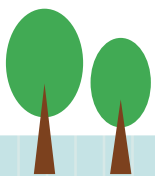
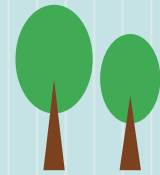
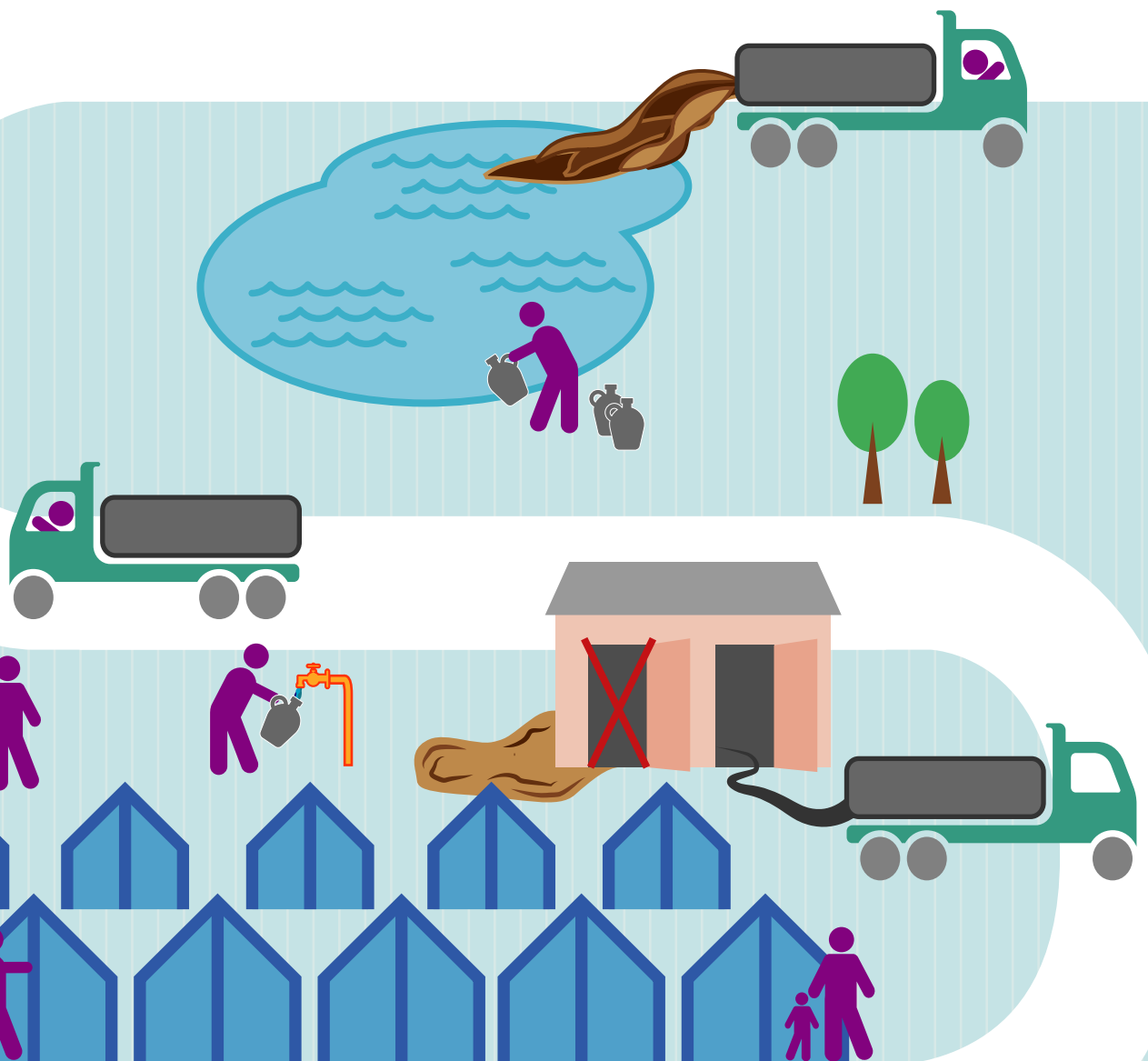


# PREPARING TO BE UNPREPARED

Decision Making and the Use of Guidance on Sanitation Systems and Faecal Sludge Management in the First Phase of Rapid-Onset Emergencies



Humanitarian  
innovation fund

elrha

Elrha's Humanitarian Innovation Fund (HIF) supports organisations and individuals to identify, nurture, and share innovative and scalable solutions to the challenges facing effective humanitarian assistance. The HIF is an Elrha programme and is supported by funding from the UK Department for International Development (DFID), the Swedish International Development Cooperation Agency (SIDA) and the Netherlands Ministry of Foreign Affairs (MFA). DFID funded this research initiative.

[www.elrha.org/hif](http://www.elrha.org/hif)



BORDA (Bremen Overseas Research and Development Association), founded in 1977, is a civil society expert organisation focused on the provision of essential public services. BORDA was responsible for the overall coordination of this research.

[www.borda-wesca.org](http://www.borda-wesca.org)



WASTE is a Dutch non-governmental organisation working to build sustainable sanitation and solid waste systems in developing countries. Jan Spit works as a Sanitation Advisor with WASTE, and provided technical advice as well as conducting key informant interviews in this research.

[www.waste.nl](http://www.waste.nl)



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[www.solidarites.org](http://www.solidarites.org)

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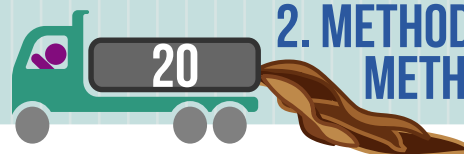
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## ACROYNMS

|        |  |
|--------|--|
| BA     | Barrier Analysis   |
| BORDA  | Bremen Overseas Research and Development Association               |
| DBC    | Designing for Behavior Change                                      |
| DRR    | Disaster Risk Reduction  |
| EAWAG  | Swiss Federal Institute of Aquatic Science and Technology          |
| Ecosan | Ecological sanitation  |
| FGD    | Focus Group Discussion   |
| FSM    | Faecal Sludge Management   |
| HIF    | Humanitarian Innovation Fund                                       |
| IDP    | Internally Displaced Person  |
| IO     | International Organization   |
| KII    | Key Informant Interview  |
| M&E    | Monitoring and Evaluation  |
| MSF    | Medicins sans Frontieres   |
| NGO    | Non-Governmental Organization                                      |
| O&M    | Operations and Maintenance   |
| SuSanA | Sustainable Sanitation Alliance                                    |
| UN     | United Nations   |
| UNHCR  | UN High Commissioner for Refugees                                  |
| WASH   | Water, Sanitation and Hygiene                                      |
| WEDC   | Water, Engineering and Development Centre, Loughborough University |
| WHO    | World Health Organization  |

# EXECUTIVE SUMMARY



In the early stages of a rapid-onset emergency, considerable effort and resources are invested to build latrines to contain excreta and prevent open defecation. However, the next steps – emptying full latrines and safely managing the faecal sludge – are essential services that are often overlooked in initial planning. Although information and guidance on safe faecal sludge management exists, measures are rarely applied in practice.<sup>1</sup> When decisions on faecal sludge disposal, the sites selected, and mitigation measures are inappropriate, the solutions applied can impose serious risks to those affected by an emergency and their surrounding environment.

Despite the numerous innovations and technologies for a variety of humanitarian contexts that have emerged, there is still a gap in managing the disposal of faecal sludge during the first phase of rapid on-set emergencies. In order to address this problem, HIF, a program managed by Elrha, launched a Challenge to develop and effectively disseminate guidance on faecal sludge disposal sites in first phase emergencies. This guidance is intended to support humanitarian practitioners in site selection and establishment, as well as associated risk mitigation. The challenge has two components 1) Research and 2) Dissemination. This research is the first component of the challenge.

This research aims to contribute a small part towards larger efforts building credible evidence and increasing understanding of the current proven solutions in the emergency context through two components. The first component aims to investigate and compile what options have been proven for applications in the emergency context. The second component aims to understand what are the driving forces behind the decisions made on faecal sludge disposal in first phase emergencies at the field level.

The findings of this research are intended to inform

<sup>1</sup> Christophe Grange, “WASH in Emergencies Problem Exploration Report: Faecal Sludge Management,” Humanitarian Innovation Fund, January 2016, <http://www.elrha.org/wp-content/uploads/2016/01/Faecal-Sludge-Management-WASH-Problem-Exploration-Report.pdf>.

practitioners (planners, managers and implementers), organizations and stakeholders (including donors) as well as researchers and students in the field of WASH regarding faecal sludge disposal options and selection of appropriate solutions in emergencies. The research will inform the development of guidance addressing the second component of the HIF challenge—dissemination. The intended audience and stakeholders for the final guidance document are humanitarian practitioners who plan, manage or are involved with supporting WASH responses.

## METHODS AND METHODOLOGY

The research approach employed a methodology informed by the Designing for Behavior Change (DBC) Framework, which includes a pathway to change through five components: (1) through promoting this behavior; (2) among this priority and/or influencing group; (3) we will focus on these determinants which are the most critical barriers and facilitators; (4) and promote these bridges to activities; (5) by implementing these activities.

To identify the determinants within this framework, the overall research methodology was a Barrier Analysis, which focuses on identifying what is preventing the priority group from adopting the behavior, as well as enablers of the behavior. To identify the key barriers and motivators, data are compared among groups of people who already have adopted the new behavior, known as “Doers”, and people who haven’t yet adopted the new behavior, called “Non-Doers”.

Within this methodology, this research employed a mixed-methods approach, utilizing a combination of desk research as well as primary data collection through both quantitative and qualitative methods.

The literature review on applicable faecal sludge management technologies focused on two areas.



The first area was on the technology itself in relation to the context of a first phase emergency, which options are feasible, and which factors (context, budget, timeframe, etc.) need to be considered in order to select an appropriate solution. The second investigation focused on what guidance exists on these technologies and their selection, as well as how accessible the guidance is, an important factor when trying to understand the behavior of practitioners in the field.

Primary data collection included semi-structured Key Informant Interviews (KIIs) with 9 respondents, and an open online practitioner survey on the topic of understanding human waste management decisions in first phase emergencies. The survey contained 5 sections, containing a combination of closed- and open-ended questions. In total, the survey yielded 93 usable responses. Following the initial findings of the survey and qualitative research for this project, a Guidance Design and Dissemination Workshop was held in the Solidarités International Headquarters in Paris, France in November 2017. The discussions and contributions of the presenters and participants in this workshop were also reviewed, triangulated with research findings, and incorporated into this report.

## KEY FINDINGS

### FSM IN FIRST PHASE EMERGENCIES

- **Latrine type and FSM:** Research found that although agencies often know that a pit latrine would have to be replaced or desludged frequently depending on the number of users, due to the extra cost involved in lining the latrine, designing a latrine to be desludged is a rare occurrence in practice.
- **Desludging:** Humanitarian actors usually do not deploy sewer trucks in their response during the first phases of the emergency, but they immediately look for local contractors. However, in many developing countries, sewer trucks are often not available in sufficient numbers, not in good condition, and may lack adequate storage capacity.<sup>2</sup> Agencies often find that desludging costs become the greatest burden in their WASH budget.<sup>3</sup> Numerous papers report faecal sludge being discharged indiscriminately into streets,

sewers, drains, nearby surface water, and coastal areas.

- **Design choices don't account for protracted emergencies:** The average life time of a refugee camp is 17 years, but often initial camp designs, implementation approaches or choices of technologies to provide WASH facilities do not reflect this longer-term perspective.

## EXISTING GUIDANCE

- **Heavy focus on the early stages of the sanitation chain:** The majority of the guidance for first phase emergencies focuses on different designs of latrines and the latter stages of the sanitation chain are often ignored or only lightly mentioned. Guidance on the conveyance or transport of faecal sludge was covered also, but without giving delving too deeply into the different emptying technologies available.<sup>4</sup>
- **Insufficient guidance on interconnections along the sanitation chain:** A key gap in the emergency-targeted resources was emphasis on the important interconnections along the sanitation chain. Technologies were presented within the different groups, user interface, conveyance etc., but no linkages were made regarding how the different technologies function together.
- **Insufficient guidance on O&M and FSM:** The key gap among the emergency-targeted resources is guidance on the important O&M and contextual factors that encompass both classical engineering aspects of technology integration, as well as other issues concerning the institutional management that defines the FSM program.
- **Insufficient guidance on considering FSM in emergency and contingency planning:** Three key WASH preparedness guides were reviewed and while they outlined planning elements for the different WASH interventions, there was no checklists or guidance on how to incorporate faecal sludge management into preparedness and contingency planning.
- **Progress in draft revised Sphere guidance, but further improvements required:** The Sphere guidance is currently undergoing a revision of the 2011 version. The new Sphere guidance contains a standard that specifically deals with collection transport disposal and treatment, but does not mention that the identification and

<sup>2</sup> Ibid.

<sup>3</sup> Brigitte Rohwerder, "Solid waste and faecal sludge management in situations of rapid, mass displacement," Helpdesk Report, K4D Knowledge, Evidence and Learning for Development, 30 October 2017, <http://www.gsdr.org/wp-content/uploads/2017/11/228-solid-waste-and-faecal-sludge-management-in-situations-of-rapid-mass-displacement.pdf>.

<sup>4</sup> Buttle. M., Smith. M. (2004), Harvey et. Al. (2002), Harvey. P. (2007), Davis. J., Lambert. R. (2002), , Reed. B (2009), UNICEF (2012)

implementation of appropriate technologies should consider the entire sanitation service chain. The identification of service providers for collection is not mentioned. Additionally, the indicator for this standard '*Percentage of sites free of de-sludged faecal matter in surface or groundwater sources*' is not clearly defined, difficult and resource-intensive to measure, and inappropriate as it does not address the issue of dumping faecal sludge off-site, a common practice that seriously affects human and environmental health.

## THE BEHAVIOUR

- **Frequent self-reported use of guidelines:** Survey respondents were asked how often or infrequently they consult guidelines when faced with real-time decisions regarding the management of human waste in first phase emergencies. 27% reported that they always consult guidelines; 38% most always; 29% sometimes; 4% rarely; and 2% said that they never use guidelines in this context.<sup>5</sup>
- **Sphere guidelines most commonly consulted, followed by organizational guidance and the Cluster system:** Sphere guidelines are the most commonly consulted, with 64% reporting that they consult them. Respondents also reported high utilization of internal organizational guidelines (55%) guidelines from other organizations (53%), guidelines from the Clusters (56%), and local government guidelines (53%). Less commonly consulted were guidelines from consortia (28%) and online forums (23%).
- **Some consultation of guidance on decisions around blackwater and FSM:** The most common types of decisions guidelines were utilized for were in relation to humanitarian standards (53%), construction of latrines (48%), how many latrines are needed (49%), types of latrines (52%), and factors to consider in planning (56%). Specifically, in relation to FSM, there was a moderate level of guideline utilization reported, though much lower than desired. 31% of respondents reported they consult guidelines for decisions regarding wastewater risks, and 45% to help them determine the quantity and nature of wastewater that will be produced. 33% said they consult guidelines to make decisions regarding factors related to possible blackwater disposal methods, 41% regarding the selection of blackwater disposal methods, and 40% for decisions regarding latrine

desludging. However, only 29% reported that they consult guidelines to inform decisions regarding the disposal of blackwater in different phases of an emergency.

- **Low utilization of guidelines on FSM operational factors:** There were lower levels of reported guideline utilization for operational factors related to FSM. Only 45% reported that they use guidelines to guide decision-making for factors related to the volume of blackwater that would be produced, 38% on the nature of blackwater that would be produced, 33% on the location of risks or nuisances that blackwater disposal may cause, and only 19% on the variance in production of blackwater throughout the day and over longer periods.
- **Only a third of respondents classified as 'Doers':** Respondents were classified as 'Doers' if they: (1) always or most always consult guidelines when faced with real-time decisions regarding management of human waste in first phase emergencies; and (2) use guidelines to help them make decisions regarding factors related to blackwater disposal methods possible, selection of blackwater disposal methods, or blackwater disposal in different phases of an emergency. Overall, out of the 74 respondents that could be classified, 25 were 'Doers' and 49 were 'Non-Doers'.

## PRIORITY AND INFLUENCING GROUPS

- **In practice, FSM decision are often not made by WASH practitioners:** The most commonly reported decision-makers were sanitation-specific technical staff (57%), but field-level emergency response staff (44%) and management-level emergency response staff (44%) were also commonly reported as having involvement as primary decision-makers. Workshop participants also noted that a key issue that needs to be addressed is the involvement of non-WASH practitioners in decision-making.
- **General approval of guideline use:** Clusters or coordination mechanisms, management, the government, and teams were commonly reported as people who approve of the use of guidelines. Most commonly respondents reported that no one disapproves of guideline use. However, other common answers regarding those who disapprove of guideline use included beneficiaries and non-beneficiaries from the local community, as well as

<sup>5</sup> Survey respondents were only asked about behaviours regarding FSM and the use of guidelines if they had experience in FSM in first phase emergencies and/or if they anticipated having such responsibilities in the future. 82 survey respondents were in this category, and 11 did not.



government under some circumstances.

- **Mixed promotion of guideline use in organizational policies and procedures:** 40% said that their organization did not have policies in place that would make them more likely to consult guidelines, and 7% did not know. 23% said that their organization has policies in place that would make them *less* likely to consult guidelines.
- **Mixed promotion of guideline use in national policies and procedures:** 53% reported that there were national policies or laws that would make them *more* likely to utilize guidelines in decision making on FSM in first phase emergencies. 24% reported that there were national policies or laws that would make them *less* likely to utilize guidelines. Several referenced the inconsistency of national laws and policies with guidelines.

## DETERMINANTS: MOTIVATION

- **Guidelines are perceived to help make quick, easy decisions on appropriate solutions:** The most common advantages named were helping to make quick and easy decisions and choosing appropriate or suitable FSM solutions. Other common answers included ensuring adherence to norms and standard practices. Several felt that guidelines enable them to learn from others and use existing knowledge and tested solutions, and named resource effectiveness in terms of cost and human resources as an advantage of using guidelines.
- **Guidelines are perceived to not be context-specific and that consulting them can delay implementation and inhibit innovation:** Lack of context-specificity or guidelines that are inappropriate for the context emerged as an overwhelming concern. Another key concern that emerged was that guidelines can be time-consuming to use and cause delays or present additional hurdles. Another concern was that they can inhibit innovation and creativity and prevent thinking outside the box.
- **Use of non-guideline resources to aid decision-making:** Respondents commonly reported that they use person-to-person interaction with others inside their organization, as well as person-to-person interactions with others outside of their organization. Similarly, many reported utilizing decision-making support from a technical advisor within their organization and indicated that they reference the Clusters and coordination platforms for decision-making.
- **Reliance on personal and previous experience:**

Almost all respondents said that they use their personal knowledge and experience as a resource in decision-making. However, considering the findings of this research and wider discussions among workshop practitioners, the heavy reliance on what has been implemented previously could constitute a limitation in FSM decision-making.

- **Low utilization of online learning and journals:** Webinars and massive open online courses were not very widely utilized. There as also low utilization of peer reviewed journals, which comes with inherent limitations in terms of access for humanitarian practitioners.
- **Heavy reliance on direct observation as a real-time tool to aid decision-making:** Direct observation was the most commonly utilized. Some also reported taking direct measurements to inform their decision-making and response, including water availability, space availability, and elevation/slope. Traditional semi-structured qualitative methods such as key informant interviews (KIIs) and Focus Group Discussions (FGDs) were also commonly utilized.

## DETERMINANTS: CAPACITY

- **Moderate confidence in ability to access guidelines:** Just over half of respondents felt that with their present knowledge, resources and skills they could locate and access guidelines regarding the management of human waste in first phase emergencies, and the remainder felt that they possibly could.
- **Factors perceived to make guideline access and utilization easy:** The most common enabling factor reported was having access to guidelines in both hard and soft copy, guidelines being short and consider, being trained on the correct Use of guidelines, and having guidelines with specific directives
- **Factors perceived to make guideline access and utilization difficult:** The most common barrier reported was a lack of country/context-specific guidelines. Other barriers reported included lack of consensus and differing guidelines, guidelines being too long, guidelines being impractical, guidelines being too specific or too detailed, and lack of expertise or capacity to implement the guidelines.

## DETERMINANTS: CONTEXT



- **Lack of experience may not be a motivator for seeking out guidance:** Those who reported that they did not have any experience conducting work relevant to the management of human waste in first phase emergencies but anticipated that they would have this responsibility were no more likely to report the consultation of guidelines than those who had previous experience. There were also no significant differences between those that had not received any WASH-specific training than those who had, or years of experience in emergency/humanitarian contexts, suggesting that those with less experience were no more likely to seek out and utilize guidelines for decision-making related to FSM in the first phase of rapid-onset emergencies.
- **Use of guidance for anything may promote use of guidance for FSM:** Findings generally seem to suggest that those who would utilize guidance for any type of decisions would probably be more likely to also utilize them for any kind of decisions, including those related to FSM in first phase emergencies.
- **Users want guidance on FSM:** The most common areas in which guidance is wanted were related to FSM and the latter stages of the sanitation chain, including wastewater risks, factors related to possible blackwater disposal methods, selection of blackwater disposal methods, blackwater disposal in different phases of an emergency, and latrine desludging. However, it is important to note that while these areas of guidance were the most highly requested, it was still only around half of the respondents that felt they would want guidance in this area.
- **Preference for on-the-job, field-based, and peer-to-peer learning:** The most preferred resource was on the job. Peer to peer learning was also highly rated, demonstrating clear preference for learning through methods that are interpersonal and field- and practice-based.

## CONCLUSIONS AND BRIDGES TO ACTIVITIES

The desk review found that considerable guidance does already exist. The research found a relatively high self-reported utilization rate, with around 70% saying that they always or most always consult guidelines. With the findings that guidelines exist and practitioners report that they are using them, the original research question prevails—why is the ‘behaviour’ in terms of identifying and implementing appropriate FSM solutions in the first phase of

emergencies still so poor?

## KEY CONCLUSIONS

- **Catering to the diversity of decision-maker profiles:** Though in discussions regarding sanitation systems and faecal sludge management ‘practitioners’ is often assumed to refer to WASH practitioners with sufficient technical expertise to make key decisions, the research found that in practice the spectrum of decision-maker profiles is much more diverse. As such, to be effective guidance must cater to the full spectrum of diversity of decision-maker profiles. In this scenario, while the issue of identifying appropriate technologies for an emergency response is an important one, it is only a first step if the profile of the decision-maker is not a WASH practitioner with sufficient resources, capacity and experience to evaluate the option and determine its appropriateness or to apply the necessary adaptations to make the technology appropriate to the context.
- **Use of guidance for verification and compliance rather than decision-making:** The findings revealed that when guidance is consulted, the scenarios described by respondents were generally focused on compliance and spot-checking once a solution had been advanced. This finding is similarly supported by the scenarios in which respondents said they would not consult guidelines for ‘normal’ or ‘standard’ cases or if they were using a technology or solution they were already familiar with. This suggests that guidance can often be viewed as a source of verification rather than for decision-making, and that though practitioners report using guidance.
- **Using the wrong guidance:** Taken with the desk research findings that existing guidance is not necessarily branded for use in emergencies and focuses on the early stages of the sanitation chain, this finding sheds considerable light on why solutions are still so often inappropriate despite guidance existing. The existing guidance that does actually address FSM is not the guidance that is being widely used, and the guidance that is being widely used was found to have insufficient guidance regarding FSM in emergencies.
- **Sphere as a central resource with insufficient and inadequate guidance on FSM:** The research found that the Sphere Project continues to serve as a central resource for humanitarian and emergency practitioners. The poor incorporation of FSM into the Sphere standards regarding sanitation to date is likely a reflection of or contributor to the lack of

attention to FSM in emergencies to date.

- **Wide beliefs in ‘myths’:** Though the findings showed that there is a general perception that using guidelines is acceptable, it also revealed several strongly held beliefs about disadvantages or constraints around their use, very few of which were substantiated with specific examples or cases. Key constraints of guidelines that clearly emerged were: (1) that consulting them takes too much time in an emergency and inhibits practitioners ability to respond quickly; (2) that the lack of context-specific guidance for the exact situation the practitioner is in would result in identifying contextually inappropriate solutions; and (3) that guidelines would prohibit experimentation and/or innovation. Taken together, the findings of these research would suggest that these widely-held beliefs are something of self-perpetuating myths, and constitute a considerable barrier that must be addressed in promoting behavior change in this area.
- **Wide knowledge and skill-gap among both specialists and non-specialists:** Many WASH engineers, including civil society, government, and private sector, are not conversant in FSM and may not have the confidence or capacity to implement strong FSM systems. This determinant similarly echoes the issues raised around the ‘priority group’—that the decision-makers are often not necessarily those with sector-specific expertise, either by design or perhaps more often by necessity in the context of needing to respond quickly and working with resources and capacity that is readily available at the time of the response.
- **Remaining questions around the science of FSM in emergencies:** There are still many unknowns relating to FSM such as what is faecal sludge made up of and clear, quick and easy methods for characterizing sludge as this will have an impact on how it should be managed. Similarly, the desk research found that there are very few examples of successful implementation of faecal sludge management in the humanitarian sector.
- **Lack of clarity in terminology and language limitations:** Much guidance, including most of that reviewed in the desk research, is only available in English. The desk research found a clear lack of consistency in the terminology around FSM, with the common use of the term ‘excreta disposal’, which can reference the containment of excreta in connection with the user interface. This ambiguity and inconsistent use of terminology can be both misleading when guidance is found, and could also prevent guidance on FSM from being found at all if other terminology is employed.

## BRIDGES TO ACTIVITIES

Though context-specific ready-made solutions are wanted, guidance on factors to consider in identifying a solution appropriate to the context is what is needed: Context-specificity emerged as a key concern for determining FSM solutions. However, while there is a long but generally finite list of known factors that need to be considered to select a solution that is contextually appropriate, there is an infinite amount of combinations of these factors, such that no guidance could ever capture them all. Much of the focus in addressing the issue of the ‘appropriateness’ of an FSM solution or technology in a given scenario is on determining whether that *solution* was right or wrong, rather than assessing whether the factors that were considered in selecting that solution or technology were the right *factors* and appropriately evaluated. Considering the limitations in terms of prescribing a ‘right’ solution for the full range of possible scenarios, the latter is a much more exhaustive approach and much more informative in determining what kind of guidance is needed and how it can be most effectively advanced and utilized to influence behaviour change.

While a clear demand that emerged from this research was for ‘context-specific’ ready-made solutions, generating this sort of guidance would be not only impossible but also potentially irresponsible if done without cautionary qualifications for the decision-maker, as it could provide a package solution that could be applied verbatim without providing FSM decision-makers with the necessary tools to adjust it to the specific circumstances of the emergency scenario they are faced with. Rather than needing context-specific guidance for every single possible scenario, FSM decision-makers need the guidance to assess the parameters of their emergency context and the capacity and resources to evaluate technologies against each known contextual factor to draw both context- and situation-specific conclusions about what is appropriate.

### Bridging the gap between research and the field:

The research found a clear perceived disconnect by practitioners with researchers and ‘lab-based’ work on FSM. The workshop participants concluded that case studies and implemented field examples with input from both researchers and practitioners are necessary. There was a clear hesitance, echoed throughout the survey findings, towards applying ‘lab-based’ examples that have not been field proven, and to experiment with them in the field without better understanding technical issues and

how to plan around key factors in a field setting. Workshop participants felt that more collaboration and discussions between field researchers that take place in the field instead of in a research environment or in workshops and seminars would help to promote better evidence-based practice and responsible experimentation and innovation among practitioners.

**Promotion of FSM in preparedness and contingency planning:** One key conclusion that spans the findings of this research is that many of the barriers that practitioners put forward do not emerge when a crisis occurs, but are known in advance and are simply not effectively planned for. Though some crises may have little to no lead time, many crises have early warnings or happen in predictable intervals. Taken in total, a large proportion of crises that require emergency response occur with a rapid onset, but were predictable or at least had an understood probability of occurring. In these types of rapid-onset crises, that sanitation system response will need to be able to address large amounts of human waste rapidly accumulating in an unplanned system is a known factor; there will be no emergency crisis that involves displacement or concentration of the affected population where this will be a non-issue. However, the incorporation of FSM decision-making into preparedness and contingency planning was not mentioned at all by survey respondents, and featured very little in workshop discussions.

**Developing emergency-specific and targeted guidance on FSM:** With this inevitability of the human excreta factor in a response, the lack of FSM-specific emergency guidance and standards for first phase responses is similarly problematic. Guidance and standards exist in the spheres of development practice and systems planning, but are clearly not known, sought out, or utilized by humanitarian and emergency practitioners. Though the steps towards inclusion of FSM in the revised Sphere standards is a promising step towards realigning thinking in the humanitarian and emergency sector to span beyond the immediate user interface and into the latter stages of the sanitation chain, the standards and indicators focusing primarily on removal of the faecal sludge from the sanitation facility site follows the same precedent of 'out of sight, out of mind' by failing to set a standard for practice in terms of both on-site and off-site treatment and disposal of faecal sludge in an emergency context. Essentially, by failing to include FSM throughout the end of the sanitation chain in guidance and standards for emergency responses, we are preparing to be unprepared when it comes time to make decisions in a crisis situation regarding the sanitation system and how the resultant faecal sludge will be managed.

## RECOMMENDATIONS

- **Existing resources that were highlighted in this research should utilize the findings and conclusions to strengthen their FSM components, particularly the Sphere Guidance and the WASH Cluster:**
  - Sphere guidelines should draw on and link to existing key resources that pioneered the sanitation chain approach, thus providing the user with access to key resources that can support in decision making.
  - The inclusion of standards related to FSM in the revised Sphere guidance is an excellent step forward in terms of bringing practitioner thinking and accountability through to the latter stages of the sanitation chain. However, the wording of the current indicators in the revised guidance only focus on needing to remove the faecal sludge from the site, and do not bring practitioners fully through to the ultimate off-site disposal of the faecal sludge. The indicator should be revised to promote
  - The WASH Cluster should be the 'go to' for information, but with a simple search function using the term 'faecal sludge' there are 'no results'. At the time of this research the WASH Cluster has expressed intentions to develop a knowledge management platform. Its development should involve the participation of users and would serve as an excellent opportunity to address this gap.
- **Develop a professional directory to enable peer-to-peer engagement among professionals, organizations, and practitioners on FSM:** The research showed that technology choices in the field are rarely made using guidelines or a resource on technology options, and peer-to-peer learning is preferred. Collaborating with those who have implemented or developed the technology allows the practitioner to feel confident that their questions and concerns have been addressed before implementing a new system. A comprehensive directory of FSM WASH professionals, organizations, and individuals, by country and by region could be a useful support mechanism. Such a mechanism would make it easier for practitioners to find someone who speaks his or her language and is familiar with their particular situation. This directory would need to be updated regularly. It was observed

that contact information for those with experience related to a particular technology was absent in the guidance of resources reviewed.

- Focus more on mode of dissemination in resource development, ensuring access both on- and off-line:** Based on the findings regarding access to, it is vital that an effective guidance be available in both electronic hard copy formats – the latter for users without computers or Internet access. For practitioners who do have adequate access to the Internet, a number of useful support resources are available, although several will need to be used together in order to give practitioners the full range of options and assessment methods appropriate for emergencies. While even remote rural parts of the world are becoming more connected, those who have internet access may still find it unreliable or inadequate for downloading large files. As a result, alternatives such as hard copy documents, will continue to be an important option in many areas for some years to come. The guidance for emergencies was obtained from many different sources on the internet, which could also be a barrier to access. IFRC have made a library and useful document search tool on their website, however there are alternatives to this such as Knowledge point (managed by RedR) and then individual organisations such as WEDC and Oxfam who also have documents libraries.
  - Come to consensus on terminology in humanitarian and emergency contexts related to FSM, and then use it consistently across all relevant stakeholders:** Inconsistent and misleading use of terminology was found to have further compounded several issues related to the identification and use of guidance for FSM decision-making. It is critical that technical professionals, researchers, and practitioners reach a general consensus on language and terminology related to FSM, ideally through the WASH Cluster or a similarly cross-contextual forum. With generally agreed technology, consistency in its use and application can be promoted through the guidance and resources developed as well as by donors and other stakeholders. This is critical to ensure that practitioners find resources when they look for them, and have the knowledge of terminology to find the resources they need.
  - Consider language in dissemination and conduct translation with user-specific understandings of terminology relevant to areas of humanitarian operation:** Another aspect of information access is language. The majority of guidance resources are available only in English. Many support resources that were created in English are not translated
- into other languages, with exception of a few, for example the Compendium of Sanitation Systems and Technologies is available in French, Arabic, Spanish, Nepali, Vietnamese and Korean. The limited diversity of available languages limits the use of these support resources in some regions. It was previously often assumed that practitioners can understand and are most comfortable incorporating new information that is presented in their native language, however in some situations modern engineering and sanitation terms don't exist in the native language and therefore the English terms are often taught in university curriculum. An example of this was with younger engineers trained in Iraq, they reported that they preferred to use the English version as they were more familiar with the English terms.<sup>6</sup> Before translation efforts are undertaken, a focus group of potential practitioners in various contexts can help identify the priority languages for translation.
- Building on this research, conduct a more complete, multilingual search to identify support resources that may have been missed by the scope of this review.**
  - Ensure that guidance materials span the entire sanitation chain, or if focused on a particular phase, make reference to resources for users to continue to take implementation through to the very end of the sanitation chain:** An effective FSM guidance tool can help practitioners reduce faeco-oral mortality and morbidity by addressing the interconnected factors along the sanitation chain and consider the different needs of different settings. An effective guide will, within the context of an emergency, compare the benefits and challenges of each FSM technology option, provide information on the materials and other resources needed to implement each technology, detail scalability and ongoing operation and maintenance needs, provide options for involving the community, address institutional elements of success, compare costs of different technologies, and highlight resource recovery options. Additional information is needed so that users can obtain a sense of the use of this technology in multiple settings via case studies.
  - Regularly update existing guidance resources:** In order for guidance to be trusted in the field, it needs to be accurate and updated over time.
  - Include success stories and case studies and field examples, but not as standalone resources:**

<sup>6</sup> Personal communication with sanitation engineers in a training in the Kurdish Region Iraq.

A collection of success stories and illustrative failures would be an invaluable supplement to the guidance. It would include information on the technology, financial approaches, operation and maintenance, and challenges. At the time of writing this report, numerous FSM technologies are being designed and implemented in Cox's Bazaar in Bangladesh, for Rohingya Refugees<sup>7</sup>. This is a unique situation where FSM has been prioritised, the knowledge and learnings from these projects and the overall approaches should be captured as guidance. Another accessible example from Nepal was developed by a local NGO that demonstrated a small FSM plant that can be successfully implemented in emergencies<sup>8</sup>. In addition to this, there are a number of success stories or case studies available, however they are often written to demonstrate an agency's success (to a donor for example). Similarly, workshop participants expressed a desire for examples from the field instead of the lab. Therefore, an independent analysis and presentation of success stories, consistent in format and targeting the humanitarian sector, linked in with the Compendium for Sanitation Technologies for Emergencies, would provide good supporting guidance. However, the research also found that many practitioners want a ready-made solution to implement, but this is not possible or advisable given the range of factors that must be considered to determine the most appropriate FSM solution in a given context. As such, the case studies should not be presented as standalone resources but in complement to technical and decision-making guidance to ensure that these critical factors are not overlooked.

- **Partner with intended users to develop guidance and dissemination strategies, potentially in multiple forms and strategies catered to various contexts and intended points of use:** The research analysis and conversations with current practitioners revealed that the creation of effective guidance solves only half of the problem. Practitioners cannot use guidance that they do not know about or which they lack easy access. Effective dissemination is key to the success of guidance. Ideally, guidance needs to be created in partnership with users so that it is designed to meet their needs, and is already primed for their immediate use. In addition, guidance should be

supplemented with in-country education and workshops to inform potential users about where to find the tool and how to use it.

- **Complement guidance resources with easily accessible and/or deployable technical support:** To ensure FSM systems are implemented to the highest possible standards within a context, practitioners must have access to experts (preferably local) who can answer questions during the planning, design and construction and help with troubleshooting problems during operation. This was also something that was brought up during the workshop – making technical support teams available in each region.<sup>9</sup> Funding mechanisms for such teams needs exploration but ideally they could be connected with the guidance and regional workshops or trainings in order to create a comprehensive package that provides practitioners with the support and resources needed to implement new technologies.
- **Emergency practitioners should bear some professional responsibility to seek out and utilize relevant existing resources that are not specifically branded for emergency practitioners:** The research found that there is not a deficit of guidance on FSM technical options and decision-making; the gap is in resources branded and targeted specifically at emergency practitioners. While having such guidance and resources will help to ensure appropriateness and ease of rapid use for emergency practitioners, those working in sanitation-related fields must also invest efforts to be aware of the existing guidance and resources that are relevant, even if not branded as emergency-specific.

<sup>7</sup> "Situation Report: Rohingya Refugee Crisis, Cox's Bazar," Inter Sector Coordination Group, 14 January 2018, <https://reliefweb.int/report/bangladesh/iscg-situation-report-rohingya-refugee-crisis-cox-s-bazar-14-january-2018>.

<sup>8</sup> Rajendra Shrestha, Bipin Dangol, and Reetu Rajbhandari, "Faecal Sludge Treatment and Resource Recovery: A case study from Lubhu, Nepal," ABZ Spiez, Switzerland, June 26th to 30th 2017, <https://www.shareweb.ch/site/Water/resources/RsEAU%20Library/Aguasan%20Workshop%202017/Shrestha%20Rajendra%20Faecal%20Sludge%20Treatment%20and%20Resource%20Recovery%20Nepal.pdf>.

<sup>9</sup> For example, a good mechanism being run by the German WASH Network, is regional workshops that aim to strengthen Humanitarian preparedness and response capacity in emergency WASH; see <http://www.washnet.de/en/training/regional-workshops/>

# 1. INTRODUCTION



In the early stages of a rapid-onset emergency, considerable effort and resources are invested to build latrines to contain excreta and prevent open defecation. However, the next steps – emptying full latrines and safely managing the faecal sludge – are essential services that are often overlooked in initial planning. Although information and guidance on safe faecal sludge management exists, measures are rarely applied in practice.<sup>10</sup> When decisions on faecal sludge disposal, the sites selected, and mitigation measures are inappropriate, the solutions applied can impose serious risks to those affected by an emergency and their surrounding environment.

In a first phase emergency response, there are two key problems with the inadequate or inappropriate treatment and disposal of faecal sludge: (1) unsafe treatment and disposal of faecal sludge can expose the host and/or displaced community to pathogens and lead to pollution entering the environment, exposing people to further immediate risk; and (2) while the majority of emergency response solutions are applied as a temporary measures, especially in camp contexts, the duration of the camp is often actually long-term, without adequate sustainable FSM systems for long-term use.

## 1.1 PROJECT BACKGROUND

In 2013, the Humanitarian Innovation Fund (HIF) commissioned a Gap Analysis to identify key challenges in emergency WASH (Water Sanitation and Hygiene). This highlighted improving faecal sludge management (FSM) during emergencies as an area requiring urgent attention. Specifically, methods for disposing of bulk faecal sludge were highlighted as a significant problem, particularly in the first phase of rapid onset emergencies.<sup>11</sup> Similarly, in a 2012

Global Wash Cluster gap analysis workshop, the highest sanitation priority was identified as 'excreta disposal in difficult environments, including final deposition site for desludged excreta'.<sup>12</sup>

Despite the numerous innovations and technologies for a variety of humanitarian contexts that have emerged, there is still a gap in managing the disposal of faecal sludge during the first phase of rapid onset emergencies. However, it is unclear whether this gap is due to a knowledge gap, a gap in terms of application of knowledge regarding appropriate management of faecal sludge in practice, operational or contextual constraints, or a combination of these various factors.

In order to address this problem, HIF, a program managed by Elrha, launched a challenge to develop and effectively disseminate guidance on faecal sludge disposal sites in first phase emergencies. This guidance is intended to support humanitarian practitioners in site selection and establishment, as well as associated risk mitigation. The challenge has two components: 1) research; and 2) dissemination.

This research is the first component of the challenge. Though there has been research and investment of resources in identifying appropriate FSM technologies and solutions in emergencies, there has been less research into how these decisions are made and applied, by whom, and utilizing what knowledge and resources. Even with the existence of guidance and resources, inappropriate decisions are often made, or their application is not effective. As such, this research focuses on helping to identify the underlying factors that lead to the inappropriate or ineffective solutions for FSM in first phase emergency responses to help identify the most effective entry points for promoting behavior change among emergency organizations, stakeholders, and practitioners regarding FSM.

<sup>10</sup> Grange, Christophe. "WASH in Emergencies Problem Exploration Report," January 2016.

<sup>11</sup> Andy Bastable and Lucy Russell, "Gap Analysis in Emergency Water, Sanitation and Hygiene Promotion," Humanitarian Innovation Fund, 2013, [https://reliefweb.int/sites/reliefweb.int/files/resources/hif\\_wash\\_gap\\_analysis.pdf](https://reliefweb.int/sites/reliefweb.int/files/resources/hif_wash_gap_analysis.pdf).

<sup>12</sup> Ibid.

This project is applied research, aiming at finding a solution for the immediate problem of issues around decision-making and the utilization of guidance on appropriate disposal of faecal sludge in the first phase of rapid-onset emergencies. The purpose of this research is to identify factors that discourage practitioners from referring to existing guidance on safe faecal sludge disposal, as well as associated barriers, and assessing the gaps in existing guidance with the aim of identifying effective means through which to encourage their utilization.

## 1.2 THE SANITATION CHAIN AND FSM WITHIN A SANITATION SYSTEM

Sanitation refers to the maintenance of hygienic conditions by proper storage, treatment and disposal of human urine and faecal sludge.<sup>13</sup> Discussions around adequate sanitation often draw to mind the facilities and infrastructure in place for the user, namely toilet facilities. However, the activities related to the management of faecal sludge and human waste extend well beyond the immediate collection of human excreta, and can be understood as a 'sanitation chain', which considers all stages between the source of faecal sludge generation until the final discharge point.<sup>14</sup> This includes:

- 1. User interface:** This is the point at which the waste stream (excreta, wastewater, and potentially other organic waste) is first taken out of the user's immediate environment; for example a toilet.
- 2. On-site collection and storage:** The collection and storage of waste streams can take place on-site or at a more central point; for example in jerry cans for urine, and holding or septic tanks for wastewater.
- 3. On-site treatment:** Sometimes, partial treatment of products that are generated from the user interface is done on-site. The treatment that is provided by these technologies is often a function of storage and is usually passive (e.g., no energy inputs). Thus, products that are "treated" by these technologies often require subsequent

treatment before use and/or disposal.

- 4. Emptying, conveyance and transport:** Depending on system configuration the waste stream may need to be conveyed between locations and technological functions. Emptying and conveyance describes the removal and transportation of faecal sludge from one place to another (e.g., septic tank to treatment plant). This becomes necessary when the on-site collection/storage/treatment component has reached its capacity. The means of conveyance and transport can range from plastic containers to piped networks to trucks.
- 5. Off-site Treatment:** This is a set of processes designed to eliminate or remove unwanted or harmful components and render other components safe and practical for reuse (or release into the environment). Treatment can be passive (storage) or active, using mechanical, biological or chemical processes. It can occur on-site (meaning conveyance and transport are not required) or can occur off-site after faecal sludge has been conveyed or transported.
- 6. Off-site Use and/or Disposal:** Disposal describes the safe disposal or use of the treated product for some benefits. There are various methods for recovery and reuse or recycling the resources in waste streams, depending on demand and local conditions. Several may overlap with treatment (e.g. composting, digestion for biogas production).<sup>15</sup>

Achieving technical functionality of the sanitation and wastewater management system requires planning and designing along the entire sanitation chain that considers all relevant operational and contextual factors (e.g. geographical and socio-cultural), both at the time of the system design and in projected. System design should address the diverse needs of the different user groups, and must be designed to be appropriate to the context from a cultural and behavioral perspective.<sup>16</sup>

Within the sanitation chain, as displayed in the graphic above, there are a wide range of technical options available, and these can be adapted to the context to make a sanitation and wastewater system more sustainable. Key variables include operational

<sup>13</sup> Shubhra Singh, Sujaya Rathi, Sonali Patro, Shramana Dey, and Riya Rachel Mohan, "Technology Options for the Sanitation Value Chain," Center for Study of Science, Technology and Policy (CSTEP), July 2016, [http://cstep.in/uploads/default/files/publications/stuff/CSTEP\\_Technology\\_Options\\_for\\_the\\_Sanitation\\_Value\\_Chain\\_Report\\_2016.pdf](http://cstep.in/uploads/default/files/publications/stuff/CSTEP_Technology_Options_for_the_Sanitation_Value_Chain_Report_2016.pdf).

<sup>14</sup> Laura Bright-Davies, Andreas Schmidt, Larissa Duma, and Faraja Mbuduka, "City sanitation planning package for Dar es Salaam," BORDA, 2016, <http://www.susana.org/en/knowledge-hub/resources-and-publications/library/details/2562>.

<sup>15</sup> Singh, Shubhra, Sujaya Rathi, Sonali Patro, Shramana Dey, and Riya Rachel Mohan. "Technology Options for the Sanitation Value Chain." 2016.

<sup>16</sup> Andersson, K., Rosemarin, A., Lamizana, B., Kvarnström, E., McConville, J., Seidu, R., Dickin, S. and Trimmer, C., "Sanitation, Wastewater Management and Sustainability: from Waste Disposal to Resource Recovery," United Nations Environment Programme and Stockholm Environment Institute, 2016, <https://www.sei-international.org/mediamanager/documents/Publications/SEI-UNEP-2016-SanWWM&Sustainability.pdf>.

| ON-SITE                    |                                |                         |  | TRANSPORT                        |                                    |            | OFF-SITE                       |   |                               |  |                      |
|----------------------------|--------------------------------|-------------------------|--|----------------------------------|------------------------------------|------------|--------------------------------|---|-------------------------------|--|----------------------|
| Input Products             | User Interface                 | Input / Output Products | Collection and Storage / Treatment       |                                  | Input / Output Products            | Conveyance |                                |   | (Semi-) Centralised Treatment | Input / Output Products                  | Use and /or Disposal |
|                            |                                |                         | Collection / Storage                     | (Pre-) Treatment                 |                                    | Emptying   | Transport                      | Intermediate Storage                      |                               |  |                      |
| Urine                      | U.1 Dry Toilet                 |                         | S.1 Deep Trench Latrine                  | S.17 Hydrated Lime Treatment (E) | C.1 Manual Emptying & Transport    |            | C.6 Transfer Station & Storage | PRE PRE-Treatment Technologies            |                               | D.1 Application of Stored Urine          |                      |
| Faeces                     | U.2 Urine Diverting Dry Toilet |                         | S.2 Borehole Latrine                     | S.18 Urea Treatment (E)          | C.2 Motorised Emptying & Transport |            |                                | T.1 Settler                               |                               | D.2 Application of Dried Faeces          |                      |
| Anal Cleansing Water       | U.3 Urinal                     |                         | S.3 Single Pit Latrine                   | S.19 LAF Treatment (E)           | C.3 Simplified Sewer               |            |                                | T.2 Anaerobic Baffled Reactor             |                               | D.3 Application of Pit Humus & Compost   |                      |
| Dry Cleansing Materials    | U.4 Flush Toilet               |                         | S.4 Single Ventilated Improved Pit (VIP) | S.20 Caustic Soda Treatment (E)  | C.4 Conventional Gravity Sewer     |            |                                | T.3 Anaerobic Filter                      |                               | D.4 Application of Sludge                |                      |
| Flushwater                 | U.5 Controlled Open Defecation |                         |  |                                  | C.5 Stormwater Drainage            |            |                                | T.4 Biogas Reactor                        |                               | D.5 Fill & Cover                         |                      |
| Greywater                  | U.6 Shallow Trench Latrine     |                         |  |                                  |                                    |            |                                | T.5 Waste Stabilisation Ponds             |                               | D.6 Surface Disposal & Sanitary Landfill |                      |
| Stormwater                 | U.7 Handwashing Facility       |                         | S.5 Twin Pit Dry System                  |                                  |                                    |            |                                | T.6 Constructed Wetland                   |                               | D.7 Use of Biogas                        |                      |
| Organics                   |                                |                         | S.6 Twin Pit with Four Flush             |                                  |                                    |            |                                | T.7 Trickling Filter                      |                               | D.8 Co-Combustion of Sludge (E)          |                      |
| Menstrual Hygiene Products |                                |                         | S.7 Raised Latrine                       |                                  |                                    |            |                                | T.8 Sedimentation & Thickening Ponds      |                               | D.9 Leach Field                          |                      |
|                            |                                |                         | S.8 Single Vault UDDT                    |                                  |                                    |            |                                | T.9 Unplanted Drying Bed                  |                               | D.10 Soak Pit                            |                      |
|                            |                                |                         | S.9 Double Vault UDDT                    |                                  |                                    |            |                                | T.10 Planted Drying Bed                   |                               | D.11 Irrigation                          |                      |
|                            |                                |                         | S.10 Container-Based Toilet              |                                  |                                    |            |                                | T.11 Co-Composting                        |                               | D.12 Water Disposal & GW Recharge        |                      |
|                            |                                |                         | S.11 Chemical Toilet                     |                                  |                                    |            |                                | T.12 Vermicomposting (E)                  |                               | D.13 Fish Ponds                          |                      |
|                            |                                |                         | S.12 Worm-Based Toilet (E)               |                                  |                                    |            |                                | T.13 Activated Sludge                     |                               |  |                      |
|                            |                                |                         | S.13 Septic Tank                         |                                  |                                    |            |                                | P.0 ST Tertiary Filtration & Disinfection |                               |  |                      |
|                            |                                |                         | S.14 Anaerobic Baffled Reactor           |                                  |                                    |            |                                |   |                               |  |                      |
|                            |                                |                         | S.15 Anaerobic Filter                    |                                  |                                    |            |                                |   |                               |  |                      |
|                            |                                |                         | S.16 Biogas Reactor                      |                                  |                                    |            |                                |   |                               |  |                      |

| CROSS - CUTTING ISSUES                        |  |  |
|---|--|--|
| Initial Situation                             | Conceptual Aspects   | Design & Social Consideration                                |
| X.1 Assessment of the Initial Situation       | X.5 Resilience and Preparedness                                    | X.10 Inclusive and Equitable Design                          |
| X.2 Rehabilitation of Existing Infrastructure | X.6 Exit Strategy, Hand-Over and Decommissioning of Infrastructure | X.11 Child Excreta Management                                |
| X.3 Soil and Groundwater Assessment           | X.7 Urban Settings and Protracted Crisis Scenarios                 | X.12 Hygiene Promotion and Working with Affected Communities |
| X.4 Institutional and Regulatory Environment  | X.8 Solid Waste Management   | X.13 Market-Based Programming                                |
|   | X.9 Cholera Prevention and Epidemic Management                     |  |

Figure: Technology Overview from the forthcoming Compendium for Sanitation Technologies in Emergencies

levels (centralized, decentralized, on-site, off-site), waterborne or non-waterborne systems, source-separating approaches, and treatment technologies. Treatment technologies depend on whether resource recovery is a component of the system and the associated treatment priorities.<sup>17</sup>

## PRIORITIES IN FIRST PHASE EMERGENCY RESPONSES

Additionally, in understanding the sanitation chain within this research, it is important to add another dimension with the foundations of priorities in first phase emergency response versus the recovery stage and in longer-term development programming. Whereas the main objective of recovery and development programming is to support sustainable, long-term economic, environmental, social and political development, in the context of a first phase emergency response the primary objective is to save lives, alleviate immediate suffering, and to maintain and protect human dignity.

As such, the objectives and approaches in an emergency response would often prioritize short-term measures that are perhaps more output-oriented and less long-term in focus if they are able to save more lives in the immediate phase of the

response.

## PHASES OF AN EMERGENCY

The prevalent categories used to distinguish between the different emergency phases are: (1) acute or rapid response phase, (2) transition or stabilization phase, and (3) recovery or rehabilitation phase. However, the division into these broad modes of assistance should be viewed as a rather theoretical and simplified classification model primarily modeled after singular natural disaster events. Real life is seldom so clearly defined.

### ACUTE/RAPID RESPONSE PHASE

This refers to humanitarian relief interventions that are implemented immediately following natural disasters, conflicts, protracted crises or epidemics. It usually covers the first hours and days up to the first few weeks, where effective short-term measures are applied to alleviate the emergency situation quickly until more permanent solutions can be found.

People affected by disasters are generally much more vulnerable to disease, which to a large extent are

17 Ibid.



related to inadequate sanitation and inability to maintain good hygiene. The purpose of interventions in the acute response phase is to ensure the survival of the affected population, guided by the principles of humanity, neutrality, impartiality and independence.

Essential sanitation related services needed at this stage include the establishment of instant and safe excreta management options (particularly excreta containment measures) as they are critical determinants for survival in the initial stages of a disaster, ensure a safe environment and avoid contamination of water sources. If applicable, this may also include the quick rehabilitation of existing WASH infrastructure, the establishment of appropriate drainage solutions and the provision of tools and equipment to ensure basic operation and maintenance services.

## EARLY RECOVERY: TRANSITION AND STABILIZATION

In early recovery, the affected population is in a more stable period of transition. They have a place to get food and water and a temporary or transitional shelter that can withstand wind and rain. They can go about their daily lives, beginning to resume some kind of normal existence. Early recovery can last any number of weeks or months—even years. While the phases from relief to recovery may follow a similar pattern, the timeline for how quickly a particular community follows this path may depend on its initial vulnerability, access to resources, adaptability, and other considerations.<sup>18</sup>

## RECOVERY AND REHABILITATION

During medium to long-term recovery, the work of building permanent physical structures to replace tents, trailers, or plywood houses begins, as does restoration of social structures. As permanent housing is being rebuilt, the social fabric of communities is strengthened. Life is finally beginning to feel stable

|  | Humanitarian Relief  | Recovery/ Rehab.   | Development   |
|--|--|--|---|
| Main Objectives                          | <ul style="list-style-type: none"> <li>To save lives</li> <li>To alleviate suffering</li> <li>To maintain and protect human dignity</li> </ul>         | <ul style="list-style-type: none"> <li>To re-create pre-emergency situation</li> <li>To build back better</li> </ul>   | <ul style="list-style-type: none"> <li>To support economic, environmental, social and political development</li> <li>To alleviate poverty in the long term</li> </ul>             |
| Target groups                            | <ul style="list-style-type: none"> <li>Populations affected by emergencies</li> </ul>  | <ul style="list-style-type: none"> <li>Populations affected by emergencies</li> </ul>  | <ul style="list-style-type: none"> <li>Societies as a whole, with particular emphasis on the poor and most needy</li> </ul>   |
| Expected timeframe                       | <ul style="list-style-type: none"> <li>Usually up to six months</li> </ul>   | <ul style="list-style-type: none"> <li>Usually between six months up to three years</li> </ul>   | <ul style="list-style-type: none"> <li>Usually between three up to ten years</li> </ul>   |
| Principles                               | <ul style="list-style-type: none"> <li>Humanity</li> <li>Independence</li> <li>Impartiality</li> <li>Neutrality</li> <li>Do no harm</li> </ul>         | <ul style="list-style-type: none"> <li>Applies development principles with restrictions (as far as humanitarian principles allow)</li> <li>To build back better</li> </ul> | <ul style="list-style-type: none"> <li>Sustainability</li> <li>Ownership</li> <li>Empowerment</li> </ul>  |
| Cooperation Partners, Local Counterparts | <ul style="list-style-type: none"> <li>Head of Government</li> <li>Government agencies</li> <li>Civil society</li> <li>Affected communities</li> </ul> | <ul style="list-style-type: none"> <li>Central and local government</li> <li>Civil Society</li> <li>Local communities</li> </ul>   | <ul style="list-style-type: none"> <li>Central and local government</li> <li>Civil society</li> <li>Local communities</li> <li>Private sector and other stakeholders</li> </ul>   |
| Main WASH Coordination Mechanisms        | <ul style="list-style-type: none"> <li>WASH Cluster at national and/or regional level</li> </ul>   | <ul style="list-style-type: none"> <li>WASH Cluster at national and/or regional level</li> <li>Relevant Ministries (national/ regional)</li> </ul>                         | <ul style="list-style-type: none"> <li>Relevant Ministries at national/ regional level</li> <li>Sector working groups (water, health etc.) at national/ regional level</li> </ul> |

Figure: WASH in different stages of emergency response<sup>20</sup>

once more.<sup>19</sup>

## THE PRE-EMERGENCY PHASE: DISASTER RISK REDUCTION, PREPAREDNESS, AND CONTINGENCY PLANNING

Another dimension in emergency programming is disaster risk reduction (DRR) and preparedness and contingency planning. These activities are in anticipation of emergencies, and aim to reduce the risk and vulnerability and promote the preparedness of a population and system in anticipation of likely disasters.

According to the UNHCR, the aim of emergency preparedness is to optimize the speed and volume of humanitarian assistance and to ensure that “the strategic direction and required building blocks for an eventual response are in place.”<sup>21</sup> Building

<sup>19</sup> Ibid.

<sup>20</sup> Robert Gensch, Roland Hansen, and Michaela Ihme. “Linking Relief and Development in the WASH Sector: A Overview and Contribution to the International Debate,” German WASH Network, 2014, [http://www.washnet.de/wp-content/uploads/2014/07/washnet\\_wash-relief-to-development\\_2014.pdf](http://www.washnet.de/wp-content/uploads/2014/07/washnet_wash-relief-to-development_2014.pdf).

<sup>21</sup> Entisar Almasri and Sarah Achermann, “Emergency Preparedness

<sup>18</sup> Melissa Crutchfield, “Phases of Disaster Recovery: Emergency Response for the Long Term,” United Methodist Committee on Relief, 30 April 2013, <https://reliefweb.int/report/world/phases-disaster-recovery-emergency-response-long-term>.

on activities such as context analysis, planning, gap identification, partnership development and resource pre-positioning, emergency preparedness reduces or eliminates the negative impact of sudden shocks or pressures, including access to adequate WASH services. This lowers the occurrence of WASH-related diseases during and following an emergency.

In emergency situations, time pressure constitutes one of the most acute problems. Emergency preparedness and contingency planning allow to deal with anticipated problems before the onset of a crisis. The aim of emergency WASH preparedness is to build resilience, to achieve a practical level of preparation and to strengthen the coping capacity of local WASH actors. This helps to reduce vulnerability and to guarantee a prompt and suitable response to an emergency, and consequently to avoid preventable loss of life and reduce suffering. Emergency preparedness is initiated long before the actual response and involves elements such as risk analysis, response planning, preparedness actions and scenario-based contingency planning.<sup>22</sup>

## 1.3 SCOPE AND PURPOSE OF THE RESEARCH

This research aims to contribute a small part towards larger efforts building credible evidence and increasing understanding of the current proven solutions in the emergency context through two components. The first component aims to investigate and compile what options have been proven for applications in the emergency context. The second component aims to understand what are the driving forces behind the decisions made on faecal sludge disposal in first phase emergencies at the field level.

Specifically, this research aims to answer the following questions:

1. What are the existing guidance materials for faecal sludge disposal in first phase emergencies?
2. What is the level of knowledge regarding FSM among organizations, stakeholders and practitioners involved in WASH-related aspects of emergency responses?
3. To what extent is FSM considered in preparedness and contingency planning?

4. How are decisions made on faecal sludge disposal in rapid onset emergencies at field level, and what are the key operational and contextual constraints?
5. What are the characteristics of the decision makers and actors responsible for FSM in rapid onset emergencies?
6. What are the underlying factors that lead to inappropriate FSM solutions in first phase emergencies, and what entry points are likely to be most effective to promote behavior change in this area?

The findings of this research are intended to inform practitioners (planners, managers and implementers), organizations and stakeholders (including donors) as well as researchers and students in the field of WASH regarding faecal sludge disposal options and selection of appropriate solutions in emergencies. Hence, especially decision makers around WASH and FSM interventions as well their organizations and donors are the targeted audience of this study. However it also aims to encourage researchers and students to further develop and build up on those findings.

As the study aims to reveal mechanisms behind decision-making processes and the limited use of existing guidelines become more clear, they can be addressed and behavior can be influenced towards safer and more sustainable practices. This study can be seen as an entry point towards further efforts and research that ultimately can develop strategies for the increased preparedness of actors in appropriate management of faecal sludge in first phase emergencies.

The research will inform the development of guidance addressing the second component of the HIF challenge—dissemination. The intended audience and stakeholders for the final guidance document are humanitarian practitioners who plan, manage or are involved with supporting WASH responses.

By investigating existing practices and the mechanisms behind them, the study aims to highlight angles on how the decision making processes can be altered. With a clearer understanding of the mechanisms behind decision-making on the management of faecal sludge, they can be addressed and FSM guidance can be adjusted, and more safer and sustainable practices implemented.

and Contingency Planning.” SSWM, 2016, <https://www.sswm.info/content/emergency-preparedness-and-contingency-planning>.

<sup>22</sup> Ibid.

## 1.4 KEY DEFINITIONS

In this report, the term 'sanitation' refers to the collection, transport, treatment and disposal or reuse of human excreta, domestic wastewater and solid waste and associated hygiene promotion.<sup>23</sup>

Faecal sludge refers to all liquid and semi-liquid contents of pits and vaults accumulating in unsewered sanitation installations, such as latrines, toilets or septic tanks. Compared to wastewater, faecal sludge is normally several times more concentrated with solids.<sup>24</sup> Examples of sources of faecal sludge generation are on-site technologies, for example dry toilets, pit latrines, or septic tanks.<sup>25</sup>

It is important to note the difference in the terms and definitions of 'excreta' versus 'faecal sludge.' Excreta consists of urine and faeces that is not mixed with any flushwater. Excreta is small in volume, but concentrated in both nutrients and pathogens. Depending on the quality of the Faeces, it has a soft or runny consistency. Excreta is collected and stored where it is produced (for example, a pit latrine, septic tank, aqua privy, and non-sewered public toilets).

Faecal sludge management includes emptying, transportation, treatment, and use or disposal of faecal sludge from an on-site sanitation technology (like a pit latrine or septic tank). Excreta management refers to the safe disposal of excreta, so that it does not contaminate the environment, water, food or hands.<sup>26</sup>

Disposal sites are areas where treatment facilities are not available, collected faecal sludge can be legally disposed of at designated "disposal sites". This practice may be considered safe or unsafe, depending on the likelihood of human exposure at the disposal site or the probability of groundwater or surface water contamination.<sup>27</sup>

23 Barbara Evans, Carolien van der Voorden, and Andy Peal, "Public Funding for Sanitation: The many faces of sanitation subsidies," Water Supply and Sanitation Collaborative Council, 2009, <http://www.susana.org/en/knowledge-hub/resources-and-publications/library/details/2010>.

24 Linda Strande, Mariska Ronteltap, and Damir Brdjanovic, "Faecal Sludge Management: Systems Approach for Implementation and Operation," IWA Publishing, 2014, [http://www.eawag.ch/fileadmin/Domain1/Abteilungen/sandec/publikationen/EWM/Book/FSM\\_Book\\_LowRes.pdf](http://www.eawag.ch/fileadmin/Domain1/Abteilungen/sandec/publikationen/EWM/Book/FSM_Book_LowRes.pdf).

25 Singh, Shubhra, Sujaya Rathi, Sonali Patro, Shramana Dey, and Riya Rachel Mohan. "Technology Options for the Sanitation Value Chain." 2016.

26 World Health Organization, "Chapter 4: Excreta Disposal," in *Healthy Villages: A Guide for Communities and Community Health Workers*, 2002, [http://www.who.int/water\\_sanitation\\_health/hygiene/settings/hvchap4.pdf](http://www.who.int/water_sanitation_health/hygiene/settings/hvchap4.pdf).

27 Bassan M, Mbeguere M, Tchonda T, Zabsonre F, and Strande L., "Delivering Water, Sanitation and Hygiene Services in an Uncertain Environment Characterization of Faecal Sludge During Dry and Rainy Seasons in Ouagadougou, Burkina Faso," 36th WEDC International Conference, Nakuru, Kenya, 2013, <https://wedc-knowledge.lboro.ac.uk/resources/conference/36/Bassan-1814.pdf>.

The focus of this call was on the initial or first phase of an emergency. In this research, the term 'first emergency phase' is used in reference to the acute response phase up to the first six months of an emergency response. This research also uses the term 'rapid onset' in reference to emergency typology. 'Rapid onset' refers to hazards that arise suddenly, where the occurrence cannot be predicted far in advance. Earthquakes, cyclones and other windstorms, landslides and avalanches, wildfires, floods and volcanic eruptions are usually categorized as rapid-onset events. The warning time for rapid-onset emergencies can range from seconds or at best a few several days. However, rapid-onset can also refer to disasters such as violent conflict or other types of civil and political events that result in a largely unanticipated or unpredictable displacement crisis that requires a rapid response.

In the Guidance Design and Dissemination Workshop, practitioners discussed guidelines as resources that outline options, and provide instructions on how to follow up and implement once the option of best fit has been selected. The term 'guidance' in this report refers to advice or information aimed at resolving a problem or difficulty, especially as given by someone in authority or who has a high level of technical expertise and experience in the field in which the guidance is being given.

Erick Baetings and Declan O'Leary, "Rapid Assessment of Household Sanitation Services Vientiane, Lao PDR: Final Report for WSP," Water and Sanitation Program, December 2010, <https://www.ircwash.org/sites/default/files/Baetings-2010-Rapid.pdf>.  
Niall L.D. Boot, "The use of transfer stations for faecal sludge management in Accra, Ghana," *Waterlines*. 2008, 27(1): 71–81.

# 2. METHODOLOGY AND METHODS



## 2.1 METHODOLOGY

### DESIGNING FOR BEHAVIOR CHANGE (DBC) FRAMEWORK

The research approach employed a methodology informed by the Designing for Behavior Change (DBC) Framework. Within this framework, the key objective is to understand actions, rather than beliefs or knowledge, and determinants of those actions.

Essentially, the five dimensions map out an actionable and evidence-based pathway to promoting the desired behavior change.<sup>28</sup>

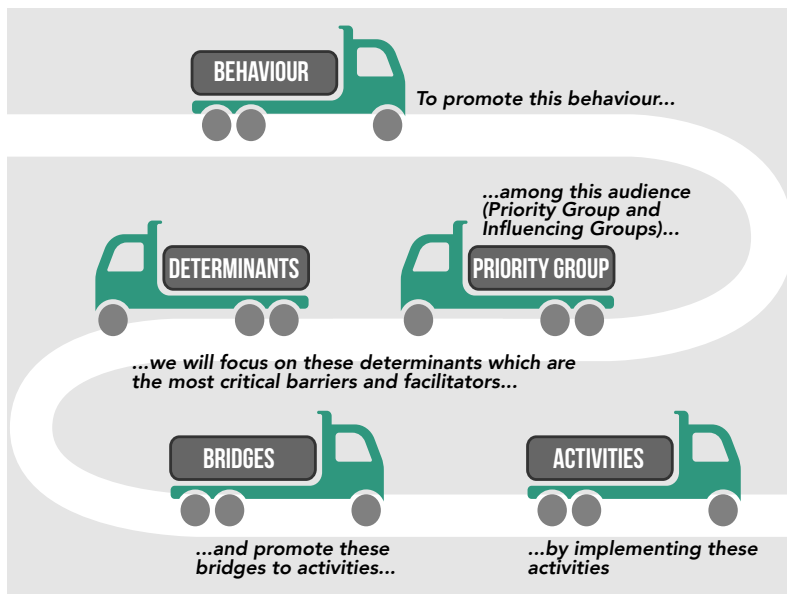


Figure: Designing for Behaviour Change (DBC) Framework

28 Ron Clemmer, "Using a Behavior Change Framework for WASH," USAID "StrateChat" Series Behavior Change for WASH Programs From Barriers & Access to Application & Use Washington, D.C., June 27, 2013, <https://www.usaid.gov/sites/default/files/documents/1865/Ron%20Clemmer.StrateChat.62613.pdf>.

## BARRIER ANALYSIS

To identify the determinants within this framework, the overall research methodology will be a Barrier Analysis, which focuses on identifying what is preventing the priority group from adopting the behavior, as well as enablers of the behavior. To identify the key barriers and motivators, the priority group is asked a series of questions to identify up to 12 potential determinants that can block people from taking action. The results of the questions are compared among groups of people who already have adopted the new behavior, known as "Doers", and people who haven't yet adopted the new behavior, called "Non-Doers".

Often the focus on increasing knowledge about benefits, but lack of knowledge is not usually the biggest barrier. Barrier Analyses enable planners to look beyond this preconception and identify those factors that really explain the difference between those who do the behavior and those who do not. Substantial evidence has accumulated that helping people overcome key barriers to behavior change may be one of the most effective ways to help them change their behaviors.

## 2.2 METHODS AND SAMPLING

Within this methodology, this research employed a mixed-methods approach, utilizing a combination of desk research as well as primary data collection through both quantitative and qualitative methods.

## DESK RESEARCH AND LITERATURE REVIEW

The literature review on applicable faecal sludge management technologies focused on two areas. The first area was on the technology itself in relation to the context of a first phase emergency, which options are feasible, and which factors (context, budget, timeframe, etc.) need to be considered in order to select an appropriate solution. The second investigation focused on what guidance exists on these technologies and their selection, as well as how accessible the guidance is, an important factor when trying to understand the behavior of practitioners in the field.

The technology-focused component of the literature review utilized an overall review of FSM in emergencies that was undertaken in 2015 commissioned by Elrha through the HIF.<sup>29</sup> This report provided a comprehensive overview of the current practices and gaps in the management of faecal sludge as well as highlighting the roles and responsibilities and institutional factors. The objective of the review of the Elrha /HIF report for this research was to:

- Understand what specific technologies and approaches for managing faecal sludge are being utilized and/or explored in the humanitarian context;
- Explore what technologies that could be deemed a priority for first phase emergencies; and
- Briefly assess the accessibility of this information on appropriate faecal sludge technologies.

The second component of the literature review assessed the existing humanitarian guidance and standards related to FSM. This work included a revision of the existing standards related to FSM in emergencies, and a review of related resources to guide decision on faecal sludge solutions in the field. The purpose of this was to understand the spectrum of appropriate guidance on FSM approached in first phase emergencies.

The literature for the review was primarily identified through: (1) primary web-based searches; and (2) referral to specific documents and guidance from practitioners on the research team as well as those who participated in the online survey and KIIs.

In identifying the resources to review for the literature review, given the limited information specifically using the term 'faecal sludge management' in emergency / humanitarian context, the search was widened from

the specific topic through a review of guidance and documentation on sanitation facilities and sludge treatment and disposal options to give a broader appreciation and understanding of what approaches would be appropriate in emergency situations. Synonyms searched for 'faecal sludge management' included: excreta management; excreta disposal; FSM, and human waste management. Synonyms searched for 'humanitarian context' included: emergency; disaster; refugee; IDP; relief; and crisis.

The literature review also included a review of the current Sphere standards, based on the current version published in 2011, as well as a comparison and review of the revised version that will be published this year (2018), as well as a review of WHO standards on FSM in emergencies.

## SEMI-STRUCTURED KEY INFORMANT INTERVIEWS (KIIS)

The KIIs for this research were designed as qualitative, in-depth interviews with people selected for their first-hand knowledge of the topic of interest. The interviews were semi-structured, following an interview guide which listed major topics and issues to be covered under each study question.

The research aimed to conduct KIIs with a target of 15 to 35 people identified through a combination of opportunity and snowball sampling to identify key informants for the semi-structured interviews. An opportunity sample is obtained by asking members of the population of interest if they would take part in your research. The investigators started from known contacts in first phase emergency contexts to conduct interviews, compiling a shared list of 'known experts', including their position, organization, and contact details. Ultimately, KIIs were carried out with 9 respondents.

The KIIs were carried out by the Investigators for the study. The interviewers were instructed that the KIIs should resemble a conversation among acquaintances, allowing a free flow of ideas and information. Interviewers were instructed to frame questions spontaneously, probe for information and takes notes, which should be elaborated on later.

The KIIs were recorded with participants' consent to allow the interviewers to focus their attention on the discussion and facilitation, with shorthand notes as a backup. The interviews were then fully transcribed from the audio recordings in English.

<sup>29</sup> Christophe Grange, "WASH in Emergencies Problem Exploration Report," January 2016.

## ONLINE PRACTITIONER SURVEY

### SURVEY CONTENTS

The quantitative component of the research comprised an open online practitioner survey on the topic of understanding human waste management decisions in first phase emergencies. The survey contained 5 sections, containing a combination of closed- and open-ended questions.

#### *Background and Demographics*

The first section included background information, with basic demographic details related to the individual's work experience, geographic location, and WASH and emergencies experience. Based on responses to this section, respondents were either directed to more specific questions if they had conducted work relevant to the management of human waste in first phase emergencies or anticipated future responsibilities in this area, or skipped to the end of the survey.

#### *Doer and Non-Doer*

Respondents who had experience or anticipated responsibility related to the research topic then completed two sections of the survey within the framework of a 'Doer and Non-Doer' analysis. A Doer and Non-Doer analysis is a survey that focuses on identifying what is preventing the priority group from adopting the behavior, as well as enablers of the behavior. It generally consists of 2 components: (1) Doers and Non-Doer analysis (quantitative as the analysis identified statistically significant differences between Doers and Non-Doers); and 2) General open ended questions (qualitative but has quantitative elements because of the statistical comparison between Doer and Non-Doer).

The first 'Doer and Non-Doer' section asked questions related to decision-making, with a focus on the use of guidelines and the types of decisions they would or would not use them to make. Based on their answers to these questions, respondents were classified as either 'Doers' of the desired behavior (consultation of guidelines related to FSM in first phase emergencies) or 'Non-Doers'.

Respondents then completed the section with open-ended questions, with a focus on addressing the following 'Doer and Non-Doer' dimensions:

- What are the advantages of the behavior?
- What are the disadvantages of the behavior?
- Who approves of you doing the behavior?
- Who disapproves of you doing the behavior?

- What makes it easier for you to do the behavior?
- What makes it harder to do the behavior?

#### *Access to Guidelines and Guidelines Wanted*

Respondents who had experience or anticipated responsibility related to the research topic, and who also at least 'rarely' consult guidelines then completed two sections on where and how they currently access guidelines, as well as what kinds of information sources and content they prefer to consult. This addressed other information sources besides guidelines. Respondents were also asked what other kinds of tools they would use to inform decision-making, as well as the types of decisions they would want guidance on.

#### *Self-Assessed Information and Knowledge*

All survey respondents received the last section of the survey, which asked respondents to select which topics they feel that they general have adequate knowledge and information on related to sanitation and FSM, and which of the topics they generally felt they have insufficient knowledge and information on.

#### *Survey Administration*

The survey was built using Survey Legend software, which was also used for data collection.

In total the survey reached out to approximately 3000 people and in two ways: (1) a public link to the survey was posted on the Sustainable Sanitation Alliance (SuSanA) working group 8 'Emergency Reconstruction' forum; (2) a public link to the survey was sent out to 200 WASH practitioners in the Kurdish Region of Iraq and participants in the WASH clusters in South Sudan and Ethiopia via email through personal contacts of members of the research team.

In total, the survey yielded 93 usable responses. Of these, there was a dropout rate of 30%, meaning that 28 respondents did not complete the entire survey. For these surveys, the information provided was retained, and the answers to the remaining questions after the survey was discontinued were coded as 'Refused to respond'.

## GUIDANCE DESIGN AND DISSEMINATION WORKSHOP

Following the initial findings of the survey and qualitative research for this project, a Guidance Design and Dissemination Workshop was held

in the Solidarités International Headquarters in Clichy, France in November 2017. The workshop was organized by BORDA, Solidarités International, WASTE, and SURICATS Consulting. The objectives of the workshop were to:

- Present and discuss initial research findings, aimed at finding a solution for the immediate problem of issues around decision-making and the utilization of guidance on appropriate disposal of faecal sludge in first-phase rapid on-set emergencies;
- Facilitate the exchange of knowledge and experience on challenges to effective faecal sludge management.
- Collaboratively explore strategic and practical solutions to encourage utilization of guidance.
- Address relevance and application of certain technologies for disposal of faecal sludge in first-phase rapid on-set emergencies.
- Collectively define next steps and collaborations on other ongoing initiatives

22 WASH practitioners participated in the workshop. The discussions and contributions of the presenters and participants in this workshop were also reviewed, triangulated with research findings, and incorporated into this report.

## SURVEY RESPONDENT CHARACTERISTICS

### LOCATION

The survey was completed by a very diverse range of respondents. Respondents reported that they were currently based in 34 countries.

Respondents were also asked where most of their sanitation work occurs, with the option for multiple responses. 27% described their sanitation work as global, with no specific region. The most common regions were Sub-Saharan Africa (39% of respondents), the Middle East and North Africa (24% of respondents), and South Asia (22% of respondents).

### CURRENT JOB

Respondents were primarily from the NGO sector. 41% described themselves as working for an international NGO, and 23% for a national NGO. 7% were working for private companies, 5% for research organizations, and less than 5% each described themselves as private consultants, private entrepreneurs, working for the UN, or working for other international organization (IOs).

Interestingly, 47% would describe their primary role and responsibilities in their current role as 'Programs', versus 32% who would describe it as 'Emergencies'. 8% described it as 'Systems', 2% 'Monitoring and Evaluation', 1% 'Logistics', and 10% 'Other'. Similarly, 52% described their primary work context as 'Humanitarian', 31% as 'Development', and only 17% as working in first phase emergencies.

Respondents also represented a wide range of specializations. 50% described their primary sector of responsibilities in their current position as 'WASH'. 28% described their responsibilities as multi-sector, WASH included; 15% as 'sanitation', 4% as 'water', 2% as other (non-WASH), and 1% as 'hygiene'.

## EXPERIENCE

69% of respondents reported that they had conducted work relevant to management of human waste in first phase emergencies, and 81% anticipated having responsibilities or involvement in work relevant to the management of human waste in first phase emergencies.

63% had worked in camp settings; 41% in conflict-affected settings; 43% in urban host communities; 50% in rural host communities; 28% in non-camp displacement settings; 32% in protracted emergencies; and 38% in the context of hydro meteorological or geological disaster response. 12% reported that they did not have experience working in any of these emergency contexts.

The mean years of experience working in emergency or humanitarian contexts among respondents was approximately 8 years,<sup>30</sup> ranging from 1 year of experience to 34 years. 11% had 1 year of experience; 33% 1-5 years; 24% 5-10 years, and 24% more than 10 years of experience.<sup>31</sup> 76% of respondents reported that they have received some form of WASH-specific training, whereas 24% had not.

## 2.3 LIMITATIONS

### SAMPLE SIZE, REPRESENTATIVENESS AND GENERALIZABILITY

The sample for the quantitative component of this study was drawn from an open volunteer opportunity

<sup>30</sup>  $N=86, M=7.91, SD=7.15$

<sup>31</sup> 8% did not disclose how many years of experience they have.

sampling method. As such, it was not designed to be representative of a larger population, which has inherent limitations on the generalizability of the findings. The sample size, while a substantial response, was in several instances too small to complete inferential analysis on questions of interest in the research findings. The small sample size should also be kept in mind in interpreting the findings of this research.

## BIAS

The primary data collected for this study is subject to a number of potential biases.

### SELF-SELECTION BIAS

Self-selection bias is the problem that very often results when survey respondents are allowed to decide entirely for themselves whether or not they want to participate in a survey. To the extent that respondents' propensity for participating in the study is correlated with the substantive topic the researchers are trying to study, there will be self-selection bias in the resulting data. In most instances, self-selection will lead to biased data, as the respondents who choose to participate will not well represent the entire target population.

In the present study, it is reasonable to assume that those who would voluntarily give their time to participate in an online survey, which took up to approximately 40 minutes to complete for those with relevant experience, may also be more likely to be those who would invest time and resources into seeking out guidelines or engaging in online platforms for information in relation to FSM for emergencies.

### NON-RESPONSE BIAS (INCOMPLETE SURVEYS)

As previously stated, 30% of the 93 respondents who submitted usable online surveys did not complete the entire survey. Nonresponse can have two effects on data: first, it introduces a bias in estimates when non-respondents differ from respondents in the characteristics measured, similar to the issues presented with self-selection bias. Second, it contributes to an increase in the total variance of estimates since the sample size observed is reduced from that originally sought. In the present study, the sample size generally got smaller in each section of the survey, as the 30% of participants who did not complete the survey dropped out at various stages of survey completion.

## SOCIAL DESIRABILITY BIAS

Social desirability bias is a type of response bias that is the tendency of survey respondents to answer questions in a manner that will be viewed favorably by others. It can take the form of over-reporting "good behavior" or under-reporting "bad", or undesirable behavior. Given the privacy of self-completing the survey online, this was likely somewhat mitigated. However, respondents were given the option to disclose personal information such as name, contact information, and current employer in the survey, which may have influenced the level of social desirability bias. Social desirability bias should also be considered in the interpretation of the qualitative information provided in the KIs.

## LANGUAGE

The online survey was only available in English. Given the diversity of respondents, many were likely not native English speakers. As such, some responses to open-ended questions stated that the respondent was unable to understand the question, and other answers were difficult to understand or incomplete, and as such could not be meaningfully analyzed or interpreted.

Additionally, the literature review and search for guidance materials was only conducted in English. The scope of this research does not extend to what guidance and materials are available in other widely utilized languages.

## 2.4 STRUCTURE OF THE REPORT

Within the structure of this report, Chapter 3 addresses the 'behavior' addressing appropriate faecal sludge management solutions for the first phase of rapid-onset emergencies and a literature review of existing guidance. Chapter 4 presents the findings of the primary research, outlined below, which address the priority and influencing groups and determinants. The report concludes with recommendations on bridges to activities and activities to promote informed decision-making based on the evidence in Chapters 3 and 4.



# 3. DESK RESEARCH AND LITERATURE REVIEW:

## FSM IN EMERGENCIES AND EXISTING GUIDANCE



Within the DBC Framework, the behavior is a specific action that the priority group members carry out to address a problem they face. A behavior is also often referred to as a “practice.” When behaviors or practices are done often enough they become “habit”. In this research, the ‘behavior’ in question is twofold: (1) individual practitioners with decision-making and implementation roles regarding faecal sludge management referencing guidance and applying effective decision-making processes; and (2) the subsequent application of appropriate FSM technologies and solutions in the first phase of an emergency response.

### 3.1 FSM IN THE FIRST PHASE OF RAPID-ONSET EMERGENCIES IN THEORY AND IN PRACTICE

Safe treatment and disposal of excreta act as the primary safeguards to protect the community from pathogens and for pollution from entering the environment. Once these enter the environment, they can be transferred via the mouth (e.g., through eating contaminated vegetables/food or drinking contaminated water) or the skin (as in the case of the schistosomes and hookworms), although in many cases adequate personal and domestic hygiene can reduce such transmission. Faecal sludge and wastewater contain a high amount of excreted pathogens.<sup>32</sup>

Outbreaks of diarrheal diseases, including dysentery and cholera, are common in emergencies. Faecal-oral diseases may account for more than 40% of deaths in the acute phase of an emergency, with greater than 80% of deaths in children under 2 years of age.<sup>33</sup> Research has found that infectious disease

outbreaks following natural disasters and conflicts, many of which are directly related to WASH.<sup>34</sup>

### IN THEORY: DESIGN FACTORS AND FSM IN FIRST PHASE VERSUS RECOVERY AND DEVELOPMENT SANITATION SYSTEM DESIGN

#### DESIGN OF SANITATION SYSTEMS

Designing a sanitation system is a multi-step process in which human excreta, faecal sludge and wastewater are managed from the point of generation to the point of use or ultimate disposal. This requires a context-specific series of technologies and services for the management of these sanitation products, i.e., for their collection, containment, transport, treatment, transformation, utilization or disposal. A sanitation system is comprised of sanitation products that travel through the different stages of the chain that contains technologies that can be selected according to the context. Technology selection will depend on the characteristics of the input product and what the level of treatment required and the suitability of the technologies for the particular context. A sanitation system also includes the management and O&M required to ensure that the system functions safely and sustainably.

Among the most important choices to make in designing a sanitation or wastewater management system are where collection, storage and treatment will take place, and with what degree of centralization; whether the system will be waterborne, low-water or dry; and what kinds of treatment and resource

32 Singh, Shubhra, Sujaya Rathi, Sonali Patro, Shramana Dey, and Riya Rachel Mohan. “Technology Options for the Sanitation Value Chain,” July 2016.

33 Connolly, M. A., Gayer, M., Ryan, M. J., Salama, P., Spiegel,

P. & Heymann, D. L., “Communicable diseases in complex emergencies: impact and challenges,” *Lancet*, 2004, 364: 1974-1983.

34 Kouadio, I.K., Kofi, A.K., Attoh-Toure, H., Kamigaki, T., & Oshitani, H., “Outbreak of measles and rubella in refugee transit camps,” *Epidemiology and Infection*, 2009, 137 (11): 1593-1601.

utilization to aim for. Centralized systems require large upfront investment in order to function, while more decentralized systems can often be developed in phases and still function. However, in emergencies, centralized systems are rarely considered unless they are linked in to preexisting and functioning infrastructure or also designed to benefit a host community.

If reuse opportunities exist locally, the neighborhood or locality may be the most relevant boundary for the system, for example to avoid costly logistics and to reduce the risk of dilution and pollution of waste resources.<sup>35</sup> In an emergency, reuse is very rarely a feasible option as it will not take priority in a population in crisis. These factors generally mean that in an emergency response, decentralized and on-site systems are usually the more feasible, relevant, and appropriate solutions unless there is an existing centralized system already in place that can be utilized.

Source separation is in fact a traditional way of handling human excreta by keeping it separated from other waste streams. The systems involved can be either waterborne or dry/non-waterborne (for example, Urine Diversion Toilets). Waterborne systems are generally divided into blackwater systems (which combine faeces, excreta and urine) and brownwater systems (combining water and faeces only). Conventional non-waterborne excreta-separating systems involve different types of latrine.<sup>36</sup>

## DESIGN FACTORS IN EMERGENCIES

In an emergency context, the factors that will affect FSM technology choice are similar to several of the factors that are considered in recovery or development programming. In emergency, recovery, and development contexts, FSM technology choices will be constrained and influenced by factors related to: Financial resources; local availability of materials; availability of space; water availability; land ownership and permissions; soil and groundwater characteristics; topography; natural hazard risks;

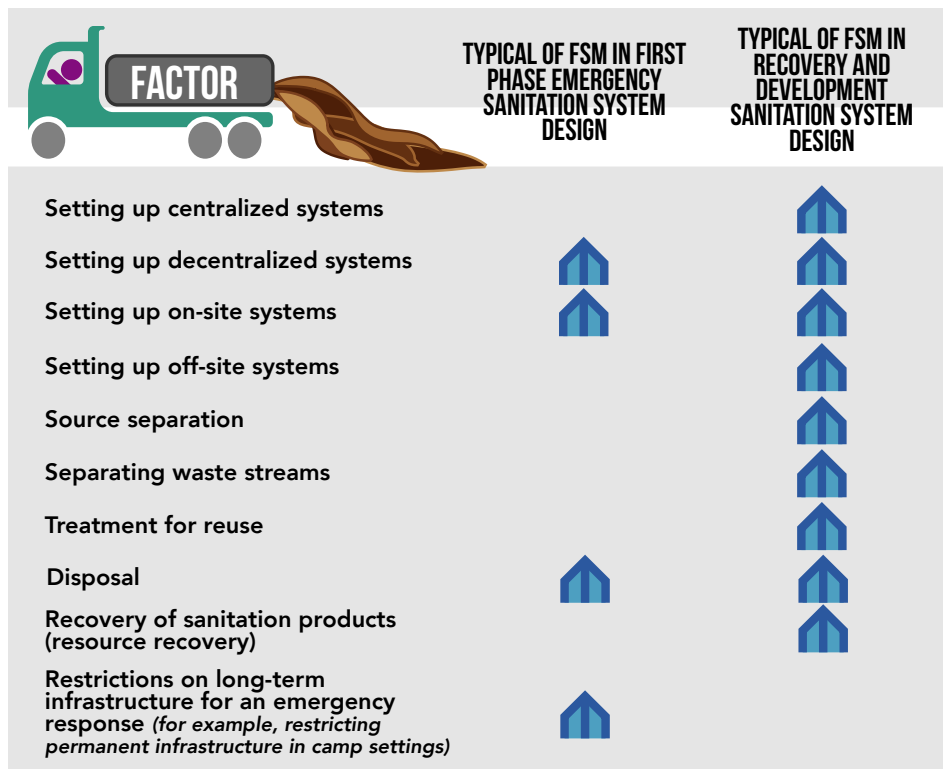
35

36 Andersson, K., Rosemarin, A., Lamizana, B., Kvarnström, E., McConville, J., Seidu, R., Dickin, S. and Trimmer, C. "Sanitation, Wastewater Management and Sustainability: from Waste Disposal to Resource Recovery," 2016.

availability and reliability of electricity; management considerations; institutional capacity and local technical support; protection of human health and the environment; and desired output product (end-use and/or standard/legal quality requirements).

Whereas projected developments in considering FSM options in recovery and development programming can focus on longer-term macro-trends such as urbanization, population density, and industrial expansion, in an emergency response projected developments are often more immediate and short-term in focus, such as population density, rapid displacement, and ease of rapid upscale. Emergency contexts must also consider the type and quantity of faecal sludge to be treated, including future projections. However, the future projections can be for an ill-defined timeframe, and making such projections in a crisis can be complex as the situation is often volatile and can be very unpredictable.

In an emergency response, speed of implementation is likely to be more of a factor in selection of technologies than it may be in recovery or development programming. Time- and resource-intensive solutions that must be carried out over time are not likely to be preferred in the first phases of response. As such, prefabrication possibility is also a factor that can be considered in choosing a technology for FSM in a first phase emergency.



Technical robustness is also an important parameter determining long-term functionality. The system needs to be able to keep functioning with variations in load, which may be significant, especially in small-scale decentralized systems. Furthermore, the system should be designed to keep functioning during and after events such as power cuts, water shortages and floods. For example, flood-proofed, raised toilets can avoid sludge overflowing during floods (<https://www.sei-international.org/mediamanager/documents/Publications/SEI-UNEP-2016-SanWWM&Sustainability.pdf>)

While skills and capacity for design and operation are also always factors in decision-making on FSM, in an emergency context there is always a risk that the necessary technical expertise is not on the ground in the early stages of the response. If organizations implementing the response on the ground are not normally focused on WASH, or even more specifically FSM, it may take time to identify and mobilize the required expertise to the response team, if such mobilization occurs at all.

While both emergency and recovery/development FSM must consider long-term financial and operations and maintenance cost effectiveness and resourcing, in the first phase of an emergency response this is often less of a consideration. When systems are being set up, their long-term management and financial implications are of lesser priority to selecting technologies with a priority of trying to minimize further risk and human suffering as quickly and effectively as possible in the immediate term.

## IN PRACTICE: DURATION OF EMERGENCY RESPONSE, OPERATIONAL CONSTRAINTS, AND SANITATION SYSTEM DESIGN CONSIDERATIONS

### STORAGE AND PRE-TREATMENT IN EMERGENCIES

During the first phase of an emergency where there is no access to reliable sanitation facilities, the provision of adequate sanitation facilities is one of the key measures to ensure that morbidity and mortality is low immediately after a disaster. This is done by isolating and storing the faeces using different sanitation technologies.

In the first phase of an emergency, humanitarian actors have constrained options for construction of sanitation infrastructures due to a number of possible factors such as timeframe, damaged infrastructure, population density, land ownership issues, civil or political unrest, and lack of space available, in addition to the normal contextual, technical, and operational factors involved in setting up a short- or long-term sanitation system.

Because of these factors, in the immediate phase of an emergency the priority is often to implement quick and simple sanitation infrastructures. These usually consist of dug pit latrines, raised pit latrines,

deep trench latrines (where digging is possible), bucket latrines, packet latrines, portable chemical toilets, and as a last resort, designated defecation areas. In some contexts, biodegradable pee-poo bags are also used to enable people to collect and safely dispose of their own faeces.<sup>37</sup>

### EMPTYING AND TRANSPORT OF FAECAL SLUDGE IN EMERGENCIES

Pit latrines are one of the most common forms of sanitation worldwide, with an estimated 1.7 billion people relying on them on a daily basis. Latrines are relatively easy to construct compared to flushing toilets which require more water and a more complex infrastructure and space to be implemented, and as such pit latrines are a common on-site storage solution applied in emergencies. The main challenge of a sanitation programme designed around pit latrines is their rapid filling speed, which requires frequent emptying and cleaning (desludging).

However, research found that although agencies often know that a pit latrine would have to be replaced or desludged frequently depending on the number of users, due to the extra cost involved in lining the latrine, designing a latrine to be desludged is a rare occurrence in practice. This short term thinking costs considerably more in the long run. Where latrines need to be desludged they should be designed with the appropriate lining and opening for the suction hose.<sup>38</sup>

### KEY INFORMANT INTERVIEW EXCERPT

“This is always an afterthought. Every time it’s water first, people think about water and then later on sometimes only think about when problems start to come out like you would find, for example a camp set up, where you are supplying water and then you provide sanitation facilities. Afterwards you would then find that we now have waste or pits are filling up, that kind of thing.

In as much as organisations do identify this connection between water, sanitation and hygiene, still it seems when it comes to implementation it is always water first. Sometimes people think about collection, that’s it. Which ends up with its own problem like people would collect waste from a camp, they will hire a local contractor, they will train them on cesspools and washer drains and pits. But after that no one actually clears up the plan of after we drain these pits, where is this waste going? So all this it’s almost like people think okay just dig a pit; it’s not a comprehensive plan which is clear from the start to say what are we collecting at which point and how are we managing it.”

37 Christophe Grange, “WASH in Emergencies Problem Exploration Report,” January 2016.

38 Ibid.

In countries where washing is an important religious factor, water-based systems are often favored. These systems are connected to underground prefabricated holding tanks, often mislabeled as septic tanks. The holding tanks require frequent desludging, especially if greywater is mixed with the wastewater increasing the volume of water discharged.

Humanitarian actors usually do not deploy sewer trucks in their response during the first phases of the emergency, but they immediately look for local public and private contractors using desludging sewer trucks. However, in many developing countries, sewer trucks are often not available in sufficient numbers, not in good condition, and may lack adequate storage capacity. In addition, it is common for the owners of the sewer trucks not to provide regular maintenance.<sup>39</sup> Agencies often find that desludging costs become the greatest burden in their WASH budget.<sup>40</sup>

Another solution for pit latrines can be on-site disposal through the decomposition process. However, this is mostly related to long-term sludge accumulation, and is therefore more relevant to the secondary phase of an emergency. There are two biological processes that have a direct influence on the contents of a pit latrine—the aerobic and the anaerobic process. As a result of these two processes, matter that enters the pit can naturally exit it through either evaporation, the transportation of dissolved particles into the surrounding soil, or the degradation of organic matter into liquids and gases by bacteria present in the pit.

## USE AND DISPOSAL OF FAECAL SLUDGE IN EMERGENCIES

Once sewer trucks empty the latrine pits or holding tanks they take the contents either to a pre-defined dumping site or to an uncontrolled place somewhere in the environment. Dumping into the environment may lead to pollution and the spread of disease if the area is not protected or isolated far away from the surrounding houses. If there is no previous technical assessment of the disposal site, there is the risk that dumping of sewage may contaminate the local water source (both surface and underground water).<sup>41</sup>



*Sludge being dumped into an open water body close to a community in the Kurdish Region Iraq, donor logo has been removed from the image.*

| COUNTRY    | CITY/REGION            | % DISPOSED UNTREATED               | VOLUME DISCHARGED UNTREATED (M <sup>3</sup> / DAY)   | LOCATION OF DISPOSAL     |
|------------|------------------------|------------------------------------|--|--------------------------|
| Senegal    | Dioukhop, Dakar suburb | 74% <sup>2</sup>                   |  | Streets                  |
| Bangladesh | Dhaka                  | 22% (of case studies) <sup>3</sup> |  | Drains or surface water  |
| Ghana      | Accra                  |                                    | 750 (39,000 m <sup>3</sup> /yr in 2000) <sup>4</sup> | Ocean                    |
| Indonesia  | Jakarta                | 26% (surveyed)                     |  | Surface water of gutters |
| Uganda     | Tanzania               | 18%                                | 130 <sup>6</sup>                                     |                          |

*Figure: Reported fraction and /or volume, and location of faecal sludge discharge untreated into the environment<sup>42</sup>*

Numerous papers report faecal sludge being discharged indiscriminately into streets, sewers, drains, nearby surface water, and coastal areas. Multiple factors influence the ultimate fate of emptied sludge, not all of which are fully understood in emergencies.

Research involving interviews with WASH programme managers from MSF, UNICEF, and UNHCR found that practitioners feel that these issues, particular in the latter phases of the sanitation chain, are tied to two key sanitation challenges: the rapid accumulation of faecal sludge in pit latrines or toilets in emergencies; and (2) the organization of regular and the safe disposal of waste. This research found that these challenges are linked to:

1. The lack of ground support, technologies and equipment to either remove sludge in pit latrines or sludge from the pits, ensure its appropriate disposal in a dumping site, or reduce its accumulation.
2. The lack of guidelines and protocols to monitor safely all operations regarding the emptying, transportation and disposal of faecal sludge during the first and the second phase of an emergency.

Report," January 2016.

42 Ashley R. Williams and Alycia Overbo, "Unsafe return of human excreta to the environment: A literature review," he Water Institute at UNC, Chapel Hill, NC, USA, 2015, [https://waterinstitute.unc.edu/files/2015/07/BMGF\\_UnsafeReturn\\_LitReview\\_UNC\\_16June15.pdf](https://waterinstitute.unc.edu/files/2015/07/BMGF_UnsafeReturn_LitReview_UNC_16June15.pdf).

39 Ibid.

40 Brigitte Rohwerder, "Solid waste and faecal sludge management in situations of rapid, mass displacement," 2017.

41 Christophe Grange, "WASH in Emergencies Problem Exploration

## FSM SYSTEM DESIGN COMPLICATIONS WHEN FIRST- PHASE EMERGENCIES BECOME PROTRACTED

As discussed in the introduction, delineation between the different phases of an emergency is rarely clear. The consideration of design factors for short-term sanitation systems in a first phase emergency response detailed above assume an actual first phase response, and a system that would be in use for a duration of six months or less.

However, refugee and internally displaced persons (IDP) camps in areas of conflict are frequently not short term events, yet they are designed this way. The average life time of a refugee camp is 17 years, but more often than not initial camp designs, implementation approaches or choices of technologies to provide WASH facilities do not reflect this longer-term perspective. Research has found that there are several reasons for this short-term approach and a lack of emphasis on sustainability, including: (1) a lack of good analysis of the likelihood of people returning home; (2) lack of political will; and (3) short-term funding cycles.<sup>43</sup>

The majority of refugee and internally displaced camps are set up as a temporary measure to accommodate people fleeing from conflict or natural disasters. However, in many conflict-related camps, the duration of the camp is long-term (e.g. Sudan, Palestine), resulting in high operation and maintenance costs arising from the installation of short term emergency water and sanitation facilities.<sup>44</sup>

### KEY INFORMANT INTERVIEW EXCERPT

“But in every day refugee situations, for instance, what is happening now in Cox’s Bazaar in Bangladesh, where all these refugees are coming, all they are doing now I’m sure is just building banks and banks of pit latrines. And then they’ll have to worry about how to deal with the enormous amount of waste because there is no easy solution. You don’t have the space to move around and make new pit latrines, so I have no doubt that it will become a problem in the next few months as these camps become more and more established.”

43 A. Bastable and T. Wise, “Promoting sustainability in refugee and IDP responses,” 38th WEDC International Conference, Loughborough University, UK, 2015, <https://wedc-knowledge.lboro.ac.uk/resources/conference/38/Bastable-2223.pdf>.

44 Ibid.

## 3.2 EXISTING GUIDANCE

There is a variety of guidelines that exist on how to plan, design and implement sanitation systems. Generally, guidance falls into four categories:

- 1) Assessment tools – resources that help users choose among multiple options for a particular problem. Assessment tools include decision support tools, decision trees, and comparison tables.
- 2) Process guides and documents – guidelines describing a suggested set of steps decision makers should take to assess and improve sanitation conditions in a particular context.
- 3) Technical Briefs – technical briefs provide succinct descriptions of a technology, method or process. They are usually intended to give enough information to make a quick decision about the potential applicability of the technology for the practitioner’s situation. In some cases, process guides include technical briefs.
- 4) Guidance on sector standards regarding the management of excreta.

Existing guidance is also directed at different audiences. Regarding sanitation systems, the sanitation chain, FSM, and excreta management, guidance is generally directed towards: (1) development practitioners; (2) governments and municipal sanitation management; or (3) humanitarian practitioners and emergency response programming.

Referring back to the key definitions in this report, different terms are found in the guidance relating to the management of human waste. Guidance that outlines sanitation configurations along the sanitation service chain, using the specific term ‘faecal sludge management’ were mainly targeted at governments and actors in the development sector. Guidance targeted at humanitarian and emergency contexts, mainly used the term ‘excreta disposal’—a term almost completely absent from the development-targeted guidance.

Literature was selected according to the above definition of guidelines. The documents had to contain information by an authoritative individual, agency, or organisation to support the problem of excreta or faecal sludge. Guidance that was not open source was omitted from the review.

This review identified 33 guidance documents that covered part of or the entire sanitation service chain. The evaluation of these guidelines includes a brief description and a checklist of elements included in

each resource. These elements include the five steps of the sanitation chain, and technological guidance,<sup>45</sup> guidance on O&M and contextual issues,<sup>46</sup> and if the guidance on these elements is targeted for use in humanitarian contexts.

Out of the 33 reviewed guidance, 13 were targeted at development practitioners, and 20 targeted at humanitarian practitioners.

## GUIDANCE MATERIALS ON FSM TECHNOLOGIES

Of the 13 guidance resources for the development sector, nine resources included technological guidance that covered off-site treatment and eight included guidance on the off-site use and / disposal part of the sanitation chain. Of the 20 guidance resources reviewed for emergency context, eight dealt with off-site treatment and four with the off-site use and/or disposal.

Understanding the design considerations of a technology is important when assessing its appropriateness for a particular scenario and context. If the technology requires specific engineering support, materials or inputs that might be difficult to assure or obtain, and knowing this will support planning and save the decision maker time. Technical details of different faecal sludge technologies were found in much more detail in the development-targeted resources, with nearly all of the resources covering enough information to make an informed decision and select an appropriate technology.

Of the emergency-focused resources, eight could be categorised as process manuals and were designed to be used in the field. These covered other non-sanitation WASH sectors (for example, water supply and hygiene promotion). Their generality meant that specifics such as technical design information, drawings and facts and figures were highly condensed or omitted entirely. The remaining 12 emergency-targeted resources focused specifically on excreta management and included guidance on how to plan and conduct initial assessments along with technical briefs. One of the guidance resources was targeted at the affected population, and although useful it was not considered here as practitioners are not the intended audience.

The technical briefs within the guidance covered information on implementation and designs of

45 Inclusion of technological descriptions, figures, detailed designs, and /or key design considerations.

46 Information on the specific O&M requirements for a technology, or a general discussion of O&M within a framework or methodology and information on context specific considerations.

latrines - user interface,<sup>47</sup> within which information was provided the on the collection and storage of the faecal sludge, predominantly within the pits situated under the latrines. Guidance for on-site treatment of faecal sludge was available with different technologies such as anaerobic systems like septic tanks and biogas digesters<sup>48</sup> as well as some treatment using additives such as lime, urea etc.<sup>49</sup> that can be done on-site or off-site.

Guidance on the conveyance or transport of faecal sludge was covered also, but without giving delving too deeply into the different emptying technologies available.<sup>50</sup> A number of hand and motorized pumps have been developed in recent years that a facilitate emptying by hand or using motorized techniques but no detailed guidance was found on these in the emergency-targeted guidance. Guidance on the end parts of the sanitation chain—off-site treatment and off-site treatment and / or disposal—was very limited and covered a small number of technologies and options.<sup>51</sup>

In general, there are several very good resources available that can support a sanitation or WASH practitioner in the decision on which faecal sludge treatment or disposal option would fit a particular context or sanitation system. However, for emergencies, practitioners first need assistance to understand the technologies within the framework of an emergency. For example, the faecal sludge treatment technology Drying Beds is a suitable FSM technology option. However, there is no detailed technical guidance presented for this technology within the 'framework of an emergency', for example, how it can be implemented in a phased approach with prefabricated components and plants added at a later phase when time or resources allow.

An additional key gap in the emergency-targeted resources was emphasis on the important interconnections along the sanitation chain. Technologies were presented within the different groups, user interface, conveyance etc., but no linkages were made regarding how the different technologies function together. For example, the final treatment will depend on the user interface and these need to be planned together. No case studies of technical implementations were included for the off-site treatment and disposal, which can also be considered a key gap in helping practitioners

47 Reed. B (2013), Harvey. P. (2007,2009), Reed. B (2009), Wisner, B., & Adams, J. (2002)

48 Buttle. M., Smith. M. (2004), Harvey et. Al. (2002), Harvey. P. (2007,2009), Davis. J., Lambert. R. (2002), UNICEF (2012), Wisner, B., & Adams, J. (2002)

49 Mamani et. al. (2014), Mamani et. al. (2016)

50 Buttle. M., Smith. M. (2004), Harvey et. Al. (2002), Harvey. P. (2007), Davis. J., Lambert. R. (2002), , Reed. B (2009), UNICEF (2012)

51 Buttle. M., Smith. M. (2004), Harvey et. Al. (2002), Davis. J., Lambert. R. (2002), Reed. B (2009), UNICEF (2012)



**TITLE**  
**AUTHOR / PUBLISHER**  
**YEAR**

**DESCRIPTION**  
**TARGET PHASE / CONTEXT**

**TARGET AUDIENCE**  
**PUBLIC RESOURCE**  
**AVAILABLE ONLINE**

**STEPS IN THE SANITATION CHAIN**

**GUIDANCE ON:**  
**CONTEXT AND OPERATIONAL FACTORS**  
**HUMANITARIAN EMERGENCY RESPONSE**

|  |      |   |   |   |  |  |                                |  |  |  |  |
|--|------|---|---|---|--|--|--------------------------------|--|--|--|--|
| <b>TECHNOLOGY OPTIONS FOR THE SANITATION VALUE CHAIN</b><br><br>Center for Study of Science, Technology and Policy (CSTEP)<br><br>Authors: Shubhra Singh, Sujaya Rathi, Sonali Patro, Shramana Dey, and Rya Rachel Mohan | 2016 | The purpose of the compendium is to provide information on sanitation technologies from across the sanitation value chain. The compendium details the characteristics, advantages and disadvantages of the different technology options, and also describes the different types of systems formed as a combination of the technologies, addressing all stages of the value chain. These technologies have been included in the Technology Decision support Tool for Sanitation (SANTECH), developed by the Center for Study of Science, Technology and Policy (CSTEP). The document was compiled based on literature review and expert validation. The compendium is intended to be a live document, updated as and when new technologies and relevant data become available. | Development context and long-term systems-based programming | Government authorities, Planners, Engineers |  |  | USER INTERFACE                 |  |  |  |  |
|  |      |   |   |   |  |  | COLLECTION AND STORAGE ON-SITE |  |  |  |  |
|  |      |   |   |   |  |  | ON-SITE TREATMENT              |  |  |  |  |
|  |      |   |   |   |  |  | CONVEYANCE                     |  |  |  |  |
|  |      |   |   |   |  |  | OFF-SITE TREATMENT             |  |  |  |  |
| OFF-SITE USE AND/OR DISPOSAL   |      |   |   |   |  |  |                                |  |  |  |  |

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| <b>COMPENDIUM OF SANITATION SYSTEMS AND TECHNOLOGIES 2ND EDITION</b><br><br>Swiss Federal Institute of Aquatic Science and Technology (Eawag)<br><br>Authors: ElizabethTilley, Lukas Ulrich, Christoph Lüthi, Philippe Reynmond and Christian Zurbürg | 2014 | A guidance document for engineers and planners in low- and middle-income countries, primarily intended to be used for communicative planning processes involving local communities. It is also intended for persons/experts who have detailed knowledge about conventional high-end technologies and require information on infrastructure and different system configurations. | Development context and long-term systems-based programming | Government authorities, Planners, Engineers |  |  | USER INTERFACE                 |  |  |  |  |
|   |      |   |   |   |  |  | COLLECTION AND STORAGE ON-SITE |  |  |  |  |
|   |      |   |   |   |  |  | ON-SITE TREATMENT              |  |  |  |  |
|   |      |   |   |   |  |  | CONVEYANCE                     |  |  |  |  |
|   |      |   |   |   |  |  | OFF-SITE TREATMENT             |  |  |  |  |
| OFF-SITE USE AND/OR DISPOSAL  |      |   |   |   |  |  |                                |  |  |  |  |

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| <b>SANITATION 21: A PLANNING FRAMEWORK FOR IMPROVING CITY-WIDE SANITATION SERVICES</b><br><br>Swiss Federal Institute of Aquatic Science and Technology (Eawag)<br><br>Authors: Jonathan Parkinson, Christoph Lüthi, and Dirk Walther | 2014 | The document sets out key principles and process guidelines to help city stakeholders develop appropriate and affordable solutions to sanitation problems, taking into account technology issues, management arrangements, institutional challenges and demands for improvement from different stakeholders. | Urban development context and long-term systems-based programming | Government authorities, Planners, Engineers |  |  | USER INTERFACE                 |  |  |  |  |
|   |      |  |   |   |  |  | COLLECTION AND STORAGE ON-SITE |  |  |  |  |
|   |      |  |   |   |  |  | ON-SITE TREATMENT              |  |  |  |  |
|   |      |  |   |   |  |  | CONVEYANCE                     |  |  |  |  |
|   |      |  |   |   |  |  | OFF-SITE TREATMENT             |  |  |  |  |
| OFF-SITE USE AND/OR DISPOSAL  |      |  |   |   |  |  |                                |  |  |  |  |

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|---|------|---|---|---|--|--|--------------------------------|--|--|--|--|
| <b>FACCAL SLUDGE MANAGEMENT: SYSTEMS APPROACH FOR IMPLEMENTATION AND OPERATION</b><br><br>IWA Publishing<br><br>Authors: Linda Strand, Wanska Romelap, and Damir Brijdjanovic | 2014 | The book addresses the organization of the entire faecal sludge management service chain, from the collection and transport of sludge, and the current state of knowledge of treatment options, to the final end use or disposal of treated sludge. The book also presents important factors to consider when evaluating and upscaling new treatment technology options. In addition to providing fundamentals and an overview of technologies, the book goes into details of operational, institutional and financial aspects. | Development context and long-term systems-based programming | Government authorities, Planners, Engineers |  |  | USER INTERFACE                 |  |  |  |  |
|   |      |   |   |   |  |  | COLLECTION AND STORAGE ON-SITE |  |  |  |  |
|   |      |   |   |   |  |  | ON-SITE TREATMENT              |  |  |  |  |
|   |      |   |   |   |  |  | CONVEYANCE                     |  |  |  |  |
|   |      |   |   |   |  |  | OFF-SITE TREATMENT             |  |  |  |  |
| OFF-SITE USE AND/OR DISPOSAL  |      |   |   |   |  |  |                                |  |  |  |  |



| TITLE   | AUTHOR / PUBLISHER  | YEAR | DESCRIPTION   | TARGET PHASE / CONTEXT  | TARGET AUDIENCE                             | PUBLIC RESOURCE | AVAILABLE ONLINE | STEPS IN THE SANITATION CHAIN   | TECHNOLOGIES | GUIDANCE ON: CONTEXT AND OPERATIONAL FACTORS | HUMANITARIAN EMERGENCY RESPONSE |
|---|---|------|---|---|---|-----------------|------------------|---|--------------|--|---------------------------------|
| <b>HOW TO SELECT APPROPRIATE TECHNICAL SOLUTIONS FOR SANITATION</b>   | Concerted Municipal Strategies (CMS)<br>Authors: Jacques Monvois, Julien Gabert, Clément Frenoux, and Marie Guillaume   | 2014 | A guidance document to assist local contracting authorities and their partners in identifying sanitation technologies best suited to the different contexts that exist within their town. The first part of the guide contains a planning process and a set of criteria to assist in characterizing each area of intervention in order to identify the most appropriate technical solutions. The second part of the guide consists of technical factheets which give a practical overview of the technical and economic characteristics, operating principle and the pros and cons of the 29 sanitation technology options most commonly used in sub-Saharan Africa.  | Development context and long-term systems-based programming       | Government authorities, Planners, Engineers |                 |                  | USER INTERFACE<br>COLLECTION AND STORAGE ON-SITE<br>ON-SITE TREATMENT<br>CONVEYANCE<br>OFF-SITE TREATMENT<br>OFF-SITE USE AND/OR DISPOSAL |              |  |                                 |
| <b>COMMUNITY-LED URBAN ENVIRONMENTAL SANITATION : CLUES COMPLETE GUIDELINES FOR DECISION MAKERS WITH 30 TOOLS</b> | Swiss Federal Institute of Aquatic Science and Technology (Eawag), Water Supply and Sanitation Collaborative Council (WSSCC), and UN HABITAT<br>Authors: Christoph Lüthi, Antoine Morel, Elizabeth Tilley, and Lukas Ulrich | 2014 | The Community-Led Urban Environmental Sanitation (CLUES) approach presents comprehensive guidelines for the planning and implementation of environmental sanitation infrastructure and services in disenfranchised urban and peri-urban communities. The guidance is geared towards the community level and is meant to complement citywide infrastructure planning approaches, such as Sanitation 21 Framework or City Sanitation Plans (Parkinson et. Al 2014). Does not deal with technology sheets but is meant to be used in conjunction with the Compendium of Sanitation Technologies in Development (Eawag, 2014)   | Development context and long-term systems-based programming       | Government authorities, Planners, Engineers |                 |                  | USER INTERFACE<br>COLLECTION AND STORAGE ON-SITE<br>ON-SITE TREATMENT<br>CONVEYANCE<br>OFF-SITE TREATMENT<br>OFF-SITE USE AND/OR DISPOSAL |              |  |                                 |
| <b>SANITATION, WASTEWATER MANAGEMENT AND SUSTAINABILITY: FROM WASTE DISPOSAL TO RESOURCE RECOVERY</b>             | United Nations Environment Programme and Stockholm Environment Institute<br>Authors: Andersson, K., Rosemarin, A., Lamizana, B., Kvarnström, E., McConnell, J., Seidu, R., Dickinson, S., and Trimmer, C.                   | 2016 | This book brings together the latest thinking and practice in sustainable sanitation and wastewater management. Giving real-world examples and illustrations, it aims to make the key issues in system design, implementation and operation accessible to policy audiences and development practitioners, while still providing a useful overview for technical and academic readers more directly involved in sanitation and wastewater management. The book takes current thinking on sustainable development as an analytical framework. Overall the book aims to demonstrate that sustainable sanitation and wastewater systems are not only smart, cost-effective investments for sustainability, but also practical, affordable – and already here. | Urban development context and long-term systems-based programming | Government authorities, Planners, Engineers |                 |                  | USER INTERFACE<br>COLLECTION AND STORAGE ON-SITE<br>ON-SITE TREATMENT<br>CONVEYANCE<br>OFF-SITE TREATMENT<br>OFF-SITE USE AND/OR DISPOSAL |              |  |                                 |
| <b>DECENTRALISED WASTEWATER TREATMENT SYSTEMS (DEWATS) AND SANITATION IN DEVELOPING COUNTRIES</b>                 | Bremen Overseas Research and Development Association (BORDA) and Water, Engineering and Development Centre (WEDC)<br>Authors: Bernd Guttewer, Ludwig Sasse, Thilo Panzerbieter and Thorsten Reckerzuegel                    | 2009 | Based on the experiences and “good practice” of numerous programmes and projects, this book aims to present the most important features for successful DEWATS dissemination. This is a practical guideline to support decision making, planning and implementation activities. For very specific questions, additional literature can be consulted. A selection of books and articles can be found in the appendix. Technical briefs on key anaerobic systems and their O&M considerations are included.  | Development context and long-term systems-based programming       | Government authorities, Planners, Engineers |                 |                  | USER INTERFACE<br>COLLECTION AND STORAGE ON-SITE<br>ON-SITE TREATMENT<br>CONVEYANCE<br>OFF-SITE TREATMENT<br>OFF-SITE USE AND/OR DISPOSAL |              |  |                                 |





| TITLE   | AUTHOR / PUBLISHER  | YEAR | DESCRIPTION  | TARGET PHASE / CONTEXT   | TARGET AUDIENCE                             | PUBLIC RESOURCE | AVAILABLE ONLINE | STEPS IN THE SANITATION CHAIN   | TECHNOLOGIES         | GUIDANCE ON: CONTEXT AND OPERATIONAL FACTORS | HUMANITARIAN EMERGENCY RESPONSE |
|---|---|------|--|--|---|-----------------|------------------|---|----------------------|--|---------------------------------|
| <b>TECHNICAL ASSESSMENT AND PLANNING GUIDELINES FOR FACCAL SLUDGE MANAGEMENT: PRACTICAL HANDBOOK</b>            | Asian Institute of Technology and NICCR<br>Authors: Thammarat Koattarp, Paul Jacob, and Attiya Panuwatvanich                    | 2014 | A manual on planning for FSM is primarily and process document focused on developing situations. Guidance is given on planning with local authorities and on how to establish a monitoring system. A table explaining different decentralized treatment options is provided.   | Development context and long-term systems-based programming                          | Government authorities, Planners, Engineers |                 |                  | USER INTERFACE<br>COLLECTION AND STORAGE ON-SITE<br>ON-SITE TREATMENT<br>CONVEYANCE<br>OFF-SITE TREATMENT<br>OFF-SITE USE AND/OR DISPOSAL | <br><br><br><br><br> |  |                                 |
| <b>DOMESTIC WASTEWATER TREATMENT IN DEVELOPING COUNTRIES</b>  | Earthscan<br>Authors: Duncan Mara   | 2004 | This book details methods of domestic wastewater treatment that are especially suitable in developing countries. The emphasis is on low-cost, low-energy, low-maintenance, high-performance systems that contribute to environmental sustainability by producing effluents that can be safely and profitably used in agriculture for crop irrigation and/or in aquaculture for fish and aquatic vegetable pond fertilization. Modern design methodologies, with worked design examples, are described for waste stabilization ponds (WSP), wastewater storage and treatment reservoirs, constructed wetlands, upflow aerated lagoons, and oxidation ditches. | Development context and long-term systems-based programming                          | Government authorities, Planners, Engineers |                 |                  | USER INTERFACE<br>COLLECTION AND STORAGE ON-SITE<br>ON-SITE TREATMENT<br>CONVEYANCE<br>OFF-SITE TREATMENT<br>OFF-SITE USE AND/OR DISPOSAL | <br><br><br><br><br> |  |                                 |
| <b>INTERNATIONAL SOURCE BOOK ON ENVIRONMENTALLY SOUND TECHNOLOGIES FOR WASTEWATER AND STORMWATER MANAGEMENT</b> | United Nations Environment Programme (UNEP)<br>Authors: Dr. Goen Ho   | 2000 | This book is a sequel to 'International Source Book on Environmentally Sound Technologies for Municipal Solid Waste Management'. It gives a technical brief on on-site, off-site treatment systems and specific FSM treatments   | Development context and long-term systems-based programming                          | Government authorities, Planners, Engineers |                 |                  | USER INTERFACE<br>COLLECTION AND STORAGE ON-SITE<br>ON-SITE TREATMENT<br>CONVEYANCE<br>OFF-SITE TREATMENT<br>OFF-SITE USE AND/OR DISPOSAL | <br><br><br><br><br> |  |                                 |
| <b>A SEWER CATASTROPHE COMPANION: DRY TOILETS FOR WET DISASTERS</b>   | Pacific Northwest College of Art (PNCA) and Portland Bureau of Emergency Management<br>Authors: M. Danielsson and M. Lippincott | 2012 | A guide presenting a toilet system that a person can implement themselves, without relying on a coordinated and timely response by someone else. This guide is for planning ahead and preparing kits, whether for yourself, your household, your apartment building, or your block. This flexible system is built around ubiquitous and freely available 5-gallon buckets.   | Acute phase of emergency Development context and long-term systems-based programming | Persons affected by an emergency            |                 |                  | USER INTERFACE<br>COLLECTION AND STORAGE ON-SITE<br>ON-SITE TREATMENT<br>CONVEYANCE<br>OFF-SITE TREATMENT<br>OFF-SITE USE AND/OR DISPOSAL | <br><br><br><br><br> |  |                                 |





GUIDANCE ON:

CONTEXT AND OPERATIONAL FACTORS

HUMANITARIAN EMERGENCY RESPONSE

| TITLE  | AUTHOR / PUBLISHER  | YEAR | DESCRIPTION   | TARGET PHASE / CONTEXT                       | TARGET AUDIENCE  | PUBLIC RESOURCE | AVAILABLE ONLINE | STEPS IN THE SANITATION CHAIN  | TECHNOLOGIES | CONTEXT AND OPERATIONAL FACTORS | HUMANITARIAN EMERGENCY RESPONSE |
|--|---|------|---|--|--|-----------------|------------------|--|--------------|---------------------------------|---------------------------------|
| <b>OUT IN THE COLD: EMERGENCY WATER SUPPLY AND SANITATION FOR COLD REGIONS</b>                                   | Water, Engineering and Development Centre (WEDC)<br>Authors: Mark Bartle and Michael Smith  | 2004 | Supplement to more general guidelines as it is focusing on extra interventions to target in colder geographical regions such as the former Soviet Union, Iraq or Afghanistan. Hereby this guideline provides a brief overview of different sanitation technologies covering the entire sanitation chain. It gives useful design modifications to be considered when designing sanitation infrastructure in colder climates. A few illustrations of the technologies is given. | Acute and transition emergency phase         | Engineers, WASH specialists and coordinators of WASH interventions in colder regions |                 |                  | USER INTERFACE<br>COLLECTION AND STORAGE ON-SITE<br>ON-SITE TREATMENT<br>CONVEANCE<br>OFF-SITE TREATMENT<br>OFF-SITE USE AND/OR DISPOSAL |              |                                 |                                 |
| <b>SUSTAINABLE RECONSTRUCTION IN URBAN AREAS: A HANDBOOK</b>   | Skat – Swiss Resource Centre and Consultancies for Development and International Federation of Red Cross and Red Crescent Societies<br>Authors: Claudia Schneider | 2012 | Guidelines that focus on the overall reconstruction efforts after an emergency. Sanitation chapter gives a selected overview of sanitation examples for centralised, decentralised and on-site sanitation systems, mainly based on the Compendium for Sanitation Technologies (EAWAG).  | Recovery / reconstruction phase of emergency | WASH specialists and coordinators of WASH interventions.                             |                 |                  | USER INTERFACE<br>COLLECTION AND STORAGE ON-SITE<br>ON-SITE TREATMENT<br>CONVEANCE<br>OFF-SITE TREATMENT<br>OFF-SITE USE AND/OR DISPOSAL |              |                                 |                                 |
| <b>DISASTER RISK REDUCTION: A GUIDELINE FOR FIELD PRACTITIONERS PLANNING AND IMPLEMENTING WASH INTERVENTIONS</b> | Global WASH Cluster<br>Authors: Erik Rottler  | 2011 | A guide to support WASH practitioners in linking WASH activities better with DRR early in the emergency. The guide proposes possible measures that can be undertaken in excreta management activities to support sustainability and DRR.  | Emergency WASH programming                   | WASH specialists and coordinators of WASH interventions.                             |                 |                  | USER INTERFACE<br>COLLECTION AND STORAGE ON-SITE<br>ON-SITE TREATMENT<br>CONVEANCE<br>OFF-SITE TREATMENT<br>OFF-SITE USE AND/OR DISPOSAL |              |                                 |                                 |
| <b>EMERGENCY FIELD HANDBOOK A GUIDE FOR UNICEF STAFF</b>   | UNICEF  | 2005 | A comprehensive to emergency operations. Chapter 5.2 focused on the WASH with a short To Do list for the safe containment of excreta and an overview of the standards for emergency latrines (pict latrines). No detailed technical guidance or illustrations.  | Emergency WASH programming                   | Engineers, WASH specialists and coordinators of WASH interventions.                  |                 |                  | USER INTERFACE<br>COLLECTION AND STORAGE ON-SITE<br>ON-SITE TREATMENT<br>CONVEANCE<br>OFF-SITE TREATMENT<br>OFF-SITE USE AND/OR DISPOSAL |              |                                 |                                 |





| TITLE   | AUTHOR / PUBLISHER  | YEAR | DESCRIPTION   | TARGET PHASE / CONTEXT                  | TARGET AUDIENCE   | PUBLIC RESOURCE | AVAILABLE ONLINE | STEPS IN THE SANITATION CHAIN   | TECHNOLOGIES         | CONTEXT AND OPERATIONAL FACTORS | HUMANITARIAN EMERGENCY RESPONSE |
|---|---|------|---|---|---|-----------------|------------------|---|----------------------|---------------------------------|---------------------------------|
| <b>THE APPLICATION OF ECOLOGICAL SANITATION FOR EXCRETA DISPOSAL IN DISASTER RELIEF: EXPERIENCE, SELECTION AND DESIGN</b> | Institute of Wastewater Management and Water Protection<br>Authors: Katharine Krinstedt                             | 2012 | This report presents several examples where Ecosan methods have been applied in emergency situations. Details of different Ecosan technologies are provided and their application in different contexts assessed. Emphasis is placed on the hygienisation of the sludge and various 'treatment' methods to achieve this is discussed. A sanitation decision flow chart is included to compare different sanitation systems in different scenarios.          | Acute and transition phase of emergency | Engineers, WASH specialists and coordinators of WASH interventions  |                 |                  | USER INTERFACE<br>COLLECTION AND STORAGE ON-SITE<br>ON-SITE TREATMENT<br>CONVEYANCE<br>OFF-SITE TREATMENT<br>OFF-SITE USE AND/OR DISPOSAL | <br><br><br><br><br> |                                 | <br><br><br><br><br>            |
| <b>EMERGENCY SANITATION: ASSESSMENT AND PROGRAMME DESIGN</b>  | Water Engineering and Development Centre (WEDC)<br>Authors: Peter Harvey, Sobrah Beghin and Bob Reed                | 2002 | A book to assist in planning and implementation of emergency sanitation programmes. The main focus is a systematic and structured approach to assessment and programme design. Chapter 6, Excreta Disposal - provides a selection criteria and detailed design guidance with illustrations on different technologies along the sanitation value chain. Burying is the recommended action for off site disposal. Useful case studies included.               | Emergency WASH programming              | Emergency/humanitarian WASH planners, managers and implementers   |                 |                  | USER INTERFACE<br>COLLECTION AND STORAGE ON-SITE<br>ON-SITE TREATMENT<br>CONVEYANCE<br>OFF-SITE TREATMENT<br>OFF-SITE USE AND/OR DISPOSAL | <br><br><br><br><br> |                                 | <br><br><br><br><br>            |
| <b>SUSTAINABLE SANITATION FOR EMERGENCIES AND RECONSTRUCTION SITUATIONS</b>   | Sustainable Sanitation Alliance (SuSanA)<br>Authors: Ase Johannessen, Julie Patrino, William Carter, and Jenny Lamb | 2012 | A fact sheet that outlines different approaches to sustainable sanitation in emergencies. A table with suggested technologies for different phases of emergencies is included.  | Acute and transition phase of emergency | WASH practitioners, planners, managers and implementers   |                 |                  | USER INTERFACE<br>COLLECTION AND STORAGE ON-SITE<br>ON-SITE TREATMENT<br>CONVEYANCE<br>OFF-SITE TREATMENT<br>OFF-SITE USE AND/OR DISPOSAL | <br><br><br><br><br> |                                 | <br><br><br><br><br>            |
| <b>EXCRETA DISPOSAL IN EMERGENCIES: A FIELD MANUAL</b>  | Water Engineering and Development Centre (WEDC)<br>Authors: Peter Harvey  | 2007 | The manual provides guidance on how to plan, design and construct systems, and how to maintain and promote appropriate use of those systems. Technical design information is provided on how to construct different types of latrines and handwashing devices is provided, together with strategies for difficult situations and advice on operation and maintenance. The manual also provides guidance for different situations e.g high water tables etc. | Acute and transition phase of emergency | Field-based technicians or engineers (with limited experience) or non-technical staff responsible for sanitation planning, management and intervention in emergencies |                 |                  | USER INTERFACE<br>COLLECTION AND STORAGE ON-SITE<br>ON-SITE TREATMENT<br>CONVEYANCE<br>OFF-SITE TREATMENT<br>OFF-SITE USE AND/OR DISPOSAL | <br><br><br><br><br> |                                 | <br><br><br><br><br>            |





**TITLE**

**AUTHOR / PUBLISHER**

**YEAR**

**DESCRIPTION**

**TARGET PHASE / CONTEXT**

**TARGET AUDIENCE**

**PUBLIC RESOURCE**

**AVAILABLE ONLINE**

**STEPS IN THE SANITATION CHAIN**

**TECHNOLOGIES**

**GUIDANCE ON: CONTEXT AND OPERATIONAL FACTORS**

**HUMANITARIAN EMERGENCY RESPONSE**

| TITLE  | AUTHOR / PUBLISHER  | YEAR | DESCRIPTION  | TARGET PHASE / CONTEXT               | TARGET AUDIENCE                                   | PUBLIC RESOURCE | AVAILABLE ONLINE | STEPS IN THE SANITATION CHAIN   | TECHNOLOGIES         | GUIDANCE ON: CONTEXT AND OPERATIONAL FACTORS | HUMANITARIAN EMERGENCY RESPONSE |
|--|---|------|--|--------------------------------------|---|-----------------|------------------|---|----------------------|--|---------------------------------|
| <b>TECHNICAL OPTIONS FOR EXCRETA DISPOSAL IN EMERGENCIES: TECHNICAL NOTES ON DRINKING WATER, SANITATION AND HYGIENE IN EMERGENCIES</b> | World Health Organization (WHO) and Water, Engineering and Development Centre (WEDC)<br>Authors: Bob Reed     | 2013 | Four page illustrated technical notes on ways to contain urine and excreta in the acute phase of an emergency while longer term solutions can be developed. The solutions are purposefully limited and simple.   | Acute emergency phase                | Emergency WASH planners and practitioners         |                 |                  | USER INTERFACE<br>COLLECTION AND STORAGE ON-SITE<br>ON-SITE TREATMENT<br>CONVEYANCE<br>OFF-SITE TREATMENT<br>OFF-SITE USE AND/OR DISPOSAL | <br><br><br><br><br> | <br><br><br><br><br>                         | <br><br><br><br><br>            |
| <b>ENGINEERING IN EMERGENCIES: A PRACTICAL GUIDE FOR RELIEF WORKERS</b>  | ITDG Publishing<br>Authors: Jan Davis and Robert Lambert  | 2002 | It provides the information needed to implement an effective engineering response in the aftermath of an emergency.  | Acute and transition emergency phase | Engineers, Humanitarian relief workers in general |                 |                  | USER INTERFACE<br>COLLECTION AND STORAGE ON-SITE<br>ON-SITE TREATMENT<br>CONVEYANCE<br>OFF-SITE TREATMENT<br>OFF-SITE USE AND/OR DISPOSAL | <br><br><br><br><br> | <br><br><br><br><br>                         | <br><br><br><br><br>            |
| <b>PUBLIC HEALTH ENGINEERING IN PRECARIOUS SITUATIONS</b>  | Médecins Sans Frontières<br>Authors: Joos Van Den Noortgate and Peter Maes                                    | 2010 | Manual intended for the setting up of public health programmes in disadvantaged areas, particularly in refugee and displaced persons camps, and in health structures. Chapter 3, gives a thorough overview of the planning and process of setting up an excreta containment response. Technical sizing but not drawings are given. | Acute and transition emergency phase | Humanitarian relief workers in general            |                 |                  | USER INTERFACE<br>COLLECTION AND STORAGE ON-SITE<br>ON-SITE TREATMENT<br>CONVEYANCE<br>OFF-SITE TREATMENT<br>OFF-SITE USE AND/OR DISPOSAL | <br><br><br><br><br> | <br><br><br><br><br>                         | <br><br><br><br><br>            |
| <b>CAMP MANAGEMENT TOOLKIT</b>   | International Organization for Migration (IOM), Norwegian Refugee Council (NRC) and UN Refugee Agency (UNHCR) | 2014 | An overall guide to emergency operations. Chapter 14 focused on WASH and the provision of latrines and how to empty latrines. No technical illustrations.  | Acute phase of emergency             | Humanitarian relief workers in general            |                 |                  | USER INTERFACE<br>COLLECTION AND STORAGE ON-SITE<br>ON-SITE TREATMENT<br>CONVEYANCE<br>OFF-SITE TREATMENT<br>OFF-SITE USE AND/OR DISPOSAL | <br><br><br><br><br> | <br><br><br><br><br>                         | <br><br><br><br><br>            |





| TITLE   | AUTHOR / PUBLISHER   | YEAR | DESCRIPTION  | TARGET PHASE / CONTEXT               | TARGET AUDIENCE                           | PUBLIC RESOURCE | AVAILABLE ONLINE | STEPS IN THE SANITATION CHAIN   | TECHNOLOGIES         | GUIDANCE ON: CONTEXT AND OPERATIONAL FACTORS | HUMANITARIAN EMERGENCY RESPONSE |
|---|--|------|--|--------------------------------------|---|-----------------|------------------|---|----------------------|--|---------------------------------|
| <b>EXCRETA DISPOSAL IN EMERGENCIES. A FIELD MANUAL</b>            | Water, Engineering and Development Centre (WEDC)<br>Authors: Peter Harvey  | 2009 | A comprehensive guide that can support in planning and execution of excreta management programme. This gives a range of solutions from the very rapid to more complex technologies (e.g septic tanks). The guide also outlines solutions for challenging contexts, e.g: flooding, high water table etc. Recommendations for FS disposal are: burial, co-composting, and drying beds. | Acute and transition emergency phase | Emergency WASH planners and practitioners |                 |                  | USER INTERFACE<br>COLLECTION AND STORAGE ON-SITE<br>ON-SITE TREATMENT<br>CONVEYANCE<br>OFF-SITE TREATMENT<br>OFF-SITE USE AND/OR DISPOSAL | <br><br><br><br><br> | <br><br><br><br><br>                         | <br><br><br><br><br>            |
| <b>COMPENDIUM OF WASH IN SCHOOLS FACILITIES IN EMERGENCIES</b>    | UNICEF<br>Authors: Richard Luff  | 2012 | A guidance for Specifications for WASH in schools. Sanitation facilities are illustrated with diagrams, schematic drawings, photographs and bills of quantities – detailed statements of work, prices and dimensions for construction of the WASH facilities.  | Acute and transition emergency phase | Humanitarian relief workers in general    |                 |                  | USER INTERFACE<br>COLLECTION AND STORAGE ON-SITE<br>ON-SITE TREATMENT<br>CONVEYANCE<br>OFF-SITE TREATMENT<br>OFF-SITE USE AND/OR DISPOSAL | <br><br><br><br><br> | <br><br><br><br><br>                         | <br><br><br><br><br>            |
| <b>EMERGENCY EXCRETA DISPOSAL STANDARDS AND OPTIONS FOR HAITI</b> | Water, Engineering and Development Centre (WEDC)<br>Authors: Bob Reed  | 2010 | This document provides an overview of emergency excreta disposal options and standards for the Haitian context. It briefly describes technical solutions along the sanitation chain to help the reader decide on the best approach to use.   | Acute and transition emergency phase | Humanitarian relief workers in Haiti      |                 |                  | USER INTERFACE<br>COLLECTION AND STORAGE ON-SITE<br>ON-SITE TREATMENT<br>CONVEYANCE<br>OFF-SITE TREATMENT<br>OFF-SITE USE AND/OR DISPOSAL | <br><br><br><br><br> | <br><br><br><br><br>                         | <br><br><br><br><br>            |
| <b>SPEEDY SANITATION AND STABILISATION</b>                        | Humanitarian Innovation Fund, WASTE, London School of Hygiene and Tropical Medicine, and Enhancing Learning & Research for Humanitarian Assistance, Sanitation Innovations for Humanitarian Disasters in Urban Areas<br>Authors: Gover Maman, Jan Spik, and Ednah Kamboi | 2014 | A research report that outlines the research methods for sanitizing sludge using low-cost additives such as lime, Caustic soda, Lactic acid. Possible applications could be for onsite or off site treatment in emergency context, but have not been proven in such a context in this research.  | Acute and emergency phase            | Humanitarian WASH practitioners           |                 |                  | USER INTERFACE<br>COLLECTION AND STORAGE ON-SITE<br>ON-SITE TREATMENT<br>CONVEYANCE<br>OFF-SITE TREATMENT<br>OFF-SITE USE AND/OR DISPOSAL | <br><br><br><br><br> | <br><br><br><br><br>                         | <br><br><br><br><br>            |



|  <b>TITLE</b><br><b>AUTHOR / PUBLISHER</b>  | <b>YEAR</b> | <b>DESCRIPTION</b>  | <b>TARGET PHASE / CONTEXT</b>                                  | <b>TARGET AUDIENCE</b>                     | <b>PUBLIC RESOURCE</b>  | <b>AVAILABLE ONLINE</b>   | <b>STEPS IN THE SANITATION CHAIN</b>  | <b>TECHNOLOGIES</b>  | <b>GUIDANCE ON: CONTEXT AND OPERATIONAL FACTORS</b>   | <b>HUMANITARIAN EMERGENCY RESPONSE</b>   |
|---|-------------|---|--|--|---|---|---|--|---|--|
| <b>THE DEVELOPMENT OF AN ONSITE SANITATION SYSTEM BASED ON VERMIFILTRATION: THE 'TIGER TOILET'</b><br>Journal of Water, Sanitation and Hygiene for Development<br>Authors: Claire Furlong | 2015        | This paper describes the development of a novel onsite sanitation system based on vermifiltration, the 'Tiger Toilet'. The vermicilters were processing the amount of faeces entering the system on a daily basis, so faeces was not accumulating. It was estimated that they would require emptying after approximately five years, based on the depth of the vermicompost generated. Possible application for onsite treatment in emergencies yet still not proven. | Development context: with application for emergencies          | WASH practitioners                         |  |  | USER INTERFACE<br>COLLECTION AND STORAGE ON-SITE<br>ON-SITE TREATMENT<br>CONVEYANCE<br>OFF-SITE TREATMENT<br>OFF-SITE USE AND/OR DISPOSAL | <br><br><br> | <br><br> | <br><br><br> |
| <b>ENVIRONMENTAL HEALTH IN EMERGENCIES AND DISASTERS: A PRACTICAL GUIDE</b><br>World Health Organization (WHO)<br>Authors: B. Wisner and J. Adams   | 2002        | A guide for emergency response. Particular emphasis on WASH, and the chapter on sanitation gives some examples of different technologies. Treatment is mentioned but no technical guidance provided.  | Acute and recovery emergency phase                             | Humanitarian Practitioners                 |    |    | USER INTERFACE<br>COLLECTION AND STORAGE ON-SITE<br>ON-SITE TREATMENT<br>CONVEYANCE<br>OFF-SITE TREATMENT<br>OFF-SITE USE AND/OR DISPOSAL | <br><br>   | <br><br>      | <br><br>   |
| <b>REQUIREMENTS FOR FAECAL SLUDGE TREATMENT AND DISPOSAL IN EMERGENCY SITUATIONS</b><br>WASTE-Netherlands Red Cross, and Aldus Bouwinnovatie  | 2012        | Report on the requirement of faecal sludge management facilities in emergencies to support innovation and design for FSM in emergencies.  | Acute and recovery emergency phase                             | Engineers, humanitarian WASH practitioners |    |    | USER INTERFACE<br>COLLECTION AND STORAGE ON-SITE<br>ON-SITE TREATMENT<br>CONVEYANCE<br>OFF-SITE TREATMENT<br>OFF-SITE USE AND/OR DISPOSAL | <br><br>  | <br>  |   |
| <b>EMPTYING PIT LATRINES</b><br>Water, Engineering and Development Centre (WEDC)<br>Authors: Rebecca Scott and Brian Reed   | 2017        | Technical note on pit emptying specifically aimed at dry systems, rather than wet systems such as cesspits and septic tanks.  | Acute and recovery emergency phase as well development context | WASH practitioners                         |    |    | USER INTERFACE<br>COLLECTION AND STORAGE ON-SITE<br>ON-SITE TREATMENT<br>CONVEYANCE<br>OFF-SITE TREATMENT<br>OFF-SITE USE AND/OR DISPOSAL | <br><br>  | <br>  |   |



| TITLE   | AUTHOR / PUBLISHER   | YEAR | DESCRIPTION  | TARGET PHASE / CONTEXT | TARGET AUDIENCE         | PUBLIC RESOURCE                     | AVAILABLE ONLINE                    | STEPS IN THE SANITATION CHAIN   | TECHNOLOGIES | CONTEXT AND OPERATIONAL FACTORS | GUIDANCE ON: HUMANITARIAN EMERGENCY RESPONSE |
|---|--|------|--|------------------------|-------------------------|-------------------------------------|-------------------------------------|---|--------------|---------------------------------|--|
| <b>CONTINGENCY PLANNING GUIDE</b>   | International Federation of Red Cross and Red Crescent Societies | 2012 | This document provides an overview of the key elements of contingency planning. Some considerations of construction capacity, as well as local user needs. No reference of faecal sludge management.   | Emergency context      | Emergency practitioners | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | USER INTERFACE<br>COLLECTION AND STORAGE ON-SITE<br>ON-SITE TREATMENT<br>CONVEYANCE<br>OFF-SITE TREATMENT<br>OFF-SITE USE AND/OR DISPOSAL |              |                                 |  |
| <b>EMERGENCY RESPONSE PREPAREDNESS (ERP)</b>  | Inter-Agency Standing Committee (IASC)                           | 2014 | Preparedness Package for Refugee Emergencies (PPRE) sets a standard for preparing for refugee emergencies, combining non-risk-specific preparedness action lists with scenario based contingency/response planning. It is meant for UNHCR offices as well as UN, NGO and other partners involved in preparing for refugee influxes. WASH related information include links to the WASH cluster Guidance on Accountability to Affected Populations and guidance on Capacity Mapping.<br><br>No reference to faecal sludge management or excreta management. | Emergency context      | Emergency practitioners | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | USER INTERFACE<br>COLLECTION AND STORAGE ON-SITE<br>ON-SITE TREATMENT<br>CONVEYANCE<br>OFF-SITE TREATMENT<br>OFF-SITE USE AND/OR DISPOSAL |              |                                 |  |
| <b>INTER-AGENCY CONTINGENCY PLANNING GUIDELINES FOR HUMANITARIAN ASSISTANCE. INTER-AGENCY STANDING COMMITTEE SUB-WORKING GROUP ON PREPAREDNESS AND CONTINGENCY PLANNING</b> | Inter-Agency Standing Committee (IASC)                           | 2007 | Guidelines aim to assist Humanitarian Country Teams in preparing to respond to potential emergencies with appropriate humanitarian assistance and protection. These guidelines provide recommendations on how to establish and implement an inter-agency contingency planning process, how to develop integrated plans and monitor ongoing preparedness actions. No reference to faecal sludge management or excreta management.   | Emergency context      | Emergency practitioners | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | USER INTERFACE<br>COLLECTION AND STORAGE ON-SITE<br>ON-SITE TREATMENT<br>CONVEYANCE<br>OFF-SITE TREATMENT<br>OFF-SITE USE AND/OR DISPOSAL |              |                                 |  |

understand how a specific technology can function within a specific context.

The Compendium of Sanitation Technologies for Development<sup>52</sup> is one of the most useful technical guidance resources reviewed and provides the user a systematic way of accessing technologies, explained in colour coded technical briefs, along the sanitation service chain. This year, the German WASH Network in partnership with EAWAG has developed a compendium using the same colour coded layout but with a focus on the emergency context. This is due to be published in 2018. However, this compendium for emergencies will not include case studies.

## GUIDANCE MATERIALS ON CONTEXTUAL AND OPERATION AND MAINTENANCE FACTORS

Understanding the operation and maintenance (O&M) of different technical options is critical when making the initial technology choice as these considerations also affect the long-term sustainability of technologies. If the long term O&M considerations are not planned, the infrastructure is more likely to fall into a state of disrepair. In addition to information on O&M, effective guidance support should account for regional variations. Evaluating soil, temperature, institutional landscape, social structure, cultural practices, and other regional characteristics can help determine successful FSM solutions and avoid the selection of inappropriate technologies. For example, a water-based user-interface, collection and treatment system may be inappropriate in an area with severe water scarcity. Similarly, sludge sanitisation through solar drying methods (e.g. drying beds) may not work in places with high humidity and rainfall.

Only 17 of the 33 resources reviewed incorporate details of operation and maintenance (O&M) requirements. Within the emergency targeted resources, O&M guidance covering the first part of the sanitation chain is well covered<sup>53</sup> and planning lists are given in some of the process documents to support field staff to plan for the O&M of the latrines or user interface component of the chain. Beyond the user interface, no guidance was found for FSM off-site treatment or disposal. Contextual considerations for the first parts of the sanitation chain are well covered in emergency guidance – cold climates, urban areas, flooded areas etc.

52 Elizabeth Tilley, Lukas Ulrich, Christoph Lüthi, Philippe Reymond and Christian Zurbrügg, "Compendium of Sanitation Systems and Technologies," eawag, 2016, <http://www.iwa-network.org/wp-content/uploads/2016/06/Compendium-Sanitation-Systems-and-Technologies.pdf>.

53 See Harvey et. al 2002, Harvey, P. 2007, Reed. B. (2010, 2013) UNICEF (2012) guidance

The key gap among the emergency-targeted resources is guidance on the important O&M and contextual factors that encompass both classical engineering aspects of technology integration, as well as other issues concerning the institutional management that defines the FSM programme. It is especially important with emergency context to include O&M considerations for FSM technology often needs to incorporate 'service delivery' beyond merely contracting a desludging company to empty latrines or septic tanks. However, such planning may currently be beyond the capacity of the majority of humanitarian WASH field practitioners but in order for FSM technologies to be sustainable O&M needs to be considered as an integral part of the life-cycle cost of the technology.

## GUIDANCE ON FSM SPECIFIC TO FIRST PHASE EMERGENCY RESPONSE

The majority of the guidance for first phase emergencies focuses on different designs of latrines and the latter stages of the sanitation chain are often ignored or only lightly mentioned. For example, in the comprehensive guide to Emergency Sanitation<sup>54</sup> detailed designs of some on-site containment and treatment options for reducing or managing the faecal sludge such as composting toilets and septic tanks and briefly recommends burial or dumping in nearby sewerage plants, or co-composting for off-site treatment. However, it does not give any specific guidance on how to implement these in practice.

This guide was revised and updated in 2007 and added sludge drying beds as an alternative option for off-site treatment and provides brief technical guidance on this. Similar recommendations are seen the more recent guidance by Médecins Sans Frontières<sup>55</sup> however detailed designs or O&M implications for any of the off-site disposal and treatment components are not given.

In response to the cholera outbreak in Haiti in 2010, guidance was developed for the Haitian government that recommended four different FSM options in addition to burial and disposal into sewerage plants. Although this guidance was targeting the emergency situation in Haiti, the phase of the emergency was moving in the direction of stabilization and recovery. Additional approaches on sanitizing sludge in emergencies using different additives such as lime, urea, and lactic acid are found in the literature, however, this information is within a research report and hasn't been presented in a very accessible

54 Harvey et. al 2002

55 Joos Van Den Noortgate and Peter Maes, "Public Health Engineering in Precarious Situations," 2010.



guidance format. More recently, this work was built on through reviewing the use of additives as a rapid means of sanitizing faecal sludge to make it safe for disposal.<sup>56</sup>

There have been efforts to address this gap and investment into research on appropriate FSM solutions for emergencies. This has resulted in a spattering of research papers on FSM approaches however none of these have been consolidated into humanitarian targeted guidance. Overall, there is good coverage of programme planning for excreta disposal, however this is weak on the end part of the sanitation chain.

A notable point regarding the guidance for FSM in first phase is the predominance of the use of the term excreta disposal rather than FSM, a term that does not encapsulate the whole management or treatment of faecal sludge. A reason for this could be that emergency-targeted guidance were developed from the need to guide actors in how to comply with the Sphere standards, which focus on containment of excreta with no reference to the end steps in the sanitation chain, leaving uncertainty as to the ultimate fate of faecal sludge.

This could be the reasons why the guidance material targeted for humanitarian practitioners focused mainly on the first components of the sanitation chain, with no comprehensive guidance that covered approaches, designs or operational issues related to FSM for the disposal/reuse part of the sanitation chain. However, in recent years, there have been efforts to address this gap and investment into research on appropriate FSM solutions for emergencies. This has resulted in a spattering of research papers on faecal sludge technologies<sup>57</sup> however none of these have been consolidated into humanitarian targeted guidance.

### ***Incorporating FSM in Preparedness and Contingency Planning***

Three key WASH preparedness guides were reviewed and while they outlined planning elements for the different WASH interventions, there was no checklists or guidance on how to incorporate faecal sludge management into preparedness planning. For example, there is guidance on water distribution, hygiene items, number of latrines required for a given number affected people but no guidance how to plan to manage the faecal sludge from the latrines. The key gap is on how to incorporate FSM into

<sup>56</sup> Grover Mamani, Jan Spit, and Ednah Kemboi, “Speedy Sanitation and Stabilization,” May 2016.

<sup>57</sup> e.g. Spit et al. (2014)

preparedness and contingency planning guidance.

## **GUIDANCE MATERIALS ON STANDARDS RELATED TO FSM IN EMERGENCIES**

The Sphere Project was launched in 1997 to develop a set of minimum standards in core areas of humanitarian assistance. The aim of the project is to improve the quality of assistance provided to people affected by disasters, and to enhance the accountability of the humanitarian system in disaster response. One of the major results of the project has been the publication of the handbook, Humanitarian Charter and Minimum Standards in Disaster Response—The Sphere Handbook.

Excreta management in an emergency should meet the standards outlined in the Sphere Handbook. The standard on excreta disposal states that the affected community must have access to adequate, appropriate and acceptable toilet facilities, sufficiently close to their dwellings, to allow rapid, safe and secure access at all times, day and night. The emphasis of the standards is primarily on the user interface component of the sanitation chain. ‘Emptying’ and ‘transport’ components of the sanitation chain are referenced in the Sphere the guidance notes with the definition: “Desludging: When appropriate, and depending on the need, desludging of toilets/septic tanks and excreta containers, including siting of final sewage disposal point, needs to be considered right from the start.” However, there is no mention of latter stages of the sanitation chain, how to dispose of the sludge or where.

## **SPHERE STANDARDS AND FSM**

The Sphere Project guidelines offer some relevant standards to consider when developing a sanitation infrastructure aimed to support the progress towards the stabilization phase (Sphere Project, 2011). For example, the guidelines suggest that in the early stages of an emergency the maximum number of people per toilet should be around 50. This is expected to drop down to 20 people/toilet during the stabilization period, as more sanitation facilities are built in the respective refugee or IDP camps.<sup>58</sup> The recommendations proposed by the Sphere report are similar to the recommendation of several predominant publications on excreta removal in disaster response from RedR, Medicins San Frontieres, Oxfam, the World Health Organization and UNICEF and UNHCR.

<sup>58</sup> Christophe Grange, “WASH in Emergencies Problem Exploration Report: Faecal Sludge Management,” January 2016.

The Sphere guidance is currently undergoing a revision of the 2011 version. The final version is not published however there are efforts to extend the excreta disposal section beyond on-site containment to include collection, treatment and final disposal. The new Sphere guidance contains a standard that specifically deals with collection transport disposal and treatment.

The draft standard at the time of this research begins (4.1 ) with access to and use of toilets. However, what is omitted is the consideration of the rest of the sanitation chain to be able to make the final selection of the toilet, for example, between dry or water-based toilet. Under the standard (4.3) on excreta collection, transport, disposal and treatment, the new revision does not mention that the identification and implementation of appropriate technologies should consider the entire sanitation service chain to ensure the proper collection, transport, treatment and safe disposal/reuse of the generated products in the sanitation system. The identification of service providers for collection is not mentioned.

Additionally, the indicator for this standard '*Percentage of sites free of de-sludged faecal matter in surface or groundwater sources*' is not clearly defined, difficult and resource-intensive to measure, and inappropriate as it does not address the issue of dumping faecal sludge off-site, a common practice that seriously affects human and environmental health.

A 'key action' missing in this section is to identify the sludge collection service providers and how these services can be integrated, expanded and/or created. For both 4.3 and 4.4 the enabling environment is an important consideration especially for the longer term provision of excreta management and needs to be stated in the handbook. The standard 4.4 on management and maintenance only mentions the user interface, and emptying components of the chain even though the overall standard refers to all the sanitation chain the maintenance section.

An additional box on 'Excreta as a resource' was included but is very general and would benefit from emphasising health and safety by directly referencing the WHO guidelines on excreta reuse. Terms are loosely used, for example 'excreta de-sludging', where emptying is a better term as it can include both hand and motorised emptying. Additionally, the whole section draws on no key sanitation resources that pioneered the sanitation chain and sustainable sanitation approaches in.

# 4. RESEARCH FINDINGS



## 4.1 BEHAVIOR

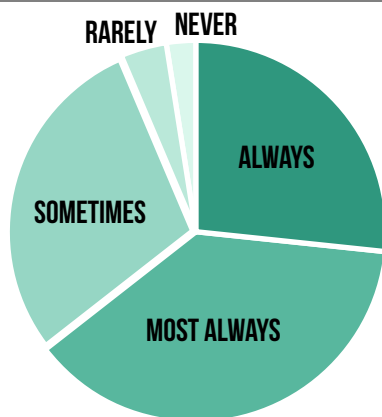
### CONSULTATION OF GUIDELINES

Survey respondents were asked how often or infrequently they consult guidelines when faced with real-time decisions regarding the management of human waste in first phase emergencies. 27% reported that they always consult guidelines; 38% most always; 29% sometimes; 4% rarely; and 2% said that they never use guidelines in this context.<sup>59</sup> In the Guidance Design and Dissemination Workshop, most participants discussed that they 'sometimes' consult guidance, and one said that they 'never' do.

Respondents who reported that they at least rarely consult guidelines were asked to describe situations in which they would consult them in an open-ended question. Responses were very diverse. Eight respondents reported they would consult them to understand or ensure compliance with various quality standards. Six described

consulting guidelines when they needed to make decisions regarding the disposal of faecal sludge. Five respondents discussed consulting them in a situation where they were faced with decisions around faecal sludge treatment, three regarding transportation, and two regarding its collection. Several discussed country-specific regulations, four mentioning that they would consult guidelines to find country regulations and ensure compliance, and one that they would consult them if the country they were operating in had no relevant regulations. Three said they would look for guidance if they were faced with a situation where local government or municipal actors were unable to manage faecal sludge disposal on their own.

WHEN YOU ARE FACED WITH REAL-TIME DECISIONS REGARDING MANAGEMENT OF HUMAN WASTE IN FIRST PHASE EMERGENCIES, HOW OFTEN OR INFREQUENTLY DO YOU CONSULT GUIDELINES?



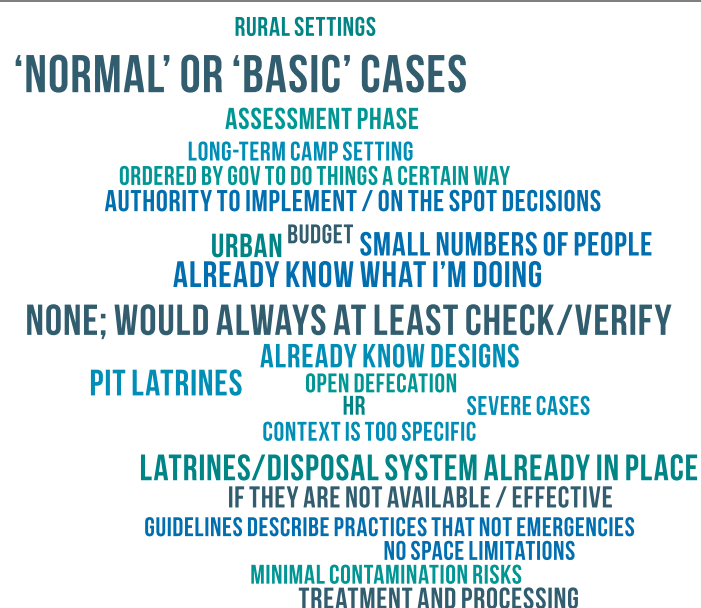
<sup>59</sup> Survey respondents were only asked about behaviours regarding FSM and the use of guidelines if they had experience in FSM in first phase emergencies and/or if they anticipated having such responsibilities in the future. 82 survey respondents were in this category, and 11 did not.

#### PLEASE DESCRIBE SITUATIONS IN WHICH YOU WOULD LIKELY CONSULT GUIDELINES REGARDING MANAGEMENT OF HUMAN WASTE IN FIRST PHASE EMERGENCIES:

IN THE EVENT OF SPILLAGE DURING TRANSPORTATION  
WHEN GOVERNMENT/LOCAL ACTORS CAN'T MANAGE

**QUALITY STANDARDS**  
COLLECTION OF WASTEWATER  
**CHOOSING LATRINE MODEL/LATRINE CONSTRUCTION**  
CAMP SETTINGS  
CONTRACTOR AND SUPPLIER CAPACITY  
HYDROLOGICAL FACTORS BREAKDOWN OF FACILITIES  
GEOLOGICAL FACTORS INSTALLING ABR/LARGE SEWAGE SYSTEMS BEFORE ARRIVAL  
RURAL RESEARCH WRITING PROPOSALS/FOR DONOR  
PREPARE TRAININGS ALL SITUATIONS  
TO AVOID MISTAKES FIRST PHASE URBAN CONTEXTS  
HIGH GROUNDWATER TABLE LOCATION CHOICE  
**DISPLACEMENT** GEOGRAPHIC FACTORS  
SOIL FILTRATION RATES SOCIAL/CULTURAL FACTORS  
**FAECAL SLUDGE DISPOSAL**  
TRANSPORTING FAECAL SLUDGE  
**TREATMENT OF FAECAL SLUDGE**  
NO COUNTRY REGULATIONS  
AVOID HARMFUL ENVIRONMENTAL IMPACTS  
**SITUATIONS WHERE I DON'T HAVE PREVIOUS EXPERIENCE**  
OUTBREAK/CHOLERA/DANGEROUS SLUDGE  
**FIND COUNTRY REGULATIONS/ENSURE COMPLIANCE**

PLEASE DESCRIBE SITUATIONS IN WHICH YOU WOULD NOT CONSULT GUIDELINES REGARDING MANAGEMENT OF HUMAN WASTE IN FIRST PHASE EMERGENCIES:



Regarding specific settings, four mentioned they would consult them if they were faced with FSM decisions in a camp setting, and three if they were faced with such decisions in urban contexts. Four said they would consult them for decision-making in displacement contexts, and one regarding rural settings.

Respondents were also asked in an open-ended question to describe situations in which they would not consult guidelines. Six respondents felt that there was no situation in which they would not consult guidelines of some sort, at the very least to check or verify whether a known course of action being taken was appropriate. One respondent explained, “[I] cannot think of any situation I would not first check basics through established references,” and another “Does not apply - there is always times where you consult - simply for ideas, to verify something.”

However, nine respondents explained that they would not consult guidelines for ‘normal’ or ‘basic’ cases, though it was not clear what types of cases are ‘normal’. Four said they would not consult guidelines if it was a situation where they already had knowledge and they knew what to do, and three said the same if they were implementing a solution using a known or commonly accepted design. Three specifically mentioned urban settings, which one respondent explained, “they [guidelines] are less relevant and context is complex.” Three respondents said they would not consult guidelines if the situation was one with a small number of people, and four stated that they would not consult guidelines on FSM if they were working with pit latrines.

Those who at least rarely consult guidelines<sup>60</sup> were also asked which sources of guidelines they consult. The results showed that the Sphere guidelines are the most commonly consulted, with 64% reporting that they consult them. Respondents also reported high utilization of internal organizational guidelines (55%) guidelines from other organizations (53%), guidelines from the Clusters (56%), and local government guidelines (53%). Less commonly consulted were guidelines from consortia (28%) and online forums (23%).

Those who reported that they consult Cluster guidelines were also asked to specify which Cluster/s. Interestingly, even though the question was being asked regarding consulting guidance in relation to the management of human waste in the first phase of rapid onset emergency, the responses regarding sector were quite varied.

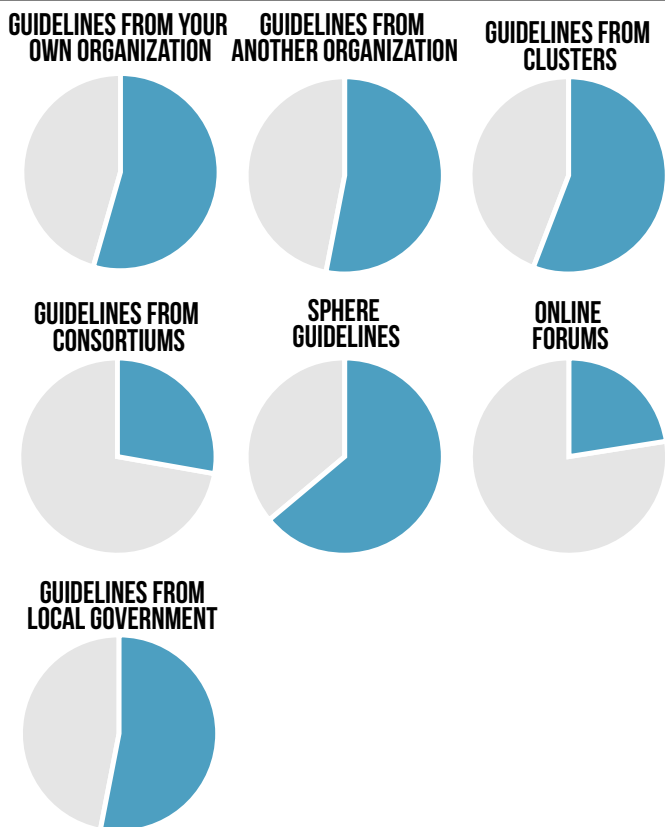
Specific guidance resources were discussed in further detail among the participants in the Guidance Design and Dissemination Workshop. Regarding Cluster guidelines, participants noted that the WASH cluster has almost a complete lack of guidelines on FSM, but could represent a good way to distribute guidelines if appropriate resources were identified and appropriate for utilization in a range of contexts. This discussion of the lack of Cluster guidance on FSM is particularly interested when taken in triangulation with the survey findings, where almost half of the respondents who said that they use guidelines reported that this is a resource that they use.

Sphere was also discussed extensively. As this was found to be the most commonly consulted source of guidance in the survey, participants also felt that Sphere is the right level of guidance, serving as a ‘one stop shop’ in emergency response. However, they noted an important limitation to this in that Sphere standards are principles, not ‘how to’ guidance. Participants felt that Sphere is most commonly referenced because it is available everywhere and a reputable and widely accepted ‘brand’ within the sector. The discussion also noted that Sphere is one of the only documents existing that is referenced as a common guideline across organizations and contexts in emergency response which everyone accepts that they must align to.

Participants felt that the WEDC sheets have a good level of content in a recognizable and easily navigable format, containing drawings that are familiar and easy to interpret quickly. Considering the limitations that emerged from the research in terms

60 75 respondents

**WHICH OF THE FOLLOWING SOURCES OF GUIDELINES DO YOU CONSULT?**



of decision-making tools and support, participants also discussed the Decision Support Tool developed by WASTE. WASTE has developed this as a support tool to come to the best options suitable for the local situation of the client, wishing to realise a toilet with a functioning system to maintain it. The tool can be used on an individual level, but it is also practical to start a discussion with a group or show decision makers alternatives to more common solutions. Currently, the tool is available in paper form. In reviewing the initial survey findings, participants in the workshop noted that this resource was not mentioned by survey respondents, and discussed that it is not being used.

Participants also discussed the Compendium, with strong enthusiasm for the compendium as a first step toward gathering information on technical decisions to make on FSM. However, they felt that costs should be divided into investment and running costs, and that while costs are there they are not context specific. The Compendium was viewed as a useful first step to summarising what is out there, but participants felt it should also include an objective / goal of each of the technologies (for example, is it to stabilize / reduce sludge), and that it needs to be backed up by a big brand

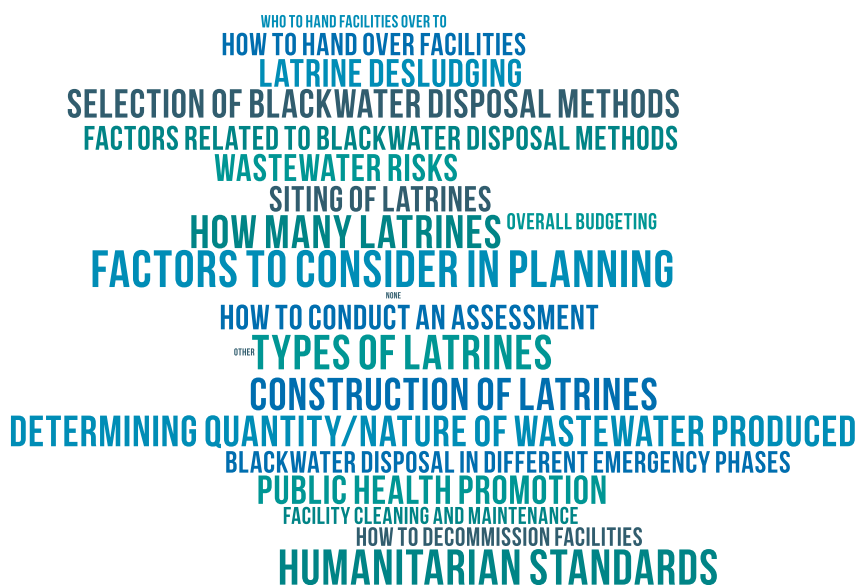
endorsing its content. These limitations perhaps help to understand why the Compendium was not mentioned in survey results.

## USING GUIDELINES TO MAKE DECISIONS

Respondents who reported that they at least rarely consult guidelines in relation to the management of human waste in first phase emergencies were then also asked what types of decisions they utilize these guidelines to guide their decision-making on. The most common types of decisions guidelines were utilized for were in relation to humanitarian standards (53%), construction of latrines (48%), how many latrines are needed (49%), types of latrines (52%), and factors to consider in planning (56%). There was very low utilization of guidelines in relation to budgeting (20%), who to hand facilities over to (13%), decommissioning facilities (24%), and facility cleaning and maintenance (21%).

Specifically, in relation to FSM, there was a moderate level of guideline utilization reported, though much lower than desired. 31% of respondents reported they consult guidelines for decisions regarding wastewater risks, and 45% to help them determine the quantity and nature of wastewater that will be produced. 33% said they consult guidelines to make decisions regarding factors related to possible blackwater disposal methods, 41% regarding the selection of blackwater disposal methods, and 40% for decisions regarding latrine desludging. However, only 29% reported that they consult guidelines to inform decisions regarding the disposal of blackwater in different phases of an emergency.

**WHICH TYPE/S OF DECISIONS DO YOU UTILIZE THESE GUIDELINES TO GUIDE YOUR DECISION-MAKING ON?**



**WHICH CONTEXTUAL FACTORS DO YOU CONSULT GUIDELINES FOR TO GUIDE YOUR DECISION-MAKING?**



Overall, these findings suggest that guidelines are utilized with an emphasis on the planning process and in the initial phases with a focus on latrine construction, but are utilized less and less for decisions that relate to factors after latrines are constructed.

Respondents were also asked if they consult guidelines on various contextual factors to guide their decision-making. There was somewhat higher usage of guidelines in relation to local availability of materials (60%), local government rules and regulations (58%), number of users (55%), and cultural practices and preferences (65%).

Regarding operational factors, respondents would commonly consult guidelines to guide decision-making around compliance with various guidelines and strategies, including their own organization (59%), the Cluster or another coordination platform (55%), and donors (43%). Other operational factors

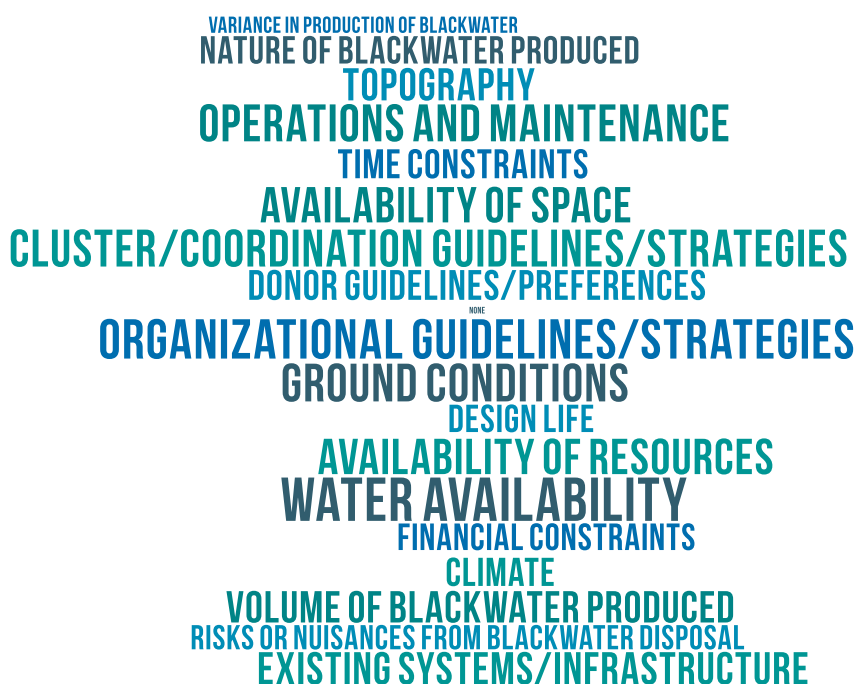
that respondents more commonly reported utilizing guidelines for included space availability (52%), ground conditions (56%), resource availability (52%), water availability (66%), and operations and maintenance (55%). Interestingly, only 38% reported consulting guidance on the design life of solutions in relation to FSM, again suggesting less focus on long-term thinking and planning.

There were lower levels of reported guideline utilization for operational factors related to FSM. Only 45% reported that they use guidelines to guide decision-making for factors related to the volume of blackwater that would be produced, 38% on the nature of blackwater that would be produced, 33% on the location of risks or nuisances that blackwater disposal may cause, and only 19% on the variance in production of blackwater throughout the day and over longer periods.

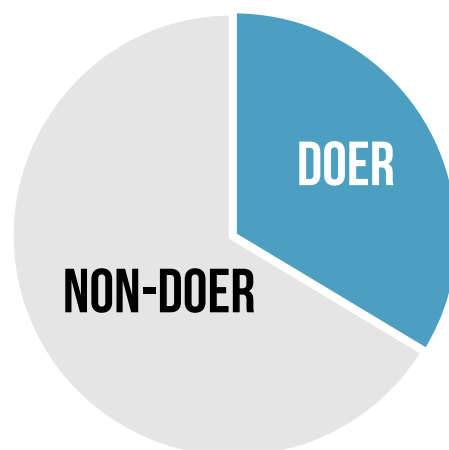
**DOERS AND NON-DOERS**

Respondents were classified as 'Doers' if they: (1) always or most always consult guidelines when faced with real-time decisions regarding management of human waste in first phase emergencies; and (2) use guidelines to help them make decisions regarding factors related to blackwater disposal methods possible, selection of blackwater disposal methods, or blackwater disposal in different phases of an emergency. Overall, out of the 74 respondents that could be classified, 25 were 'Doers' and 49 were 'Non-Doers'.

**WHICH OPERATIONAL FACTORS DO YOU CONSULT GUIDELINES FOR TO GUIDE YOUR DECISION-MAKING?**



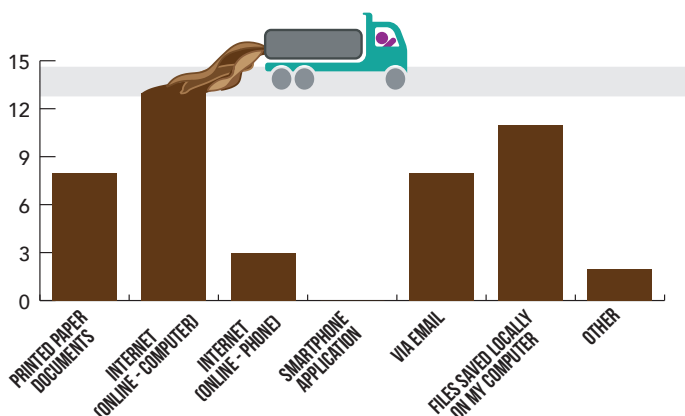
Doers were also asked where they primarily access and utilize the guidelines they are using for real-time decisions regarding FSM in first phase emergencies. Guidelines were most commonly accessed online from the respondent's computer or saved locally on computer. There was little utilization of guidelines through



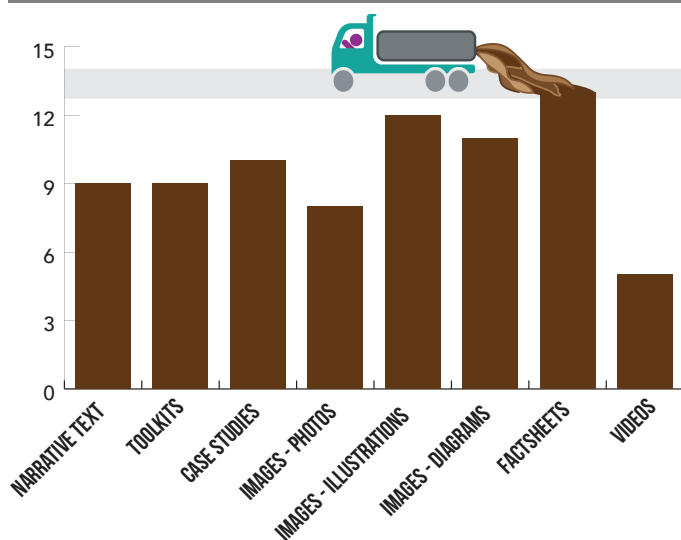
smartphones, either online or through smartphone applications, which no respondent reported using. They were also asked what the guidelines they consult usually contain, with the most common being factsheets, diagrams and illustrations.

Doers were also asked whether there are any guidelines they regularly utilize or find particularly useful, to which 11 responded affirmatively. Four named the Sphere guidelines, and two the WEDC Emergency Sanitation guidelines. Other references named were the Ecosan Building Guidelines in Rwanda, Oxfam minimum WASH requirements and technical briefs, MSF Public Health Engineering guidelines, the EAWAG Compendium, and non-specific YouTube videos or trainings. The most common reason respondents gave for finding these guidelines particularly helpful were that they are short and concise. Other reasons included that they are simple and straightforward, easy to read and understand, and comprehensive.

**WHERE DO YOU PRIMARILY ACCESS/UTILIZE THE GUIDELINES YOU USE WHEN YOU ARE FACED WITH REAL-TIME DECISIONS?**



**WHAT DO THE GUIDELINES YOU CONSULT USUALLY CONTAIN?**



## 4.2 PRIORITY AND INFLUENCING GROUPS

Within the DBC Framework, the 'priority group' is the group of people that are being encouraging to adopt the behavior, as well as those people who ensure that someone else practices the new behavior. In this research, the 'priority group' was defined as individual practitioners with decision-making and implementation roles regarding faecal sludge disposal in first phase emergencies, the organizations employing them, and the donor supporting emergency programs.

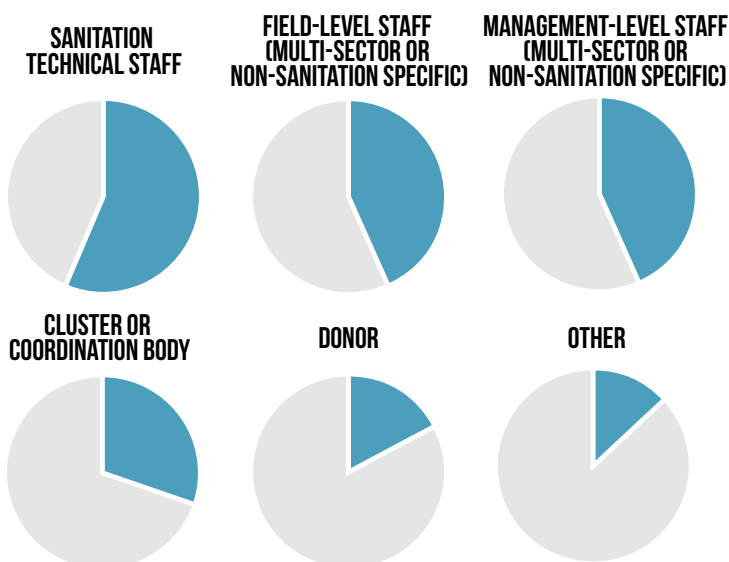
The 'influencing group' is the group that has the most influence on the priority group regarding the specific behavior. Formative research with the priority group is used to identify who the influencing group. Typically there are only one or two influencing groups. This research is designed to understand and determine the influencing group in regards to the above behavior.

## FSM DECISION MAKERS

Respondents with relevant experience were asked to think of their most recent experience relevant to the management of human waste in a first phase emergency. In addition to describing the context, types of decisions, and what was implemented, respondents were asked who were the primary decision-makers, with the option to provide multiple responses.

The most commonly reported decision-makers were

**PLEASE THINK OF YOUR MOST RECENT EXPERIENCE RELATED TO FSM IN A FIRST PHASE EMERGENCY. WHO WERE THE PRIMARY DECISION-MAKERS?**



sanitation-specific technical staff, which 57% of the 47 respondents who were asked the question and provided answers named as decision-makers. Field-level emergency response staff (44%) and management-level emergency response staff (44%) were also commonly reported as having involvement as primary decision-makers. Workshop participants also noted that a key issue that needs to be addressed is the involvement of non-WASH practitioners in decision-making, noting the specific example of camp management, where camp planners are often in a position where decisions must be made before WASH practitioners even arrive, at which point it is very difficult to fix or change what has been put in place.

Clusters or coordination bodies were somewhat less commonly reported as primary decision-makers (30% of cases), followed by donors (17%). Six respondents named 'other' decision-makers, naming other parties including the local and/or national government, landowners, and the community.

## STAKEHOLDERS AND INFLUENTIAL GROUPS

Doers and non-doers were asked whether people do or would approve of their use of guidelines to make decisions regarding FSM in first phase emergencies. Of the 58 respondents, 37 answered yes, nine somewhat or under certain circumstances, and seven answered no. Five respondents were unsure. One respondent who answered that people approved explained, "Yes, they do agree after community meetings," and another that people approve "if it provides justification for decisions." Another explained, "Yes and it is expected, although the reality is that trust of you using them is often implied and not actually checked."

Respondents who answered somewhat seemed to

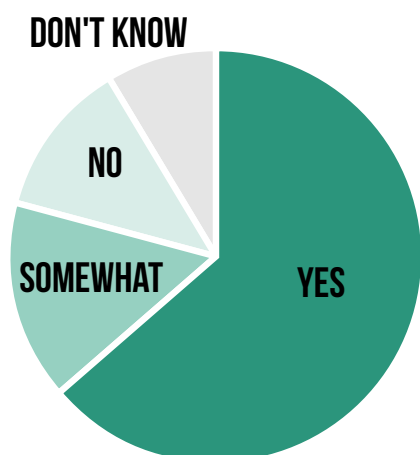
generally feel that the use of guidelines is commonly viewed as acceptable, but that in practice there tend to be some caveats in terms of their use. One explained, "They aren't against it but they prefer that action is fast; better to do something to respond quickly and then fix it later seems to be the attitude." Another stated, "Most people do not understand what guidelines are and become frustrated when trying to apply formal policy arrangements." Yet another explained, "Not all the time, it depends the state of emergency and geographical situation, also access to the affected area and also most importantly the security situation."

Doers and non-doers were also asked who generally approves and disapproves of the use of guidelines. Clusters or coordination mechanisms, management, the government, and teams were commonly reported as people who approve. Eight respondents (out of 57 who provided answers) did not know who approves of guideline use.

One respondent explained, "When I work for organizations like the World Bank and other international agencies, they tend to be keen on the use of guidelines." Another highlighted the role of the development sector in setting standards and the government in monitoring and enforcing them, stating "Usually, national and international stakeholders working in the WASH Cluster to approve SOPs regarding human waste management. During the implementation phase, national authorities must be involved in each phase of the first phase emergency to monitor the respect and use of standards and guidelines."

One respondent explained that management and their team support the use of guidelines because they "establish clear standards and objectives." Several also highlighted that beneficiaries support their use. One answered, "Beneficiaries, because

DO/WOULD MOST PEOPLE THAT YOU KNOW APPROVE OF YOUR USE OF GUIDELINES IN REAL-TIME DECISION-MAKING?



WHO ARE ALL THE PEOPLE THAT DO/WOULD APPROVE OF YOUR USE OF GUIDELINES IN REAL-TIME DECISION-MAKING?





during my implementations in the affected area they are aware that governorate could not give assistance so respecting for the NGOs they are fine with the guidelines,” and another highlighted vulnerable or marginalized groups from the local community, “especially women, elderly people, disables, marginalized community members.” However, some also referenced caveats to this approval, with a recurring theme throughout responses on the survey of concern for the length of time it may take to identify and consult guidelines. One answered that those who approve include “donors, sector coordinators, and the boss as long as I don’t take too long to do it.”

Generally, responses on those who approve were similar between doers and non-doers. However, interestingly, higher proportion of Non-doers than Doers answered that the cluster/s or coordination bodies and donors approve, though the sample size was not large enough to determine whether the difference observed was statistically significant. A higher proportion of Doers than Non-Doers answered that the government approves of guideline use.

Respondents also gave information on those who they felt do not approve of their use of guidelines. Most commonly respondents reported that no one disapproves of guideline use (12 out of 52 respondents). However, other common answers included beneficiaries and non-beneficiaries from the local community, as well as government under some circumstances.

On respondent explained, generally, that “usually people do not take advantage in following guidelines during human waste management in first phase emergency (private sector mostly).” Another highlighted the importance of engaging stakeholders from the outset and the role that could play in terms of supporting guideline usage, stating “Those who are not informed the program before the start-up of the intervention can disapprove of the use of the guidelines.”

Regarding beneficiaries and non-beneficiaries

disapproving, references to non-beneficiaries seemed to possibly imply a general lack of support for the intervention in general or being unhappy if they are not receiving support, not necessarily the specific solutions that may be informed by guidelines. For example, one answered “host community representatives/government in areas where IDPs are not accepted by host communities,” and another that “sometimes government actors are unhappy with the low levels, also host communities if they are not receiving any support.”

Again, the concern regarding time came up. One respondent stated, “although not disapproving, but we prefer that staff doesn’t lose time to keep on looking for information (on the internet for instance) in an acute emergency, instead of using approved guidelines.” Another highlighted the role of ego or strong individuals in the team, stating that they were “not sure if any actually disapproves; sometimes project or program managers think they know everything and do not need to refer to guidelines.”

Again, responses were generally similar on those who disapprove were similar between doers and non-doers, and the sample size was not large enough to determine whether the differences observed was statistically significant. However, a higher proportion of Non-doers than Doers answered that the cluster/s or coordination bodies, government, and management disapprove. A higher proportion of Doers than Non-Doers answered that beneficiaries disapprove of guideline use.

Most interestingly, a higher proportion of Non-doers than Doers reported that nobody disapproves of the use of guidelines (27% of 34 Non-doers compared to 17% of 18 Doers). This suggests that it is possible that perceived disapproval of guideline use does not necessarily impact on the likelihood of their usage, and is not a mediating factor.

## ORGANIZATIONAL POLICIES

There was no statistically significant difference between Doers and Non-Doers regarding whether their organization had policies or practices in place that would make them more<sup>61</sup> or less likely<sup>62</sup> to consult guidelines. Of the 55 Doers and Non-Doers who provided responses, 53% said that their organization has policies in place that would make them more likely to consult guidelines.

Respondents who felt that there were policies that

<sup>61</sup>  $X^2(1, 51) = .040, p > .05$   
<sup>62</sup>  $X^2(1, 56) = .407, p > .05$

### WHO ARE ALL THE PEOPLE THAT DO/WOULD APPROVE OF YOUR USE OF GUIDELINES IN REAL-TIME DECISION-MAKING?



## NATIONAL LAWS OR POLICIES

would make them more likely to use guidelines gave a range of explanations. One explained that “Most organizations refer to meeting minimum standards and which ones,” and another that “internal/adapted guidelines in the organization are more likely to be used.” Similarly, one respondent answered that “there are certain policies and procedures but not in the approved forms and these are also universal not specified for different types of emergency.”

Some also explained that the use of guidelines was emphasized through M&E and organizational learning. One answered, “of course, basics readings, case study trainings and later into the field...and transforming theoretical into experience in terms of what went wrong and what we learned.” Another explained that the use of guidelines was emphasized by their organization through “having it in reviews and evaluations as a standard question.”

However, 40% said that their organization did not have policies in place that would make them more likely to consult guidelines, and 7% did not know. Regarding their experience, one respondent explained regarding guidelines that “there were none; it was quite unstructured and I relied on Google.”

Of the 56 Doers and Non-Doers who provided responses, 23% said that their organization has policies in place that would make them *less* likely to consult guidelines. 68% said they did not, and 9% did not know. One respondent explained, “I use guidelines for my own purpose not because of organizational documents.” Another felt that the organization “focus[es] on internal guidelines,” suggesting that this makes it less likely that external guidelines would be utilized.

There was no statistically significant difference between Doers and Non-Doers regarding whether there were national policies or laws that would make them more<sup>63</sup> or less likely<sup>64</sup> to consult guidelines. Of the 55 Doers and Non-Doers who provided answers, 53% reported that there were national policies or laws that would make them *more* likely to utilize guidelines in decision making on FSM in first phase emergencies. 33% reported that there were not, and 14% that they did not know whether such policies or laws were in place.

Several emphasized the importance of national laws and policies in relation to guidelines. One explained how guidelines can help to ensure compliance, answering “You need to always respect the national policies regarding such a sensitive subject - therefore adherence to this is key, hence the use of the guidelines.” Another emphasized the importance of national laws and policies in relation to guidelines, stating:

“Guidelines do not overrule national policies or laws. We have to obey the existing rules, but if they are so bad we encourage lobbying for better solutions, which might be described in guidelines. But this might be difficult in an acute emergency context. Also, in an acute emergency context, the national laws are not always known in the beginning, and the guidelines could be the first to fall back to (even when it turns out to be illegal afterwards).”

However, some also discussed the difficulty of finding national laws or policies, even if they are in place. One explained that the problem as “there are the policies and procedures but not public, also lack of awareness.” Another explained that “national policies need to be given or found by the Clusters in order to support the agencies implementing work during emergencies.”

Conversely, of the 46 Doers and Non-Doers who provided answers, 24% reported that there were national policies or laws that would make them *less* likely to utilize guidelines in decision making on FSM in first phase emergencies. 61% reported that there were not, and 15% that they did not know whether such policies or laws were in place.

Several referenced the inconsistency of national laws and policies with guidelines. One explained that there are “some restrictions forbidding you to use some materials (i.e. material that could be

<sup>63</sup>  $\chi^2(1, 24) = 1.261, p > .05$

<sup>64</sup>  $\chi^2(1, 39) = .225, p > .05$

### KEY INFORMANT INTERVIEW EXCERPT

In terms of support if it ends with the practitioners on the ground it is not enough. Because at the end of the day a lot of NGOs have a structure, and then you also sometimes have specialists in the structure. Another thing might be coming up with something that helps organisations to look at WASH approaches in an emergency in a holistic manner. Like in emergency setup what are the phases; what comes first but what you need to think about immediately after you do the first thing, or what you should do at the same time.

But at the end of the day if a program doesn't include this, even if I have had training, it ends in frustration because I highlight these issues, and we say okay this issue is to do with this. I know the technology that should be done but if it is not part of the organisation's strategy, if it's not supported by the higher structures, at the end it all becomes all talk but with very little or no action.

seen as permanent).” Another explained that in one situation they were “forced to use night soil latrines because the local law said it was forbidden to dig holes in order to protect the water table (although it was more than 10 m deep in homogeneous soil).” Another explained that there are FSM-specific difficulties in that “in some cases [it is] hard to get sign off for faecal matter disposal outside camps [because] host communities and local governments are resistant to this.”

## 4.3 DETERMINANTS

‘Determinants’ are categories of reasons why the priority group may or may not practice a given behavior. Formative research, such as a Doer/Non-Doer Study or Barrier Analysis, should be conducted among the priority group to find the most influential (significant) determinants. Understanding key determinants will draw upon the Triad model, advanced by Dr. Theo Poiesz. The model ‘forecasts’ the behavior of people using three factors: Motivation, Capacity and Context.

### MOTIVATION

Motivation deals with the willingness of the priority group to adopt the promoted behavior. It can be intrinsic, or personal, such as those based on an individual’s interests, desires, or purposes and aims. Motivation can also be extrinsic, steered by factors such as social validation or fear of penalties.

### ADVANTAGES OF USING GUIDELINES

In an open-ended question, respondents named many advantages to using guidelines. The most common advantages named were helping to make quick and easy decisions (21% of respondents who answered) and choosing appropriate or suitable FSM solutions (20% of respondents). One respondent explained that guidelines promote “the right decision making even when under pressure,” and another that they “facilitate quick decision making on quick-to-do human waste management options and increase the level of confidence in options selected as one can justify from guidelines.”

Another explained that they not only enable decisions to be made quickly, but also help to avoid common issues that arise when decisions need to be made quickly. The respondent explained, “Guidelines

assist in taking decisions promptly instead of guessing as to what to do while the situation could deteriorate and cause more challenges that could turn into a worse situation that could cause more casualties or fatalities.”

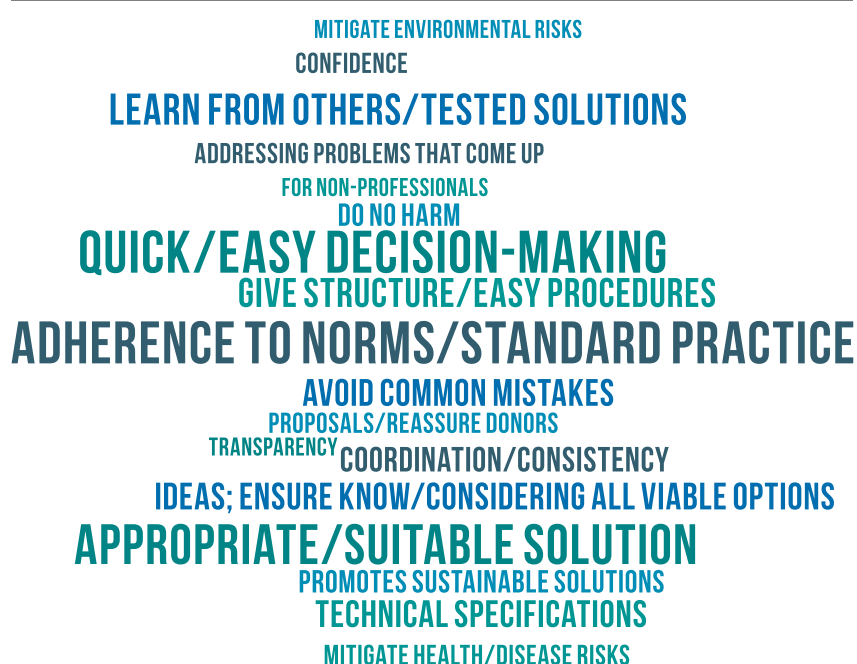
Other common answers included ensuring adherence to norms and standard practices (21% of respondents who answered). Several felt that guidelines enable them to learn from others and use existing knowledge and tested solutions (13%).

Several named resource effectiveness in terms of cost and human resources as an advantage of using guidelines (11%). For example, one respondent stated, “It will give direction on coming up with a cost and service delivery effective intervention on human waste disposal.”

Others felt that guidelines are advantageous in that they give structure and easy to follow procedures (11%) or in that they provide more information on technical specifications (9%). One explained, “Checklists are useful especially when delegating and to ensure the basics are covered, they also give reassurances to managers and donors.” Another stated:

“Having guidelines save time during the implementation of human waste in first phase emergencies. They will provide clear information on how the activity could be implemented in each phase according to In-country or global standards.”

#### WHAT ARE/WOULD BE THE ADVANTAGES OF USING GUIDELINES?



And another:

“[Guidelines] provide you structure, informative design parameters/criteria to consider, and communicate a clear idea of what you should consider in the design, implementation and operations and maintenance.”

Others felt that guidelines promote sustainable solutions (5%). One respondent explained that they promote “more sustainable work which doesn’t require tremendous rework at early recovery or stabilization time.”

A few respondents referenced flexibility in the application of guidelines in their answers. One stated, “Guidelines help us to design a suitable solution with minimum resources and we can easily amend it with context from using these guidelines.” Another explained, “it would guide rapid technology choice according to context.”

Responses were largely similar on advantages between doers and non-doers, and the sample size was not large enough to determine whether the differences observed was statistically significant. However, a higher proportion of Doers than Non-Doers answered that advantages include adhering to norms or standard practices, giving structure and easy-to-follow procedures, and promoting sustainable solutions.

Very interestingly, a higher proportion of Non-doers than Doers named avoiding common mistakes, supporting quick and easy decision-making, promoting coordination and consistency, and learning from others or using existing knowledge as advantages. However, despite seeing these advantages, they still did not self-report the use of guidelines in decision-making related to FSM in first phase emergencies.

## DISADVANTAGES OF USING GUIDELINES

Respondents were also asked in an open-ended question what the disadvantages of using guidelines would be. Lack of context specificity or guidelines that are inappropriate for the context emerged as an overwhelming concern, named by 38% of Doers and Non-doers who provided responses to the question.

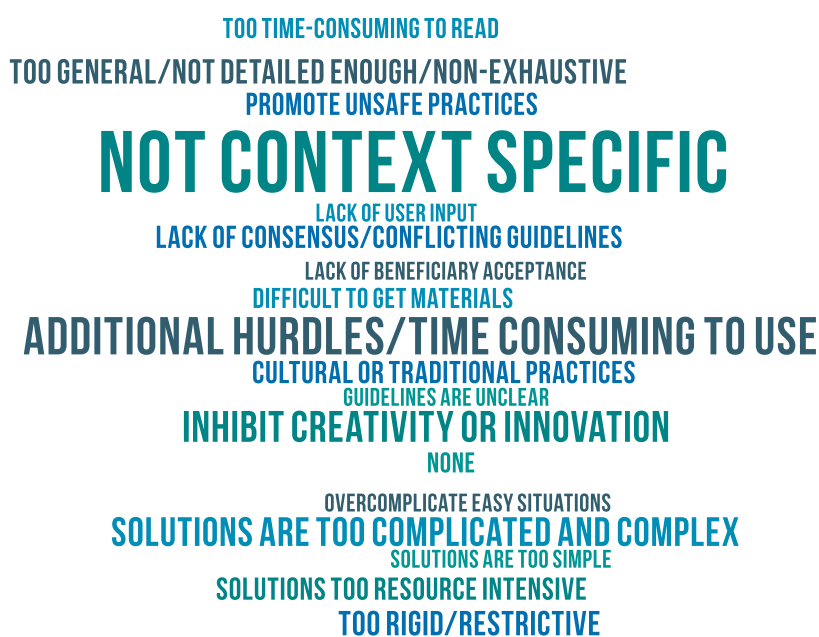
One respondent explained: “The guidelines are mostly not contextual and sometime donors are strict

to follow it whereas the context is totally different. An active supply chain is needed...Social acceptance varies and would need to be determined for target population. [Solutions would] require intense hygiene campaigns to educate the community.” Another stated: “Some guidelines are very uniform and do not take into consideration contextual and cultural factors. Some are over-designed and some are simply not possible. Professionals have less training on adapting the guidelines.”

However, while some noted the need for context-specificity, they also felt that guidelines do not preclude such adaptations in their application. One explained, “You still need to contextualize it for your site, but that’s okay given you should have a structured and coherent guideline,” and another that “guidelines never provide a perfect solution, and always need to be adapted to each specific context.”

In a Key Informant Interview, one respondent explained their experience over several decades in a range of contexts, from Afghanistan to the recent displacement crisis in Rohingya camps in Bangladesh. The practitioner explained, “It really depends on where you are and what the context is, which technology you apply. All sorts of things. The problem is of course, you think you know what the context is when you start but then sometimes the contexts [changes]; it lasts longer or it’s shorter or... so it’s very difficult.”<sup>65</sup>

### WHAT ARE/WOULD BE THE DISADVANTAGES OF USING GUIDELINES?



65 Key Informant Interview

One felt that “should primarily be focused on initial consultation and regular feedback from the users; plus you need to follow the principals of response as every situation is a little different and any you have to adapt any guidelines to the specific situation.” Yet another explained that this issue can be due to misconceptions or a misunderstanding on how to use them, that “they can be seen as the regulation and not guides, the regulations and guides don’t fit all context and so often require best practice interpretation.”

Another key concern that emerged was that guidelines can be time-consuming to use and cause delays or present additional hurdles (mentioned by 18% of respondents). One stated, “The disadvantage of using guidelines is that they could restrict or delay decision making while consulting them or perusing them.” Another felt that “they slow things down because usually the guidelines are more rigorous than what you can provide quickly.”

Another concern was that they can inhibit innovation and creativity and prevent thinking outside the box (13%). One explained that guidelines “can prevent you for thinking outside the box or considering local, perhaps more applicable solutions. Often too simple solutions that are difficult to implement with limited resources, or perhaps sometimes a little top over ambitious.” Some also felt that the solutions guidelines promote are too complicated or complex to implemented (11%).

Other concerns included that guidelines are unclear or not detailed enough, or that at times they can be too general (7%). One respondent felt that guidelines contain “too much general information, often more like a training book for non-experts.” Another explained:

“Not all systems are described inside guidelines. Some systems described are not appropriate, and it sometimes gives the feeling that the authors have not worked in first phase emergencies, or at least have not built what they describe.”

A lack of consensus or conflicting guidance was also mentioned (6%). One explained that they felt there is a “lack of consensus on some topics or designs. Each situation is different and sometimes its difficult to refer to guides that are too rigid.”

Responses were again largely similar on disadvantages between doers and non-doers, and the sample size was not large enough to determine whether the differences observed was statistically significant. However, interestingly a higher

proportion of Doers than Non-Doers answered that disadvantages include additional hurdles or time consuming to follow, that guidelines are too general or not detailed enough, and that the solutions they promote are too complicated or complex. However, despite seeing these disadvantages, they still self-reported the use of guidelines in decision-making related to FSM in first phase emergencies.

A higher proportion of Non-doers than Doers named the inhibition of creativity and innovation, solutions promoted being too resource-intensive, and guidelines being too time-consuming to read as disadvantages.

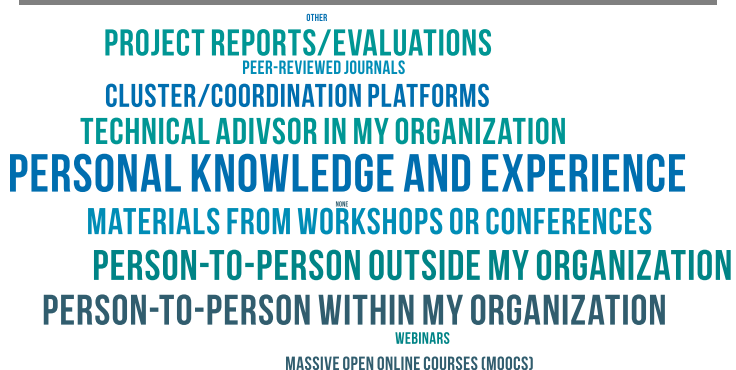
## OTHER WAYS OF GETTING INFORMATION TO MAKE DECISIONS

Another potential motivation for not using guidelines is the utilization of other means of informing decision-making. Respondents were asked about a number of other tools and processes they might use to inform decisions.

73% of respondents reported that they use person-to-person interaction with others inside their organization, and also 73% regarding person-to-person interactions with others outside of their organization. Similarly, 62% reported utilizing decision-making support from a technical advisor within their organization. 53% also indicated that they reference the Clusters and coordination platforms for decision-making.

Workshop participants similarly noted that learning from peers is often the quickest and most accessible form of learning, and that practitioners have a tendency to draw upon personal linkages, but similarly noted that this is a challenge in terms of generating and promoting the use of guidance in that it is difficult to capture or mobilize.

### WHICH OTHER RESOURCES DO YOU UTILIZE TO GUIDE YOUR REAL-TIME DECISION-MAKING?



Decision-making based on personal or organizational experience was also very common. Almost all respondents (92%) said that they use their personal knowledge and experience as a resource in decision-making. 62% of respondents reported referencing project reports or evaluations to help make their decisions. However, considering the findings of this research and wider discussions among workshop practitioners, the heavy reliance on what has been implemented previously could actually constitute a limitation in FSM decision-making. Workshop participants also noted this, highlighting that in practice habit is often to do what one has already done in a previous mission, and that it is difficult to get people to diverge from their previous experiences.

Webinars and massive open online courses were not very widely utilized, with only 20% and 26% of respondents reporting utilizing them respectively. Only 26% reported utilizing peer reviewed journals, which comes with inherent limitations in terms of access for humanitarian practitioners. However, 62% reported that they utilize materials from workshops or conferences.

Decision-making can also be driven by real-time tools, assessments and analysis. Survey respondents were asked about what tools they use for this. Direct observation was the most commonly utilized, reported by 76% of respondents. Some also reported taking direct measurements to inform their decision-making and response, including water availability (55%), space availability (56%), and elevation/slope (40%).

## KEY INFORMANT INTERVIEW EXCERPT

“Part of my degree was specifically sanitation focused. But I have not really had any specific WASH training, apart from working with people that are a lot more experienced. For example, I learned to build a cholera treatment centre on-the job. That has been an important thing for me. I have learned a lot from others in my career.

I think now organisations are getting much better at building training modules and using modern resources like the internet to do training. Those kinds of training modules are very useful but if you are at the stage where you are relying on a training module on the internet to remind you of the things that you could do in a given situation then the responsibility on the training module is huge.

I think it depends on who you talk to. First of all, people need to be prepared before they go to the field. I think fortunately more and more this is happening but I think you have to send people to the field who have the qualifications to do what you expect them to do. Now when you get the field we now have the capacity, because of advances in technology and so forth, to provide them with e-books, e-learning modules and all sorts of things that they can do. I think it is necessary to address those problems in a more professional way, and prepare people in a more professional way, because I think the problems are going to become much more intense in the years to come.”

Traditional semi-structured qualitative methods such as key informant interviews (KIIs) and Focus Group Discussions (FGDs) were also commonly utilized, such as interviews with government stakeholders (71%) and key informants such as engineers, health staff, etc. (73%) were also commonly reported. Other profiles of respondents for interviews and consultations were also utilized though somewhat less frequently, including focus group discussions with men, women and/or children from the affected population (62%), formal leaders (58%), and representatives of minority or vulnerable groups (53%). Consultations with private sector actors were only reported by 38% of respondents. Some also reported the use of structured survey questionnaires with individuals or households (51%), though the practicality of this method in an emergency response context can be quite limited.

### WHICH TOOLS/PLANNING PROCESSES WOULD YOU BE MOST LIKELY TO USE WHEN FACED WITH REAL-TIME DECISIONS REGARDING MANAGEMENT OF HUMAN WASTE IN A FIRST PHASE EMERGENCY?



Some respondents also reported the use of participatory approaches. 49% reported the use of participatory community mapping exercises, and 58% having conducted transect walks. 38% reported having utilized a Barrier Analysis (BA) to inform their response.

## CAPACITY

Capacity deals with the ability of the priority group to adopt the promoted behavior. This has three aspects—financial, physical, and mental. Financial aspects refer to the ability to pay. Physical aspects refer to the ability to construct, operate, and maintain. Mental aspects refer to the ability to understand.

57% of respondents felt that with their present knowledge, resources and skills they could locate and access guidelines regarding the management of human waste in first phase emergencies, and 43% felt that they possibly could. Nobody reported that they did not think they would be unable to locate guidelines. However, it is also interesting to note that the response of ‘possibly’ would suggest that the respondent had not ever tried to locate such guidelines.

Respondents were asked in an open-ended question which website they would go to if they were to go online right now to search for guidance or literature on the management of human waste in the first phase of a rapid onset emergency. 10 responded that they would go to Google, nine to SuSanA, five to the Water Engineering Development Centre (WEDC) website,

## WHAT MAKES IT EASY TO USE GUIDELINES

In an open-ended question, survey respondents named a number of factors that they feel can make it easy to utilize guidelines. The most common enabling factor reported was having access to guidelines in both hard and soft copy (12 respondents), guidelines being short and concise (11), being trained on the correct use of guidelines (7), and having guidelines with specific directives.

Other commonly reported enabling factors included guidelines being well structured, formatted and indexed (5), guidelines being easily adaptable (5), agreement on guidelines with international stakeholders (4) and national stakeholders (4), inclusion of examples and case studies (3), and design of guidelines for rapid use (3).

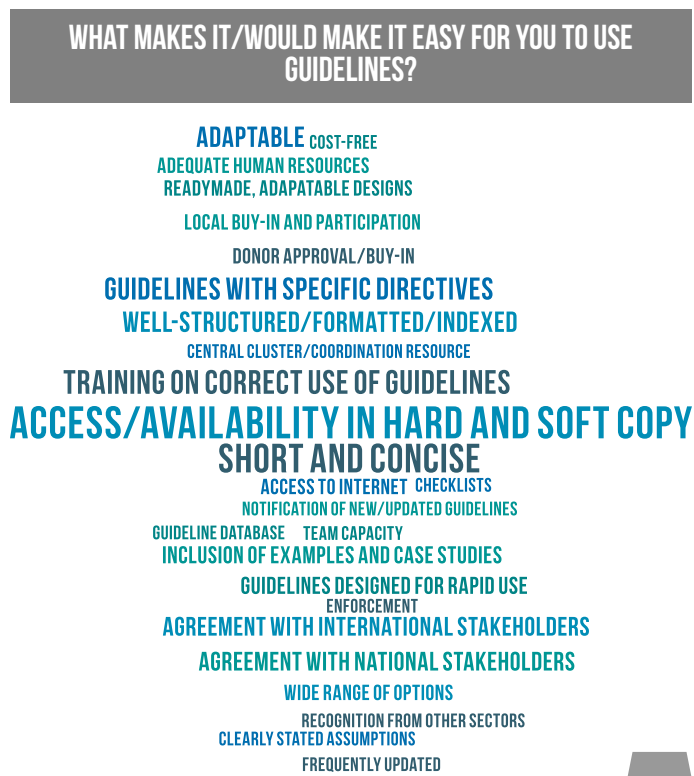
Factors that were less reported by survey respondents included donor approval and buy-in (2), guidelines with a wide range of options (2), local buy-in and participation (2), ready-made, adaptable

designs (2), visuals (2), having access to internet (2), notification when new or updated guidelines are available (1), team capacity (1), having a centralized Cluster/coordination resource (1), enforcement (1), a guideline database (1), checklists (1), recognition from other sectors (1), clearly stated assumptions (1), and guidelines that are frequently updated (1) and cost free (1). One respondent explained “[It is easy to use guidelines] if they are well structured, easy accessible (on- and offline), approved by many humanitarian actors, and they have been introduced as part of capacity development/trainings prior to the intervention so that one knows what to expect in case they are needed.”

## WHAT MAKES IT DIFFICULT TO USE GUIDELINES

In an open-ended question, survey respondents named a number of factors that they feel can make it difficult to utilize guidelines. The most common barrier reported was a lack of country/context-specific guidelines (15 respondents). Other barriers reported included lack of consensus and differing guidelines (5), guidelines being too long (5), guidelines being impractical (5), guidelines being too specific or too detailed (5), lack of expertise or capacity to implement the guidelines (5), guidelines being unclear (4), and the situation on the ground changing too rapidly (3).

Other factors that were less commonly reported by survey respondents were guidelines being poorly structure (2), lack of internet access (2), guidelines being too theoretical (2), being unsure of the



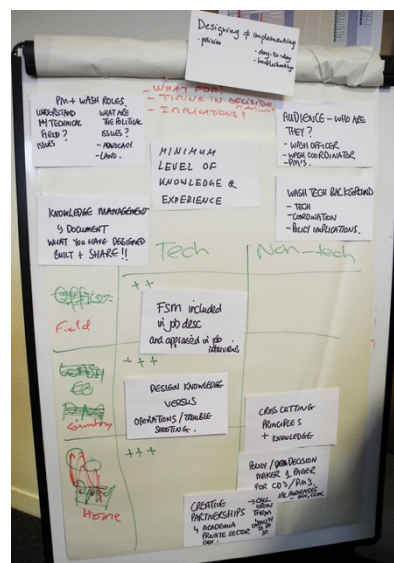
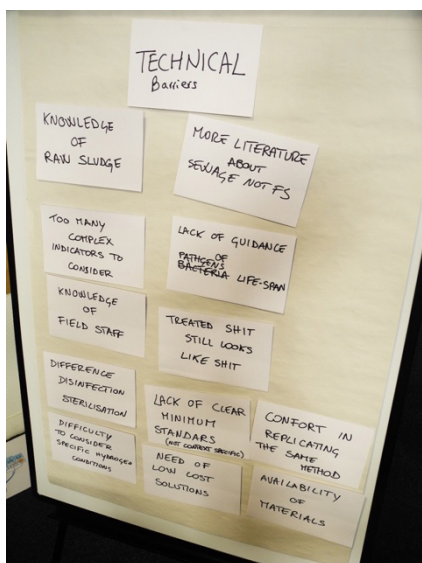
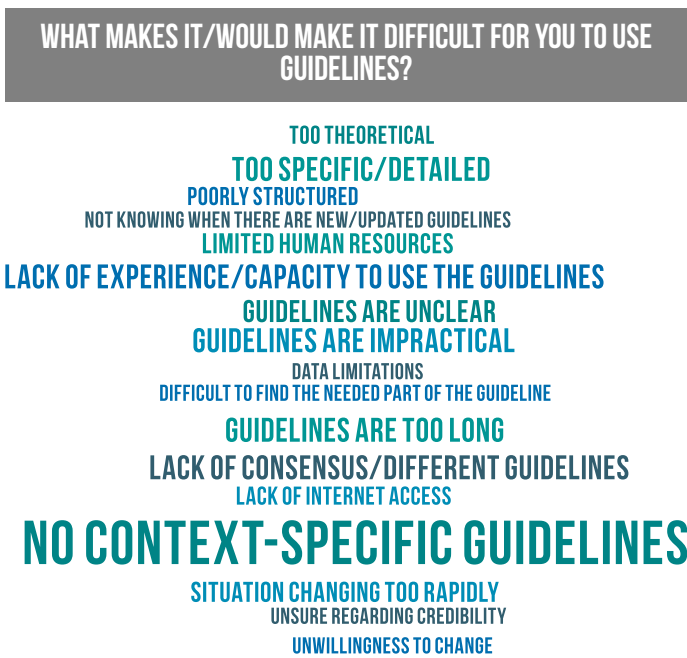
credibility of the guidelines (1), not knowing when there are new or updated guidelines (1), difficulty finding the part of the guideline that is needed (1), data limitations (1), and unwillingness to change (1). Workshop participants explored three categories of barriers in more detail, dividing into groups to brainstorm specific kinds of barriers for practices to evolve, including: (1) technical barriers, (2) non-technical barriers, and (3) minimum knowledge and experience required. In the discussion on barriers, workshop participants noted that people live by 'myths'—that there are widely held beliefs about barriers that are not necessarily substantiated by experience or reality in practice.

## CONTEXT

Context deals with the aspects that stimulate or impede the adoption of the promoted behaviour. These can also be intrinsic, which refer to aspects that can be influenced, such as time available. Context can also be extrinsic, referring to aspects that cannot necessarily be influenced, such as physical conditions or donor regulations.

There was no significant difference between those working for national versus international NGOs in terms of being 'Doers' or 'Non-Doers'.<sup>66</sup> There was also no significant difference between those who described their work as being primarily in first phase emergency contexts versus those who described their work as primarily humanitarian or development.<sup>67</sup> There were also no significant differences between Doers and Non-Doers in terms of experience working in various emergency contexts, including natural disaster response, protracted emergencies, non-camp displacement, rural host communities, urban host communities, conflict-affected settings, and camp settings.

Interestingly, those who reported that they did not have any experience conducting work relevant to the management of human waste in first phase emergencies but anticipated that they would have this responsibility were no more likely to report the consultation of guidelines than those who had previous experience.<sup>68</sup> Similarly, those that had not received any WASH-specific training were also not any more likely to be 'Doers' than those who had received some form of WASH training.<sup>69</sup> There was also no significant difference in the mean years of experience in emergency/humanitarian contexts



Group work on technical, non-technical, and knowledge and experience barriers from workshop participants

66  $X^2(1, 46) = .749, p > .05$   
 67  $X^2(1, 74) = .210, p > .05$   
 68  $X^2(1, 74) = .704, p > .05$   
 69  $X^2(1, 74) = 1.079, p > .05$



between Doers and Non-Doers,<sup>70</sup> suggesting that those with less experience were no more likely to seek out and utilize guidelines for decision-making related to FSM in the first phase of rapid-onset emergencies.

There were, however, some statistically significant differences between the likelihood of being a 'Doer' or 'Non-Doer' according to the sources of guidelines respondents consulted. Those who reported that they consult guidelines from Clusters were significantly more likely to be Doers than those who do not, with 44% of those consulting Cluster guidelines being Doers compared to only 21% of those who do not.<sup>71</sup> Those who consult guidelines from other organizations were also significantly more likely to be 'Doers', with 45% who consult them being Doers, compared to only 21% who did not.<sup>72</sup> However, there were no significant differences between those who did or did not consult guidelines from their own organization,<sup>73</sup> guidelines from consortia,<sup>74</sup> the Sphere guidelines,<sup>75</sup> online forums,<sup>76</sup> or guidelines from local government.<sup>77</sup>

The only other kinds of decisions that did not have any significant difference between Doers and Non-Doers were humanitarian standards, budgeting, who to hand facilities over to and how, public health promotion, and how to conduct assessments. However, these findings generally seem to suggest that those who would utilize guidance for any type

of decisions would probably be more likely to also utilize them for any kind of decisions, including those related to FSM in first phase emergencies.

## 4.4 GUIDELINES AND INFORMATION WANTED

### GUIDANCE TOPICS

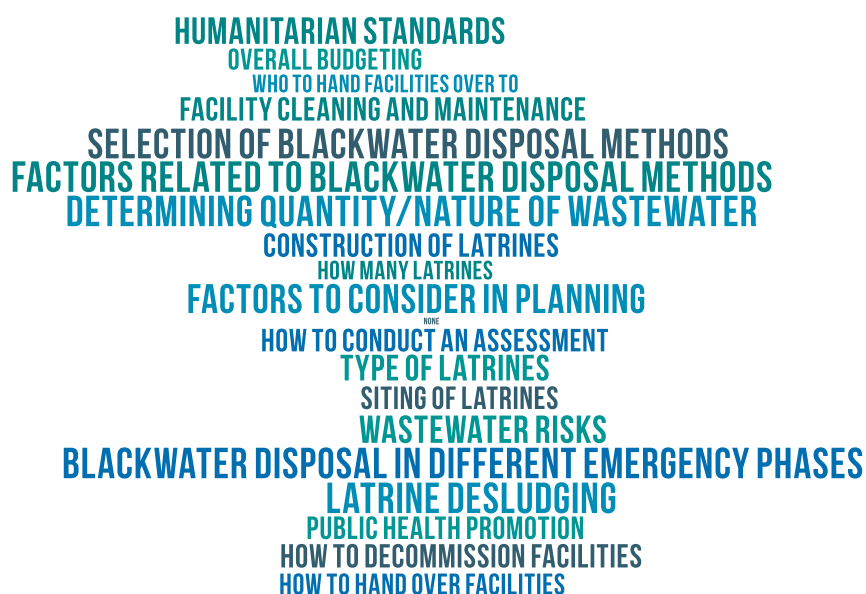
Survey respondents provided information regarding the types of decisions they would want guidelines on to guide their decision-making. The most common areas in which guidance is wanted were related to FSM and the latter stages of the sanitation chain, including wastewater risks (50%), factors related to possible blackwater disposal methods (57%) selection of blackwater disposal methods (56%), blackwater disposal in different phases of an emergency (57%), and latrine desludging (57%). However, it is important to note that while these areas of guidance were the most highly requested, it was still only around half of the respondents that felt they would want guidance in this area.

Other common guidance wanted included facility cleaning and maintenance (41%) and how to decommission facilities (41%). Despite many respondents reporting the use and reference of humanitarian standards, 48% named this as an area in which they would want guidelines to guide their decision-making. 54% also wanted guidelines to help guide their decisions on the topic of factors to consider in FSM planning.

Survey respondents were similarly asked about which topics they felt that have adequate and inadequate information and knowledge about. Regarding decision-making factors, 43% felt they have adequate knowledge and information on health and hygiene human waste management issues, 22% on sociocultural issues, and 39% on environmental issues in rapid-onset emergencies.

Only 35% felt they have adequate knowledge and information on technical issues related to FSM in a rapid-onset emergency, and 43% regarding human waste management in the first phase of an emergency. Similarly, 26% felt their knowledge of technical issues was insufficient, and 26% regarding the management of human waste in the first phase of an emergency.

#### WHICH TYPE/S OF DECISIONS WOULD YOU WANT GUIDELINES TO GUIDE YOUR DECISION-MAKING ON?



- 70  $t(71) = -.581, p > .05$   
 71  $X^2(1, 74) = 4.208, p < .05$   
 72  $X^2(1, 74) = 4.896, p < .05$   
 73  $X^2(1, 74) = 2.424, p > .05$   
 74  $X^2(1, 74) = 2.509, p > .05$   
 75  $X^2(1, 74) = .843, p > .05$   
 76  $X^2(1, 74) = .539, p > .05$   
 77  $X^2(1, 74) = 2.957, p > .05$

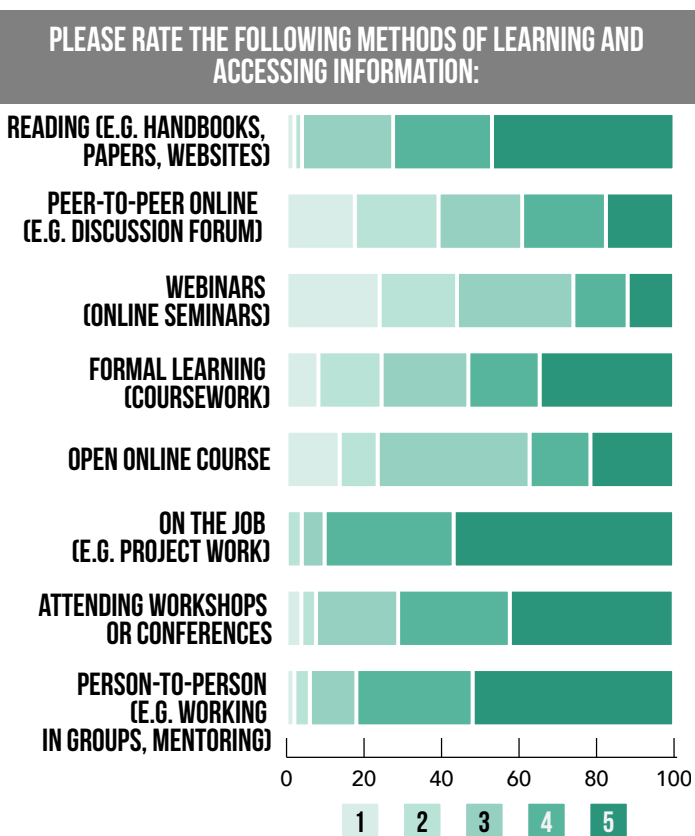
Specifically regarding FSM in the later phases of the sanitation chain, only 32% felt they have adequate knowledge and information on mechanical latrine desludging, and 32% on manual latrine desludging, and 29% on sludge disposal. A low 23% reported adequate knowledge and information on management of dangerous sludge, such as that produced in the context of a cholera outbreak.

42% felt they have adequate knowledge and information on collection and transport in wastewater treatment systems, whereas 23% felt their knowledge was insufficient in this area. 35% reported adequate knowledge and information on treatment and disposal in wastewater treatment systems, compared to 31% who felt their knowledge was insufficient. Only 28% reported adequate knowledge and information on acceptable treatment standards.

## GUIDANCE FORMAT

Survey respondents were asked to rate methods of learning and accessing information, rating from 1 (low preference) to 5 (high preference). The most preferred resource was on the job, with 50% of respondents rating it as a 4 or 5. Peer to peer learning was also highly rated (44% giving a rating of 4 or 5), demonstrating clear preference for learning through methods that are interpersonal and field- and practice-based.

Several also expressed preference for attending workshops and conferences (40% rating 4 or 5), and others also for learning through reading, for example in handbooks, papers, or online (40% rating 4 or 5).



28% rated formal learning through coursework as a 4 or 5.

However, other online mediums were clearly less preferred. Only 22% rated peer to peer learning online, for example through discussion forums, a 4 or 5, and only 14% the same for webinars and online seminars and 20% regarding open online courses.

Workshop participants also participated in a session designed to inform the format of guidance develop, dividing into groups to brainstorm around this issue. Interestingly, the formats advanced by workshop participants were quite dissimilar from the preferences expressed by survey respondents, with a focus on online and technology-centric formats.

Some groups highlighted smartphone app as a good format for the guidance, which they felt would allow for different types of documents to be centralized and for more interactive contents. One of the groups called their app the "Trip Advisor for FSM". In their opinion, this format could allow networking between practitioners working in the same environment and practices exchanges. It could also allow geo-localization that can help individuals to be aware of what projects are implemented within the area. An app could also contain a smart search

## KEY INFORMANT INTERVIEW EXCERPT

"If you are relying on an internet based communication system, if you are out of range of the internet you are in trouble. So you need to have something that is not always dependent on the internet. That's why I said people need to be as well prepared before they go to the field.

You would use it whenever you are unsure. If I had something on my phone that I could review the different options, what can I use what options do I have available to me in this context, and I can go through them very quickly, in goes my constraints and out comes my different options, I think that would be a very powerful tool to have in my back pocket. This could link me to costs, designs it could link me to all sorts of different suppliers even in some cases.

We have such an enormous potential that we are simply not exploiting at the moment. Especially in the humanitarian field. I have now stepped out of the humanitarian field, I'm in development, we know that the priorities are very different but their use of technology is far better. I have seen that. Then we, in humanitarian aid need the technology far more than the development people who use it much more effectively. So you know, I think we are lagging behind in humanitarian aid in terms of how we handle information handle all sorts of things. We have to evolve."

engine or carefully crafted questions that could lead the user through a decision-making process towards resources of the guidance tailored to the individual's needs and context.

In addition to an app, or within the app, tutorial videos were also popular. Participants felt they should be short and technically-oriented, with one per technology or phase of the sludge treatment process. One group even pushed the idea of using a mini-projector to be able to show technical practices to one's team on site, advancing a solution that seemed to bridge the divide between the technology-focused ideas from the workshop participants and the more field- and practice-based preferences expressed by survey respondents.

For the guidance to be able to help practitioners to take decisions, another workshop group thought about an adventure book, which would be a book in which you can jump from one page to another based

on the decisions made at the end of each page. This type of format would also focus on interactivity, visualization and aims at saving time in decision-making.

## KEY INFORMANT INTERVIEW EXCERPT

"It has changed, years ago we had HF radio. Sending documents has changed, whereas now it is almost instant using the Internet. Before we were moving bits of paper. And it will change even more—I'm not sure if we are keeping up very well. I worked for [an organization] doing a study on Ebola, and what we found was that the guidance for Ebola—setting up the camps, setting up the treatment systems, setting up the mechanisms to work around there—those guidance notes were not clearly defined.

We had a number of different guidance notes, some more complex than others, but the point is that there was not a very clear set of guidelines for people going out to the field to use. In the situation like Ebola, it is actually very important because you have a lot of people who have not experienced that before. There is a certain amount that you can train before they go out into the field, so you need to give them resources that they can inform themselves while they are in the field and that we found, even in the most recent case of Ebola, a few years ago in West Africa, that was not the case. And that wasn't the case for anyone.

It has changed. If you are in the bazaar and have good internet then you have access to the whole world and if you do not then you are on your own. So it's really about technology. But of course, the fact is that today you can put a lot of things on phone apps so we could be much smarter than we are. More or less, anyone who carries a phone around and enormous amount of power in our back pocket."

## KEY INFORMANT INTERVIEW EXCERPT

"It depends on the organisation, because some organisations have technical people in headquarters that will assist and give guidance. Other organisations, either you don't know the contact or it is not feasible to contact so you are left alone. Before the internet age, I was working with a book in my bag and that's what I did. So if I had to make a decision make it was engineering in emergencies that helped me out. So yes, it depends on the organisation, where you are and now of course that you have good communications means.

[One organization] for example are very organised in their technical components, [another organization] used to have at least had internal manuals and best practices that it tried to keep updated all the time but it is a difficult and slow process to get new ideas introduced into those technical manuals. So people tend to work with what they know and what is safe first."

## GUIDANCE DISSEMINATION

Another session of the workshop was dedicated to exchanging knowledge and experience on effective dissemination strategies, with participants dividing into groups to reflect on several key questions.

### *Who should guidance target?*

The group chose to differentiate between 'direct users', 'indirect users' and 'influencers/enforcers', aligning as well with the approach of the DBC framework. The delineation between direct users and indirect users was somewhat fluid, with a number of categories of users that could fall into either. Direct users included field practitioners and those working with faecal sludge in the field. Mentors, consultants, government engineers were viewed as potentially being in either of these categories, and students and researchers and the government as 'indirect' users.

Influencers and enforcers were seen to include local NGOs, international NGOs, the private sector, donors, researchers, UN agencies, the Global WASH Cluster, Sphere, professional bodies, civil society, and potential users of treated faecal sludge.

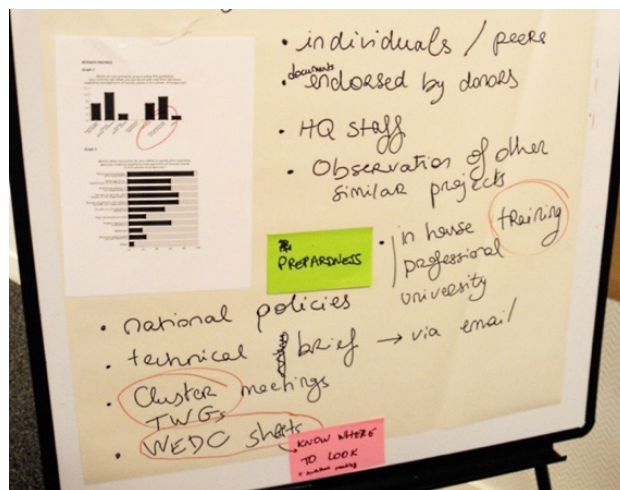
**What are the channels used by practitioners in accessing knowledge on FSM during rapid onset emergencies?**

Cluster & Technical Working Groups meetings were forwarded as a good way to make sure that information on good practices is passing to the practitioners. Training, preparedness was also highlighted as very important for effective solutions to be implemented during the emergency. WEDC sheets were pointed out as very effective to channel information as they are all elaborated in the same format, which makes specific information easy to find.

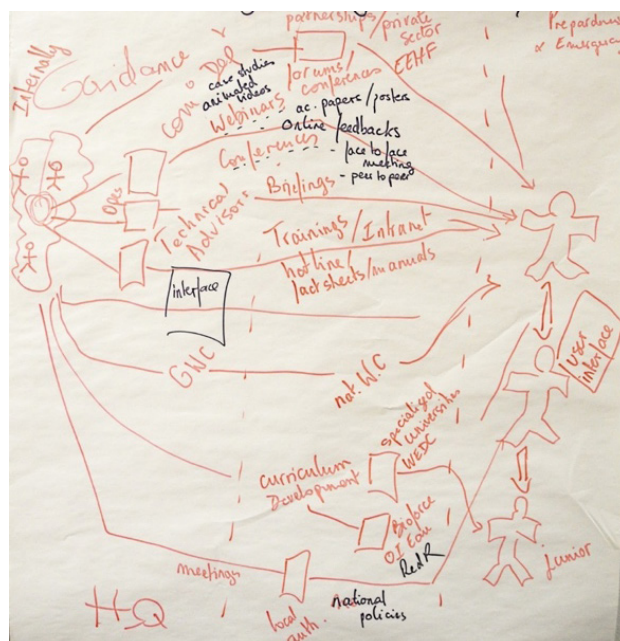
**What would be the most effective tool/medium for disseminating knowledge on faecal sludge management and why?**

As shown below, to answer this question, the group created a user journey map, in order to understand potential routes and mediums. On the left, practitioners with expert knowledge on FSM, on the right interface users, junior practitioners for example. Each arrow is a channel that links senior WASH practitioners to junior WASH practitioners.

As can be seen in the user journey map, there are a wide range of individual, organizational, and external resources that may be relevant to various users at various stages in making decisions and implementing FSM technologies, including (1) formal education, (2) participatory interfaces such as meetings, trainings, briefings, and conferences; (3) documented resources such as organization Intranet, fact sheets, internal and external guidance; (4) technical backstopping such as technical advisors and headquarters; and (5) stakeholder interfaces such as local authorities, partnerships, the private sector, users, and working groups.



Group work on who guidance should target from workshop participants



Group work on dissemination from workshop participants

# 5. DISCUSSION AND CONCLUSIONS



In terms of the ‘behaviours’ regarding the consultation of guidance, decision-making processes, and ultimately the selection and implementation of appropriate FSM technologies and solutions in the first phase of an emergency response, the desk research conducted and findings of this research generally found that the current approaches being employed have a strong focus on the user interface and the early stages of the sanitation chain, with insufficient attention to the latter stages. The desk research reviewed reiterated that often, emergency sanitation systems don’t look beyond the emptying step in the sanitation chain, with faecal sludge being transported and disposed of in manners that are unsafe and can expose affected populations to even further risks.

The desk review found that considerable guidance does already exist. There are resources that address FSM technologies, though there is a considerable gap in terms of adequate guidance on technologies specifically designed for use by humanitarian and emergency practitioners. Similarly, guidance is much more comprehensive and readily available addressing the earlier stages of the sanitation chain, and becomes more sparse and/or less sufficiently detailed moving into the treatment and disposal phases. There is also a gap in terms of supporting practitioners to make linkages along the entire sanitation chain in sanitation systems planning for an emergency context. Additionally, the desk review found no guidance that would help practitioners to incorporate FSM into emergency preparedness and contingency planning.

From this review, the research went on to investigate whether the existing guidance is consulted and utilized, and found a relatively high self-reported utilization rate, with around 70% saying that they always or most always consult guidelines. With the findings that guidelines exist and practitioners report that they are using them, the original research question prevails—why is the ‘behaviour’ in terms

of identifying and implementing appropriate FSM solutions in the first phase of emergencies still so poor?

## PRIORITY GROUP

Though in discussions regarding sanitation systems and faecal sludge management ‘practitioners’ is often assumed to refer to WASH practitioners with sufficient technical expertise to make key decisions, the research found that in practice the spectrum of decision-maker profiles is much more diverse. It includes experienced and technically knowledgeable WASH practitioners, but can also include practitioners who are new to the field, or who have expertise in some areas of WASH but not others, or even practitioners who may have no experience or technical knowledge on WASH at all, such as camp managers or decision makers on the ground in the immediate stages of a first phase response. It is critical to note the finding that in the most recent experience among survey respondents, multi-sector or non-sanitation specific field staff and management staff were reported as decision-makers in 44% of cases, and 33% of cases had no staff with a technical WASH specialization involved.

### KEY INFORMANT INTERVIEW EXCERPT

“If you work as a water and sanitation engineer, you arrive somewhere and there is already a project and you are taking over the work that someone’s is doing. Often, unless you are the person that set the project up, you’re just influencing something that someone else has done so it can be quite hard to make the changes that you think are necessary.”

In the workshop, participants discussed the need for different levels and types of guidance in order for them to be effective, noting that they should include: (1) how to, (2) FSM principles, and (3) indicators. They also noted that the audience for guidelines is broad, from the most junior staff and those with limited technical expertise and experience ranging to donors and those driving approaches within the sector. They noted that guidelines must exist for each user profile, and that it may not be possible for one format or resource to be appropriate to reach everyone along the spectrum of users. They felt that this is manifest in a missing format that is something between the Sphere guidelines and a compendium, and that this is the gap that needs to be addressed.

As such, to be effective guidance must cater to the full spectrum of diversity of decision-maker profiles. In this scenario, while the issue of identifying appropriate technologies for an emergency response is an important one, it is only a first step if the profile of the decision-maker is not a WASH practitioner with sufficient resources, capacity and experience to evaluate the option and determine its appropriateness or to apply the necessary adaptations to make the technology appropriate to the context.

Interestingly, while the workshop highlighted the spectrum of decision-maker profiles, echoing the findings of the research, one of the workshop conclusions was that the focus should be less about a mass education programme but more about informing few high level people in the organisation to understand what their options are. However, the findings of this research would suggest that this may not be the best approach, as there seems to be a considerable gap between where the technical expertise is held in an organization and those who are making real time decisions in an emergency.

## DETERMINANTS

### WHEN AND WHY DO PRACTITIONERS CONSULT GUIDANCE?

The findings revealed that when guidance is consulted, the scenarios described by respondents were generally focused on compliance and spot-checking once a solution had been advanced. Though several did describe using guidance to support decision-making processes, but it did not stand out as a main use of guidance resources. Similarly, when asked what types of decisions they would consult guidelines on, the most common answers were humanitarian standards and issues

## KEY INFORMANT INTERVIEW EXCERPT

“I would think the issue is even if we have guidelines, is this actually taken into consideration during the planning of the response, because it becomes difficult to give someone a manual or let someone know what to do. But if this was never included in the planning, first of all you will probably not be able to cover the costs of this method that you are thinking about. Then second of all you might have to renegotiate with the donors because at first you never talked about it with them and then because you never engaged critical partners from the start, stakeholders like the government need to be reengaged.”

It still actually goes to the actual planning to see if people are going to approach an emergency and what are the things they are going to take into consideration. But then the question is if a manual is a practical on the ground resource. So if a manual talks about collection, it would talk about this but then at the end of the day if issues like costs, issues like capacity, and conditions aren't taken into consideration, it's no longer effective. I think the guidelines should cover issues of how to actually plan for it, how to budget for it you know. It should cover the entire response cycle, not just this part where someone is implementing.”

around latrines, reiterating a focus on compliance and the user interface, or at best the early stages of the sanitation chain. Only a third self-reported consulting guidance to guide their decision-making process and the factors that need to be considered in selecting a blackwater disposal method.

This finding is similarly supported by the scenarios in which respondents said they would not consult guidelines for 'normal' or 'standard' cases or if they were using a technology or solution they were already familiar with. This suggests that guidance can often be viewed as a source of verification rather than for decision-making, and that though practitioners report using guidance.

## WHAT GUIDANCE DO PRACTITIONERS USE?

The responses provided across the survey, qualitative interviews, and workshop regarding what guidance is being used were focused around a small core of heavily emergency-branded resources, namely the Sphere Project, the Cluster system, and a handful of online resources. Though workshop participants also discussed WASTE and WEDC, these came up far less in the survey. As the workshop was attended by a somewhat less diverse of WASH-focused practitioners, this would suggest that such resources are not as well known and/or utilized by non-WASH specialists.

Taken with the desk research findings that existing guidance is not necessarily branded for use in emergencies and focuses on the early stages of the sanitation chain, this finding sheds considerable light on why solutions are still so often inappropriate despite guidance existing. The existing guidance that does actually address FSM is not the guidance that is being widely used, and the guidance that is being widely used was found to have insufficient guidance regarding FSM in emergencies.

The research found that the Sphere Project continues to serve as a central resource for humanitarian and emergency practitioners. While it is difficult to determine which factor is causal, the desk review reiterated the lack of FSM and attention to latter stages of the sanitation chain permeating standards around emergency response as well. The poor incorporation of FSM into the Sphere standards regarding sanitation to date is likely a reflection of or contributor to the lack of attention to FSM in emergencies to date. However, even if FSM is more clearly incorporated, this may only begin to address the issue by bringing focus to the area if guidance is still primarily used for standards and post hoc verification rather than for decision-making in the planning stages.

## HOW IS USING GUIDANCE PERCEIVED?

Respondents reported that guidance is generally positively perceived, and that it is often used to justify decisions or the use of resources in a certain way, as well as establishing objectives and standards for implementation. This was similarly put forward as an explanation among those who said that there were organizational policies that would make them more likely to use guidelines and the advantages of using them, again highlighting the importance of 'standards' and a preference for the use of guidelines in this manner.

Though the findings showed that there is a general perception that using guidelines is acceptable, it also revealed several strongly held beliefs about disadvantages or constraints around their use, very few of which were substantiated with specific examples or cases. Key constraints of guidelines that clearly emerged were: (1) that consulting them takes too much time in an emergency and inhibits practitioners ability to respond quickly; (2) that the lack of context-specific guidance for the exact situation the practitioner is in would result in identifying contextually inappropriate solutions; and (3) that guidelines would prohibit experimentation and/or innovation. Taken together, the findings of these research would suggest that these widely-held beliefs are something of self-perpetuating myths,

## KEY INFORMANT INTERVIEW EXCERPT

"I think it depends on who is in the field and who is picking up the phone. I think generally organisations are conservative, and understandably. The one thing that someone said to me once, a long time ago was you don't experiment with communicates at risk. I think that is a very import point, we shouldn't be testing ideas, we should be sure of ideas before we do it. Somehow the research has to be done but not on the communities when they actually need something to simply work.

Knowledge is not really a problem. In most of the orignations I have experienced people with lots of knowledge and experience. Perhaps willingness within the organisation to accept different types of solutions – yes. As I say a certain risk aversion within an organisation to make sure that they are doing the right thing by the beneficiaries they are trying to help but not really money. Of course, sometimes you have to do things quickly. For example in southern Bangladesh, you more or less have one month or two months you have half a million people arrive on your door step. Time can be a huge constraint because you put in a system, but it is absolutely that it won't be helpful down the line."

and constitute a considerable barrier that must be addressed in promoting behaviour change in this area.

## DOERS AND NON-DOERS

Disappointingly, while the research provided a number of helpful insights regarding determinants that helped to identify potential bridges to activities, it identified very few factors that would seem to clearly distinguish doers from non-doers. While this was likely partly due to the relatively small sample size for identifying statistically significant differences between the two groups, it also seems somewhat likely when looking at the full spectrum of the research findings that there actually are few truly pronounced or recognizable factors that differentiate between the two categories of practitioners.

One key finding in the doer/non-doer analysis was that guideline use for anything is strongly related to guideline use for other things. This suggests that those who consult guidelines on anything are more likely to consult guidelines on FSM as well, which follows a clear theoretical vein of logic. With this, the research suggests that promoting general use of guidelines for decision-making, not only on FSM, may be likely to encourage people to use guidelines on FSM also.

## KNOWLEDGE AND SKILLS OF PRACTITIONERS

Many WASH engineers, including civil society, government, and private sector, are not conversant in FSM and may not have the confidence or capacity to implement strong FSM systems. This determinant similarly echoes the issues raised around the 'priority group'—that the decision-makers are often not necessarily those with sector-specific expertise, either by design or perhaps more often by necessity in the context of needing to respond quickly and working with resources and capacity that is readily available at the time of the response. That only half of the survey respondents felt confident that they could identify and access guidelines related to the management of human waste in first phase emergencies with their current level of knowledge, resources, and skills, suggests that having this basic understanding and awareness is a key determinant. It is possible that those who do not have the relevant knowledge and expertise would be even less able to know what to look for, let alone where to find it, than those who already have a sufficient level of understanding to make such decisions.

## LACK OF CLARITY IN THE SCIENCE OF FAECAL SLUDGE AND FSM IN EMERGENCIES

There are still many unknowns relating to FSM such as what is faecal sludge made up of and clear, quick and easy methods for characterizing sludge as this will have an impact on how it should be managed.<sup>78</sup> Similarly, the desk research found that there are very few examples of successful implementation of faecal sludge management in the humanitarian sector. The debate continues on how to properly manage the whole sanitation system in humanitarian situations. That the workshop so strongly called for cases studies and examples from the field echoes this gap, and suggests that the awareness that there are so few documented examples of both successful and failed technologies and implementation in this area could be a deterrent to seek out guidance in the first place.

## LANGUAGE AND TERMINOLOGY

Though language didn't come up as a self-reported barrier, from the responses to the survey alone it was clear that many practitioners in the field are not native English speakers and do not have a working-level proficiency in English. Especially for national staff working in their own country of origin in their own languages, materials requiring English proficiency may not be accessible or easy to use. However,

much guidance, including most of that reviewed in the desk research, is only available in English.

Similarly, the desk research found a clear lack of consistency in the terminology around FSM, with the common use of the term 'excreta disposal'. This term can also be used in reference to the containment of excreta in connection with the user interface, where for certain sanitation structures such as pit latrines, it does not necessarily also refer to desludging and the management of faecal sludge at the end of the sanitation chain. This ambiguity and inconsistent use of terminology can be both misleading when guidance is found, and could also prevent guidance on FSM from being found at all if other terminology is employed.

## BRIDGES TO ACTIVITIES

In the DBC Framework, 'bridges to activities' are based on the responses given by the priority group during the formative research and are more-specific descriptions of a change one should make to address the issue revealed by the research. A bridge to activity usually begins with a directional verb (e.g., increase, decrease, improve, reinforce) and often proposes to change the perception of the priority group. These 'bridges' are what this research was designed to recommend based on findings of the Barrier Analysis.

## CONTEXT-SPECIFIC SOLUTIONS, OR GUIDANCE ON FACTORS TO CONSIDER IN IDENTIFYING A SOLUTION APPROPRIATE TO THE CONTEXT?

Context-specificity emerged as a key concern for determining FSM solutions. However, while there is a long but generally finite list of known factors that need to be considered to select a solution that is contextually appropriate, there is an infinite amount of combinations of these factors, such that no guidance could ever capture them all. Similarly, in one context there may be more than one context-specific and appropriate solution. Even in one specific 'context', the factors in a seemingly similar emergency scenario could be vastly different. For example, if there is a flood in city X and FSM technology A is successfully and effectively applied, and two years later there is another flood in the same location, but there have been developments in municipal sanitation structures and a change in the government and policies around sanitation and faecal sludge management, simply reapplying technology A without re-evaluating and adapting

<sup>78</sup> Spit et. al 2014 discussed faecal sludge characteristics



that solution may not still be appropriate. When taking together the multitude of social, political, cultural, geographic, capacity and resource-related contextual factors, the task of generating exhaustive guidance that is 'context-specific' is Sisyphean.

Much of the focus in addressing the issue of the 'appropriateness' of an FSM solution or technology in a given scenario is on determining whether that *solution* was right or wrong, rather than assessing whether the *factors* that were considered in selecting that solution or technology were the right factors and appropriately evaluated, such that would ensure an appropriate solution would be identified and applied. Considering the limitations in terms of prescribing a 'right' solution for the full range of possible scenarios, the latter is a much more exhaustive approach and much more informative in determining what kind of guidance is needed and how it can be most effectively advanced and utilized to influence behaviour change.

### KEY INFORMANT INTERVIEW EXCERPT

"It doesn't have to be a solution that says you do this, but it's more of an approach which takes me to what I need to consider, also taking into consideration the different sectors in different locations. I need something that I can use in Iraq, that I can use in Yemen, that I can use in Zimbabwe...so given all the difference in those countries considering water availability where you don't have water and the different types of factors in emergencies. In some cases in a natural disaster, what happens if there is an earthquake or there is a flood, which is a totally different kind of context."

Considering the level of concern regarding context-specificity and appropriateness of solutions applied for the user population, it was interesting to find a relatively low level of utilization of actual consultations with the user population. Though government and key stakeholders were somewhat widely reported to be consulted, only just over half reported direct consultation of community-level stakeholders such

### KEY INFORMANT INTERVIEW EXCERPT

"Guidance should put a real emphasis on impact and risk. The real fear in choosing a technology is the risk involved. Will it cause any negative consequences if it goes wrong? To either the population themselves, people downstream, using the groundwater... In choosing a technology we just need reassurance from someone that it is a decent choice and unlikely to have a negative impact."

### KEY INFORMANT INTERVIEW EXCERPT

"What influenced my decision most with respect to the camp household solution was my experience with the Rohingya camps in Bangladesh. See the thing is, whatever resources you use, it's very unusual that you will find a single resource that gives you every option. I've seen attempts of that and they end up being absolutely enormous. I've just recently seen another one [an organization] was working on.

The problem is that you've got to make your knowledge base so enormous or so simple that it is actually very, very hard to do. And every situation is absolutely dependent on the context, the ground conditions, the water table, the political situation, the customs, the traditions of the people. Every single situation is different; your decision tree becomes vast. Trying to accommodate that within a knowledge base is obviously doable, but it needs a really clever way of working. Rather than a library, you have got to have a – I don't know – I have not yet found a knowledge system that I can navigate through and find solutions to whatever I'm looking for."

as the affected population themselves, informal leaders, or minority and vulnerable groups. There was also relatively low reporting of measurement of the context-specific environmental factors, with only about half reporting that they measure key factors like water and space availability. These findings demonstrate something of a discontinuity between the expressed concerns of practitioners regarding selection of FSM solutions and actual practice in terms of taking measures to address context- and user-specificity.

As such, while a clear demand that emerged from this research was for 'context-specific' ready-made solutions, generating this sort of guidance would be not only impossible but also potentially irresponsible if done without cautionary qualifications for the decision-maker, as it could provide a package solution that could be applied verbatim without providing FSM decision-makers with the necessary tools to adjust it to the specific circumstances of the emergency scenario they are faced with. Rather than needing context-specific guidance for every single possible scenario, FSM decision-makers need the guidance to assess the parameters of their emergency context and the capacity and resources to evaluate technologies against each known contextual factor to draw both context- and situation-specific conclusions about what is appropriate.

Other research related to the topic of FSM heeds the same warning. A guidance document developed by UNEP and SEI on sustainable sanitation and wastewater management explained:

“A common mistake in many attempts to improve sanitation and wastewater management is to start with a preferred technology that has “worked”, even as part of a sustainable system, elsewhere. This approach has left many cities and communities with less-than-optimal systems that, for example, cannot be easily adapted to changes in population density; put heavy demands on scarce water resources; break down or malfunction frequently, especially during flooding and heavy rains; and in some cases are not even used. Furthermore, models for financing and service delivery, and institutional arrangements that work in one city may not necessarily work in another...No sanitation user interface or treatment technology is sustainable in itself – there are only technologies that serve specific functions within a more or less sustainable system. This system must be planned, designed and operated to suit the specific conditions in which it will operate.”<sup>79</sup>

## BRIDGING THE GAP BETWEEN RESEARCH AND THE FIELD

The research found a clear perceived disconnect by practitioners with researchers and ‘lab-based’ work on FSM. The workshop participants concluded that case studies and implemented field examples with input from both researchers and practitioners are necessary. There was a clear hesitance, echoed throughout the survey findings, towards applying ‘lab-based’ examples that have not been field proven, and to experiment with them in the field without better understanding technical issues and how to plan around key factors in a field setting. Workshop participants felt that more collaboration and discussions between field researchers that take place in the field instead of in a research environment or in workshops and seminars would help to promote better evidence-based practice and responsible experimentation and innovation among practitioners.

## FSM IN GUIDANCE FOR EMERGENCIES AND PREPAREDNESS AND CONTINGENCY PLANNING

One key conclusion that spans the findings of this research is that many of the barriers that practitioners put forward do not emerge when a crisis occurs, but

<sup>79</sup> K. Andersson, Rosemarin, A., Lamizana, B., Kvarnström, E., McConville, J., Seidu, R., Dickin, S. and Trimmer, C., “Sanitation, Wastewater Management and Sustainability: from Waste Disposal to Resource Recovery, for the Sanitation Value Chain” 2016.

are known in advance and are simply not effectively planned for. While emergency preparedness and contingency planning have become a widely advanced step to effective emergency programming, the incorporation of FSM decision-making into preparedness and contingency planning was not mentioned at all by survey respondents, and featured very little in workshop discussions.

In practice, there are generally two scenarios when emergency responses are deployed: (1) mobilizing a rapid response where the responders are going into an entirely new area/sector of operation without organizational structures or contextualized knowledge and experience in place; or (2) responding to a rapid-onset crisis that occurs in a context in which an organization is already operating and has a pool of contextualized knowledge and experience to draw upon in mobilizing the response, or networks if the sector of response is outside of their typical area of expertise. Especially in the second scenario, barriers such as context-specificity, geographic and logistical issues, and all the other factors that drive FSM decision-making should be irrelevant, because they should already be known and incorporated into preparedness and contingency planning. In this situation, the issue is not how to make a decision regarding FSM quickly, but why a decision is being made quickly at all instead of planned for in advance.

Similarly, context-specific factors such as geography, national laws, availability of materials, etc. are often known before a crisis occurs. Though some crises may have little to no lead time, many crises have early warnings or happen in predictable intervals, such as seasonal hazards or political instability that can be a driver of displacement. Taken in total, a large proportion of crises that require emergency response occur with a rapid onset, but were predictable or at least had an understood probability of occurring. In these types of rapid-onset crises, that sanitation system response will need to be able to address large amounts of human waste rapidly accumulating in an unplanned system is a known factor; there will be no emergency crisis that involves displacement or concentration of the affected population where this will be a non-issue, so why is it not planned for?

## EMERGENCY-SPECIFIC GUIDANCE AND STANDARDS ON FSM

With this inevitability of the human excreta factor in a response, the lack of FSM-specific emergency guidance and standards for first phase responses is similarly problematic. That such guidance and

standards exist in the spheres of development practice and systems planning, but are clearly not known, sought out, or utilized by humanitarian and emergency practitioners indicates a breakdown either in: (1) motivation and/or feasibility of the use of these types of resources by emergency practitioners; or (2) translation of such resources into materials that are accessible and useful in an emergency context.

Though the steps towards inclusion of FSM in the revised Sphere standards is a promising step towards realigning thinking in the humanitarian and emergency sector to span beyond the immediate user interface and into the latter stages of the sanitation chain, the standards and indicators focusing primarily on removal of the faecal sludge from the sanitation facility site follows the same precedent of 'out of sight, out of mind' by failing to set a standard for practice in terms of both on-site and off-site treatment and disposal of faecal sludge in an emergency context. Essentially, by failing to include FSM throughout the end of the sanitation chain in guidance and standards for emergency responses, we are preparing to be unprepared when it comes time to make decisions in a crisis situation regarding the sanitation system and how the resultant faecal sludge will be managed.

# REFERENCES



- Almasri, Entisar and Sarah Achermann. "Emergency Preparedness and Contingency Planning." SSWM. 2016. <https://www.sswm.info/content/emergency-preparedness-and-contingency-planning>.
- Andersson, K., Rosemarin, A., Lamizana, B., Kvarnström, E., McConville, J., Seidu, R., Dickin, S. and Trimmer, C. "Sanitation, Wastewater Management and Sustainability: from Waste Disposal to Resource Recovery." United Nations Environment Programme and Stockholm Environment Institute. 2016. <https://www.sei-international.org/mediamanager/documents/Publications/SEI-UNEP-2016-SanWWM&Sustainability.pdf>.
- Baetings, Erick and Declan O'Leary. "Rapid Assessment of Household Sanitation Services Vientiane, Lao PDR: Final Report for WSP." Water and Sanitation Program (WSP). December 2010. <https://www.ircwash.org/sites/default/files/Baetings-2010-Rapid.pdf>.
- Bassan M, Mbeguere M, Tchonda T, Zabsonre F, and Strande L. "Delivering Water, Sanitation and Hygiene Services in an Uncertain Environment Characterization of Faecal Sludge During Dry and Rainy Seasons in Ouagadougou, Burkina Faso." 36th WEDC International Conference, Nakuru, Kenya, 2013. <https://wedc-knowledge.lboro.ac.uk/resources/conference/36/Bassan-1814.pdf>.
- Bastable Andy and T. Wise, "Promoting sustainability in refugee and IDP responses," 38th WEDC International Conference, Loughborough University, UK, 2015, <https://wedc-knowledge.lboro.ac.uk/resources/conference/38/Bastable-2223.pdf>.
- Bastable, Andy and Lucy Russell. "Gap Analysis in Emergency Water, Sanitation and Hygiene Promotion." Humanitarian Innovation Fund. 2013. [https://reliefweb.int/sites/reliefweb.int/files/resources/hif\\_wash\\_gap\\_analysis.pdf](https://reliefweb.int/sites/reliefweb.int/files/resources/hif_wash_gap_analysis.pdf).
- Boot, Niall L.D. "The use of transfer stations for faecal sludge management in Accra, Ghana,". Waterlines. 2008. 27(1): 71–81.
- Bright-Davies, Laura, Andreas Schmidt, Larissa Duma, and Faraja Mbuduka. "City sanitation planning package for Dar es Salaam." BORDA, 2016, <http://www.susana.org/en/knowledge-hub/resources-and-publications/library/details/2562>.
- Buttle, Mark and Michael Smith. "Out in the Cold: Emergency Water Supply and Sanitation for Cold Regions." Water, Engineering and Development Centre Loughborough University. 2004. [http://www.unicefemergencies.com/downloads/eresource/docs/WASH/Out\\_in\\_the\\_Cold\\_-\\_Complete.pdf](http://www.unicefemergencies.com/downloads/eresource/docs/WASH/Out_in_the_Cold_-_Complete.pdf).
- "Camp Management Toolkit." International Organization for Migration (IOM), Norwegian Refugee Council (NRC) and UN Refugee Agency (UNHCR). Edition June, 2015. <http://www.globalccmcluster.org/>

[system/files/publications/CMT\\_2015\\_Portfolio\\_compressed.pdf](#).

- Clemmer, Ron. "Using a Behavior Change Framework for WASH." USAID "StrateChat" Series Behavior Change for WASH Programs From Barriers & Access to Application & Use Washington, D.C., June 27, 2013. <https://www.usaid.gov/sites/default/files/documents/1865/Ron%20Clemmer.StrateChat.62613.pdf>.
- Connolly, M. A., Gayer, M., Ryan, M. J., Salama, P., Spiegel, P. & Heymann, D. L., "Communicable diseases in complex emergencies: impact and challenges," *Lancet*, 2004, 364: 1974-1983.
- Crutchfield, Melissa. "Phases of Disaster Recovery: Emergency Response for the Long Term." United Methodist Committee on Relief. 30 April 2013. <https://reliefweb.int/report/world/phases-disaster-recovery-emergency-response-long-term>.
- "Contingency planning guide." International Federation of Red Cross and Red Crescent Societies. 2012. <http://www.ifrc.org/PageFiles/40825/1220900-CPG%202012-EN-LR.pdf>.
- Danielsson M., Lippincott M. "A Sewer Catastrophe Companion - Dry Toilets for Wet Disasters." PNCA (Pacific Northwest College of Art ) and Portland Bureau of Emergency Management. 2012. <http://www.susana.org/en/knowledge-hub/resources-and-publications/library/details/2449>.
- Davis, Jan, and Robert Lambert. "Engineering In Emergences: A practical guide for relief workers; second edition." ITDG Publishing. 2002. <https://www.developmentbookshelf.com/doi/pdf/10.3362/9781780441139.000>.
- "Emergency Response Preparedness (ERP): Risk Analysis and Monitoring, Minimum Preparedness, Advanced Preparedness, and Contingency Planning – Draft for Testing." Inter-Agency Standing Committee (IASC). July 2015. <https://cms.emergency.unhcr.org/documents/11982/54224/Emergency+Response+Preparedness+July+2015/cc602e5b-7084-483d-becb-ea72286cc00e>.
- Evans, Barbara, Carolien van der Voorden, and Andy Peal. "Public Funding for Sanitation: The many faces of sanitation subsidies." Water Supply and Sanitation Collaborative Council. 2009. <http://www.susana.org/en/knowledge-hub/resources-and-publications/library/details/2010>.
- Furlong, Claire. "The development of an on-site sanitation system based on vermifiltration: the 'Tiger Toilet'." *Journal of Water, Sanitation and Hygiene for Development*, 5(4): pg. 608-613. [https://dspace.lboro.ac.uk/dspace-jspui/bitstream/2134/19851/1/WASHDev-D-15-00067\\_R2.pdf](https://dspace.lboro.ac.uk/dspace-jspui/bitstream/2134/19851/1/WASHDev-D-15-00067_R2.pdf).
- Gensch, Robert, Roland Hansen, and Michaela Ihme. "Linking Relief and Development in the WASH Sector: A Overview and Contribution to the International Debate." German WASH Network. 2014. [http://www.washnet.de/wp-content/uploads/2014/07/washnet\\_wash-relief-to-development\\_2014.pdf](http://www.washnet.de/wp-content/uploads/2014/07/washnet_wash-relief-to-development_2014.pdf).
- Grange, Christophe. "WASH in Emergencies Problem Exploration Report: Faecal Sludge Management." Humanitarian Innovation Fund. January 2016. <http://www.elrha.org/wp-content/uploads/2016/01/Faecal-Sludge-Management-WASH-Problem-Exploration-Report.pdf>.
- Gutterer, Bernd, Ludwig Sasse, Thilo Panzerbieter and Thorsten Reckerzügel. "Decentralised wastewater treatment systems (DEWATS) and sanitation in developing countries: A practical guide." Bremen Overseas Research and Development Association (BORDA) and Water, Engineering and Development Centre. 2009. [http://www.susana.org/\\_resources/documents/default/2-1153-en-sample-only-borda-dewats-2009.pdf](http://www.susana.org/_resources/documents/default/2-1153-en-sample-only-borda-dewats-2009.pdf).
- Harvey, Peter, Sohrab Baghri and Bob Reed. "Emergency Sanitation: Assessment and Programme Design." Water, Engineering and Development Centre, Loughborough University. 2002. <https://reliefweb.int/sites/reliefweb.int/files/resources/2533D212287DCAC6C1256D780035CC8D-lou-water-02.pdf>.
- Harvey, Peter. "Excreta Disposal in Emergencies: A Field Manual." Water, Engineering and Development Centre, Loughborough University. 2007. <https://www.ircwash.org/sites/default/files/Harvey-2007->

[Excreta.pdf](#).

Ho, Dr. Goen. "International Source Book On Environmentally Sound Technologies for Wastewater and Stormwater Management." United Nations Environment Programme (UNEP). 2000. [http://www.unep.or.jp/ietc/Publications/TechPublications/TechPub-15/main\\_index.asp](http://www.unep.or.jp/ietc/Publications/TechPublications/TechPub-15/main_index.asp).

"Inter-Agency Contingency Planning Guidelines for Humanitarian Assistance." Inter-Agency Standing Committee (IASC). November 2007. [https://interagencystandingcommittee.org/system/files/legacy\\_files/IA%20CP%20Guidelines%20Publication\\_%20Final%20version%20Dec%202007.pdf](https://interagencystandingcommittee.org/system/files/legacy_files/IA%20CP%20Guidelines%20Publication_%20Final%20version%20Dec%202007.pdf).

Inter Sector Coordination Group. "Situation Report: Rohingya Refugee Crisis, Cox's Bazar." 14 January 2018. <https://reliefweb.int/report/bangladesh/iscg-situation-report-rohingya-refugee-crisis-cox-s-bazar-14-january-2018>.

Johannessen, Åse, Julie Patinet, William Carter, and Jenny Lamb. "Sustainable sanitation for emergencies and reconstruction situations." Sustainable Sanitation Alliance (SuSanA). April 2012. [http://www.susana.org/\\_resources/documents/default/2-797-9--wg08-en-susana-factsheet-wg08-emergencies-final-ci-tms-evmx.pdf](http://www.susana.org/_resources/documents/default/2-797-9--wg08-en-susana-factsheet-wg08-emergencies-final-ci-tms-evmx.pdf).

Kinstedt, Katherine. "The Application of Ecological Sanitation for Excreta Disposal in Disaster Relief: Experience, Selection and Design." Institute of Wastewater Management and Water Protection. 2012. [http://www.susana.org/\\_resources/documents/default/2-1506-ecosan-in-disaster-reliefkinstedt.pdf](http://www.susana.org/_resources/documents/default/2-1506-ecosan-in-disaster-reliefkinstedt.pdf).

Kouadio, I.K., Kofi, A.K., Attoh-Toure, H., Kamigaki, T., & Oshitani, H., "Outbreak of measles and rubella in refugee transit camps," *Epidemiology and infection*, 2009, 137 (11): 1593-1601.

Luff, Richard. "Compendium of WASH in Schools Facilities in Emergencies." UNICEF. December 2012. [http://www.susana.org/\\_resources/documents/default/2-1683-wins-facilities-in-emergencies-unicef-draft-2012.pdf](http://www.susana.org/_resources/documents/default/2-1683-wins-facilities-in-emergencies-unicef-draft-2012.pdf).

Lüthi, Christoph, Antoine Morel, Elizabeth Tilley, and Lukas Ulrich. "Community-Led Urban Environmental Sanitation Planning: CLUES Complete Guidelines for Decision-Makers with 30 Tools." Swiss Federal Institute of Aquatic Science and Technology (Eawag), Water Supply and Sanitation Collaborative Council (WSSCC), and UN HABITAT. 2011. [http://www.eawag.ch/fileadmin/Domain1/Abteilungen/sandec/schwerpunkte/sesp/CLUES/CLUES\\_Guidelines.pdf](http://www.eawag.ch/fileadmin/Domain1/Abteilungen/sandec/schwerpunkte/sesp/CLUES/CLUES_Guidelines.pdf).

Mamani, Grover, Jan Spit, and Ednah Kemboi. "Speedy Sanitation and Stabilization." Humanitarian Innovation Fund, WASTE, London School of Hygiene and Tropical Medicine, and Enhancing Learning & Research for Humanitarian Assistance, Sanitation Innovations for Humanitarian Disasters in Urban Areas. May 2016. [https://emergencysanitationproject.wikispaces.com/file/view/HIF%20Line%201%20Speedy%20Sanitization%20%26%20Stabilization%20Final\\_Report\\_draft\\_23.5.2016.pdf/607343967/HIF%20Line%201%20Speedy%20Sanitization%20%26%20Stabilization%20Final\\_Report\\_draft\\_23.5.2016.pdf](https://emergencysanitationproject.wikispaces.com/file/view/HIF%20Line%201%20Speedy%20Sanitization%20%26%20Stabilization%20Final_Report_draft_23.5.2016.pdf/607343967/HIF%20Line%201%20Speedy%20Sanitization%20%26%20Stabilization%20Final_Report_draft_23.5.2016.pdf).

Mara, Duncan. "Domestic Wastewater Treatment in Developing Countries." Earthscan. 2003. [http://www.pseau.org/outils/ouvrages/earthscan\\_ltd\\_domestic\\_wastewater\\_treatment\\_in\\_developing\\_countries\\_2003.pdf](http://www.pseau.org/outils/ouvrages/earthscan_ltd_domestic_wastewater_treatment_in_developing_countries_2003.pdf).

Monvois. Jacques, Julien Gabert, Clément Frenoux, and Marie Guillaume. "Water and Sanitation for All Methodological Guide: How to select appropriate technical solutions for sanitation." Concerted Municipal Strategies (CMS), a program coordinated by the Municipal Development Partnership (MDP) and programme Solidarité Eau (pS-Eau). 2014. [https://www.pseau.org/outils/ouvrages/pdm\\_ps\\_eau\\_cms\\_guide\\_n\\_4\\_how\\_to\\_select\\_appropriate\\_technical\\_solutions\\_for\\_sanitation\\_2010.pdf](https://www.pseau.org/outils/ouvrages/pdm_ps_eau_cms_guide_n_4_how_to_select_appropriate_technical_solutions_for_sanitation_2010.pdf).

Murray A, Mekala GD, Chen X, "Evolving policies and the roles of public and private stakeholders in wastewater and faecal-sludge management in India, China and Ghana," *Water International*, 2011, 36(4):491–504.

Oyoo R, Leemans R, Mol a. P.J., "Future projections of urban waste flows and their impacts in African

metropolises cities," *International Journal of Environmental Research*, 2011, 5(3): 705–24.

Parkinson, Jonathan, Christoph Lüthi, and Dirk Walther. "Sanitation 21: A Planning Framework for Improving City-wide Sanitation Services." *International Water Association (IWA), Swiss Federal Institute of Aquatic Science and Technology (Eawag), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)*. 2014. [http://www.susana.org/\\_resources/documents/default/3-2712-7-1484539315.pdf](http://www.susana.org/_resources/documents/default/3-2712-7-1484539315.pdf).

Peal A, Evans B, Blackett I, Hawkins P, "Fecal Sludge Management : A Comparative Analysis of 12 cities," *Journal of Water, Sanitation and Hygiene for Development*, 2014, 4 (4): 563-575, <http://eprints.whiterose.ac.uk/78124/1/FSM%20paper%202%20comp%20analysis%202014%2002%2021%20FINAL.pdf>.

Reed, Bob. "Emergency Excreta Disposal Standards and Options for Haiti." WEDC (Water, Engineering and Development Centre) Loughborough University. April 2010. [http://www.susana.org/\\_resources/documents/default/2-1549-draft-report424-cropped.pdf](http://www.susana.org/_resources/documents/default/2-1549-draft-report424-cropped.pdf).

Reed, Bob. "Technical options for excreta disposal in emergencies." World Health Organization (WHO) and Water, Engineering and Development Centre (WEDC), *Technical Notes on Drinking Water, Sanitation, and Hygiene in Emergencies*. July 2013. [http://www.who.int/water\\_sanitation\\_health/emergencies/WHO\\_TN\\_14\\_Technical\\_options\\_for\\_excreta\\_disposal.pdf](http://www.who.int/water_sanitation_health/emergencies/WHO_TN_14_Technical_options_for_excreta_disposal.pdf).

Robbins, David M. and Grant C. Ligon. "How to Design Wastewater Systems for Local Conditions in Developing Countries." *Water Intelligence*. 2014. <https://www.iwapublishing.com/books/9781780404769/how-design-wastewater-systems-local-conditions-developing-countries>.

Rohwerder, Brigitte. "Solid waste and faecal sludge management in situations of rapid, mass displacement." *Helpdesk Report, K4D Knowledge, Evidence and Learning for Development*. 30 October 2017. <http://www.gsdrc.org/wp-content/uploads/2017/11/228-solid-waste-and-faecal-sludge-management-in-situations-of-rapid-mass-displacement.pdf>.

Rottier, Erik. "Disaster Risk Reduction and Water, Sanitation and Hygiene: Comprehensive Guidance." *Global WASH Cluster*. 2011. [https://www.preventionweb.net/files/25105\\_disasterriskreductionandwashcompreh.pdf](https://www.preventionweb.net/files/25105_disasterriskreductionandwashcompreh.pdf).

Schneider, Claudia. "Sustainable Reconstruction in Urban Areas: A Handbook." *Skat – Swiss Resource Centre and Consultancies for Development and International Federation of Red Cross and Red Crescent Societies*. 2012. <http://www.ifrc.org/PageFiles/95526/publications/Urban%20reconstruction%20Handbook%20IFRC-SKAT.pdf>.

Scott, Rebecca and Brian Reed. "Emptying pit latrines." *WEDC Mobile Note 27, Water, Engineering and Development Centre (WEDC), Loughborough University*. 2017. <https://wedc-knowledge.lboro.ac.uk/resources/e/mn/027-Emptying-pit-latrines.pdf>.

Shrestha, Rajendra, Bipin Dangol, and Reetu Rajbhandari. "Faecal Sludge Treatment and Resource Recovery: A case study from Lubhu, Nepal." *ABZ Spiez, Switzerland, June 26th to 30th 2017*. <https://www.shareweb.ch/site/Water/resources/RsEAU%20Library/Aguasan%20Workshop%202017/Shrestha%20Rajendra%20Faecal%20Sludge%20Treatment%20and%20Resource%20Recovery%20Nepal.pdf>.

Singh, Shubhra , Sujaya Rathi, Sonali Patro, Shramana Dey, and Riya Rachel Mohan. "Technology Options for the Sanitation Value Chain." *Center for Study of Science, Technology and Policy (CSTEP)*. July 2016. [http://cstep.in/uploads/default/files/publications/stuff/CSTEP\\_Technology\\_Options\\_for\\_the\\_Sanitation\\_Value\\_Chain\\_Report\\_2016.pdf](http://cstep.in/uploads/default/files/publications/stuff/CSTEP_Technology_Options_for_the_Sanitation_Value_Chain_Report_2016.pdf).

Strande, Linda, Mariska Ronteltap, and Damir Brdjanovic. "Faecal Sludge Management: Systems Approach

for Implementation and Operation.” IWA Publishing. 2014. [http://www.eawag.ch/fileadmin/Domain1/Abteilungen/sandec/publikationen/EWM/Book/FSM\\_Book\\_LowRes.pdf](http://www.eawag.ch/fileadmin/Domain1/Abteilungen/sandec/publikationen/EWM/Book/FSM_Book_LowRes.pdf).

Surinkul N and Koottatep T, “Advanced Sanitation Planning Tool with Health Risk Assessment: Case Study of a Peri-Urban Community in Thailand,” *Human and Ecological Risk Assessment: An International Journal*, 2009, 15(5): 1064–77.

Thammarat Koottatep, Paul Jacob, and Atitaya Panuvatvanich. “Practical booklet on technical assessment and planning guidelines for fecal sludge management.” Asian Institute of Technology and NCCR. 2014. [https://www.researchgate.net/publication/263619169\\_Practical\\_booklet\\_on\\_technical\\_assessment\\_and\\_planning\\_guidelines\\_for\\_fecal\\_sludge\\_management](https://www.researchgate.net/publication/263619169_Practical_booklet_on_technical_assessment_and_planning_guidelines_for_fecal_sludge_management).

Tilley, Elizabeth, Linda Strande, Christoph Lüthi, Hans-Joachim Mosler, Kai M. Udert, Heiko Gebauer, and Janet G. Hering. “Looking beyond Technology: An Integrated Approach to Water, Sanitation and Hygiene in Low Income Countries.” *Environmental Science and Technology*. 2014. [http://www.eawag.ch/fileadmin/Domain1/Abteilungen/sandec/publikationen/EWM/Sustainable\\_Implementation/Looking\\_beyond\\_Technology.pdf](http://www.eawag.ch/fileadmin/Domain1/Abteilungen/sandec/publikationen/EWM/Sustainable_Implementation/Looking_beyond_Technology.pdf).

Tilley, Elizabeth, Lukas Ulrich, Christoph Lüthi, Philippe Reymond and Christian Zurbrügg. “Compendium of Sanitation Systems and Technologies.” Swiss Federal Institute of Aquatic Science and Technology (Eawag). 2016. <http://www.iwa-network.org/wp-content/uploads/2016/06/Compendium-Sanitation-Systems-and-Technologies.pdf>.

Van Den Noortgate, Joos and Peter Maes. “Public Health Engineering in Precarious Situations.” *Médecins Sans Frontières*. 2010. [http://refbooks.msf.org/msf\\_docs/en/public\\_health/public\\_health\\_en.pdf](http://refbooks.msf.org/msf_docs/en/public_health/public_health_en.pdf).

WASTE, Netherlands Red Cross, and Aldus Bouwinnovatie. “Requirements Faecal Sludge Treatment and disposal in emergency situations.” November 2012. [https://emergencysanitationproject.wikispaces.com/file/view/SpecsTreatmentandDisposal\\_FinalDraftSuSanAForum\\_07-11\\_12.pdf](https://emergencysanitationproject.wikispaces.com/file/view/SpecsTreatmentandDisposal_FinalDraftSuSanAForum_07-11_12.pdf).

Williams, Ashley R. and Alycia Overbo, “Unsafe return of human excreta to the environment: A literature review,” the Water Institute at UNC, Chapel Hill, NC, USA , 2015, [https://waterinstitute.unc.edu/files/2015/07/BMGF\\_UnsafeReturn\\_LitReview\\_UNC\\_16June15.pdf](https://waterinstitute.unc.edu/files/2015/07/BMGF_UnsafeReturn_LitReview_UNC_16June15.pdf).

Wisner, B. and J. Adams. “Environmental health in emergencies and disasters: a practical guide.” World Health Organization. 2002. [http://apps.who.int/iris/bitstream/10665/42561/1/9241545410\\_eng.pdf?ua=1](http://apps.who.int/iris/bitstream/10665/42561/1/9241545410_eng.pdf?ua=1).

World Health Organization. “Chapter 4: Excreta Disposal” in *Healthy Villages: A Guide for Communities and Community Health Workers*. 2002. [http://www.who.int/water\\_sanitation\\_health/hygiene/settings/hvchap4.pdf](http://www.who.int/water_sanitation_health/hygiene/settings/hvchap4.pdf)