 14.4 % of the town population and septic tanks by 1.7 %. Turkana County has the highest open defecation (OD) rate in Kenya (MoH, 2016a). The exceptionally high OD rate can be explained by the partly nomadic pastoralist way of life of the rural population. In the urban centres, OD is significantly less common but still prevalent. UN-Habitat (2017) estimates that 15.3 % of the town's population practice open defecation.

In the camp, UNHCR through NRC provides communal toilets in the reception centres, block latrines in schools and communal and household toilets in the camps. The NRC standard household toilet is a simple (unlined) pit latrine with a domed cement slab for squatting (with lid) and a corrugated iron sheet super structure without a roof. 75% of the households use a pit latrine (unlined and abandoned when full) which is located on their plot and 19.8% use a shared pit latrine. 1.5% of the camp population use septic tanks. OD is estimated to be 2.9% (UN-Habitat, 2017)

The social enterprise Sanivation has installed 250 container-based urine-diversion toilets for households in Kakuma 1. The faeces are collected in a bucket that is lined with a plastic bag whilst the urine is diverted into a soak pit. Those toilets currently contribute to about 1% of the total distribution of containment options.

The combined proportions for the camp as well as the host community are given in Tab. 1.

Type	Town	Camp	Total
Pit latrine on plot	52%	75%	68%
Shared pit latrine	15%	20%	18%
Improved pit	14%		4%
Septic tank	2%	2%	2%
Open defecation	15%	3%	6%

Tab. 1: Types of toilets used in Kakuma camp/town

Most pit latrines in town and none of the pit latrines in the camp are not emptied when full but are abandoned. Particularly in the densely populated camp areas (and hereof specially in Kakuma camp I and II) this increasingly leads to a lack of space to construct new toilets and occasionally exposes the population to health risks due to insufficient covering of filled-up toilets. Private sector exhauster truck operators and the Kakuma based Community Based Organization (CBO) USAFI offer emptying of septic tanks. The service is rather costly since the exhauster truck needs to be hired from Lokichoggio. USAFI does not have a vacuum truck, or exhauster truck as called in Kenya, but hires a truck from a private business. Due to the high service costs, only few households have a septic tank and most septic tanks are attributed to businesses, institutions or aid agencies.

There is currently no treatment facility to safely treat the sludge from septic tanks or household latrines in the entire county. The sludge from septic tanks is transported either to a disposal site around 10 km outside town or mainly to unregulated dumping sites 'in the desert'.

This means that services along the sanitation chain are currently only provided for the facilities within the Sanivation business model. The waste from the toilets is collected twice a week and transported to a dehydration plant, which processes the faecal matter into briquettes that can be used as a charcoal alternative. At its current capacity, the site can treat/process waste from around 2,000 household toilets. However, the business model developed by Sanivation for the sale of the reused product is based on 500 household toilets. If more households were to be included into the emptying scheme, a market assessment for an alternative reuse product would be necessary (Sanivation 2017b).

Fig.1: Sanivation dehydration plant (source: Sanivation)

Presently, groundwater is the only available source of water for the Kakuma Refugee Camp and town. Whilst the hydrogeological conditions influencing the groundwater pollution risk are the same for the refugee camp and the host community, the practices of groundwater

abstraction are putting the host community at a higher risk to groundwater contamination than the camp. Water for the camp as well as the host community is pumped from boreholes that are located along the banks of River Tarach (also referred to as Lagga Tarach). In the camp, the water is distributed via a piped distribution system to various water points (taps). In Turkana town the local water service provider supplies via water kiosks (6) and a small number of individual household connections. In addition, people in the host community fetch water from private boreholes, shallow-wells and improvised wells (scoop holes) in the river bed or at the river banks (UN-Habitat, 2017). Due to the more chaotic groundwater abstraction and siting of latrines in Kakuma town, the groundwater pollution risk in the host community was assessed as 'high' whereas it was estimated to be 'low' in the well managed camp environment. This leads to the contrast that abandoned pit latrines in the camp are recognized as 'safely managed in-situ treatment' whereas the same sanitation option in Kakuma town contributes to the proportion of 'unsafely managed faecal sludge'.

5. Service delivery context

There is a separation of institutional roles and responsibilities between sanitation service delivery in the refugee camp and in town:

In Kakuma town, the County and its sub-structures are the lead institutions for sanitation service provision. The administrative structures of the devolved system of County Governments include the County, the Sub-County and the Ward. According to the Turkana County Water and Sewerage Services Bill (2017), the Turkana County Water Department has the overall responsibility for water, sewerage and sanitation. The Sub-County Public Health Department is responsible for implementing public health and hygiene promotion campaigns such as Community-Led Total Sanitation (CLTS).

Besides the national legal and policy framework, the most important legal, planning and policy documents for sanitation in Kakuma are:

- Turkana County Water, Sanitation Services Sector Strategic Plan 2017 – 2021
- Turkana County Water and Sewerage Services Bill, 2017
- County Integrated Development Plan (CIDP) 2013-2017

In Kakuma refugee camp, the United Nation High Commissioner for Refugees (UNHCR) is responsible for the management of provision of basic services in Kakuma refugee camp. UNHCR has delegated the implementation of WASH related activities within Kakuma camps and Kalobeyei settlements to the Norwegian Refugee Council (NRC). For hygiene promotion, NRC cooperates with so-called health partners, which is the International Rescue Committee (IRC) in Kakuma camp. School WASH is organised in cooperation with the Lutheran World Federation (LWF) which is the main education partner in the refugee camps in Kakuma and Kalobeyei.

There are so far hardly any established sanitation services in Kakuma town. Households are expected to organise and fund their sanitation facilities themselves. Digging of toilets is organised privately or using casual labour. Emptying of pit latrines is not very common and septic tanks are used by and affordable for few households. In addition, the majority of the toilets for the host community and the refugee community are pit latrines which are not suitable for emptying. Exhauster services are currently only in demand by institutions, NGOs, businesses or aid agencies.

There are plans to construct a decentralised sludge treatment facility for Kakuma town and camp. The technology and operational model still need to be decided upon. According to the current planning, the facility will be operational by 2020 (GIZ, 2018)

Kenya has no comprehensive regulatory framework for on-site sanitation. According to the Turkana County Water and Sewerage Services Bill (2017), the Turkana County Water Department shall develop standards and regulations for water and sanitation service provision in the county.

NRC aims to provide household toilets in the camp. However, currently, most toilets are shared between more than one household, which is not compliant with the UNHCR WASH guidelines for post-emergency refugee setting (UNHCR, 2018).

Fig. 2: Communal toilet in the reception

6. Overview of stakeholders

The main stakeholders in the current institutional and organisational set-up in Kakuma are summarised in the table below.

Key Stakeholders	Institutions/Organizations
Public Institutions	Turkana County, Turkana-West Sub-County, Kakuma Ward
Non-governmental Organizations	NRC, LWF, IRC
Private Sector	Private exhauster truck owners, Sanivation pit emptiers, USAFI, local water service provider (KAWASEPRO)
Development Partners, Donors	UNHCR, UN-Habitat, World Bank, Danida, GIZ
Others	Sanivation

Tab. 2: Key sanitation stakeholders in Kakuma camp/town

There are plans to establish and support a water service provider under WASREB license in Kakuma town. It is likely that such a provider would also play a role in sanitation services e.g. through direct or delegated management of the planned sludge treatment site as well as the emptying services in the camp and Kakuma town.

7. Process of SFD development

This SFD was developed as part of the assignment "Production of 10 SFD reports for cities around the world" commissioned by the GIZ Sector Programme Sustainable Sanitation. The field research contributing to the compilation of this report was carried out as part of a sanitation assessment mission under a cooperation of the GIZ Water Sector Reform Programme, Kenya and the GIZ Programme Support to Refugees, especially Voluntary Returnees and Host Communities in Kakuma (GIZ/SRHC) which took place in October/November 2017. No specific field research was carried out during the actual compilation of the report. Data uncertainties or additional required information was followed up via email and skype from the established contact. The SFD has not been validated by the County authorities.

8. Credibility of data

This SFD report was based on interviews, field observations and literature review. Key informant interviews were carried out with eight (8) institutions, NGOs, aid agencies. Follow up interviews were carried out via skype/email. There is no consistent data on open defecation prevalence in town and in the camp. The groundwater vulnerability in town as well as in the camp would need to be studied in more detail.

9. List of data sources

- GIZ 2018. Various discussions with GIZ SRHC programme manager in Kakuma and Nairobi. January – March 2018.
- GoK 2016. Water Act. Nairobi: Government of the Republic of Kenya (GoK)
- Kakuma Ward Administration 2017. Interview Environmental and Public Health Officer in Kakuma. October 2017.
- NRC 2017a. Improvement and maintenance of water supply, sanitation and hygiene (WASH) conditions in Kakuma Refugee Camp. Latrine Census Report. Kakuma: Norwegian Refugee Council.
- NRC 2017b. Interview with WASH Officers of NRC in Kakuma. October 2017.
- NRC 2018a. Knowledge, Attitudes and Practices Survey (KAP) on Water, Sanitation and Hygiene (WASH) in Kakuma Refugee Camp, Kenya. Kakuma: Norwegian Refugee Council.
- NRC 2018b. Email and Skype exchange with NRC WASH Coordinator Kakuma. August – September 2018.
- Sanivation, 2018. Email and Skype exchange with Director of Humanitarian Programmes of Sanivation. August – September 2018.
- Turkana County Government 2017. Turkana County Water, Sanitation Services Sector Strategic Plan 2017-2021. Lodwar: Republic of Kenya.
- Turkana County Government 2018. Turkana County Water and Sewerage Services Bill. Lodwar: Republic of Kenya.
- Turkana-West Sub-County 2017. Meeting with Sub-County Health Officers in Kakuma. October 2017.
- UN-Habitat 2017. KISEDP Socio-Economic and Mapping Baseline Survey Report, 2016. Nairobi: UN-Habitat.
- UNHCR 2018b. UNHCR WASH Manual: Practical Guidance for Refugee Settings. Geneva: United Nations High Commissioner for Refugees.
- USAFI 2017. Interviews and observations during field visits with USAFI in Kakuma. October and November 2017.

SFD Kakuma, Kenya, 2018

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Abbreviations

ASALs	Arid and Semi-Arid Lands
CIDP	County Integrated Development Plan
CLTS	Community Led Total Sanitation
GIZ	German Development Cooperation
IRC	International Rescue Committee
KAWASEPRO	Kakuma Water Services Provider
KISEDP	Kalobeyei Integrated Social and Economic Development Programme
LWF	Lutheran World Federation
MoH	Ministry of Health
MoENR	Ministry of Environment and Naturals Resources
MoWS	Ministry of Water and Sanitation
NEMA	National Environmental Management Authority
NGO	Non-Governmental Organization
NRC	Norwegian Refugee Council
PSF	Public Sanitation Facility
SFD	Shit-flow Diagram
SRHC	Support to Refugees & Host Communities (GIZ)
UN-Habitat	United Nations Human Settlement Programme
UNHCR	United Nations High Commissioner for Refugees
WFP	World Food Programme
WASH	Water, Sanitation and Hygiene
WASREB	Water Service Regulatory Board
WSP	Water Service Provider
WRA	Water Resources Authority
WSTF	Water Sector Trust Fund

1 City context

Kakuma town is located in northern Kenya, in the north-western part of Turkana County approximately 123 km north of the county capital Lodwar and about 100 km east from the border to South Sudan. Kakuma town is located on the eastern bank of Tarach River (Figure 1).

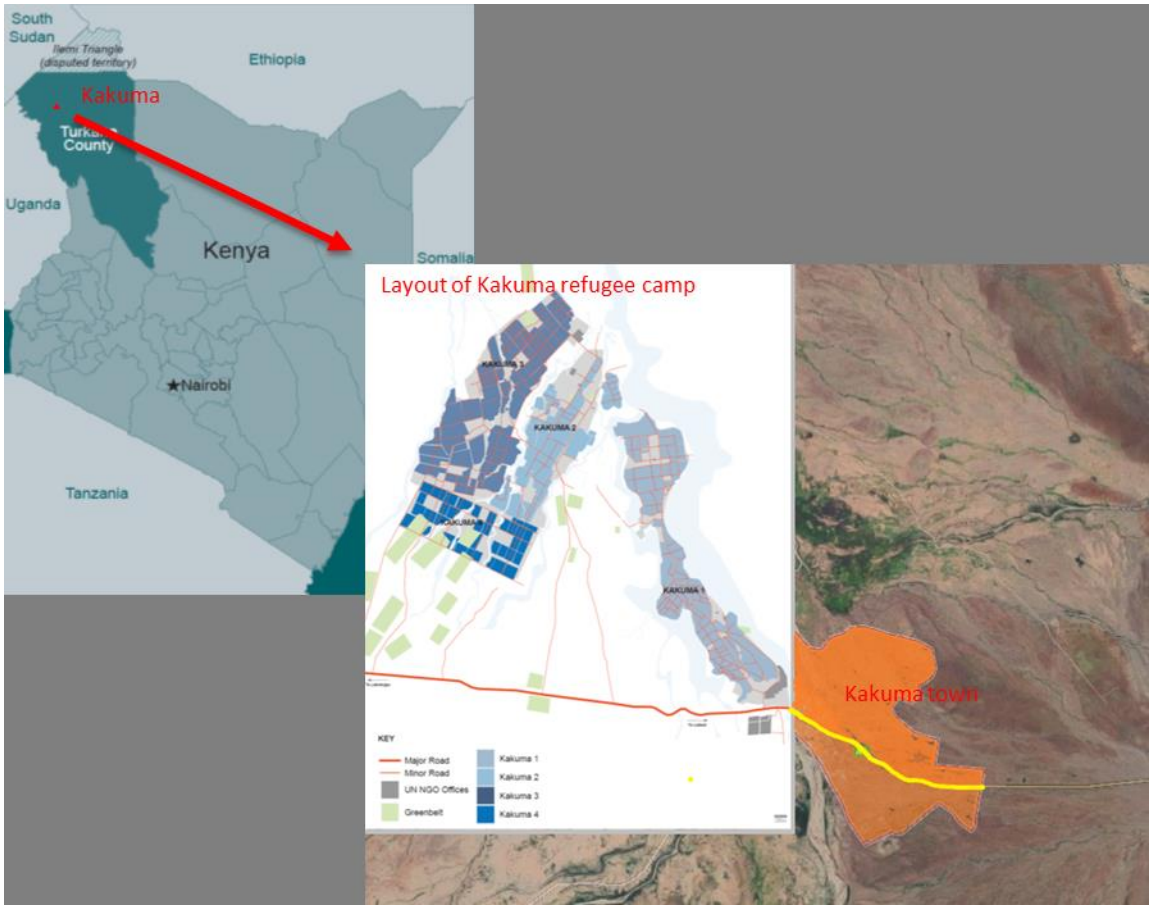

Figure 1: Location of Kakuma town and layout of camp

(adapted from Sanghi et al, 2016 and Google maps)

According to projections based on the national census of 2009, it is estimated that in 2018, the town population is around 58,878 inhabitants. This projection is based on an annual population growth rate of 6,61% (Turkana County Government, 2013). Vemuru et. al. (2016) describe the huge impact the establishment of the refugee camp has had a on the demographic development and how it transformed the socio-economic dynamics of the town. Prior to the establishment of the refugee camp in 1992, Kakuma was a small market place which was a culturally and economically significant location for the Turkana pastoralists from the area. Kakuma also served as a rest-and-fuel stop for truck drivers on the highway that links Kitale in Western Kenya to Juba, South Sudan.

Kakuma refugee camp is located on the north-western bank of Tarach River and can be subdivided into four (4) settlement sections, namely Kakuma I, II, III and IV. The population density within the camp is approximately 12,000 to 13,000 persons per km², which is about 1,000 times that of the host Turkana community (Sanghi et. al, 2016). Kakuma I, which was the original camp set-up in 1992, stretches along the riverbank and is restricted by the Lodwar-

Lokichoggio highway to the South. Kakuma I was established by the United Nations High Commission for Refugee (UNHCR) and the World Food Programme (WFP). Kakuma I has grown naturally over the years and is now the most congested zone of the camp, whilst Kakuma IV, which was only established in 2014, is less densely populated. In July 2018, Kakuma camp hosted 147,744 refugees (UNHCR, 2018a). The population size within the camp is highly dependent on and fluctuates with the security situation in the neighbouring countries, foremost South Sudan (Sanghi et. al, 2016).

Kalobeyei settlement, which was established in 2015 to take the strain off Kakuma camp, and located around 40 km northwest of Kakuma is not subject to this report.

Turkana County belongs to Kenya's arid and semi-arid lands (ASALs), where the total demand of water often exceeds the water available to people and livestock. In general, there are two rainfall seasons, the long rains usually occur between April and July and the short rains between October and November. The rainfall, however, follows an erratic pattern and most precipitation occurs as torrential rainfalls (Turkana County Government, 2015). Annual rainfall in Kakuma averages at only 321 mm. (Advisian, 2016). Drought and famine events have recurred regularly for multiple years with small intervals of around 5 - 6 years separating them (Vemuru, et. al., 2016). The population in Turkana has still not fully recovered from the severe drought in 2016/2017. The average annual temperature in Kakuma is 27.6°C and temperatures rarely fall below 21°C (Advisian, 2016).

Kakuma is situated in the North-Western zone of the Kenyan rift, the Lotikipi plains which are part of the Turkana depression, at an elevation of approximately 600m above sea level. The vegetation is characterized by sparse bushland and savannah. Tarach River is an ephemeral river which flows only a few days per year (Sottas, 2013).

There are no major industries in Kakuma and main economic activities are subsistence pastoralism, small-scale trading and casual labour (Sanghi et. al, 2016).

2 Service Outcomes

2.1 Overview

This section presents the range of infrastructure/technologies, methods and services designed to support the management of faecal sludge through the sanitation service chain in Kakuma town and refugee camp (Figure 2). For details on quantitative estimations, refer to section 2.2.

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					Significant risk of GW pollution Low risk of GW pollution					Not Applicable
Septic tank					T2A2C5 T1A2C5					
Fully lined tank (sealed)					Significant risk of GW pollution Low risk of GW pollution					T1A3C10
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									T2A5C10 Low risk of GW pollution
Unlined pit										Significant risk of GW pollution Low risk of GW pollution
Pit (all types), never emptied but abandoned when full and covered with soil										T2B7C10 T1B7C10
Pit (all types), never emptied, abandoned when full but NOT adequately covered with soil										T1B8C10
User interface failed, damaged, collapsed or flooded										
Containment (septic tank or tank or pit latrine) failed, damaged, collapsed or flooded										T1B10C10
No toilet. Open defecation	Not Applicable							T1B11 C7 TO C9		Not Applicable

Figure 2: Selection grid of Kakuma town and refugee camp

2.1.1 Containment

Kakuma Town

There is no off-site sanitation system in Kakuma town or camp.

According to UN-Habitat (2017) the sanitation facilities used in Kakuma town are unlined pit latrines (67%) of which 15.3% are shared latrine. Partly lined pit latrines are used by 14.4% of the town population and septic tanks by (1.7%). Open defecation (OD) is a widespread problem in Turkana County. With 82.2%, the county has the highest open defecation rate in Kenya (MoH, 2016). The exceptionally high OD rate can be explained by the partly nomadic pastoralist way of life of the rural population. In the urban centres, OD is significantly less common but it still prevalent. UN-Habitat (2017) estimates that 15.3% of the town's population practice open defecation.

Unlined pit latrines are the primary onsite sanitation technology used by most households in Kakuma. Institutions, businesses, NGOs or few prosperous households use septic tanks or fully lined tanks (Kakuma Ward Administration, 2017). There are no major industries in Kakuma and thus industrial wastewater or sludge can be neglected. Water is scarce in Turkana. There are only around 400 individual water connections in Kakuma town (KAWASEPRO, 2017) and water supply is regularly interrupted. Therefore, water based sanitation facilities for individual households are rather the exception.

The only public sanitation facility (PSF) in Kakuma town is located at a busy market. According to the Ward Administrator and the CBO USAFI the toilet was constructed in 2012, but had never been connected to the piped network. After the County Administration failed to provide sufficient water via a water truck, it has fallen into disrepair due to lack of water for flushing. It has been out of service for a few years and is now used as storage (USAFI, 2017).

Kakuma Camp

In the camp, UNHCR through NRC provides communal toilets in the reception centres, block latrines in schools and communal and household toilets in the camps (Figure 3). The NRC standard household toilet is a simple (unlined) pit latrine with a domed cement slab for squatting (with lid) and a corrugated iron sheet super structure without a roof. NRC has also a small number of elevated urine diversion toilets and non-emptyable twin pit latrines. According to UN-Habitat (2017), 75% of the households use a pit latrine (unlined and abandoned when full) which is located on their plot and 19.8% use a shared pit latrine (no own pit latrine on their plot, they share an unlined pit latrine with their neighbours). 1.5% of the camp population use septic tanks. Open defecation is estimated to be 2.9%.

Communal toilets are lined pit latrines with open bottoms. Some of those can be emptied, others are abandoned once filled up.

The international social enterprise Sanivation has installed 250 container-based urine-diversion toilets for households in Kakuma 1. The faeces are collected in a bucket that is lined with a plastic bag whilst the urine is diverted into a soak pit. The plastic bags are exchanged twice a week. Sanivation plans to install an additional 250 toilets until the end of October 2018. (Sanivation, 2018).

Figure 3:Toilets in Kakuma refugee camp (Sanivation hh toilet, communal toilet, NRC hh toilet)

2.1.2 Emptying services

So far, it is not possible to empty most toilets in Kakuma and there are no established emptying services for pit latrines in Kakuma (Kakuma Ward Administration, 2017). The pit latrines in the camp and in town are not emptied but abandoned once full.

Kakuma Camp

Particularly in the densely populated camp areas (and hereof specially in Kakuma camp I and II) this increasingly leads to a lack of space to construct new toilets and occasionally exposes the population to health risks due to insufficient covering of filled-up toilets (NRC, 2017b).

As mentioned above, Sanivation organizes the emptying of the container-based toilets under their business model. Emptying of the toilets is organised by Sanivation and is free of charge for the refugees. The plastic bags are transported to the treatment facility on motorized tricycles (Figure 4). Sanivation's sanitation concept in Kakuma is based on recovery of operation cost through the production and sales of reuse products (see *section 2.1.4* and *2.1.5*).

Figure 4: Sanivation emptying and transport (source: Sanivation)

Private sector vacuum truck operators and the Kakuma based Community Based Organization (CBO) USAFI offer septic tank emptying services within the town and camps. The service is rather costly since the exhauster truck needs to be hired from Lokichoggio. USAFI does not have a vacuum truck but hires a truck from a private business. Costs for emptying are around USD250 to 300 (USAFI, 2017).

2.1.3 Transport

The sludge from septic tanks is transported by exhauster trucks either to the disposal site (see below) or mainly to unregulated dumping sites 'in the desert'.

Sanivation transports the excreta from the container based toilets to their treatment facility via manual push-carts and motorized tricycles.

2.1.4 Treatment

There is currently no treatment facility to safely treat the sludge from septic tanks or household latrines in Turkana County.

Only the excreta collected from the Sanivation toilets is treated. Sanivation is operating a dehydration plant, which processes the faecal matter into briquettes that can be used as a charcoal alternative. At its current capacity the site can treat/process waste from around 2,000 household toilets. However, the business model developed by Sanivation for the sale of the reuse product is based on 500 household toilets. If more households were to be included into the emptying scheme, a market assessment for an alternative reuse product would be necessary (Sanivation, 2017b).

2.1.5 End-use / Disposal

There is a fenced solid waste and sludge disposal site approximately 10km outside of Kakuma town on the road towards Lokichoggio at coordinates 3˚43'10.36" N 34˚47'10.04" E.

The Sub-County Administration has delegated the management of the site to USAFI, however, the site is barely used since USAFI's pick-up truck used for solid waste collection burnt in an accident in 2017 and has not been replaced yet. They now operate with hand-carts (donated by IRC) and thus cannot access the solid waste collection any longer. According to USAFI, they dump about one exhauster truck per month of faecal sludge at the site (Kakuma Ward Administration, 2017). The remaining faecal sludge is dumped unregulated into the environment (NRC, 2018b). During the site visit in December 2017, the fence of the site was partly destroyed and the site appeared to be no longer in use. Based on a preliminary estimate from Sanivation, the total sludge volume from septic tanks from the compounds of the aid agencies should be around 600 – 650 tons (14 truckloads per year) (Sanivation, 2018). According to NRC, there is increasing pressure from the National Environmental Management Agency (NEMA) that sludge should be disposed safely, especially sludge produced through the aid agencies (NRC Interview). The Sub-County government also confirmed their interest in the establishment of a sludge treatment site (KII 5, 2017).

As described above, Sanivation produces briquettes from faecal waste and charcoal dust in their dehydration plant. The briquettes are sold to households in Kakuma at Ksh 20 ($US 0.2) per kilo -which is the normal price for charcoal in Kakuma (Sanivation, 2017a).

2.2 SFD Matrix

Kakuma, Turkana, Kenya, 4 Sep 2018. SFD Level: 2 - Intermediate SFD
Population: 206622
Proportion of tanks: septic tanks: 100%, fully lined tanks: 100%, lined, open b

System label	Pop	F3	F4	F5
System description	Proportion of population using this type of system	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
T2A2C5 Septic tank connected to soak pit, where there is a 'significant risk' of groundwater pollution	1.0	0.0	0.0	0.0
T1A2C5 Septic tank connected to soak pit	2.0	95.0	0.0	0.0
T1A3C10 Fully lined tank (sealed), no outlet or overflow	1.0	100.0	100.0	100.0
T2A5C10 Lined pit with permeable walls and open bottom, no outlet or overflow, where there is a 'significant risk' of	5.0	0.0	0.0	0.0
T2B7C10 Pit (all types), never emptied but abandoned when full and covered with soil, no outlet or overflow, where there is a 'significant	15.0			
T1B7C10 Pit (all types), never emptied but abandoned when full and covered with soil, no outlet or overflow	40.0			
T1B8C10 Pit (all types), never emptied, abandoned when full but NOT adequately covered with soil, no outlet or overflow	19.0			
T1B10C10 Containment (fully lined tanks, partially lined tanks and pits, and unlined pits) failed, damaged, collapsed or flooded -	11.0	0.0	0.0	0.0
T1B11 C7 TO C9 Open defecation	6.0			

Figure 5: SFD Matrix Kakuma

2.2.1 Risk of groundwater contamination

Presently, groundwater is the only available water source for the Kakuma Refugee Camp and town. Water for the camp as well as the host community is pumped from boreholes that are located along the banks of River Tarach (also referred to as Lagga Tarach). In the camp, the water is distributed via a piped distribution system to various water points (taps). In Turkana town, the local water service provider supplies via water kiosks (6) and a small number of individual household connections. In addition, people in the host community fetch water from private boreholes, shallow-wells and improvised wells (scoop holes) in the river bed or at the river banks (UN-Habitat, 2017). Sottas (2013), as well as available drilling data, suggests that both the overlying sediments and underlying, weathered (or fractured) rock serve as aquifers. Most boreholes draw from both the volcanic rock and overburden alluvial aquifers. According to Baumann et al. (2017), recharge is likely associated with direct recharge from River Tarach during flooding events (i.e. the lagga fills in flash floods, and aquifers are recharged from the laggas). Rainwater acts as a secondary but direct source of recharge.

There is no comprehensive data on bacteriological contamination of the ground water in Kakuma. Sottas (2013) highlights that the alluvial aquifer is generally associated with higher yields and greater storage, with lower fluoride concentrations, but with greater vulnerability to bacterial contamination. The deeper volcanic rock aquifer is associated with lower yields, high naturally occurring fluoride concentrations, and lower vulnerability to bacterial contamination. According to UNHCR borehole data (UNHCR, 2018) the water level is quite shallow with depth between 2 – 12m along the western bank of River Tarach. The average depth of the latrines is 5m (NRC, 2018b). Based on the Groundwater pollution risk assessment tool the groundwater pollution risk is low in the camp but high in Kakuma town (see Table 1). The percentages for drawing the diagram where adapted respectively.

Table 1: Groundwater pollution risk in camp and town

Proxy indicator for groundwater pollution risk	In refugee camp	In town
Q1.A: Rock type in unsaturated zone?	medium sand	medium sand
Q1.B: Depth of groundwater table?	5 - 10 m	5 - 10 m
Q2.A: % of sanitation facilities that are located <10m from groundwater sources?	Less than 25%	Less than 25%
Q2.B: % of sanitation facilities, if any, that are located uphill of groundwater source?	Less than 25%	Greater than 25%
Q3: % of drinking water produced from groundwater sources?	Greater than 25%	Greater than 25%
Q4: Water production technology used?	Protected boreholes	Protected boreholes*
Overall risk	Low	High

* This option was selected to make sure that the groundwater risk is not overestimated / in reality, people use a mix of protected and unprotected sources

2.2.2 SFD Matrix Explanation – Containment

It is important to note, that there is no integrated data on sanitation coverage and technologies used for the Kakuma refugee camp and the town. Consequently, the author estimated the proportions for the SFD matrix based on calculating the weighted average from separated data as illustrated by Table 2 and Table 3.

Table 2: Distribution of population in Kakuma refugee camp and Kakuma town

Location	Population	% of total population
Kakuma refugee camp (camps I – IV)	58,878	29%
Kakuma town	147,744	71%
Total	206,622	100%

The percentage for the different sanitation technologies were all taken from UN-Habitat (2017). The author also reviewed different data that show different distributions for the containment technologies but only few sources show estimates for both the camp and the town. The estimates given by the abovementioned source were also in line with the authors own observations and key informant interviews with stakeholders in Kakuma. Limitations to the data used are presented in Section **¡Error! No se encuentra el origen de la referencia.**.

Table 3: Distribution of sanitation in Kakuma refugee camp and Kakuma town

Sanitation technology used (UN-Habitat, 2017)	Kakuma refugee camp (camps I – IV)	Kakuma town
Pit latrine on plot	75%	52%
Shared pit latrine	20%	15%
Improved pit latrines		14%
Septic tank	2%	2%
Open defecation	3%	15%

Subsequently, the general technologies were transferred to the system descriptions used in the SFD manual. Based on the results of the groundwater contamination risk assessment using the SFD groundwater risk evaluation tool (Section 0) it was assumed that all containment options used in the camp are subject to a low risk of groundwater contamination and all containment types used in the town were subject to a high risk of groundwater contamination. The container-based toilets under the Sanivation sanitation service scheme were classified as SFD category *T1A3C10: Fully lined tank (sealed) no outlet or overflow.* It was furthermore assumed that at least 10% of the unlined pit latrines in the camp and 20% of the unlined pit latrine in town can be categorized as *T1B10C10 Containment (fully lined tanks, partially lined tanks and pits, and unlined pit latrines) failed, damaged, collapsed or flooded – with no outlet or overflow*. This assumption was based on the authors own observations as well as on the climatic conditions with regular flooding of facilities and the high poverty prevalence in both the camp and the town which impedes the users' capacity for preventive maintenance and repairs. Despite the fact that it can be assumed that there are some badly constructed septic tanks in town (e.g. no proper soak pit, not fully sealed) this category was not further subdivided since

the low total share of this technology would have made any further dissection meaningless. Table 4 below summarizes the resulting percentages used for creating the SFD Matrix.

Table 4: Distribution of containment types used for SFD matrix

ID (Reference)	Description	in camp	in town	Total rounded[1]
T1A2C5	Septic tank connected to soak pit, where there is a 'significant risk' to groundwater pollution		2%	**1%**
T1A2C2	Septic tank connected to soak pit	2%		**2%**
T1A3C10	Fully lined tank (sealed) no outlet or overflow *(Sanivation container toilets)*	1%		**1%**
T1A5C10	Lined pit with semi-permeable walls and open bottom, no outlet or overflow where there is a "significant risk" of groundwater pollution		14%	**5%**
T2B7C10	Pit (all types), never emptied but abandoned when full and covered with soil, no outlet or overflow where there is "significant risk" of groundwater pollution		54%	**15%**
T1B7C10	Pit (all types), never emptied but abandoned when full and covered with soil, no outlet or overflow	84%		**40%**
T1B8C10	Pit (all types), never emptied but abandoned when full but NOT adequately covered with soil, no outlet or overflow			**19%**
T1B10C10	Containment (fully lined tanks, partially lined tanks and pits, and unlined pit latrines) failed, damaged, collapsed or flooded – with no outlet or overflow.	9%	13%	**11%**
T1B11C7TOC9	Open defecation	3%	15%	**6%**

2.2.3 SFD Matrix Explanation – Emptying, Transport, Treatment

Pit latrines (lined or unlined) are not emptied in Kakuma camp or town. Once full, they are abandoned and a new pit is dug. In the camp, particularly in the congested areas of Kakuma camp I and II, this already leads to a problem with space for new latrines. The only latrines that get emptied are the container-based toilets under the Sanivation scheme. Excreta collected in these latrines are also the only excreta that get efficiently treated. It was assumed that 95% of the faecal sludge from septic tanks is emptied. Since there is no treatment facility in the entire County, none of this sludge is treated. As described above (Sections 2.1.4 and 2.1.5) the

[1] Based on Total Population of both areas. These percentages used for SFD graphic calculations are based and taken from the UN-Habitat report (UN-Habitat, 2017).

sludge from septic tanks is either disposed at the official disposal site or dumped indiscriminately in the environment.

2.2.4 Discussion of data uncertainties / challenges

There are significant differences between the estimates of shared latrine use between UN-Habitat (2017) and the results of a latrine census carried out by NRC (NRC, 2017a). Assuming a household size of five (5) people/household, the census results conclude that only around 42% of the households in Kakuma camp have their own latrine, compared to 75% in the UN-Habitat report. The proportion of people using shared latrines, however, was calculated into the total percentage of people using unlined pit latrines and thus the actually distribution of shared and individual latrines is not of high relevance for the outcomes of the SFD analysis. Nonetheless, one might argue that the proportion of shared latrines can have an impact on sporadic open defecation rates. UN-Habitat (2017) collected data via household interviews and therefore, it is likely that people reported only on their usual sanitation behaviours. In addition, according to NRC (2018a) and key informant interviews, people in Kakuma (camp and town) are frequently unaware of the contamination risk through baby faeces and therefore respondents could neglect open defecation from toddlers and small children in their answers. Baby faeces are often disposed directly in the environment or thrown with the diapers into the pit latrines. In conclusion, there might be an underestimation of the open defecation rate in Kakuma camp but due to the lack of better data, the numbers given by UN-Habitat (2017) seemed to be the most valid approximation.

2.3 The SFD Graphic

The presented SFD graphic shows that 41% of the excreta is safely managed in Kakuma town and camp. It seems necessary to highlight the context of this result. The result is based on the assumption that there is no significant risk of groundwater pollution in the camp and therefore unlined pits that are abandoned once full are a form of safe containment / in-situ treatment. It is assumed by the author that 40% of the abandoned pits are adequately covered with soil, yet 19% are not adequately covered. Due to lack of data on this share, this is an estimation made by the author which therefore would need further research or confirmation by key stakeholders in the future. The assessment of the groundwater pollution risk was carried out using the SFD Groundwater Pollution Risk Evaluation Tool (Section 0) and the results seems valid as Kakuma refugee camp is a UN managed camp environment with professionally set-up water extraction points. Nonetheless, if additional data would change the groundwater pollution risk from low to high in the camp, the SFD result would be modified to only 1% safely managed excreta.

It is important to note that the result shown in the SFD graphic could be misleading if it would be used as stand-alone indication of the public health risk from the currently used toilets or as a tool for the assessment of sanitation intervention needs.

Parts of Kakuma refugee camp flood during torrential rainfalls and therefore there is a public health risk through overflowing toilets even though these might not affect the groundwater extracted from the boreholes.

In addition, the fact, that the currently used pit latrines in the camp ‘safely manage’ the excreta does not mean that they are adequate sanitation technologies for the context. As mentioned

above, due to congested settlement structure in the camp, there is a need for more sustainable and permanent sanitation solutions.

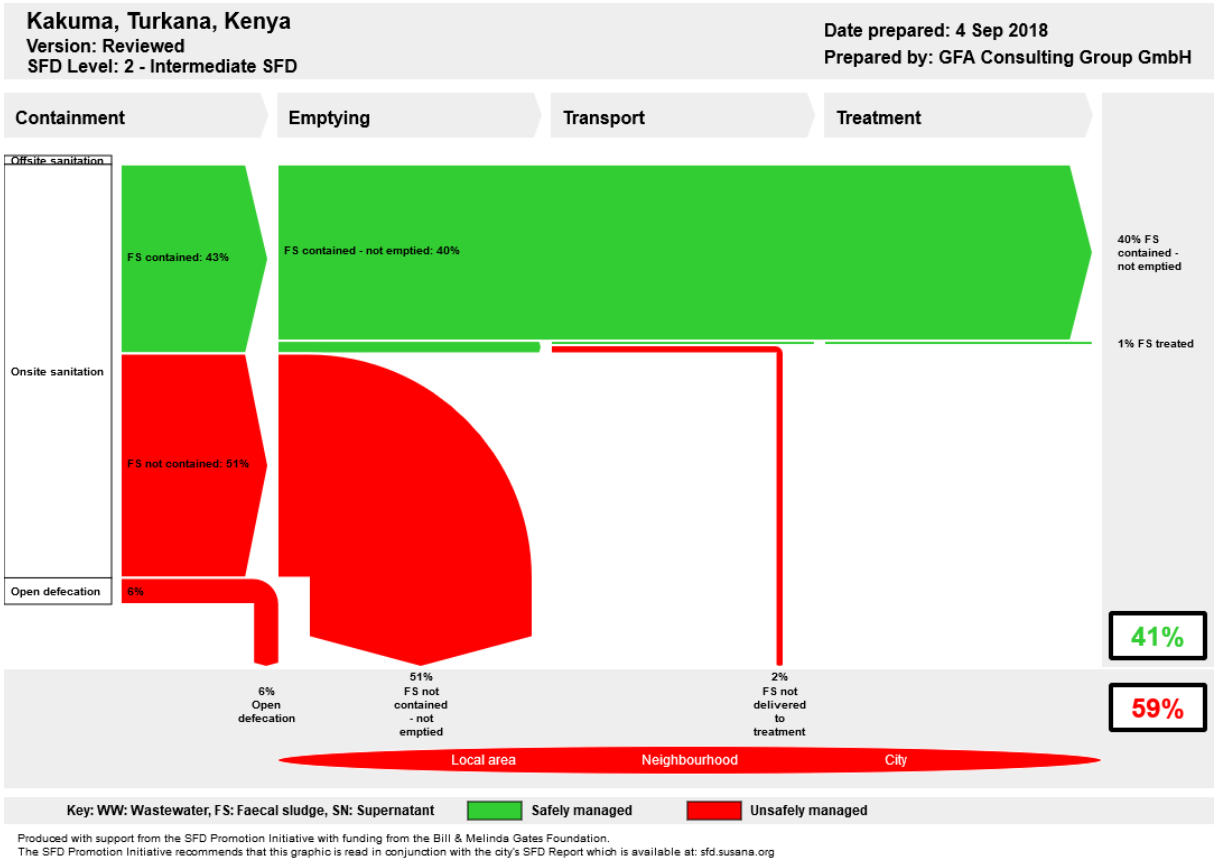

Figure 6: SFD Graphic Kakuma

3 Service delivery context

The Kenyan Constitution 2010, recognizes access to safe and sufficient water, and adequate sanitation as a basic human right. Under the devolution process, the provision of these core services is the responsibility of the 47 counties. To realise government's goal to provide all Kenyans with access to water and sanitation by 2030, significant financial and institutional efforts must still be undertaken. Kenya still faces serious challenges with regard to urban water supply and sanitation services (WSS). These arise from a high population growth, rural to urban migration, declining availability of water resources, inadequate management / maintenance of existing infrastructure, and the failure to replace assets or extend infrastructure according to the needs (MoWI, 2016).

3.1 Policy, legislation and regulation

3.1.1 Policy

Article 43 (b) of the Constitution of Kenya "declares sanitation as a basic human right and guarantees every person to reasonable standards of sanitation." Beyond that, Article 42 guarantees the right to "a clean and healthy environment" (KESHP, p.16) and by 2030 the government aspires to ensure improved access to safe sanitation, including "(iv) Constructing water and sanitation facilities to support industries and a growing urban population" (NCWSC Strategic Plan, p.3). In Kenya's economic blueprint Vision 2030, the government aspires to establish itself as a middle-income country to ensure improved and increased accessibility to both safe water and sanitation services beyond present levels by the year 2030. Hence, in the last ten years, the following documents have shaped the development of the sector (Table 5):

Table 5: Main legal and policy documents for sanitation sector (source: adapted for Mansour, et al., 2017)

Policy / Act	Key points
Kenyan Constitution 2010	Recognizes human rights to water and sanitation
Kenya Vision 2030	Kenya Vision 2030, developed in 2007 and revised in 2012, aims for universal sanitation by 2030.
Water Act (2002)	Introduced important reforms in the sector, separating responsibilities for asset ownership from the operation of water and sewerage infrastructure, creating autonomous utilities and an independent sector regulator, ring-fencing revenues within the sector, and establishing a framework for utilities and other Water Service Providers (WSPs) to move towards cost-reflective tariffs.
Water Act (2016)	Issued to reflect constitutional changes and adjusting the institutional arrangements, based on devolution reforms.
Environment Management and Coordination Act (EMCA 1999)	Provides the legal framework for environmental management and conservation and established the National Environment Management Authority (NEMA). EMCA provides regulations on water pollution prohibition, effluents to be discharged into the sewerage system, licensing for discharge of effluents, standards for waste, licenses for existing waste disposal sites and plants, etc.
Kenyan Environmental Sanitation and Hygiene Policy 2016-2030	The KESHP aims to achieve improved sanitation for all (not just eradication of open defecation) by 2030. KESHP sets the ambition to increase public investment in sanitation from 0.2% to 0.9% of the GDP by 2030. The policy promotes the adoption of sustainable sanitation systems. It emphasizes the need for sustainable systems for collection and safe disposal of solid waste from residential and commercial areas.
National Environmental Sanitation and Hygiene Strategic Framework (KESHSF) 2016-2030	The Kenya Environmental Sanitation Strategic Framework (KESSF) 2016-2030 provides a medium-term framework for the implementation of the KESHP 2016-2030. It aims to declare 100% of Kenya ODF by 2030, and to ensure that at least 55% of urban households have access to improved sanitation facilities.
Urban Areas and Cities Act (2011)	Provides for the classification, governance, and management of urban areas and cities and the criteria of establishing urban areas. One of the criteria for classifying an area as urban, city, or a municipality is the capacity to effectively and efficiently deliver essential services including sanitation services and the capacity for functional and effective waste management and disposal. To this end every city and municipality must formulate and operate within the framework of an integrated development plan. The Urban Areas and Cities Act also provides the basis for promoting service provider contracting, public-private partnerships, and joint ventures as well as the regulation of city, municipal, and town services.
County Government Act (2012)	Provides the basis for sanitation planning and performance management within each country's integrated development plan. The Act requires that in planning for services the county governments must provide clear input, output, and outcome performance

Policy / Act	Key points
	indicators, including the percentage of households with access to basic services including water and sanitation.
Public Health Act (1986)	Makes provisions to promote public health and prevent infectious, communicable, or preventable diseases. The Act makes proscriptions on sanitation and housing and prohibits nuisance injurious to health, including unsafe housing
Kenya Water Master Plan 2030	Framework for water resources development and management based on the Kenya Vision 2030.

Due to institutional restructuring processes after the 2017 election, the development of the national Sanitation Bill is currently on hold.

The main policy documents with regard to water and sanitation in the county are (Table 6):

Table 6: Legal and policy documents regarding sanitation in Turkana County

Policy / Act	Key points
Turkana County Water, Sanitation Services Sector Strategic Plan 2017 – 2021	In regard to urban sanitation there is a strong tendency towards establishing sewer systems in the urban centres but there is also reference to improved sanitation facility design and zoning as well as the acknowledgment of the need to improve sludge management and treatment
Turkana County Water and Sewerage Services Bill, 2017	Obliges the County Government to put in place measures to ensure progressive realisation of the right to water and sanitation.
County Integrated Development Plan (CIDP) 2013-2017	The CIDP has yet to be reviewed and updated to cover the next five years (2018-2023). With regard to sanitation, the document mentions that latrine coverage in primary schools has been improved through GoK / UNICEF funded latrine construction in primary schools. The CIDP proposes the continuations of Community Led Total Sanitation (CLTS) campaigns implemented through the Ministry of Public Health and Sanitation as well as planning, designing and developing a sewerage treatment plant and sewer lines in all sub county headquarters.

3.1.2 Institutional roles

According to Eberhard (2017), Kenya's urban water sector and related institutions have evolved in two main phases over the last two decades. The Water sector reform 2002, led to the establishment of eight nationally-owned asset development and holding companies for water services (Water Services Boards) operating regionally, as well as at the local-level, commercially-oriented operating companies for water supply in cities and towns. The Constitutional reform of 2010, led to the establishment of 47 devolved county governments with water supply and sanitation responsibilities. The water companies are now owned by the county governments. The water services boards (WSBs) have continued to play a dominant role in investment planning and implementation, pending the establishment of water works development agencies provided for in the Water Act 2016 and an uptake of the investment role by county governments. The intention is for the water works development agencies to fund "nationally important" or strategic water service assets as well as cross-county water service infrastructure.

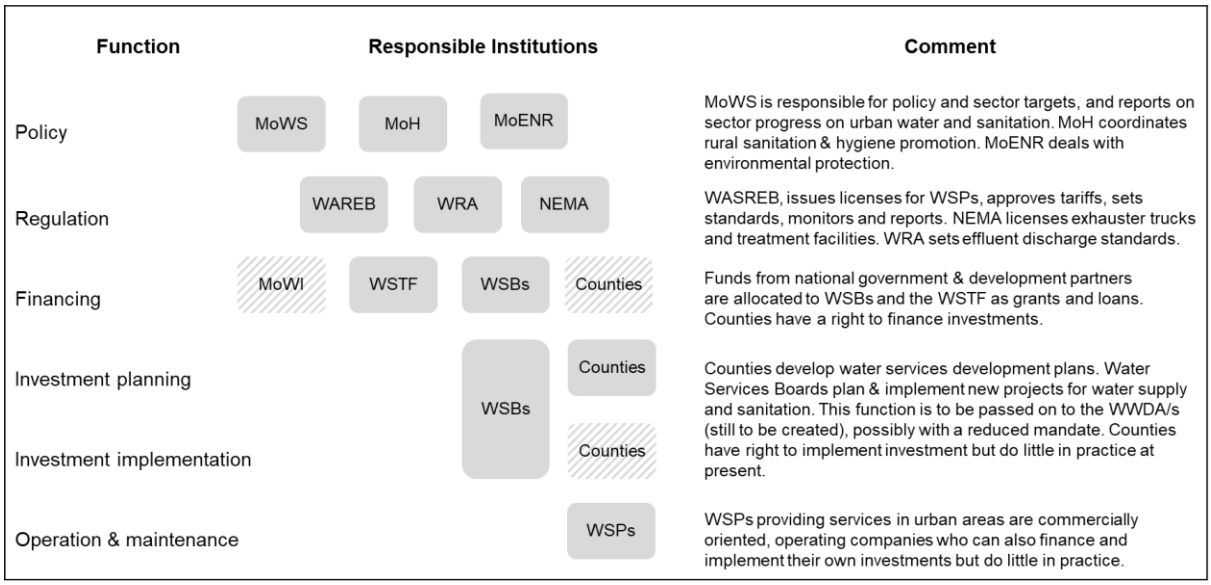

Figure 7: Institutional roles in the water & sanitation sector

(source: adapted from Eberhard, 2017)

At the national level, the institutional set-up of the Kenyan urban water and sanitation sector is headed by the Ministry of Water and Sanitation (formerly Ministry of Water and Irrigation) which is responsible for the formulation of relevant policies (Figure 6). The Ministry of Health (MoH) is coordinating rural sanitation and hygiene promotion and the Ministry of Environment and Naturals Resources (MoERN) through the National Environmental Management Authority (NEMA), is responsible for environmental regulation (Mansour, et al., 2017). Below the policy level, there is an institutional division between Water Resources Management and Water and Sanitation Services. At the national level, Water and Sanitation Services are regulated by the Water Service Regulatory Board (WASREB). The Water Resources Authority (WRA) issues permits and sets standards for effluent discharge into water bodies. NEMA is in charge of environmental protection and issues licenses to exhauster trucks and wastewater and sludge treatment facilities. The County Governments delegate their mandate for water and sanitation service provision to registered and licensed Water Service Providers (WSPs) which are responsible for providing water and sanitation services to the population in their service area. The water users are represented by water consumer groups or water action groups. The Water Sector Trust Fund (WSTF) is the pro-poor financing institution of the Kenyan water sector with the mandate to fund the development of water and sanitation services in marginalized areas (GoK, 2016 and Eberhard, 2017)

There is a lack in clarity towards responsibilities for urban on-site sanitation. According to the Water Act 2016, the counties through established WSPs are responsible for 'water services provision' within specified areas through a license from WASREB. The Act further defines, 'water services' as "any service of or incidental to the supply or storage of water and includes the provision of sewerage services". As per definition in the Act, sewerage services are defined as "the development and management of infrastructure for transport, storage, treatment of water originating from centralized and decentralized systems but shall not include household sanitation facilities" (GoK, 2016).

For the case of Kakuma, there is a separation of institutional roles and responsibilities between sanitation service delivery in the camp and in town:

In **Kakuma town** the County and its sub-structures are the lead institution for sanitation service provision. County Governments are headed by the Speaker of the County Assembly and Members of the County Assemblies (MCA). The administrative structures of the devolved system of County Governments include the County, the Sub-County and the Ward. According to the Turkana County Water and Sewerage Services Bill (2017), the Turkana County Water Department has the overall responsibility for water, sewerage and sanitation. The Sub-County Public Health Department is responsible for implementing public health and hygiene promotion campaigns such as Community-Led Total Sanitation (CLTS).

In **Kakuma refugee camp**, the United Nation High Commissioner for Refugees (UNHCR) is responsible for the management of provision of basic services in Kakuma refugee camp. UNHCR has delegated the implementation of WASH related activities within Kakuma camps and Kalobeyei settlement to the Norwegian Refugee Council (NRC). NRC has around 60 WASH staff and further employs around 100 people (mainly refugees from the camps) as casual labours (incentive staff). For hygiene promotion, NRC cooperates with so-called health partners, which is the International Rescue Committee (IRC) in Kakuma camp. School WASH is organised in cooperation with the Lutheran World Federation (LWF) which is the main education partner in the refugee camps in Kakuma and Kalobeyei.

3.1.3 Service provision

The counties through established WSPs are the main responsible entities for water and sewerage service provision in urban areas. This includes the development and management of infrastructure for transport, storage, treatment of water originating from centralized and decentralized systems but (as outlined above Section 3.1.2) does not include household sanitation facilities (GoK, 2016). Households are expected to organise and fund their sanitation facilities themselves.

Due to the insufficient or non-existent service provision through the County government or (where existent) WSPs, informal water service providers play an important role in the sanitation sector in Kenya (Werchota, 2013).

There are so far hardly any established sanitation services in Kakuma town. Digging of toilets is organised privately or using casual labour. Emptying of pit latrines is not very common and septic tanks are used by and affordable for few households. In addition, a majority of the toilets for the host community and the refugee community are pit latrines which are not suitable for emptying. This means that exhauster services are currently only in demand by institutions, NGOs, businesses or aid agencies.

The local water service provider, KAWASEPRO, currently plays no role in sanitation service provision. The services provided by Sanivation (container-based toilets in the camp incl. business model for emptying and reuse) have been described in the previous sections.

The slabs for the standard NRC household toilet are produced in four sanitation centres (three of which are located in Kakuma camp). The households are expected to dig the pit (usually around 3 meters deep). After completion of the pit the household comes to the closest sanitation centre where they pick up the slab, superstructure material as well as a sanitation

kit that includes a simple hand washing facility and some material for toilet cleaning. NRC monitors the construction of the superstructure and slab installation. NRC has no fixed ratio determining the recommended number of users per toilet. Latrines last on average 2.5 to 3 years after which a new pit has to be dug and the slab and superstructure is moved. Filled latrines are not emptied, therefore some plots run out of space for constructing a new toilet. Some households complain that they have to wait too long after a toilet has filled up before they are issued with a new slab for toilet construction. Delays in the construction of new toilets are mainly due to the funding disbursement schedule for WASH activity funding from UNHCR to NRC. The cost of one of these standard household toilet (including the sanitation kit) is around USD 100 per household (NRC, 2017b)

3.1.4 Service standards

Internationally, the human right to water and sanitation, and the Sustainable Development Goals (SDGs) guide the setting of service standards for water and sanitation.

In 2010, the UN General Assembly and the Human Rights Council explicitly recognized the human rights to water and sanitation. These rights are derived from the right to an adequate standard of living as stipulated in Article 11 of the International Covenant on Economic, Social and Cultural Rights and other international human rights treaties. This right is recognized in the Kenyan Constitution of 2010. For refugees, the United Nations High Commissioner for Refugees is committed to ensure that all refugees in all settings are guaranteed (UNHCR, 2018b).

Within the global development agenda, a framework for sanitation service standards is given by SDG 6 *Ensure access to water and sanitation for all* – Target 6.2 *By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations.* The proposed indicator for SDG target 6.2 refers to the proportion of people using safely managed sanitation services. This acknowledges a shift in the focus on the containment element of the sanitation chain and recognises the necessary focus on system-based approaches along the entire sanitation chain (UNDESA, 2017).

Sanitation service standards for Turkana/Kakuma town: In general, regulation of onsite sanitation is weak in Kenya. Most of the sanitation standards set in Kenya relate to offsite sanitation, WASREB is generally not involved in the regulation of on-site sanitation facilities.

The Implementation Plan for Sanitation (IPS) 2009 (The Water Sector Sanitation Concept – WSSC), states that:

> *"safe sanitation shall fulfil the requirements of the human right to sanitation and shall only be counted as sustainable access to safe sanitation if safe disposal of sludge and effluent is guaranteed."* (MoWI, 2009)

In addition, the Kenya Environmental Sanitation and Hygiene Policy (2016 – 2030) stipulates that:

> *"The National Government through the National Environmental Sanitation Coordinating and Regulatory Authority (NESCRA) in collaboration with the National Environmental Management Authority (NEMA) and Water Services Regulatory Board (WASREB) shall provide guidelines for solid and liquid waste management.* (MoH, 2016b)

According to the Turkana County Water and Sewerage Bill (2018), the Turkana County Water Department and its decentralised structures shall regulate water and sanitation service provision in the county in line with the national regulation (Turkana County Government, 2018). Apart from setting standards for effluent and pollution control through NEMA/WRA, implementation of these mandates for service standard setting are lagging behind.

Sanitation service standards in the camp: The 1951 Convention relating to the Status of Refugees is the foundation of international refugee law. It establishes the principle that refugees should not be forcibly returned to a territory where their lives or freedom would be threatened and sets out the duties of refugees and States' responsibilities toward them (UNHCR, 2017). The UNHCR WASH Guidebook (2018) as well as in the internationally recognized Sphere Standards set the main service standards with regard to sanitation in the refugee camp. A summary of the most relevant sanitation standards specified in these documents is given in Table 7.

Table 7: Summary of most relevant SPHERE sanitation standards (SPHERE project, 2011)

Indicator	Key points
Safe excreta disposal	Safe excreta disposal aims to keep the environment free from uncontrolled and scattered human faeces.
Distance of defecation systems from water sources	The distance of soak pits, trench latrines and/or toilets from water sources should be at least 30 metres and the bottom of the pits should be at least 1.5 metres above the groundwater table.
Sharing of toilets	A maximum of 20 people use each toilet
Distance from dwellings	Toilets are no more than 50 metres from dwellings
Shared use of toilets	Use of toilets is arranged by household(s) and/or segregated by sex

UNHCR recognises four main phases of assistance to refugees in which different WASH standards and priorities apply. An overview on these principles is shown in Appendix 5.

3.2 Planning

3.2.1 Service targets

According to the Kenya Vision 2030, the Kenya Water Masterplan aims to provide "water and sanitation to ensure that improved water and sanitation are available and accessible to all" (GoK, 2008). The National Water Master Plan (GoK 2014) estimates the total cost of investment and rehabilitation needed in water supply is estimated at Ksh 1.7 trillion ($US 17 billion (GoK, 2014). According to the Kenya Water Masterplan, 2030, the available government budget is Ksh 592.4 billion ($US 5.9 billion). This leaves a shortfall of Ksh 1.2 trillion" (WASREB, 2016). According to the Turkana County Water, Sanitation Services Sector Strategic Plan, the County plans to invest around Ksh 150 million ($US 1.5 million) to increase access to sustainable, safe water and environmental sanitation within the planning period (Turkana County Government, 2017).

3.2.2 Investments

After a long neglect and marginalisation of Turkana-West Sub-County, in terms of water and sanitation infrastructure development and investments, there are currently plans for multiple investments in Turkana West County and Kakuma.

The GIZ Support to Refugees, especially Voluntary Returnees and Host Communities in Kakuma Programme, plans to support the construction and sustainable operation of a decentralised sludge treatment plant in Kakuma as well as construction of household latrines for refugees in the camp. The programme will also implement hygiene and health promotion measures and support the capacity building for the local water service provider (GIZ, 2018).

UNHCR and UN-Habitat are currently developing the Kalobeyei settlement under the EU funded Kalobeyei Integrated Socio-Economic Development Programme (KISEDP). The programme aims at catalysing sustainable development and enhancing protection for refugees and host communities in Kalobeyei through the establishment of an integrated settlement area, in which refugees and the host community live peacefully together, have access to social services and develop economic ties to build sustainable livelihoods. The initial EU funding for the programme will be $US 17 million and will be implemented between June 2016 – June 2019 (UNHCR, 2017).

As described above (Section 2.1.1), Sanivation will increase their toilets in Kakuma Camp I to 500. They will also increase their briquette production until the end of October 2018. They have currently no plans to extend their toilet construction beyond the 500 households (Sanivation, 2017b)

The Danish Government has proposed DKK 100 $US 15 million) as new funding to support ASAL areas in Kenya. This new support is specifically meant to support pro-poor investments in refugee camps and host communities in Turkana and Garissa Counties as well as in counties severely affected by drought. Access to water by local communities was seen as a key entry point with the aim of the aid being to build the resilience of the communities affected by climate vagaries such as drought. The programme will focus on Turkana and Garissa counties. Around $US 6 million will be channelled through the Water Sector Trust Fund for financing investments in Turkana West. The remaining share of the money will be used to co-fund the 'Development Response to Displacement Impacts Project (DRDIP) in the Horn of Africa (P161067) implemented by the Government of Kenya and the World Bank. The geographical focus of the DRDIP is the Turkana, Wajir and Garissa counties (Danish Embassy Nairobi, 2017).

The Development Response to Displacement Impacts Project (DRDIP) in the Horn of Africa (P161067) has been launched with the aim to improve access to basic services, expand economic opportunities and enhance environmental management for communities hosting refugees. The project duration is 2017-2022 and the budget is USD 103 million of which USD 3 million is proposed as a grant to the Intergovernmental Authority on Development (IGAD) and USD 100 million is proposed as a credit to the GoK. Water supply, sanitation and hygiene activities will be financed under Component 1; Social and Economic Infrastructure and Services, which will receive approx. USD 45 million of the total financing (World Bank, 2017).

3.3 Equity

Turkana County is one of the poorest counties in Kenya. The human development index (HDI) of Turkana County is 0.33 as compared to 0.56 for Kenya as a whole (Turkana County Government, 2013). To put this in context, the Central African Republic which is ranked last (rank 188) in the 2016 UNDP HDI country ranking has a HDI of 0.35 (UNDP, 2016). Over 90% of the county's population lives below the poverty line. Literacy rates and health indicators are amongst the poorest in Kenya and the county has a long history of chronic malnutrition (Sanghi et al., 2016).

3.3.1 Current choice of services for the urban poor

Poverty prevalence is high in Kakuma town and the camp and service provision is generally insufficient and inadequate. The relatively high open defecation rates in both the camp and the town are alarming against the background of increasing urban expansion of the town.

3.3.2 Plans and measures to reduce inequity

As of August 2010, the Constitution of Kenya recognises the access to clean and safe drinking water in adequate quantities as well as the access to adequate housing and reasonable standards of sanitation as a human right. The outstanding strength of the human rights approach to water and sanitation is that it provides a comprehensive framework of standards which include physical access, water quality and quantity, price, transparency, accountability and participation. Counties have a constitutional obligation to give priority to basic needs (GIZ, 2013).

In the Turkana County Water, Sanitation Services Sector Strategic Plan, the right to water with a pro-poor approach, is anchored as the guiding principles for the implementation of the strategy (Turkana County Government, 2017). In addition, the Turkana County Water and Sewerage Bill (2018) obliges the County Water Department "to take special measures to ensure the provision of water and sanitation services to vulnerable groups."

If plans to establish a registered water service provider (WSP) under WASREB license in Kakuma (Section 3.5.2) were realized, the WSP would be eligible to WSTF funding for pro-poor water and sanitation infrastructure. In addition, the licensed WSP would also fall under WASREB regulation and would be obliged to submit annual performance reports to the regulater. In 2017, WASREB has introduced a pro-poor indicator to assess the level of pro-poor orientation of utilities and progress towards universal access. The indicator not only monitors the pro-poor interventions being implemented by county governments, but also gives guidance to water utilities to improve their services in LIAs (WASREB, 2018).

As for the situation in the refugee camp, refugees in Kakuma camp are currently not allowed to engage in any agricultural or formal economic activities outside the refugee camp and thus have few opportunities to improve their living conditions by their own means. There are signs that there might be a shift in mind-set in this regard. UNHCR and the Ministry of Interior and Coordination of National Government agreed with the Turkana County Government to develop a settlement that would promote the self-reliance of refugees and host communities by providing them with better livelihood opportunities and enhanced service delivery (UNHCR, 2018c). Kalobeyei settlement is still under construction (Section 3.2.2).

3.4 Outputs

3.4.1 Capacity to meet service needs, demands and targets

UNHCR and NRC currently do not manage to provide every household in Kakuma camp with a toilet. Toilets are shared between approximately 13 people (NRC, 2017a). Some households complain that they have to wait too long after a toilet has filled up before they are issued with a new slab for toilet construction. Delays in the construction of new toilets are mainly due to the funding disbursement schedule for WASH activity funding from UNHCR to NRC (NRC, 2017b).

In Kakuma town, there are currently no efficient structures for sanitation service provision at any stage of the service chain.

3.4.2 Monitoring and reporting access to services

The population in Kakuma town and refugee camp exclusively relies on on-site sanitation systems and there is no licensed water service provider. Consequently, there is no reporting of (sewerage) coverage data to the regulator WASREB.

Kenya has established a pro-poor database for the water sector, *MajiData* that covers all urban low-income areas and is used as an appraisal criterion for WSTF funding. The database was developed base on a comprehensive data collection and mapping exercise which started in 2009 and ended in 2011. In 2016, WSTF and WASREB took the decision not to only update *MajiData* but rather to set-up a modern database that will be connected to all existing ICT-tools of the sector institution with the support of GIZ. Since no new comprehensive mapping is planned, the update of the maps of low-income areas depends on the input of the WSPs and has not been done for Kakuma (WASREB & WSTF, 2018).

Generally, UNHCR/NRC have a good overview on the WASH facilities in the camp. All water points and boreholes have been mapped. NRC has done a sanitation census of all toilet facilities in 2017. They are planning to repeat the sanitation census in March 2019 (NRC, 2018a).

3.5 Expansion

3.5.1 Stimulating demand for services

Stimulation of demand for improved sanitation services, and the implementation of demand-based approaches will be challenged mainly by two factors. Firstly, the general socio-economic condition and high poverty prevalence within the population in Kakuma and the refugee camp (Section 3.3). Secondly, the successful management of expectations of the host and refugee community, which have emerged due to the provision of, basic services free of charge in the camp.

3.5.2 Strengthening service provider roles

As part of the planned GIZ SRHC water and sanitation interventions, the capacities of the local water service provider in Kakuma will be strengthened and there are plans to establish a licensed water utility in the town. The detailed organisational structure of this provider still needs to be decided upon but it is likely that such a provider will play a role in the management

of the new sludge treatment plant for which the programme will develop an operation and business model. The programme also plans to establish an emptying concept and business model for pit emptying services in the camp and Kakuma town (GIZ, 2018).

4 Stakeholder Engagement

4.1 Key informant interviews

In total eight (8) key informant interviews were carried out during the field visits in Kakuma in October and November 2017 (see below). The interviews were carried out as part of a broader sanitation assessment and not specifically for the preparation of the SFD. Key informant interviews included various staff of the Turkana-West Sub-County and Kakuma Ward administration as well as representatives of UNHCR, NRC and Sanivation. Additional interviews were carried out with representatives of LWF. Knowledge exchange and discussions with GIZ staff (WSRP and SRHC programmes) were more informal and not always tracked. During the preparation of the SFD report, the author was in contact with Sanivation and NRC for clarifications on data and collection of additional information necessary for the preparation of the SFD.

4.2 Observations

The author visited Kakuma three (3) times between October 2017 and March 2018. In total, she spent eight (8) days on-site. The observations during those visits included general observations of the layout of Kakuma camp and town as well as the topographic and climatic conditions that influence the service provision. The author was also able to observe the difference between dry and wet conditions in the camp and its effect on the town infrastructure, which included flooding of compounds and toilets.

In addition, the field trip to the official sludge disposal site was useful for a visual assessment of the usage and condition of the site. Furthermore, the author had the chance to visit some of the container-based toilets implemented through Sanivation as well as the Sanivation treatment and excreta processing facility.

The observations were beneficial for the data collection process as they gave the author a clearer understanding of the framework conditions in the town and the camp. Furthermore, they allowed for validation of the credibility of stakeholders on derived from the literature research.

4.3 Validation of results

As described above, observations were useful to put statements of key informants into perspective and assess their validity. An extensive literature review was carried out that helped to check accounts of interviewees and vice versa. Since some time passed during the initial data collection and the preparation of this report, follow-up interviews via skype and email were carried out to validate assumptions and uncertainties with respect to the data.

5 Acknowledgements

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7 Appendix

7.1 Appendix 1: Stakeholder identification

Table 8: Stakeholder identification

N°	Stakeholder group	Contact
	City council	Kakuma Ward Office/Turkana-West Sub County
1	Municipal authority	Kakuma Ward Office/Turkana-West Sub County
	Utility	KAWASEPRO (not licensed under regulator)
2	Ministry in charge of urban sanitation and sewerage	Ministry of Water and Sanitation
3	Ministry in charge of urban solid waste	Ministry of Environment and Naturals Resources
4	Ministry for finance and economic development	Ministry of Finance
5	Regulation of urban water and sanitation	Water Services Regulatory Board / National Environmental Management Agency
6	Service provider for construction on on-site sanitation technologies	n/a
7	Service provider for emptying and transport of faecal sludge	USAFI (CBO), private exhauster trucks
8	Service provider for operation and maintenance of treatment infrastructure	n/a
9	Market participants practising end-use of FS end products	Sanivation
10	Market participants practising collection of solid waste	USAFI

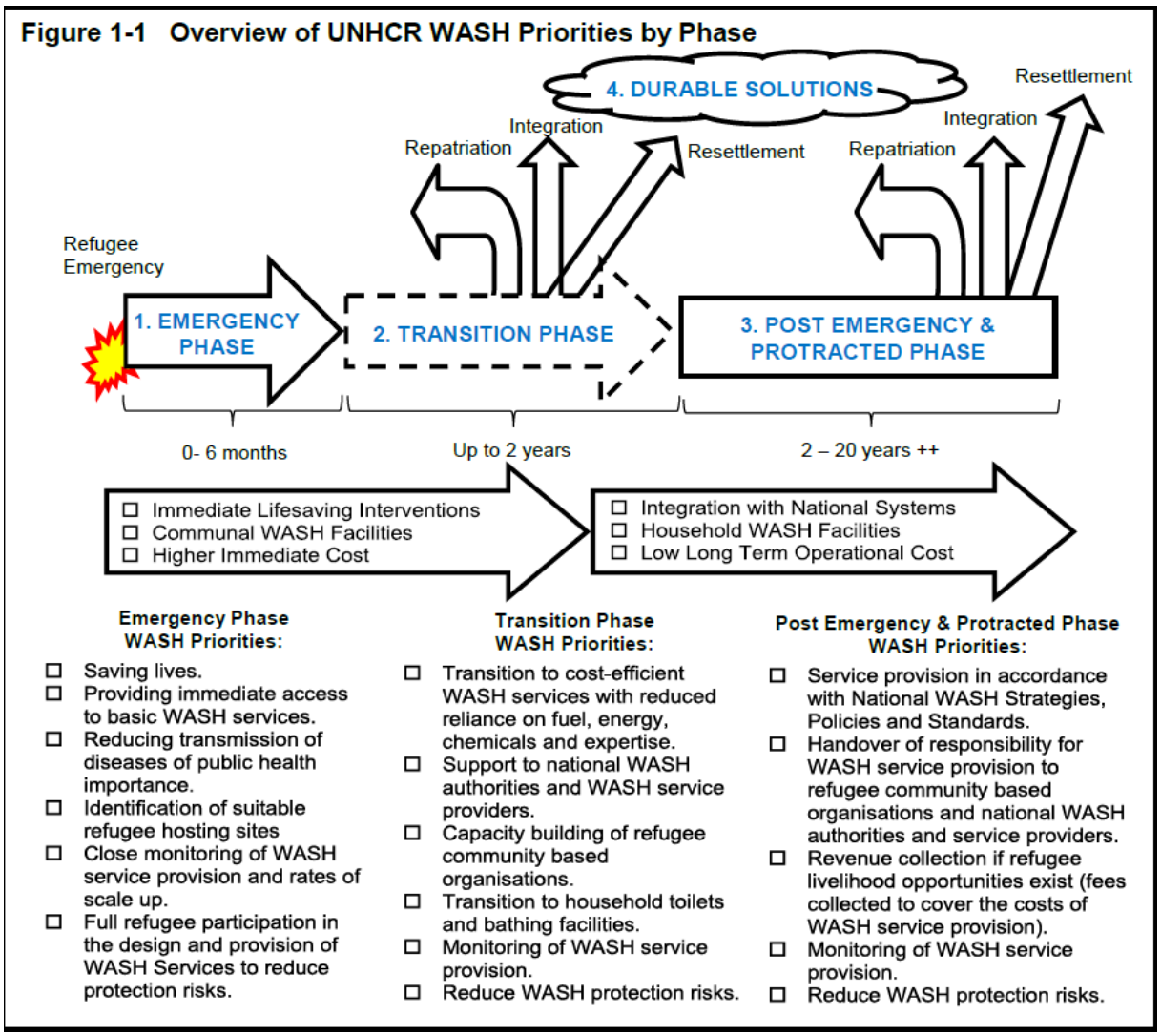
7.2 Appendix 2: Tracking Stakeholder Engagement

Table 9: Stakeholder engagement tracking

N°	Stakeholder	Date(s) of engagement	Purpose of engagement
1	GIZ SRHC	Various October 2017 – March 2018	Cooperation on sanitation assessment for Kakuma / Informal knowledge exchange / Facilitation of site visits
2	UNHCR WASH Officer	09.10.2017	KII
3	Sanivation Kakuma Field staff	10.10.2017	KII – visit of treatment facility
4	LWF	10.10.2017	KII – visit of school sanitation facilities
5	Turkana-West Sub-County (Health Officers)	11.10.2017	KII
6	NRC – WASH Officers	11.10.2017	KII – field visits sanitation facilities in camp
7	USAFI	11.10.2017	KII
8	Kakuma Ward	11.10.2017	KII
9	Sanivation – Director of Humanitarian Programmes	01.11.2017	KII
10	Turkana West Sub County	13.12.2017	KII
11	KAWASEPRO	13.12.2017	KII
12	NRC	13.12.2017	KII

7.3 Appendix 3: UNHCR WASH Priorities by Phase

Figure 1-1 Overview of UNHCR WASH Priorities by Phase



(source: UNHCR, 2018b)