

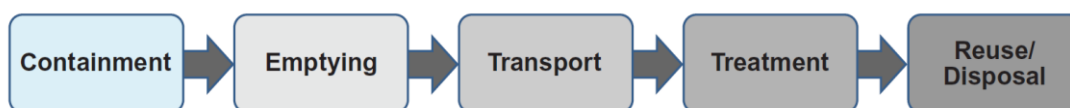
FURLONG, MENSAH, DONKOR &amp; SCOTT

39<sup>th</sup> WEDC International Conference, Kumasi, Ghana, 2016ENSURING AVAILABILITY AND SUSTAINABLE MANAGEMENT  
OF WATER AND SANITATION FOR ALL**Learnings from implementing the excreta flow  
diagram (SFD) process in Kumasi***C. Furlong, A. Mensah, J. Donkor & R. Scott (UK )***BRIEFING PAPER 2567**

*Excreta, Faecal or Shit Flow Diagrams (SFDs) are away to clearly represent how excreta flows along the sanitation service chain. This approach has already gained popularity and many SFDs have already been produced. To date little attention has been paid to the methods and data used, or the credibility of the SFDs. The SFD Promotion Initiative has created a tool to enable the wider roll-out of SFDs, which includes a credibility assessment. The product is a report on service delivery context with an embedded SFD. This briefing paper discusses the lessons learnt from trialling the tool and process developed through this initiative, in the city of Kumasi (Ghana). The most important lesson learnt is that stakeholder engagement is critical not only for obtaining credible data, but also for validating the SFD produced.*

**Introduction**

A majority of the world's population use onsite sanitation, it is estimated that only 39% are connected to sewers (Baum et al., 2014) and 13% practice open defecation (WHO, 2015). The focus of the MDG period (2000-2015) was getting people onto the sanitation ladder, by building latrines or other onsite sanitation systems. At the start of this period little consideration was given to the long term management of onsite sanitation systems as it was assumed that people would eventually progress to networked sanitation (sewered) systems. As the MDG period progressed this was found to be an unrealistic goal and the field of faecal sludge management (FSM) came into the spotlight. Faecal sludge (sludge from onsite sanitation systems) needs to be managed through a series of stages which simulate what happens in a well maintained and operated networked sanitation system. This is called the sanitation service chain (Figure 1).

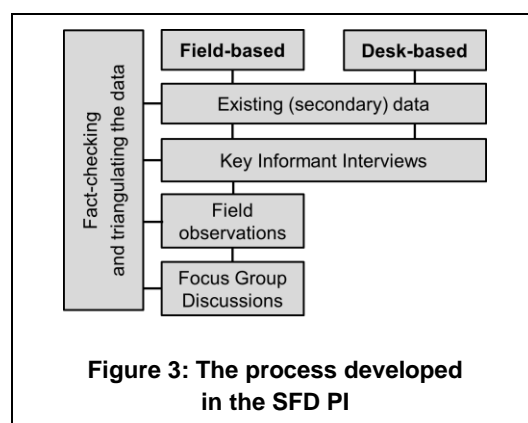
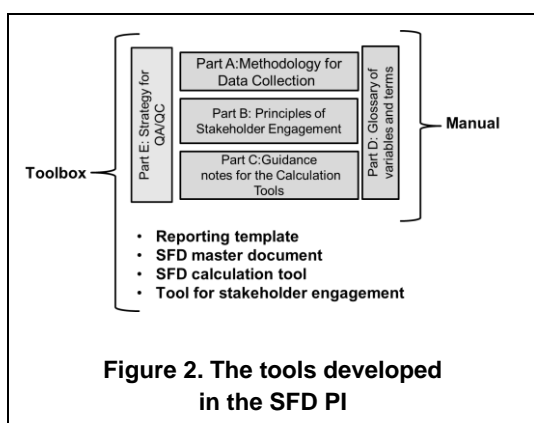
**Figure 1. The sanitation service chain**

Excreta, Faecal or Shit Flow Diagrams (SFDs) are away to clearly represent how excreta flows along the sanitation service chain (Figure 1). For each stage of the chain the proportion of population's excreta which is either effectively or not effectively managed can be seen. At the end of the chain the proportion of the population's excreta which is safely and unsafely managed is indicated (Figure 4).

This concept was first developed and trialled in 'A Review of Fecal Sludge Management in 12 Cities' which was commissioned by the World Bank's Water and Sanitation Program (Peal et al., 2015). This review introduced the concept of mapping the flow of faecal sludge across the sanitation service chain

(Figure 1), alongside an assessment of the delivery context of faecal sludge management services at the city or town level. The process was trialled in twelve cities and subsequently evolved into the SFDs seen in ‘The Missing Link in Sanitation Service Delivery: A Review of Faecal Sludge Management in 12 Cities’ (Blackett et al., 2014).

This approach has since gained popularity with SFDs increasingly being produced. This is because SFDs are seen as an easy-to-understand tool for advocacy, decision making and monitoring. They have the potential to help policy makers and practitioners realise the importance of FSM. To date little attention has been paid to the methods and data used, or the credibility of the SFDs produced. The SFD Promotion Initiative (see Acknowledgments) has created a tool to enable the wider roll-out of SFDs including a credibility assessment (Figure 2). The product is a report on service delivery which includes an embedded SFD, thus giving a baseline of the current sanitation situation. The first phase of this project was completed in early 2016, during this time tools were developed ([sfd.susana.org/toolbox/how-to-make-a-sfd](http://sfd.susana.org/toolbox/how-to-make-a-sfd)). A quality assurance and quality control strategy was included to ensure the credibility of the report and diagram. Two levels of study have been developed, a field-based study which incorporates primary data collection and a desk-based study which utilises secondary data validated by key informant interviews. The processes for these studies can be seen Figure 3. These tools and processes have been piloted in cities around the globe ([sfd.susana.org/](http://sfd.susana.org/)). The published reports (including the SFDs) have been validated by local stakeholders.

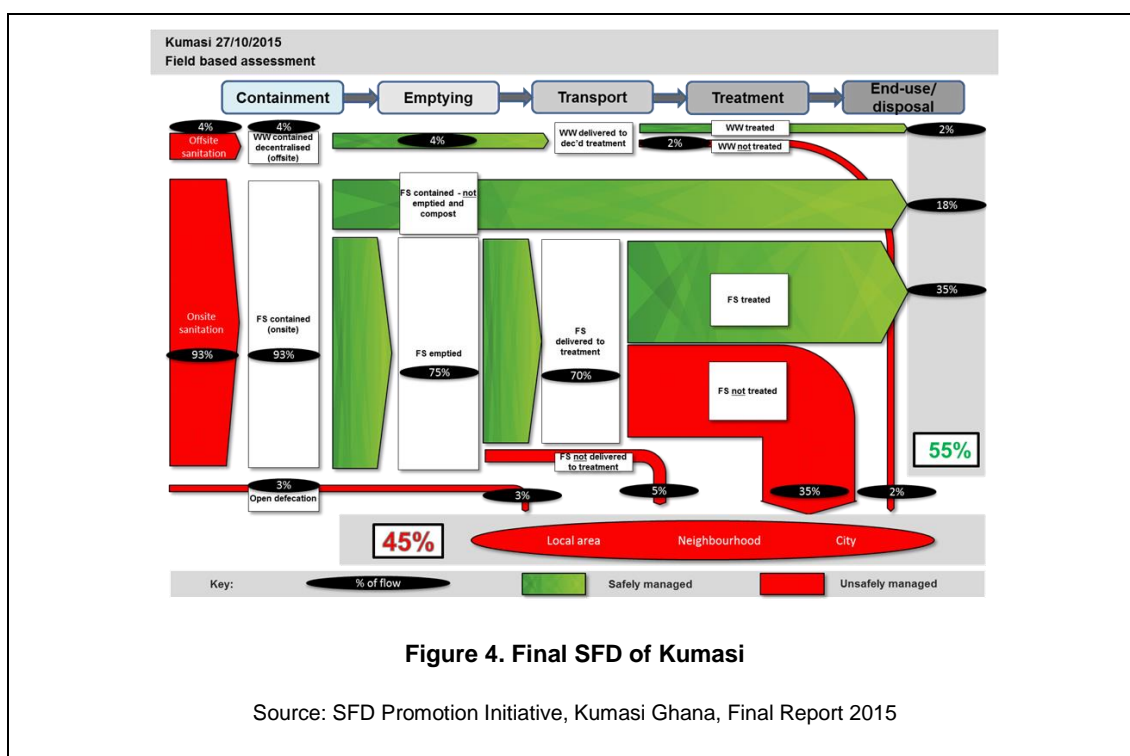


### Implementation of the process

The city of Kumasi was chosen to implement one of the initial field-based studies (Figure 3), due to strong links between WEDC and the Waste Management Department at Kumasi Metropolitan Assembly (WMD-KMA). The process took approximately two months to implement, which included one month in the field. WMD-KMA acted as gatekeepers and aided the researcher to identify the major stakeholders in the city (Table 1). Once this task was complete, an initial stakeholder meeting was held which was attended by approximately 25 people from the organisations listed in Table 1. At the stakeholder meeting the sanitation service chain was introduced and stakeholders were mapped across this chain. Data gaps were identified and a data collection plan was developed. The primary data collection activities were then planned (Table 1) and contact details were exchanged. The data collection took place over approximately three weeks. It should be noted that WMD-KMA aided with the logistics of visits, which encouraged stakeholder buy-in to the process.

The SFD was produced following extensive consultation with the key stakeholders, this can be seen in Figure 4. The accompanying report can be found at <http://sfd.susana.org/sfd-worldwide/cities/14>.

<b>Table 1. Stakeholders involved in the process</b>				
<b>Stakeholder</b>	<b>Present at stakeholder meeting</b>	<b>Primary data collection activities</b>	<b>Influence</b>	<b>Interest</b>
Kumasi Metropolitan Assembly (KMA) – Waste Management Department	Yes	Interviews with staff, observations of faecal sludge treatment plant, survey of trucks entering the faecal sludge treatment plant, observations of household systems, release of internally held secondary data.	High	High
Other departments in KMA i.e. Education, Mayor's Office, Environmental Health Officers	Public Health Officers	Education Department: telephone survey of school sanitation.	Medium	Medium
Water and Sanitation for the Urban Poor (WSUP)	Yes	Interview with project officers, release of internally held secondary data.	High	High
Kwame Nkrumah University of Science and Technology (KNUST)	Yes	Observation of wastewater treatment plant on campus and interview with staff.	Medium	Medium
Clean Team	Yes	Interview with staff, observation of Clean Team site, transect walk with payment collectors, interviews with customers.	Low	High
Environmental Engineering Ltd (Sewage treatment plant operators)	Yes	Interviews with staff, observations of sewage treatment plant, release of internally held secondary data.	Medium	Medium
J. Stanley Osusu & Co. (Landfill operator)	Yes	Visit to the faecal sludge treatment plant (see activities listed under Solid Waste Department).	Medium	Medium
Sub-Metro staff	Yes	Visits to public toilet and interviews with public health workers.	High	Medium
Vacuum Tanker Association	Yes	Arranged shadowing of vacuum tankers.	High	Medium
Vacuum Tanker Operators	Yes	Shadowing of vacuum tankers, observations of emptying and interviews with drivers.	High	Medium
Public toilet attendants	No	Interviews and observations of toilets.	Low	Medium
Kumasi Sanitation Awareness Association	Yes	None.	Medium	High



## Challenges faced by the researcher

WMD-KMA were collaborators, the key stakeholder and gatekeepers to the wider set of sector actors. This led to a high level of buy-in and eased data collection and validation of the report. Many interesting challenges were still faced by the researcher these included:

### 1. Defining the city boundary

The boundary of the city changed in 2013. The data collected for this study did not reflect this as data could not be disaggregated. Therefore study area was based on the old city boundary.

### 2. Plans transitioning from MDGs to SDGs

2015 was a transitions period for the sector, moving from the MDGs to the SDGs. The Ghanaian excreta management plans are developed to run alongside these international initiatives, meaning that most plans were being updated when the study was undertaken.

### 3. Definitions and terms used

The term “sanitation” is used in a general public health context in Ghana. It goes beyond human excreta management and covers solid waste management, storm water drainage, the cleaning of streets and public areas, food hygiene, and the disposal of dead animals and people. Therefore excreta management is only a small part of sanitation policy, legislation or regulations and budgets. Additionally the terms used to refer to human waste in Ghana are excreta or liquid wastes these are used interchangeably. In terms of sanitation technologies used, it was found that many terms were used interchangeably to describe the same or different technologies i.e. septic tank and aqua privy. Therefore in-depth discussion was required with numerous stakeholders to reach agreed definition of technologies.

### 4. Data availability

It was found that data was being collected across the sanitation service chain by local agencies, but this was not in the public domain. It could only be accessed via local agencies, making either a field partner or field work a vital part of this process. No information was found on manual emptiers. Stakeholders acknowledged that they did exist, but it is a clandestine activity in Kumasi so it was difficult to obtain any information about their activities.

### 5. *Extent of data included*

Other possible significant sources of excreta flow were investigated i.e. prisons, hospital etc. The only other sector which possibly contributes to over 1% of the total excreta flow of Kumasi was the school sector, as 35% of the population are of school age (GSS, 2013). The SFD does not include data from schools, as major assumptions are required to confirm the use of these facilities. To include the flow of excreta from schools a better knowledge of the use of school and home sanitation facilities is required, so usage can be split between locations.

### **Reflections on working with stakeholders**

The process itself was very iterative which led to relationships being built with stakeholders over the two months and the release of internally held secondary data. After initial data collection a draft SFD was drawn and presented to the major stakeholders (WMD-KMA and WSUP). This proved to be critical and the most interesting part of the process for the researcher, as the assumptions made were presented and discussed in detail. This proved vital in understanding the sanitation technology types and how they function. A stakeholder led discourse occurred on the inclusion or exclusion of infiltrate (the liquid leaving the system and entering the soil) from pit latrines and septic tanks in the flows of waste across the sanitation service chain. It was decided that the focus of the SFD should be on the faecal sludge and wastewater, due to public health risk associated with these waste streams. Therefore infiltrate was not included in the final SFD. Another active area of dialogue occurred around the names of specific variables; this led the researcher to reassess the waste streams. It is therefore important that the SFD tools are adaptable, so the final SFD can be customised to reflect these agreed terms (i.e. FS contained - not emptied and compost in Figure 4).

### **Key stakeholders reflections**

The WMD-KMA saw the study as an opportunity to experience the SFD process, to feed into its development and to learn how to apply the SFD tools. Up until this project WMD-KMA were only aware of the theory of SFD. They saw this as an opportunity to apply the tools to a complex real life situation and therefore embraced the process wholeheartedly. The SFD process was seen to incorporate many aspects of participatory planning and community engagement.

The WMD-KMA has cordial relationships with many sanitation stakeholders, developed from their previous capacity building projects in this sector. This importantly includes the private sector service providers such as the vacuum truck operators. Due to these good relationships WMD-KMA were able to leverage an enhanced level of co-operation from the stakeholders during the process. The procedure that was followed gave WMD-KMA an opportunity to critically assess and analyse the different sanitation technologies in use in Kumasi. The way the technologies were classified in the SFD was intriguing and different. It was based on how the waste interacts with the environment i.e. a non-functioning septic tank could be classified as a fully lined (sealed) tank with no outlet or overflow. While undertaking the process it was found that many stakeholders have data sets (i.e. those held by the faecal sludge treatment plant operator) which have not been analysed. If analysed well these data sets could be used for planning and monitoring processes.

Through engaging in this process and with the documentation produced, it was felt that these tools have the potential to become pivotal in the sensitisation of policy makers to FSM issues. The process has provided a deep insight into the current FSM situation in Kumasi. It has laid the foundation (as a base-lining process) for the development of future versions, which can be used to evaluate the potential impact of proposed sanitation improvements or programs not only at the city level, but also along parts of the sanitation service chain.

The Director of the WMD-KMA when this study was undertaken is now the Director of Waste Management Department at Accra Metropolitan Assembly. He is currently applying the knowledge and experience gained through this process to inspire and guide young Public Health Engineers within the Department to develop an SFD report for the Accra Metropolitan Assembly.

### Lesson learned

- Stakeholder engagement is *critical* not only for obtaining credible data, but also for validating the resulting SFD
- An iterative approach aids better understanding of the sanitation service chain
- Terminology to describe sanitation technologies is often used interchangeably
- Information on the informal sector such as manual emptiers is difficult to access
- Data is often held by local agencies, so field work/support is necessary

### The next steps

The SFD Promotion Initiative is now entering the second phase where the tools will be made more user friendly and support will be given for those wanting to use them. Further details are available from <http://sfd.susana.org/>.

### Acknowledgements

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### Note

The full report generated from this process can be found at <http://sfd.susana.org/sfd-worldwide/cities/14>.

### Contact details

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