

Use of process guides for comprehensive urban sanitation technology decision-making: practice versus theory

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Abstract

The need for taking a comprehensive perspective when selecting sanitation technologies in developing contexts has been increasingly discussed. Process guides, which are planning documents describing steps decision-makers need to take, represent one possible contribution to attain comprehensive decisions. An interview study with sanitation experts was carried out to understand the importance and real use of such planning documents for the selection of urban sanitation technologies in developing countries, as well as to understand the relevance and actual consideration of decision elements and to identify recommendations for taking them into account. Although process guides appear to be helpful to guide planning processes, their use does not seem to be common practice. It is actually doubtful that the sector is currently able to make better use of those documents in the form that they exist today. Furthermore, the importance of a comprehensive approach is generally recognised, but relevant decision elements were said to be often neglected. Finally, results from the interview analysis also emphasised the need for a conducive policy environment, namely by developing appropriate institutional and legal frameworks, and by incentivising planners and decision-makers to further adapt to comprehensive decision-making practices that effectively improve the sanitation situation in developing countries.

Keywords: Comprehensiveness; Decision-making; Process guides; Technology selection; Urban sanitation

Introduction

Reflecting the crucial importance of access to sanitation on conferring health protection, dignity and appropriate living conditions, sanitation has been recently declared by the United Nations as an

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independent human right (Meier et al., 2013). However, at the moment, 2.4 billion people still do not have access to improved sanitation facilities, concentrated mostly in Sub-Saharan Africa and Southern Asia, where only 30% and 47% of the population is serviced by improved sanitation, respectively (WHO & UNICEF, 2015). This situation, particularly severe in urban areas of developing countries, is blamed on a variety of reasons, including: unrealistic policies that do not match local practice and people's needs (Nawab & Nyborg, 2009); political pressures; lack of planning culture (Tayler & Parkinson, 2005); limited technical capacity; inappropriate management practices (Mugabi et al., 2007); as well as limited viability of currently available technologies in the local context or disregard of alternative solutions (Szántó et al., 2012).

In order to overcome the frequent failures of conventional approaches, the need to plan sanitation services from a holistic perspective that correlates with factors affecting service provision has been increasingly discussed (e.g. Tiberghien et al., 2011; Strande, 2014; WHO, 2015; Larsen et al., 2016). In particular, technology selection is one of the critical decisions during planning processes that needs to move beyond traditional engineering approaches (McConville et al., 2011). As an example, the selection of sanitation technologies could benefit by including other additional decision factors such as the local market demand for the reuse of sanitation products (Diener et al., 2014).

It is interesting to note that the move towards broader thinking in sanitation planning is actually in line with current trends in other sectors, such as urban planning and water management. For instance, many voices in science and policy advocate for a paradigm shift from the conventional fragmented approach of urban water management to an integrated approach (e.g. Pahl-Wostl et al., 2011; Larsen et al., 2016). In particular, the importance of comprehensive planning in the sanitation sector of developing countries has been manifested in an increased number of references to diverse elements that should be taken into account. A previous study (Ramôa et al., 2016) divided these elements into four categories of comprehensiveness: (1) Multi-sectoral approach recognising the interrelations between sanitation and other sectors, such as water supply and solid waste management; (2) Multiplicity of sustainable dimensions; (3) System analysis perspective recognising the distinct segments of the sanitation supply chain, from the user interface to final disposal or reuse of sanitation products; and (4) Coexistence of planning scales, such as the city-wide and the localised small-scale (Table 1).

There is a variety of literature to justify the inclusion of these categories and their specific elements in planning processes (e.g. McConville, 2010; Oosterveer & Spaargaren, 2010; Lüthi et al., 2012; Maurer et al., 2012). However, anecdotal evidence suggests that this rarely happens in the field, particularly in developing contexts. There tends to be a lack of integration between the various sanitation-related sectors, usually resulting from the fact that they are run by different agencies or institutions (Lüthi et al., 2012), which is further complicated by the project-focused and sectoral nature of development assistance (Sherpa et al., 2012). Decision-making often fails to include all key sustainability areas into decision processes (Barnes & Ashbolt, 2006), since decisions have traditionally emphasised function, safety and cost–benefit analysis, thus routinely excluding many other relevant factors (Guest et al., 2009). The selection of sanitation systems also seems to lack consideration of all segments of the sanitation supply chain (Maurer et al., 2012). In addition, sanitation approaches not accounting for the high heterogeneity of household needs and preferences within cities still dominate much of sectoral planning (Lüthi et al., 2012).

In order to overcome these challenges and to increase comprehensive decision-making, many experts have suggested the use of sanitation process guides, i.e. step-wise planning documents describing steps decision-makers need to undertake when planning for sanitation. Such documents have been published

Table 1. Categories and specific decision elements often recommended for inclusion in urban sanitation decision-making in order to increase comprehensiveness (based on Ramôa et al., 2016).

Category	Decision element
Multi-sectoral approach <i>Sanitation planning recognises and includes linkages to other sectors</i>	<i>Water supply</i> <i>Stormwater drainage</i> <i>Solid waste management</i> <i>Agriculture</i> <i>Energy</i> <i>Spatial planning</i>
Multiplicity of sustainable dimensions <i>Sanitation planning recognises influences from all dimensions of sustainability and the need to positively impact them</i>	<i>Technology and operation</i> <i>Financial and economic issues</i> <i>Institutional aspects</i> <i>Socio-cultural aspects</i> <i>Environment and natural resources</i> <i>Health and hygiene</i>
System analysis perspective^a <i>Sanitation planning recognises and specifies complementary solutions for each segment of the supply chain</i>	<i>Interface/Collection</i> <i>Sludge emptying</i> <i>Sludge/Wastewater transport</i> <i>Sludge/Wastewater treatment</i> <i>Sludge/Wastewater disposal/reuse</i>
Coexistence of planning scales <i>Sanitation planning recognises different applicable intervention scales</i>	<i>City-wide scale</i> <i>Localised small-scale</i>

^aThe division of sludge/wastewater intends to distinguish dry sanitation systems, whose main product is sludge, from water-based sanitation systems, which result in the production of wastewater.

by international organisations, such as the World Bank or the International Water Association, or research institutions like Sandec-Eawag or pS-Eau. They are generally targeted at sanitation professionals working in developing countries and are specifically oriented towards the selection of technologies (e.g. WSP, 2008; pS-Eau, 2012), or towards the development of general strategies for improving sanitation, either through a city-wide scale (e.g. IWA, 2006) or community-based (e.g. Lüthi et al., 2011). These documents present interesting planning features, such as encouragement to consider the users' interests and stakeholders' capacities (IWA, 2006), involvement of various stakeholders on strategic planning (WB, 2007), particular attention to poor and unplanned areas (Lüthi et al., 2011), and emphasis on the need for coherence of different solutions within the same city (pS-Eau, 2012). In particular, process guides provide basic guidance on the consideration of the above-mentioned decision elements for the selection of sanitation technologies, namely questions to orient decisions, tables, decision trees or multi-criteria procedures (Ramôa et al., 2016).

Nevertheless, a mismatch between theoretical guidelines and implemented practice has been documented in the sanitation sector (Barnes & Ashbolt, 2006; McConville, 2010). Planning and decision-making processes are actually still being performed relatively poorly in sanitation in developing countries, frequently lacking transparency and accountability and typically fed by incomplete, inaccurate and outdated data (Giné-Garriga et al., 2015). Finally, it has also been emphasised that planning and decision-making results are generally limited until policy and government issues are dealt with

(Rakodi, 2001). In this context, the following questions arise around the potential use of process guides for comprehensive urban sanitation technology decision-making: Is the sector interested and able to make better use of process guides? Which decision elements are most important to account for? How to improve their consideration? Which interventions, particularly policy-related, are useful for making better use of comprehensive process guides?

To answer those questions, an interview study with key informants in the sector was carried out. The results section of this paper discusses whether urban sanitation process guides are actually needed and used to support comprehensive decisions in developing countries. Then, the opinions of sanitation practitioners on the relevance and actual consideration of decision elements, as well as general suggestions for dealing with them, are explored. A subsequent section identifies recommendations for policy development that are believed to facilitate the appropriate consideration of relevant decision elements. This work is thus expected to help clarify the potential use of planning documents to improve urban sanitation decision-making in developing countries, namely by discussing their characteristics and the eventual external conditions that could improve their successful uptake. Ultimately, it aims to contribute to current debates on the need for comprehensiveness in sanitation decision-making, as well as the mismatch between theoretical planning guidelines and implemented practice.

Methodology

An interview study with sanitation experts having international experience in the sanitation sector was carried out in an attempt to analyse urban sanitation technology decision-making in developing countries. Semi-structured interviews were considered the most appropriate form of interview as they allow the flexibility needed to capture experiences and recommendations from practitioners. The interviews were divided into two parts. Firstly, interviewees were questioned about the importance, limitations and real use of process guides to support comprehensive decisions. Secondly, interviewees were asked whether specific decision elements (Table 1) are considered to be relevant in sanitation decisions, how they are taken into account, the main challenges that arise when trying to consider them, and approaches for improving their consideration.

A purposive sampling method was used to select experts who are knowledgeable on sanitation planning and decision-making processes. Interviewing different types of stakeholders, i.e. experts with different responsibilities, from distinct networks and working in diverse contexts, helped to reduce the potential bias of the analysis. A total of ten interviews were then conducted with international experts working with governments, utilities, academia, research and financial institutions, but also with development agencies such as BORDA and GIZ. The majority of interviewees have worked in more than one world region, so, in total, eight informants have worked in Asia (e.g. Nepal, India, Vietnam, Indonesia, Tajikistan, Pakistan), six in Africa (e.g. Tanzania, Zambia, Egypt, Ethiopia), and two in South America (e.g. Brazil, Colombia, Mexico). Of the ten interviewees, five were involved in the development and/or implementation of recent process guides such as IWA (2006), World Bank (2007), WSP (2008), Lüthi *et al.* (2011) and pS-Eau (2012). The results from these five interviews particularly allowed for identification of difficulties found in implementation of such documents. Five other key informants not using these process guides were also selected for the interview study in order to learn from broader experiences. The time required to cover all the decision elements under analysis during the interviews did not allow detailing interesting case studies, but rather gave a broad overview of common practices and suggested improvements.

Interviews were then coded regarding the different elements of analysis, and information was accordingly analysed with caution about how far the obtained findings could be generalised. The responses related to the importance and actual consideration of decision elements were translated to percentages and then represented in graphs to allow an easier interpretation of results.

Results: use of process guides to support comprehensive decisions

This section presents the informants' opinions on how important process guides are considered to be and whether such documents are actually used to support comprehensive decisions.

Importance and limitations of process guides

All the interviewees recognised that, in principle, process guides may be helpful to guide the planning process and structure the decision steps, or as a background reference to assist in the consideration of important decision aspects. Process guides are also expected to overcome the existing lack of awareness of viable options and to build coherence of solutions within the city. Nevertheless, concerns were expressed that some process guides may be too complex and unrealistic when they assume more capacity and planning culture than actually exist on the ground. Conversely, it appears that such documents are also often too simplistic so that not all important factors are considered, e.g. disregarding economic implications or the potential for resources' recovery of certain technical solutions. Other process guides are rather frameworks than guides and not operational enough to be followed as a step-wise process. Moreover, it was argued that planning documents frequently lack information regarding appropriate contexts for each technological option.

In addition, it was agreed by all interviewees that improvements in sanitation services are not dependent only on the use of process guides for the selection of technologies. For instance, it was noted that people using process guides need to know how to adapt them to context-specific situations, as the documents tend to generalise situations that have enormous variations. Some interviewees stressed that technology selection, at all levels of decision-making from household to municipal or higher, is often not based on real understanding of the situation or feasible options. On the contrary, decision-makers should start the planning process by having a deep understanding of the situation and the priorities of the communities. In addition, decision-makers should not underestimate the needed institutional changes or assume that the communities and the stakeholders have the required knowledge. It was also mentioned that it is important to take the time needed for planning while avoiding a drawn-out process where the momentum is lost and participants lose trust. In addition, it is important to clearly identify all potential conflicts and facilitate the willingness of stakeholders to work together.

Use of process guides

With the exception of the informants applying Lüthi *et al.* (2011) and pS-Eau (2012), the interview study showed no particular evidence of the general use of other process guides for the selection of sanitation technologies. Some informants believe this is probably due to the fact that entities publishing these guides – Eawag-Sandec and pS-Eau, respectively – are research institutions interested in applying their methodologies and which have resources available to that end. However, it was also claimed that

some current applications of such planning documents are external to these institutions, and that many organisations are becoming increasingly aware of new alternatives to planning approaches.

In contrast, it seems that use of the other process guides (i.e. IWA, 2006; World Bank, 2007; WSP, 2008) has been quite limited. Some informants explained that those documents might not be disseminated enough and their use is not compulsory. Other mentioned aspects to justify the low usage of process guides were that target users do not have the interest, or the habit of reading these documents, or they might not read English, which is often the language in which guides are written. Furthermore, engineers and planners usually have a tacit knowledge of the technical options based on where they have previously worked or what they were taught, for instance, at the university. As such, in contexts characterised by a lack of planning culture and weak technical capacity, standard solutions are commonly selected or solutions from other cities are simply copied. In addition, in face of economic constraints, available funds are often primarily used to build infrastructure, and time and money are not spent on detailed planning processes. Another mentioned reason for the limited sectoral planning guidance relates to the fact that projects from donors, public and private agencies are sometimes not coordinated enough. Instead, such entities have their own and independent project cycle, internal procedures and implementation horizons.

Decision-makers may find other difficulties in making use of process guides to make rational and comprehensive choices. Indeed, final decisions may be influenced by technology providers interested in selling their equipment and/or doing works. In such cases, it might happen that only one technology is chosen to ensure providers' economic gains, instead of considering a range of technologies that might better suit communities. Moreover, decisions may be imposed by higher levels of government, namely through official standards or reference books that prescribe specific technologies, which may be inadequate. Development agencies and/or financial institutions may also influence decisions, for instance, when funding is earmarked for specific technologies, giving no space for other options. In other situations, reports are prepared by consultants who may decide which technologies to recommend under constraints set by donors.

Furthermore, the types of toilet and possibly some form of transport for sanitation products are often decided by households, who may not follow what might have been suggested as a result of a planning process. Households may be influenced by non-governmental organisations (NGOs), landlords and/or builders providing advice not necessarily based on an understanding of the involved technicalities, which may lead to non-functional systems. As an example, a city-wide wastewater collection system may be designed based on a predicted volume of captured wastewater, while at the same time NGOs encourage low-flush and dry toilets, thus potentially affecting the performance of the wastewater system.

Finally, some interviewees gave suggestions for increasing the use of process guides. Such documents could be made more interactive and animated, taking, for instance, the form of a CD that would not take too much time to be watched. They could be distributed in conferences, through the internet and directly to local service providers. Other informants recommended that Terms of References for infrastructure contracts could specify the use of certain planning frameworks, so that their application would be guaranteed. Technical support during implementation of process guides also seems to be important.

Results: comprehensiveness in sanitation decision-making

This section presents the results of the interview analysis on the relevance and actual consideration of specific comprehensive decision elements in sanitation planning, based on the categories outlined in Table 1.

Multi-sectoral approach

Key informants generally agreed on the potential relevance of integrating sanitation-related sectors into the selection process of sanitation technologies, although defending different levels of priority based on the context specificity of each situation (Figure 1). In particular, spatial planning was considered to be always relevant to account for, especially in what concerns land tenure, land and house ownership, and density aspects. The importance of considering sanitation and solid waste management sectors together was stressed by almost all informants based on the fact that solid waste often ends up causing blockages or emptying problems in pits, tanks, drains or pipes. Synergies were also said to potentially exist, e.g. in waste transportation. The general agreement on the importance of considering water supply when selecting sanitation technologies is not only due to the fact that present and future water consumption levels, water availability, and the modality of service provision may exclude some water-based sanitation options, but also, for instance, due to the potential for freezing of sewers in cold climates such as in Mongolia. Additionally, half of the respondents believe that stormwater is important to contemplate when taking sanitation decisions, due to potential problems with flooding of on-site facilities such as pit latrines and due to stormwater overflows from sewerage pipes collecting combined wastewater and stormwater, which may discharge in the environment without treatment. Additionally, around half of the respondents claimed that agriculture should be a pillar for any sanitation strategy. For instance, one interviewee gave the example of a project in Nala, Nepal, where urine-diverting toilets were built and the sludge used in a potato-growing area around this peri-urban settlement. Finally, energy issues were said to be relevant because in many places the electricity supply is intermittent and can easily break down, thus affecting sanitation systems, as well as due to the potential energy production obtained from sanitation products.

On the other hand, some interviewees believe that considering certain sectors might not be relevant when selecting sanitation technologies, which may potentially result from local specificities. For instance, water might be not so important in places where there are no major water constraints, such as in Kampala, Uganda. Stormwater drainage relevance was said to be highly dependent on rain patterns. Linking sanitation and agriculture was also mentioned to be not important in dense settlements, industrial areas or faecophobic cultures. In addition, some informants stated that expectations for energy generation should be kept realistic, since energy self-sufficiency of sanitation systems is still a long way from being proven. From another perspective, despite recent efforts towards integrated approaches, doubts also result from the fact that, if sectors are considered together, sanitation might be neglected in terms

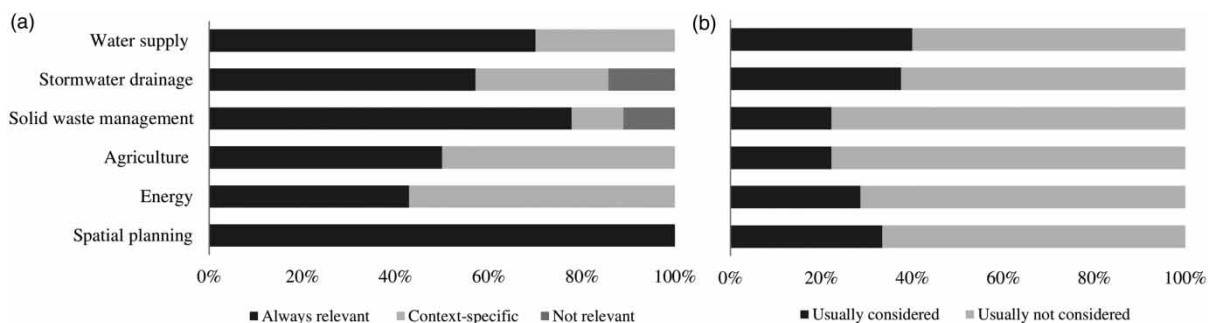


Fig. 1. Responses of the informants regarding the (a) relevance and (b) actual consideration of sanitation-related sectors.

of funding and general attention. One informant even believes that solid waste management does not have much influence on the selection of sanitation technologies, claiming that these two waste streams (faecal matter and solid waste) have different physical characteristics and hygiene risks.

When it comes to the practicalities of working on the ground, informants applying process guides take some sectors into account when analysing pros and cons of certain technologies, such as possible overflows from pit latrines in the case of linkages with stormwater management. However, in general, the systematic consideration of the multi-sectoral approach when taking sanitation decisions does not seem to be a common practice. Rather, linking to other sectors tends to occur haphazardly. Some of the frequently mentioned reasons are the lack of awareness and the fact that sectors are often institutionally separated. In particular, a lot of projects seem to recommend sanitation solutions that do not seriously reflect the water situation (e.g. sewerage-based solutions where there are water shortages, as it was said to have occurred in Kathmandu, Nepal). Critical factors for the consideration of agriculture and sanitation links include transport costs of sanitation products to the farmers, which undermine the economic viability of solutions, in addition to cultural aspects and perception issues. Although it appears that some projects already look at how energy losses can be minimised and how energy can be recovered, many others are still promoting energy-intensive technologies, especially for wastewater treatment. In fact, it seems to be easy to sell such technologies as viable and attractive because decision-makers are rarely able to take rational decisions due to lack of understanding of power usage and energy costs' implications. Finally, as regards spatial planning, peri-urban areas are usually not seen as legal settlements and, therefore, no formal infrastructure planning exists and no one takes responsibility for providing services in these areas. The problem is augmented as many cities do not have spatial development plans or the capacity to produce or apply them. Some efforts were mentioned, such as in Brazil, where some urban sanitation plans have started being developed together with other sectors like water supply, stormwater and solid waste, although this integration tends to be difficult due to the different responsible institutions.

A number of recommendations were given for improving cross-sectoral sanitation planning. Many informants suggested that practitioners should not predetermine which sectors to include in their analysis but rather to first understand what exists on the ground in every particular situation. This is expected to help avoid situations where solutions are decided without identifying all sectors and stakeholders that might be critically important, for instance, the end-users of sanitation products and municipal entities responsible for agriculture. It was emphasised to first define priorities that need to be fulfilled and only then define the secondary aspects. When participatory approaches are used, it seems to be important to be aware that the way questions are framed and presented might affect the way people answer them. Other recommendations included awareness-raising and capacity-building within the responsible institutions and universities about the long-term impacts of excluding some sanitation-related sectors in sanitation decision-making. Moreover, political decisions for the development and enforcement of relevant cross-sectoral regulations might also be crucial. Finally, it was also stressed that dissemination of good examples, viable in developing contexts, is needed at the city-level in order to help convince stakeholders of possible sectoral-combined solutions.

Multiplicity of sustainable dimensions

There was clear agreement on the importance of considering all sustainability dimensions when taking sanitation decisions, namely including operation and maintenance aspects, investment and recovery costs, institutional frameworks backed up by proper organisational plans, social practices,

behaviours, gender issues, the acceptability of certain technologies, and pollution and health risks (Figure 2).

Nevertheless, the unanimous recognition of the importance of considering sustainability dimensions does not seem to be mirrored by what generally happens in the field. Such dimensions do not seem to be systematically considered or compared in an objective way when decisions are taken. Even the multi-criteria decision-making tool included in Lüthi *et al.* (2011) has not been applied. In addition, some donors may define funding for infrastructural investment dependent on certain sustainable conditions, namely institutional and financial arrangements. However, they can be lenient and still disburse funds when those loan conditions are not fulfilled. Finally, the consideration of sustainability when taking decisions also seems to be dependent on other factors, which can also affect planning processes based on process guides, such as: the skills and capacities of entities involved in the decision process, for whom sustainability might be a novel concept; how well utility professionals and decision-makers comprehend the planning process; how the process itself is organised; the availability (and neutrality) of information; the way options are presented; how certain aspects are emphasised; preconceived ideas; and time, money, corruption and lobby from different stakeholders.

Furthermore, technical misconceptions appear to complicate the consideration of the multiplicity of sustainable dimensions. For instance, it was stressed that simpler technologies do not necessarily mean they are better managed. What sometimes happens is that they receive no maintenance at all, as exemplified by one interviewee referring to conclusions from a project about treatment technologies in India. On the other hand, there often seems to be insufficient attention given to the economic viability of projects, long-term financial implications of decisions, availability of additional funds, capacity of the communities to pay, and the development of proper business plans. It was also stated that it is frequently difficult to propose technological solutions whose costs are higher than existing ones, even when they provide higher levels of health and environmental protection. Another informant mentioned that it is difficult to quantify improvements from sanitation interventions and that politicians do not always use rational arguments to make choices.

In terms of the institutional aspects, technologies are often selected without considering who will be operating them, e.g. disregarding the capacities required for communities when they are responsible for system operation, or the involvement of the private sector. In addition, some possible reasons for neglecting social issues might be because planners and decision-makers start from theory rather than pragmatically looking at what happens on the ground, e.g. they do not make enough site visits, or they design projects based on conventional sanitation models that are not adapted to the local context.

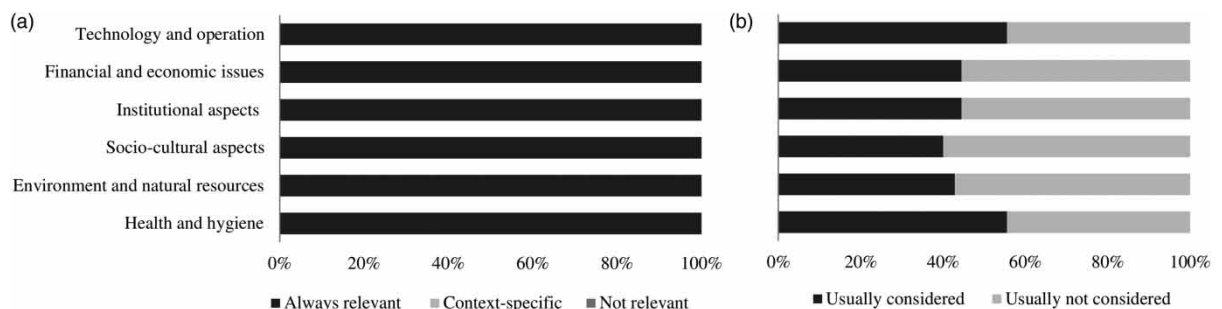


Fig. 2. Responses of the informants regarding the (a) relevance and (b) actual consideration of sustainable dimensions.

Regarding the environmental dimension, some informants believe that people are mainly worried about their own needs and not necessarily about the environment, except if poor sanitation is affecting their local surroundings. It also seems that the potential value of treated sanitation products (e.g. sludge as compost or biogas as energy) is not adequately considered. However, some cases exist where the environment is accounted for, e.g. when adequate national standards that enforce treatment quality are applied, when agencies (e.g. BORDA) prompt environmentally sound solutions such as the use of treated faecal matter, or when governments, such as in India, plan to eradicate practices such as the indiscriminate disposal of sludge. Finally, some informants stressed that health is not always a motivator for improving sanitation conditions because people may not understand the connections and tend to focus on more tangible motivators. The lack of consideration of health issues may also result from the assumption that providing sanitation will lead to the achievement of health goals, which may not necessarily happen, or even from difficulties in attributing health gains to sanitation.

Regarding the suggestions towards the increased consideration of the distinct dimensions of sustainability, various interviewees mentioned the need to be careful about complicating sanitation aims too much so that objectives end up failing completely. A balance is needed so that practitioners can be comprehensive enough in terms of sustainability without compromising immediate needs and avoiding short-term thinking that results in fragmented decisions. It was stressed that practitioners need to seriously look at what people already have, what their problems are, and then to think how their situation can actually be improved. Aiming at service provision and not only infrastructures was said to potentially contribute to the adequate consideration of sustainable issues. The importance of a broader-based, multi-disciplinary approach was also reinforced. For instance, practitioners from the social sciences might be needed to ease communication with the communities and between stakeholders. This should be accompanied by modifications on engineers' curriculum at universities in order to contain a broader spectrum of sanitation aspects, including social and economic disciplines. In addition, experts also see gender-sensitive and community participation as critical for capturing sustainability issues in the decision-making process. Other interviewees believe that practitioners should be given the opportunity to attend conferences and capacity-building programmes, provided that they are linked with practice. Furthermore, some issues, such as environmental concerns, might have to be addressed at a higher level, both national and international.

System analysis perspective

Informants generally agreed on the importance of the system analysis perspective (Figure 3). The general impression is that this aspect has been increasingly recognised in recent years, probably due to evidence of its importance and the dissemination of this concept. For instance, the Compendium of Sanitation Systems (Tilley et al., 2014, 2nd edition), referred to in the CLUES process guide (Lüthi et al., 2011), provides a significant contribution in the systematic analysis of sanitation technologies. International financing organisations are also looking more seriously at developing the whole sanitation chain.

However, in a majority of situations (e.g. when funds are limited), segments are still not considered equally. The situation is particularly worrisome with regard to the sludge segments and the disposal/reuse of wastewater. Some experts justified this lack of system thinking by pointing at the complexity of the problem itself, e.g. existence of unplanned settlements, and lack of funds, capacity, expertise, political will and inexistence of comprehensive business plans. It was also stressed that professionals

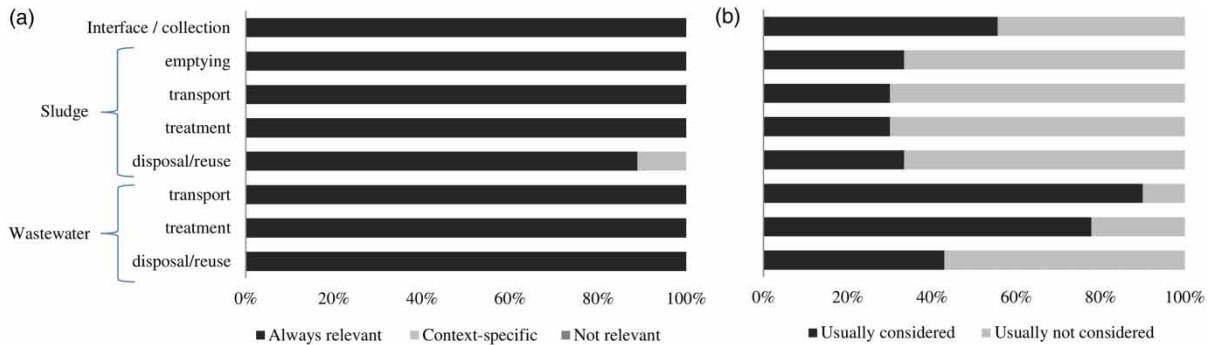


Fig. 3. Responses of the informants regarding the (a) relevance and (b) actual consideration of sanitation segments.

trained in conventional-style situations do not have much knowledge of the particularities of peri-urban contexts, where the system point of view is particularly relevant.

In particular, although the interface/collection segment may be the focus of projects from NGOs, research entities or public institutions, it is many times undertaken by the communities themselves, meaning that it is not always considered in project planning. Additionally, while the majority of urban dwellers generate sludge (instead of wastewater) and water availability is not always easily guaranteed, few places seem to exist where the management of sludge from non-water-based sanitation systems has been considered in decision-making. One of these few cases is that of Indonesia, as referred to by one interviewee, where sewerage has not been promoted and, as such, people do not come with a mindset that it is the solution, thus allowing more attention to on-site systems. In some other places, decision-makers are beginning to take sludge segments (including emptying, transport, treatment and disposal/reuse) more seriously, although it is expected to be a slow process of changing people's minds. In fact, despite the apparent increasing interest in these segments, there appears to be a general bias away from them. For instance, some development agencies tend to have a preconceived idea of the technology to be implemented, usually linked to investments on wastewater transportation and treatment, which may constrain the work of consultants and other practitioners interested in investigating other options for sludge segments. In other cases, decision-makers seem to see non-water-based solutions as temporary as they have the ambition of providing sewerage to everyone.

The wastewater segments, particularly the transport and treatment of wastewater, seem to receive more attention in the field, especially since many municipalities and financial institutions continue to demand sewer-based solutions. This may be because sewerage generally attracts projects and corresponds to the standards of developed countries. Concerning wastewater transport, some particular sewerage-related problems appear to be increasingly placed on the agenda, namely the need to increase the number of household connections and the difficulties in making sewers more suitable for poor communities. Moreover, decisions on wastewater treatment usually do not seem to be in accordance with other segments, leading to environmental disposal problems. For instance, one informant gave the example of Nakuru, Kenya, where a treatment plant became overloaded due to too many sewerage connections. In addition, it was mentioned that many practitioners aim for conventional wastewater treatment systems, but build only for primary treatment, mainly due to lack of funds, which also leads to environmental problems. Finally, there seems to be little consideration of reuse of sanitation products, as a lot of unplanned, informal and potentially unsafe practices still take place.

When asked about what could be done to improve the consideration of the system analysis perspective, some informants expressed the need to first consider what already exists, rather than reinvent solutions, since people generally already have some kind of infrastructure. Some experts felt that decisions should be made more systematically, and systems designed not only based on the user requirements, but also on the end-use opportunities of sanitation-outcome products. Whenever projects are prepared, designers should try to integrate segments and avoid individual-element thinking. International players were said to possibly contribute to creating good practices. For example, high-level meetings that bring ministers, donors and civil society were believed to constitute good opportunities to draw on these issues. It was mentioned that system thinking might improve once international agencies stop lending money for and promoting non-viable sewerage projects. Furthermore, as system thinking is more complicated to communicate, capacity-building is required, namely through more creative e-tools, e-training programmes and exchange visits to places where the system perspective has been adequately applied. Finally, it was also regarded that informal peri-urban areas need to be politically recognised, as well as the potential role of private operators to provide services related to the segments of the sanitation supply chain that are usually not covered by formal providers (e.g. sludge emptying and transportation).

Coexistence of planning scales

The majority of the interviewees believe that it would be possible and advisable to match and complement the two planning scales (Figure 4). On the one hand, the city-wide scale was said to be important for integration and coordination of small-scale actions in order to guarantee that there are no overlaps or incompatibilities. On the other hand, small-scale projects present the advantages of being closer to communities, thus helping to offer them ownership of decisions. In the opinion of one informant, the city-wide scale is too complex to plan for in some fast-growing cities and the focus should remain localised. However, another interviewee stated that the scales in planning are either too big or too small, suggesting there is not always the need to look at the whole city, but rather just to look at one part and gradually improve it.

In general, both planning scales appear to be usually taken into account in the work experiences of the interviewees, but often not jointly considered. The coexistence of planning scales seems to be a challenge when there are many non-coherent projects coming from different partners, or fragmented donor support. In fact, the general opinion is that, although there are projects at both scales, integrated investments across scales usually do not happen. Challenges that are characteristic of planning within these scales were also mentioned. In particular, one informant stressed that small-scale interventions have an intensity that may not be applicable to the entire city because they are too resource-intensive. In fact, typical community-development projects seem to involve a significant amount of effort and resources that would be difficult to replicate at the city level. Moreover, many small-scale localised

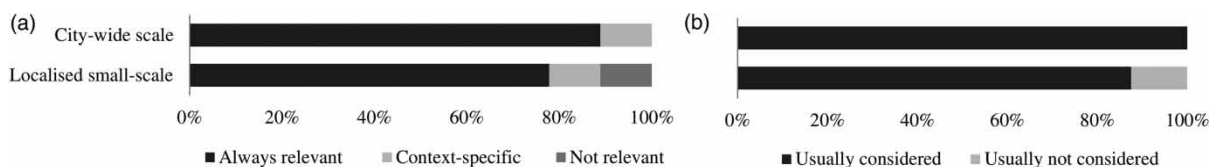


Fig. 4. Responses of the informants regarding the (a) relevance and (b) actual consideration of planning scales.

interventions correspond to decentralised solutions, which were identified by some informants as relevant options to further test and disseminate. Nevertheless, it was noted that few institutions have knowledge and/or experience of these technological options. Their increased consideration seems to be dependent on municipalities and other institutions that are willing to try innovative solutions.

In order to improve the consideration and integration of these two planning scales, informants mentioned the need to convince stakeholders that planning is important, to push them to think ‘out of the box’ and to be pro-poor. Attention was drawn to the need to think at the city-wide level from the beginning and then incorporate the diversity of conditions and corresponding solutions within the cities. In case of small-scale interventions, they should be in line with what is happening or planned at the wider scale. Also, guaranteeing that they are coordinated from the beginning of the decision process seems to be crucial. It was also stated that it might be advantageous to place extra resources on demonstration localised projects, warning however of the risk of creating dependency on resources that will probably never be available at large scale. Monitoring would thus be needed to understand what is going on during the demonstrations. In addition, challenges within decentralised systems need further consideration, ensuring that those systems are well managed, and experiences from operating them at a city-wide level disseminated. Finally, the informant who was less in favour of integrating planning scales suggested looking first at what would be the appropriate scale to work on and then possibly look at the complete system.

Policy implications for comprehensive decisions

The analysis under this section is especially relevant considering that policy sets the priorities and the allocation of resources for planning processes, programmes and services, being directly reflected in laws and regulations (Elledge, 2003). Regardless of the use of process guides, it is particularly important to explore how to inform policy development so that decision-makers can more easily consider relevant decision elements in a way that actually improves the existing sanitation situation. Indeed, the results of this interview study have made it clear that progress on sanitation is dependent not only on the best use of planning documents, but also on adaptations at the policy level.

On the one hand, the importance of a conducive policy environment, especially guaranteeing an adequate legal and institutional framework, was strongly supported by interviewees. This is expected to avoid the ineffective selection and implementation of decisions due to a policy context that is inappropriate for local specificities. In this regard, informants mentioned diverse proposals. Firstly, legislation and standards need to be adapted to the local contexts (e.g. including appropriate non-conventional technologies), and enforcement capacity has to be improved (for instance, regarding the appropriate reuse of sanitation products). Secondly, the status of the peri-urban informal areas needs to be recognised to facilitate the implementation of adequate solutions, thus allowing the consideration of certain often-disregarded decision elements, namely the sludge transportation and treatment segments and other issues of particular interest for these areas, such as social, economic and spatial planning aspects. Thirdly, policy intervention is required to overcome the fragmentation of responsibilities and to support informal providers to fill gaps in sanitation provision, namely making use of regulatory and economic instruments. Fourthly, some aspects or options usually ignored, namely environmental concerns or the alternative low-cost sanitation solutions, may benefit if addressed at a higher policy level, both international and national. Finally, another avenue for supporting the consideration of decision elements would be to continuously support capacity-building programmes that are relevant

for daily activities and local needs (e.g. through demonstration projects both at small scale and city-wide scale), thus improving the knowledge base and capacities of stakeholders.

On the other hand, key informants also presented suggestions for making policy more supportive of effective comprehensive decision-making processes. Summing them up, policies further need to incentivise planners and decision-makers to devote time and resources for planning in order to:

- clearly understand the local context, allowing the balanced identification of locally pertinent decision elements, by keeping sanitation objectives in focus and also avoiding complex, tedious and confusing decision-making processes, far ahead of available resources;
- increasingly engage with all relevant stakeholders in a coordinated and transparent way, assuming a stronger commitment, trust and sense of ownership of taken decisions;
- match decisions with appropriate capacities, local resources and funding strategies;
- continuously assess the implementation of process guides and/or applied solutions to learn about their real impacts; and
- disseminate successful examples of taken decisions as a way to contribute to their wider replication, although always accounting for local specificities.

Conclusions

This paper originates from the growing appeals for more integrated and comprehensive planning approaches. The undertaken interview study with international sanitation experts concluded that process guides have an important role to play in facilitating comprehensive decisions by creating awareness and building coherence in decision-making. Nevertheless, with some exceptions, it seems that actually getting them applied on the ground has been quite limited, mainly due to their time-consuming nature, and because they are usually not widely disseminated, and/or not suited to the default way that practitioners work. It is therefore doubtful that the sector is currently able to make better use of process guides in the form that they exist today. To counter this, research or funding institutions could adapt process guides so that they become more interactive, flexible and compatible with existing knowledge, capacities and working procedures. Interviewees also agreed that the use of these planning documents can be encouraged through further dissemination, and by translating them into different languages.

Another intriguing question in this study relates to the identification of decision elements that are most important to account for when planning for sanitation. While recognising that sanitation challenges are context-based and solutions are not necessarily replicable, there appears to be a broad consensus among interviewees that a comprehensive view of the sustainable dimensions, the sanitation supply chain and planning scales is usually crucial. Different arguments were used concerning the multi-sectoral approach, such that, depending on the context, some sectors might be more relevant to account for than others. Additionally, a lot of elements recognised as relevant were said to be neglected in the field. Even respondents using process guides revealed that it is not always simple to apply them, thus showing a clash between what is recommended and what is actually possible. Challenges to overcome include preconceived solutions, quality of available information, unpredictability of local conditions, available time, and existing skills and resources.

Furthermore, a focus in this interview analysis was oriented towards solutions for shaping the policy environment so that the consideration of relevant decision elements when selecting sanitation technologies is facilitated. Explored suggestions mainly focused on (i) developing an adequate legal and institutional framework and (ii) incentivising planners and decision-makers to further adopt efficient comprehensive decision-making practices.

Due to the importance of the topic under analysis, an in-depth analysis of cases where the comprehensive perspective was either successfully or unsuccessfully taken into account would be interesting to complement the broader view obtained from the current study. However, some challenges with attribution of positive or negative factors would have to be overcome. These include the common difficulties to gather information because there are no records or because data is not captured in the required manner (Busari, 2009). Also, caution is required regarding universally applicable solutions, as there is little evidence that successful interventions in a particular context are effective elsewhere (Hutton & Chase, 2016). Furthermore, other aspects deserve further research in order to qualify best practices on comprehensive sanitation planning. These aspects include analysis of the relative importance of the decision elements rather than only their absolute importance (especially important because such elements are likely to influence each other); a deeper understanding of the opinions from different stakeholders such as top decision-makers, namely regarding possible incentives for sound planning, such as peer pressure and financial incentives; and a broader range of countries of analysis. In addition, besides the crucial importance of technology selection on service provision, it would also be interesting to apply this conceptual study to other planning areas such as the selection of adequate institutional and financing models.

In conclusion, in view of the current appeals for comprehensive planning approaches to improve sanitation services in urban areas of developing countries, efforts are jointly required at two levels. On the one hand, process guides should be continuously improved and disseminated to provide more detailed guidance on planning, especially in view of the fact that none of the analysed urban process guides are considered ‘state-of-the-art’ as the planning approach ‘Community-Led Total Sanitation’ (CLTS) is in rural contexts. On the other hand, perhaps more importantly, an ‘enabling environment’, including political and financial support, is strongly required to overcome the significant blockages found in this sector, namely low political attention, the complexity of sanitation service provision, and the lack of a planning culture that promotes sound sectoral planning. This is believed to be fundamental to guarantee the effective uptake and successful implementation of process guides as a way to support comprehensive decisions.

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