

LeaPPS Uganda Learning for Practice and Policy on household and school sanitation and hygiene Arborloo and Fossa Alterna

LeaPPS Case: 2008-2

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“How to make a simple pit latrine and grow fruit trees!”

An Ecological Approach to Sanitation in Uganda using Arborloo and Fossa Alterna¹

Acknowledgement: Most text from the excellent work done by **Peter Morgan** see ¹

Background of Arborloo and Fossa Alterna

Arborloo and Fossa Alterna are two ecological sanitation (EcoSan) technologies that recycle human excreta. These new technologies are an attempt to make EcoSan simple and cost-effective for use by low-income communities in Uganda and most rural areas of Africa. These EcoSan options create strong links between sanitation, agriculture and food production and actually work in practice, and can benefit the users beyond the requirement of providing a latrine alone.

These EcoSan options demonstrate that a family can build effective latrines with very little support from outside. The cost is reasonably affordable: indicative UGX20-40,000² for the Arborloo and UGX 40-60,000 for the Fossa Alterna, excluding the superstructure. These shallow pit composting eco-latrines designs are based on the traditional simple pit latrine, the most commonly used latrine in Africa.

Both EcoSan systems may give an adequate answer to current problems with on-site sanitation due to (i) rocky underground not allowing deep pits; (ii) high groundwater tables and water-logged soils; (iii) flood-prone areas; and (iv) loose soils likely to cause collapsing of deep pits. The main reason is that the pit is shallow (0.8-1.0m), has a small diameter (about 0.8m) and has a strong ‘collar’ above the ground. Circular shallow pits do not collapse so easily!

The Arborloo and Fossa Alterna have been developed, field-tested and are now widely adopted as a preferred latrine option in many villages in Zimbabwe, Malawi and Mozambique. Peter Morgan (Zimbabwe) and WaterAid staff in Mozambique and Malawi did much development and research work. Peter Morgan concludes: “It has become clear to me that this story of eco-san is exciting and may have far reaching implications in the future. It adds new dimensions to the rather drab story of conventional sanitation and offers ways to overcome several

¹ Reference: Peter Morgan and SEI (2004) An ecological approach to Sanitation in Africa: A compilation of experiences (Aquamor) Harare, Zimbabwe. Also http://www.ecosanres.org/PM_Report.htm

² conversion 2008: US\$ 1≈UGX1700; €1≈UGX2500

existing problems”.



Fig. Schematic illustration of Arborloo and its use

Description of the principles of the Arborloo

Many of the rural population of Uganda/Africa do not have access to safe and reliable latrines. A good latrine, together with a safe reliable water supply and the practice of good personal hygiene can do much to improve personal and family health and wellbeing. So there is an urgent need for the construction of simple, low cost, affordable latrines that are easy to build and maintain and are relatively free of odours and flies.

This LeaPPS Case describes and advocates the Arborloo and Fossa Alterna, both low cost and easy to make. Builders and artisans are not required, once the householder has learned the basic methods of construction.

To start all that is required is part of a bag of cement, and some good river sand and thick wire. With this the householder can build a concrete slab, which will last for many years (actually a life time). The slab is mounted on a “ring beam” of bricks or concrete and a shallow pit is dug down inside the beam. A simple structure for privacy, made from locally available materials, is then built around the slab.



Figure. Digging inside the built beam or collar.

Flies and odours are controlled by regularly adding soil, wood ash and leaves into the shallow pit. By adding the soil, ash and leaves, the excreta in the pit turn into compost. It is possible to grow a tree on this compost, which will later bear fruit or supply timber for fuel or building. It is also possible to dig out the compost after a suitable time and use this to fertilise the vegetable garden. So the simple latrine can have many valuable uses!

This particular latrine is called an Arborloo

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because a tree (Arbor in latin) is planted on the filled pit. The Arborloo is then moved to a new place.

Over the years it is possible to improve on the original latrine using the same concrete slab. It is a small amount to pay for something that gives so much benefit to the family.

Description of the principles of the Fossa Alterna

If there is limited space on the compound or moving latrines is not preferred then it is possible to make two permanently sited pits and alternate between them at yearly intervals. The fertile compost can be dug out and used on the garden once a year. This is a system called the **Fossa Alterna**.



Figure. Fossa Alterna

A pit of 1 metre in diameter and 1.3 metres deep has a capacity of just over one cubic metre, about twice the capacity of an **Arborloo** pit 0.8m in diameter and one metre deep. This capacity is ideal for the use of the **Fossa Alterna**. With the **Fossa Alterna**, it is only necessary to dig two pits and these two can be used alternately for many years on one site. Once a year the compost is dug out of one pit and the slab and toilet house placed back on the emptied pit. In some cases the two pits can be dug and enclosed inside a single permanent toilet house. This method is popular in Malawi and Mozambique.

Once again, plenty of dried leaves are added to the base of the pit before use. Dry soil and wood ash are added to the pit daily and leaves quite often. This mixture together with excreta composts well.

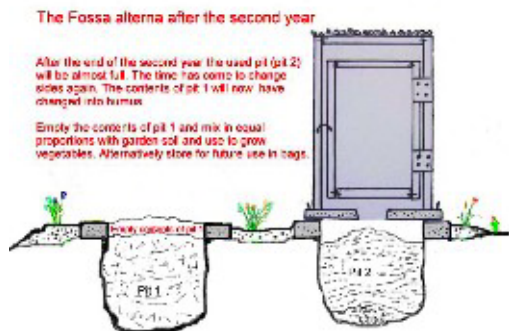


Fig. Fossa Alterna schematic process for second year of use

The compost dug out of the pit can be mixed with top

soils to increase its fertility and humus content. When mixed with poor sandy soils in equal proportions the compost can increase vegetable growth considerably.

Using the systems described here it is possible to start off in a very low cost and simple way and over the years upgrade the system to suit the needs of each family.

Major drivers of the process and success

- Building on the simple pit latrine principle
- A safe and affordable on-site sanitation option for all
- In many cases these options may solve the common problems with deep pit latrines: collapsing pits; overflowing pits; water-logged soils and high groundwater tables
- Provided the beam or 'ground collar' is sufficiently high, these options prevent the flooding of latrines
- Where rocks are found at shallow depth, the Fossa Alterna may be an affordable solution
- For the Arborloo, there is no handling of decomposed or composted human excreta; a tree is planted in the old pit.
- For the Fossa Alterna the decomposed human excreta can be safely excavated and handled after one year
- The human excreta is decomposed and with the addition of ash, soil and dry leaves it forms rich compost and excellent soil improver
- Urine is NOT separated but binds with the dry material to make nitrogen rich compost
- Human excreta and other organic material are recycled for growing trees and agricultural produces
- Human 'composted' excreta is used for growing extra fruits and vegetables, contributing to the livelihoods of the poor and reducing poverty
- Cheap and easy options, not needing much building materials such as cement and iron bars
- Superstructure can be built using locally available traditional materials

Further information

Peter Morgan and SEI (2004) An ecological approach to Sanitation in Africa: A compilation of experiences (Aquamor) Harare, Zimbabwe. Chapter 4: How to build and manage the Arborloo Chapter 5: How to build and manage the Fossa Alterna

Also http://www.ecosanres.org/PM_Report.htm
See also: <http://www.watsanuganda.watsan.net> and <http://www.irc.nl/sanitation>

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See also LeaPPS Case 2008-3 **How to ... build an Arborloo or Fossa Alterna?**
Forthcoming: **Rural Sanitation and Compost – a one-pager on Arborloo and Fossa Alterna**
Forthcoming: **Steps in constructing Arborloo and Fossa Alterna- for village builders**