

## Introduction

This information sheet describes three types of simple and affordable composting toilets. Two are shallow pit toilets and the third is a urine diverting toilet.

- The first uses a single shallow pit (about 1m deep).
- The next uses two shallow pits which are used alternately (about 1.5m deep)
- The third is built on a vault above the ground and uses a urine diverting principle where the urine and faeces are separated.

Upgrading of technologies, odour and fly control, and hygiene are also discussed. Compost from these toilets can be used in vegetable gardens or for growing trees, and urine collected from the urine diverting toilet makes an excellent fertilizer.

## The single-pit compost toilet ("Arborloo")

This toilet uses a shallow pit (1-1.5m deep) and the toilet site temporary. Excreta, soil, ash and leaves are added to the pit. When the pit is full, the toilet (ring beam, slab and structure) moves to a new site (at between 6 and 12 month intervals). The old site is covered with soil and left to compost. A tree is planted when the excreta are fully composted – best during the rains. By using this simple principle, the nutrients in our excreta can be recycled into something valuable – without any handling of the compost.

## The double-pit compost toilet ("Fossa alterna")

In this concept there are two permanently sited shallow pits (1.5m deep) close to each other which are used alternately. For a medium sized family the pit takes about 12 months to fill up and this same period allows sufficient time for the mix of excreta, soil, ash and leaves to form compost which can be excavated. Every year

one pit is excavated whilst the other becomes full. If the pits remain stable this process can continue for years.

## Urine diverting toilets

The urine diverting toilet uses a special pedestal or squat plate which separates the urine from the faeces. In a simple version, the faeces fall into a 20 litre bucket held in a brick vault. Soil and ash are added to the bucket after every deposit is made. The contents of the bucket are removed regularly and placed in another site (secondary compost site) to make compost. This process takes between 6 – 12 months. The urine collects in a plastic container. Both toilet compost and urine add fertility to the soil and can enhance food production.

## Upgrading the toilet system

The Arborloo is an excellent entry point for householders who wish to consider using ecological toilets and recycle their excreta. It is simple, cheap and the excreta are never touched. But the Arborloo can be upgraded to a Fossa alterna. Toilets can also be upgraded by fitting pedestals and vent pipes. The advantages of upgrading an Arborloo to a Fossa alterna are the permanence of location and a regular supply of compost. It is also possible to upgrade the Fossa alterna (or even Arborloo) to urine diversion. This brings with it extra cost and complexity. But the pit contents will be drier, with less potential for odour and fly breeding. Also the urine can

## How to make low-cost toilets

A simple 'arborloo' toilet is made up of 4 parts: (i) the pit, (ii) the "ring beam" to protect the pit, (iii) the concrete slab which sits on the ring beam, and (iv) the toilet house which provides privacy.

Both the ring beam and the slab can be constructed with a mixture of Portland cement and clean river sand. The Arborloo can be easily upgraded to a Fossa alterna with the addition of a second pit and ring beam.

Pedestals, both urine diverting and non-urine diverting, can also be made from a ten litre bucket and a mixture of cement and clean river sand.

Toilet houses can be built from any of a wide variety of inexpensive and readily available materials including grass, corrugated iron, plastic bags, reeds, cloth, and concrete.

For a short guide to the construction of low cost composting toilets consult Morgan (2006). For more detailed instructions see Morgan (2004).

be led to a sunken plastic container for collection, a seepage area planted with a nitrogen hungry tree (e.g. banana) or a garden compost pit or some other seepage area.

The pit contents will be drier which will be an advantage especially if the soil does not drain well. In those cases where a urine diverting pedestal is fitted to a shallow pit composting system, it is best that the urine pipe is led off above the base of the pedestal. Underground piping can be complicated to fit to pit structures. The same urine diverter (often using the same concrete slab) can be fitted to a brick vault where the toilet is constructed entirely above ground level.

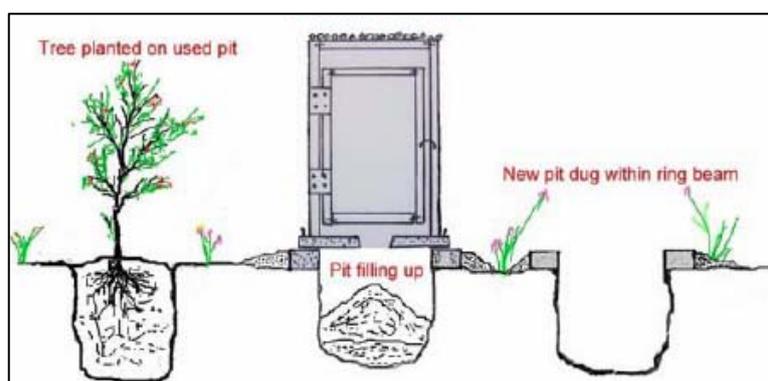


Figure 1: Arborloo in use

## Odours and fly control

**Ventilation pipes:** A screened ventilation pipe can reduce odours and flies in all the compost-making toilets described in this fact sheet. The vent pipe draws out air from the pit or vault. The air that flows out of the pipe is replaced by air passing down the squat hole or pedestal. Any foul odour from the pit or vault does not escape into the superstructure, but is diluted by air and passes out of the pipe into the atmosphere. The effect is that the toilet becomes almost odourless. The vent also helps to remove moist air from the pit or

vault which helps to reduce the moisture content of the excreta.

**Reduced moisture content:** Reduced moisture content results in reduced odours and fewer flies. In urine diverting toilets, the faeces are deposited separately and covered with dry soil and ash. Flies do not breed well under these conditions, and odours are reduced because the faeces are drier when not mixed with urine. The drying effect is increased by adding wood ash or dry soil to the deposit. Fly breeding is easier to control in urine diverting toilets, simply by adding more dry ash and dry soil to the deposit.

**Low cost options:** PVC pipes and urine diverting pedestals may be too expensive to fit to very low cost pit toilets. In this case the regular addition of soil, wood ash and leaves to the pit will help to reduce odour and fly breeding. It may not eliminate them altogether, but if flies build up it helps to add

ash liberally (if available), especially during the hotter wetter months when the fly problem is worst. The liberal addition of ash will also reduce odours. Keeping the toilet clean and covering the squat hole can also help. It is possible to upgrade a simple pit toilet by adding a vent pipe or urine diverting pedestal or both at a later date.

## A matter of hygiene and hand washing

Hand washing facilities are vital if any hygienic value can be expected out of a toilet system. There are many ways of making simple hand washing devices.

The simplest case uses a plastic cup, tin can or aluminium can with two or three 3mm holes drilled or punched near the base. The cup or tin is suspended with string near the toilet. Water is taken from a nearby basin or bucket with a cup or scoop and poured into the device just prior to washing. The water drains out for hand washing.

A bar of soap can also be suspended nearby. Simple hand washers can be made in minutes, costs almost nothing, and can cleanse the hands of dangerous bacteria after toilet use.

## References

- Morgan, P. 2006. Toilets That Make Compost. EcoSanRes Publication Series. Report 2006-2. Stockholm Environment Institute; Stockholm, Sweden. Available from [www.ecosanres.org](http://www.ecosanres.org)
- Morgan, P. 2004. An Ecological Approach to Sanitation in Africa: A Compilation of Experiences. Aquamor: Harare Zimbabwe. Available from [www.ecosanres.org](http://www.ecosanres.org)



**Figure 2: Clockwise from top-left: construction of concrete slab; construction of "ring-beam"; making a pedestal from a ten litre bucket and a concrete mixture; a complete low-cost pedestal; a concrete slab resting on a ring-beam.**

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



Stockholm Environment Institute  
Kräftriket 2B, 10691 Stockholm, Sweden  
Tel +46 8 674 7070 Fax +46 8 674 7020  
[www.sei.se](http://www.sei.se)



EcoSanRes is funded by the Swedish International  
Development Cooperation Agency (Sida)