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**ACCESS TO SANITATION AND SAFE WATER:
GLOBAL PARTNERSHIPS AND LOCAL ACTIONS**

Appropriate capacity development towards effective faecal sludge transport in cities of low-income countries

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Collection and disposal of human excreta present serious sanitation problems in most low-income countries' cities. Urban on-plot sanitation (OPS) focuses more attention on the construction of facilities than managing their contents. However, the need for faecal sludge (FS) collection and disposal in sustainability of urban OPS management for low-income countries has been clearly demonstrated in the literature. Expert and professional feelings express lack of capacity to deliver acceptable FS emptying and transport services. What is unclear is how capacity development should be executed in order to effectively address capacity concerns for FS emptying and transport. This paper therefore, tries to espouse the capacity development concerns that need considering in urban FS emptying and transport and offer some suggestions about how to tackle some of them

Introduction

On-plot systems are the predominant form of excreta disposal for the majority of urban dwellers in Africa, Asia and other low-income countries (Saywell, 2000). Several reasons may be ascribed to this: lack of water, adequate funds, expertise (technical and managerial) as well as relative ease of putting up the on-plot infrastructure individually without major governmental interventions as in sewerage reticulation systems. It is important to note that the completion and use of latrine infrastructure does not necessarily complete the sanitation management chain in the low-income countries. This is because, besides the latrine infrastructure, urban on-plot sanitation entail equally important facets such as excreta collection, transport, treatment, reuse, and disposal. Unfortunately, reports on these important services are appalling as untreated sludge is frequently discharged into the environment, causing pollution and other serious health effects (Montangero et al, 2002; Parkinson and Tayler 2003).

With on-plot facilities being the mainstay of urban sanitation milieu, latrine emptying will continue to play a key role for long time to come in low-income countries. Unfortunately capacity to deliver successful emptying and transport of faecal sludge (FS) from pits has been discouraging in many developing countries. Bucket and pit latrines fill up and overflow without being emptied (personal observation, 2007). Where emptying occurs, there is mess and lack of appropriate equipment and expertise for the job (Chaggu et al, 2002). There is also constant breakdown of emptying and transport machines with little or no chance for repair or replacement due to lack of funds and availability of spare parts. Information about various emptying and transport equipment and methods are scattered, disorganised and informal. Appropriate policy for emptying and transport is also non-existent (Jones 2005; Chaggu et al 2002). Users' poor knowledge and attitude to latrine use regarding materials dumped into the latrine compound the problems of emptying in terms of cost, equipment and method (Personal observation 2007). Poor settlement and infrastructural siting hamper or deny vehicular access, and unnecessarily increase costs to the users. This paper therefore discusses appropriate capacity development concerns for emptying and transport issues in urban communities and offer some suggestions to tackle some of them in order to reduce diseases and environmental pollution.

The need for appropriate capacity for FS emptying and transport

The general lack of appropriate capacity to satisfactorily empty and transport FS is a matter of worry (Chaggu et al 2002) as emptying and transport of FS is a critical factor for adoption and maintenance of urban on-plot latrines (Jenkins and Sugden 2006). This is because, the excreta in the pits or tanks need to be regularly emptied and transported to allow continuous use of facilities. The few capacity development attempts to

address the situation also seem to be misplaced and ineffective due to training that does not adequately address the real issues (Larbi, Clarke and Scott 2002).

How to address the capacity development issues effectively

Capacity development should focus on the abilities to solve development problems employing an appropriate mix of *knowledge, attitude, skills* and the *enabling environment* (Scott, Cotton and Coates 2006). Capacity development is *dynamic* and *contextual* (Mentz 1997), involving the right *approach, process* as well as *investment* (Scott, Cotton and Coates 2006). The combinations of these factors are needed by stakeholders for effective urban sanitation management. In emptying and transport of human excreta from latrines, it is necessary to find the right context in which capacity development will be more effective so as to avoid the business-as-usual meetings and talk shows. This implies looking at and addressing the key issues revolving around emptying and transport, which are:

- Emptying and transport technology
- Emptying and transport methods
- Users' knowledge and attitude towards latrine use
- Users' fragmented demands and cost for FS emptying and transport
- Institutional and organisational issues
- Latrine types
- Accessibility to latrines by emptying technology type
- Haulage distance
- Policy, regulations and means of ensuring compliance

The above points will be briefly discussed in the light of their capacity development concerns:

Emptying and transport technology

Appropriate technologies for emptying and transporting latrine contents in developing countries must be:

- Able to empty and transport the human excreta or FS successfully without destruction of the latrine infrastructure and or causing environmental mess
- Able to access the latrines for emptying
- Able to haul the emptied contents with relative ease without resorting to indiscriminate dumping or messing up the environment
- Desirable and affordable to the users;
- Physically robust and durable;
- Manageable by the operators who use and maintain the technology
- Replaceable and or have spare parts readily available in the country.

Technologies that satisfy these criteria will be sustainable for emptying and transport business. Available technologies may be able to satisfy all or a lot of these criteria. However, information about them are scattered, making it difficult for some communities to access them. Part of the solution is to aggregate these pieces of information into one focal point where the emptiers and transporters will have the opportunity to access their preferred choices.

Emptying and transport methods

Methods of emptying and transport are manual or mechanical and the combination thereof.

Purely manual operations have involved simple tools such as hands, buckets, brooms, spades, various forms of scoops, pick-axe, ladder and rope. Apart from conventional mechanised means such as large vacuum tankers, other appropriate technology types have been designed and built to suit local conditions and latrine types. Some of these can be operated either solely manually, mechanically or manual-mechanically. The box lists some of the popularly known ones and their modus operandi.

- ASLET(Arian Suction Latrine Emptying Technology)= Hand operated diaphragm vacuum pump and cart for pit emptying. An innovation by Arian Tech which is an Afghanistan enterprise with financial assistance from UNDP/UNCHS Habitat of Afghanistan in 1998. Cost of production as at 1998=\$1500. It's manual-mechanical, small in size and can access narrow streets and lanes
- Vacu-tug pit latrine exhauster of UNCHS Habitat and Manus Coffey Associates in Kenya. It is mechanical. Smaller than conventional vacuum tankers
- MAPET(Manual pit-latrine emptying technology project)designed and developed by Waste Consultants Netherlands in Nairobi, Kenya. Cost as at 1992 =\$3000
- Gulper developed by London School of Hygiene and Tropical medicine(LSHTM). This is handy, manual and cheap.
- Larsen Dung Beetle(use for bucket latrine emptying)in Ghana. Quite small and manoeuvrable.

Users' knowledge and attitude towards latrine use

Sanitation systems may be evaluated according to their influence on people's way of thinking as knowledge, perception and culture do influence the choice and sustainability of sanitation technology (Tiberghien 2002). Preliminary research findings in Tamale, Ghana, suggests that various practices and attitudes of users and latrine builders affect demand by increasing costs of faecal sludge emptying and transport. Besides human excreta, many of the public latrine vaults are filled with anal cleansing materials and other wastes. These increase filling rate of pits, leading to high frequency, cost and complications of emptying (Picture 1). Deductive reasons for this practice range from ignorance, attitude and technical issues. There were no bins for anal cleansing materials in many of the public latrines. From technical point of view, some of the chambers for users were too small to allow for user's manoeuvrability and anal cleansing bin (Picture 2). Also some of the tanker emptying operators charge according to how far one's latrine is from the nearest regular route. Reason offered is that since many hoses have to be joined in order to reach the pit or tank, more energy is used for siphoning. In a situation where the latrine is completely inaccessible for tanker operators, or the contents of the pits hamper mechanical suction, manual operators have to be employed. Unfortunately, manual operators charge more per latrine service than the tanker operators. This calls for the need to bring capacity development right to the household level.

Users' fragmented demands and cost for FS emptying and transport

The size of the latrine pit, different latrine filling-up times at different locations lead to fragmentation of demand for emptying and transport. It would be more economic for emptiers and users to get demand aggregated to benefit from economies of scale (Schaub-Jones, 2006). How to do this is part of capacity development. Already suggestions have been in the pipeline for either reducing the size of the latrine vault sizes to increase frequency of emptying or set up a number of holding/transfer tanks within the communities to reduce haulage distance and transport costs (Boot 2007). These issues are debatable as it has not been proven that high frequency of collective emptying in practice will reduce users' cost burden.

Institutional and organisational issues

Failure of sanitation in developing countries has been blamed on institutions and organisations that manage the industry (Parkinson and Tayler 2003). Case studies concerning small-scale and CBOs in emptying and transport business is limited in literature. This calls for the need to encourage some individual informal emptiers into forming small-scale enterprises as this could be key for empowerment, profit-making, access to credit and efficiency in service delivery.

Latrine types

There may be several different types of urban on-plot latrines in a city. Each latrine type, quality of design and use determine the contents of its pit or tank which range from liquids through semi-liquids to solids. This may pose dilemmas to emptiers as to what is expected to be sucked from the pits(Chaggu et al 2002). Inappropriately designed latrines and or unsuitable soil formation may lead to collapse of latrine during emptying operations.

Accessibility to latrines by emptying technology type

Lack of urban planning and settlement render vehicular accessibility to some latrines almost impossible (Personal observation 2007). The way housing components, the service facilities and the physical environment interact with each other impacts greatly on accessibility. Therefore in narrowly accessible situations,

emptying equipment needs to overcome accessibility limitations placed on it. In the yet-to-be developed areas, urban planners and authorities should take into considerations the nature of sanitation facilities that will be appropriate before construction and settlement begin as this will avoid potential environmental mess.

Haulage distance

The sprawling nature of settlements, lack of adequate road network and traffic jams, coupled with lack of appropriate disposal site within reach, make transport distance unnecessarily long and expensive in poorly planned cities. Therefore capacity development should look at encouraging reuse, and decentralised community-based treatments and disposal mechanisms.

Policy and regulations

Technologies adopted in sanitation policy should match the users own frames of reference(Samanta and Van Wijk 1998). Generally, the sanitation policies fail to be implemented due to lack of appropriateness and relevance. Right policy provides a framework for relevant capacity development.



Picture 1: Vault of latrine in Tamale, Ghana. (Note the anal cleansing and other materials that might disrupt vacuum tanker operations)

(Source: Author's field studies, 2007)



Picture 2: User chamber of latrine in Tamale, Ghana. (Note the chamber size, sanitary conditions and anal cleansing materials)

(Source: Author's field studies, 2007)

Conclusion

Effective capacity development and governance for faecal sludge transport, should seek to tackle the problems right from the roots; which means taking into considerations factors that impact on costs to users as well as their perceptions, attitudes and practices. It also means looking at the key issues such as appropriate emptying technologies, institutional and organisational issues in their proper socio-economic context; and draw out policies and regulatory measures that will not only guide operations but also streamline emptying and transport activities and punish the offenders.

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