TECHNICAL ASPECTS OF LOW-COST SANITATION OPTIONS FOR AFRICA

Peter Morgan

One of the household names in low-cost sanitation over the past decades, Peter Morgan has been responsible for the development of a number of low-cost, appropriate sanitation options, such as the Arborloo. Based in Zimbabwe, Peter was long connected to the Blair Research Institute where he developed the Blair Latrine, a *Ventilated Improved Pit latrine* that became widely used.

Variants of the pit toilet in a nutshell

The International Year of Sanitation 2008 draws our attention to a gigantic task, and one that will require every method at the world's disposal to satisfy the demand. The range of environments which need to be served is wide and must be matched by an equally large armament of technical options. Both well-established and conventional systems like the pit toilet and flush toilet must play their part. They should be coupled with recently introduced ecological solutions. Although modern life would not have been possible without the flush toilet system, if the Millennium Development Goals are to be achieved on a wide front, then effective, but low cost systems such as the pit toilet must also be accepted. In Africa, for instance, the pit toilet system is used more than any other. Despite its drawbacks in specific situations, its relative simplicity and ease of construction have great merit. The pit toilet system can be upgraded in many ways to suit a variety of environmental situations. In addition, some of its variants make possible recycling of both the organic and the structural unit. This presents an attractive option because cost and need must be balanced in order to achieve as wide coverage as possible. This paper provides a brief overview of pit toilets and discusses the possibilities for making them more sanitary, sustainable and upgradeable.

The pit toilet – what part can it play?

An inevitable property of all types of pit toilets is that they eventually fill up with excreta. Pits may be difficult or expensive to empty. For this reason they have been described as unsustainable in some quarters. However, as unsustainable as they may appear, they continue to be the most commonly used sanitation technology on the African continent. In terms of cost per person and per year of service, to dig and protect larger pits, which last for longer periods of time, provides a positive payoff. However, the pit will inevitably fill up. Therefore, if cost is a limiting factor, the components above slab level can be made simpler, cheaper and upgradeable over time. This is contrary to existing practice where the greater proportion of funds used to build a pit toilet may be placed in the construction of the superstructure and for appearances sake, rather than in the structure below ground.

In recent years attempts have been made to introduce the concept of shallow pit composting where materials like soil, ash and leaves are added to the pit in addition to excreta (meaning both urine and faeces). In such cases pits are dug shallower, down to a maximum of 1.5m to reduce compaction and promote composting. The conversion of raw excreta into relatively safe compost is accelerated in such conditions and places a very different perspective on the usefulness of pit sanitation. Pits fill up more quickly when the combined ingredients are added. However, pits full of compost rather than semi-decomposed excreta are far easier to excavate after a set period of time. Where there is space, shallow pits (1.5m maximum) can be filled and planted with trees or other useful plants. In an area with reduced space, this

concept allows for alternating between 2 or even 3 shallow pits in rotation. However, this method can only work if the users regularly add soil and ash to their pits. In addition, there must be willingness on the part of the users to excavate their pits at the appropriate time or pay for someone to empty them. Emptying pits that have gone through the composting process is far easier and safer than emptying pits of raw sewage. In addition, this method allows for trees to be planted on used pits, via a method known as the Arborloo. Nutrients derived from human excreta aid the growth of the tree. This method of planting trees in pits is commonly used in Africa and is a suitable practice where sufficient space is available. An added benefit is that composting rates can be increased through using the Arborloo method. This in turn creates an environment where 2 or 3 shallow pits can be used alternatively or in rotation. Moreover, it is possible that the shallow nature of the pits and the accelerated rate of composting may reduce the potential for contamination of the ground water.

In addition to composting methods and shallow pits, technologically pit toilets can be upgraded in a series of simple or complex steps depending on circumstances. All pit toilets can be upgraded with a ventilation pipe and suitable structure to become Ventilated Improved Pits (VIPs). Pedestals can be added for convenience. A further method of upgrading the shallow pit toilet system is fitting it with suitable urine diverting devices. This approach is optional if urine is required for adding nitrogen to green vegetables and other plants. Such devises also reduce odor and fly nuisance in the pit. These upgrades also permit the addition of urine diverting units to deep pit systems. Above the ground units extensions using urine diversion are also possible. Building vaults or extending pits above ground level can also be achieved. This sequence offers a large range of technical options on a ladder of increasing complexity and cost. It is possible to start simple and upgrade over time.

These various techniques add on to the existing range of technical options available to low cost sanitation and do not compete with them. Extended ranges of technical options related to the pit toilet system are now available for use, although they are not yet well known in the sector. These possibilities are being examined in various countries at the present time, including Malawi, Kenya, Mozambique, Ethiopia and Zimbabwe. In addition to the new technology and merits of pit toilets, recycling of the compost and of the physical units has also become a possibility. This low cost recycling method is simple, logical and adaptable to local conditions.

In order to continue improvements in water sanitation several specific actions must be undertaken. Firstly, each toilet must be equipped with a simple hand-washing device of which many options are available. Continued health education is a cornerstone for the continuation of water sanitation. New technology and methods such as those described in this paper need to be continuously tested, investigated and monitored. Feedback on positive and negative aspects of new methods and technology should be given in order to make “course corrections” to the road ahead. Achieving and maintaining convincing and practical evidence from the field must be the catalyst to increased water sanitation.

Peter Morgan, Stockholm World Water Week, August 2007

For more information on the above, see Peter Morgan's book 'Toilets that make Compost' published in 2007 by the Stockholm Environment Institute. The book can be downloaded for free from http://www.ecosanres.org/toilets_that_make_compost.htm
Or to learn more about Peter Morgan's work, visit his website at http://aquamor.tripod.com