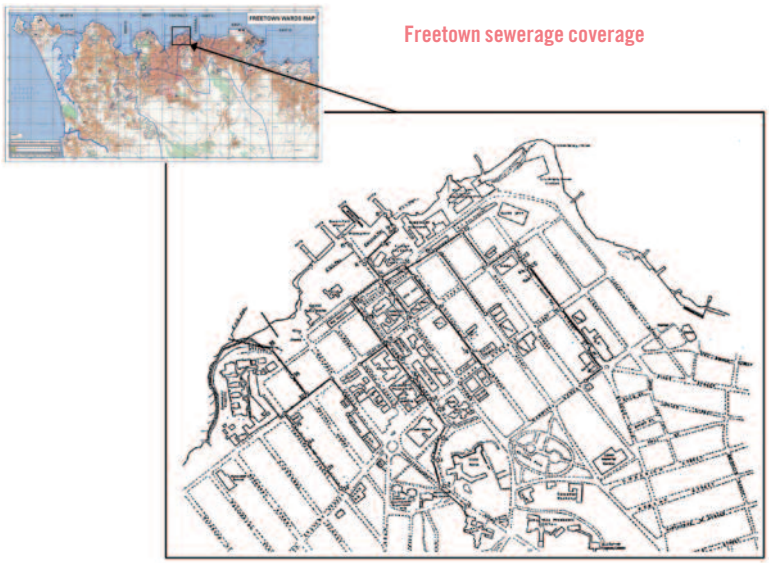
Improving servicing of on-site sanitation – a neglected issue for the UN Year of Sanitation

Despite the fact that on-site sanitation serves the majority of the world's urban population, current arrangements for servicing these facilities is woefully inadequate. Based upon experiences in Freetown, Sierra Leone, **JONATHAN PARKINSON** argues that there is a need for a new generation of master planning focusing on improving desludging of latrines and management of human wastes.

Hanging latrines are seen in the slum areas where sanitation conditions are particularly poor. Credit: Jonathan Parkinson

Traditionally, sanitation master plans have been linked to water supply improvement plans and have generally focused upon grandiose plans to increase sewerage coverage. This can be partly attributed to the fact that political representatives and government officials in low-income countries aspire to the same levels of service and technologies for their constituents that those in the more developed countries are accustomed too. They and their engineer advisors tend to support the view that basic on-site sanitation is only fit for rural or poor communities and not appropriate for more modern communities living in rapidly developing cities. The majority of consultants that are employed to prepare master plans and undertake feasibility studies are trained in universities in the West and have little or no formal training or experience in the provision or maintenance requirements associated with on-site sanitation. In addition, government-executed projects requiring the large scale investments associated with sewerage schemes have tended to suit the requirements of the development banks who have provided the financing for these schemes.



Freetown sewerage coverage

However, despite considerable investments and the implementation of many sanitation projects, the vast majority of urban dwellers lack a sewer connection and still utilise some form of on-site sanitation. According to the Human Development Report 2006, much of Sub-Saharan Africa has low coverage by sewerage networks, with less than 10% of the urban population connected. The same holds for countries at higher average incomes. Cities such as Jakarta and Manila have lower levels of sewerage coverage (8%–10%) than West African cities such as Dakar and Abidjan.

Although there has been growing focus on the need to increase access to improved sanitation as a result of the Millennium Development Goals (MDGs) and the current United Nations (UN) Year of Sanitation, there has not been a significant change. The same report concluded that although sewerage systems are appropriate for higher-density urban areas, the capital costs associated with developing a sewerage system in lower density urban areas can be prohibitive and therefore onsite sanitation or public facilities may be the most viable short- to medium-term option.

The challenges for Freetown

Freetown, capital city of Sierra Leone, which remains one of the world's most underdeveloped and impoverished countries, is no exception. A total of 4 km of sewerage in the central business district serves only a small percentage of Freetown's residents. Access to sanitation and the quality of facilities varies significantly between different parts of the city, but the areas to the east which have been expanding at great rate since the end of the civil war in 2002, are particularly poorly serviced.

The 2004 Census recorded that only 18% use some form of improved latrine, whereas the majority (75% of the population) use basic pit latrines, which are usually unlined and of poor construction. The remainder use unsanitary forms of sanitation such as hanging latrines, which discharge excreta directly into surface waters, poorly maintained communal latrines, or practise open defecation.

Many latrines are shared by more than one family. As a result, the pits fill up quickly and invariably need emptying. Freetown City Council owns some desludging vehicles but these are currently out of operation due to a lack of spare parts. A handful of commercial operators serve those who can afford them but for the urban poor, especially those who live in communities which are inaccessible by desludging trucks, the only option is to employ a small group of pit emptiers who dig out the contents of the pit using hand tools. Once the sludge has been removed, it is usually buried within the latrine owner's compound, which poses significant health and environment hazards, especially if flooded.

In what is a city of more than one million people, there is only one site for disposal of septage from the sludge trucks, which is located on one part of a large municipal solid waste dump. However, the treatment facilities are totally submerged with sludge and are in need of complete renovation. Whilst there is no direct evidence of illegal dumping in Freetown, the quantity of sludge that arrives at the site is estimated to only be a small proportion of the total waste that is produced every day.

A combination of lack of coverage, inadequacies in the sanitation facilities and deficient servicing is the cause of significant environmental health concerns. As a result, diarrhoeal disease is a constant threat, cholera outbreaks are expected every year and infant mortality is high – notably in the slums and low-income informal settlements.

Developing an improvement plan

As a result of the chronic sanitation problems and the need for improvement, the UK's Department for International Development (DFID) funded the development of a Sanitation Improvement Plan which was undertaken intermittently between November 2007 and April 2008 as part of a ten year Water and Sanitation Master Plan for Freetown. Consultant Atkins carried out the study in partnership with 3BMD, a local consulting firm, and Oxfam, who was primarily responsible for the aspects of the study and strategy that involve an interface with civil society.

In the long run, there will be a need for investments to increase sewerage coverage as water consumption increases, and the strategy identified a need for rehabilitation and limited expansion of the sewer network. But sewers require considerable capital investment and a strong institution with the capacity to manage the network. Along with the fact that revenue collection for water is problematic, the introduction of sewerage charges is not likely to be well received.

In addition, large scale expansion of sewerage was not considered appropriate due to the fact that, according to a survey carried out by Oxfam, the majority of residents indicated that they wanted better quality and better servicing of latrines, rather than sewer connections. Another reason why sewerage was not considered appropriate was due to the fact that the discharge of wastewater into the sea would be unacceptable and therefore the city would have to invest in treatment as well as sewerage infrastructure.

Atkins concluded that an effective strategy for sanitation improvements must be supported by an expanded pit and septic tank cleaning service to improve the frequency and quality of latrine and septic tank emptying operations. There is clearly a need to introduce and develop new forms of equipment for desludging pit latrines – notably in those areas that are inaccessible by larger vehicles.

Smaller mechanical desludgers (such as the Vacutug and the Dung Beetle) have been developed to offer an alternative and more affordable method for emptying pit-latrines in areas where access by other forms of desludging equipment is not possible.

There is potential to introduce technologies of this kind in Freetown, but there is a need to carry out a more detailed assessment of the different desludging options with a view to developing equipment that can be produced and repaired locally.

Some slums have communal latrines and washrooms, but these are poorly maintained and in need of repair. Credit: Photo: Jonathan Parkinson

Transfer requirements

One of the key constraints for a city-wide faecal sludge management system relates to the fact that small-scale equipment to clean pits is not suitable for transporting the waste to the disposal/treatment sites. To overcome this, the establishment of a localized collection system into which the faecal sludge can be deposited and stored prior to emptying of the tank by a large sludge vehicle is recommended. There remain some key constraints related to traffic congestion, inadequate access and lack of land availability for sludge transfer stations, but lessons may be learnt from Ghana where sludge transfer stations were introduced as part of a DFID-financed sanitation improvement project. These are not without operational problems but a recent assessment concluded they are a useful piece of infrastructure, without which pan latrine contractors would struggle to dispose of their waste safely[1].

No faecal sludge management system is complete without treatment. A financial and economic assessment indicated that the level of demand and willingness to pay is sufficient to pay for treatment. However, a preliminary review of possible locations for treatment plants concluded that available land is scarce and most open land is already occupied. Construction would therefore be problematic unless Freetown City Council proactively negotiates and provides compensation to residents who have already built their homes – sometimes illegally – on land that is considered suitable for construction of treatment facilities.

To support the development of the strategy and to quantify cost improvement options, a planning tool was developed using population and sanitation coverage data to assess the amount of faecal sludge being produced throughout the city on a ward by ward basis. The projections of waste production were calculated in a similar way to the way water demands are projected as part of water resource planning. Although there is a need to improve the estimates of faecal sludge, the planning tool was found to be useful for making projections of expected waste infrastructure requirements in the future.

Sanitation is particularly poor in the dense slums that are located along the coast. Credit: Jonathan Parkinson

There is a still a need to secure financing to implement the strategy. Unlike sewerage projects which require large scale investment, on site sanitation also facilities smaller scale 'unbundled' investments. This means that there are opportunities for financing from a wider range of donors and development organisations.

The strategy envisages the private sector and NGOs fulfilling a valuable role in service delivery. Small scale private sector entrepreneurs, operating under franchise from Freetown City Council, can provide desludging services to households and small businesses, which enables the municipality to concentrate resources on the installation of the larger scale infrastructure (transfer stations and treatment facilities) and the operation of larger desludging vehicles, which will be required to convey faecal sludge from the transfer stations to the treatment sites.

The strategy provides the basis for development of the sector but will require development and promotion of new technologies, as well as development and management and financing arrangements. Although the aims of the Millennium Development Goals are laudable, there is evidently a pressing need to provide affordable servicing of existing latrines to the millions of urban poor currently dependent upon costly and inefficient desludging services. Sanitation improvement plans, such as the Freetown Sanitation Improvement Plan, are an example of the new generation of master plans that aim to meet this aim. ●

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Reference

[1]*Boot, Niall L.D. (2008) The use of transfer stations for faecal sludge management in Accra, Ghana. Waterlines, Volume 27, Number 1, January 2008, pp. 71-81(11). Practical Action Publishing*