Introducing low cost productive sanitation in a peri-urban settlement

Peter Morgan

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In this exercise low cost shallow pit ecological toilets were introduced into Hopley Farm, a settlement close to Harare, Zimbabwe.

Alternating shallow pit composting toilets (Fossa alterna) were used in the project.

By mid 2007 over 1000 units had been built

The site

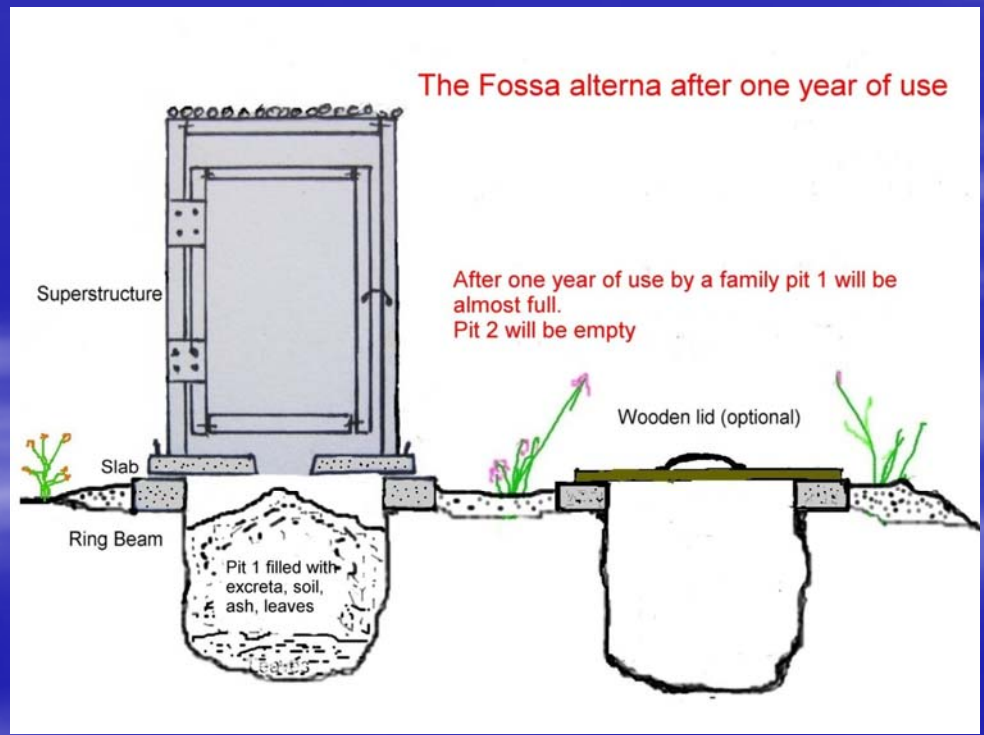
Hopley is an informal settlement close to Harare. People have been allocated small plots. Water is derived from some municipal stand- posts and boreholes fitted with hand pumps.

Sanitation

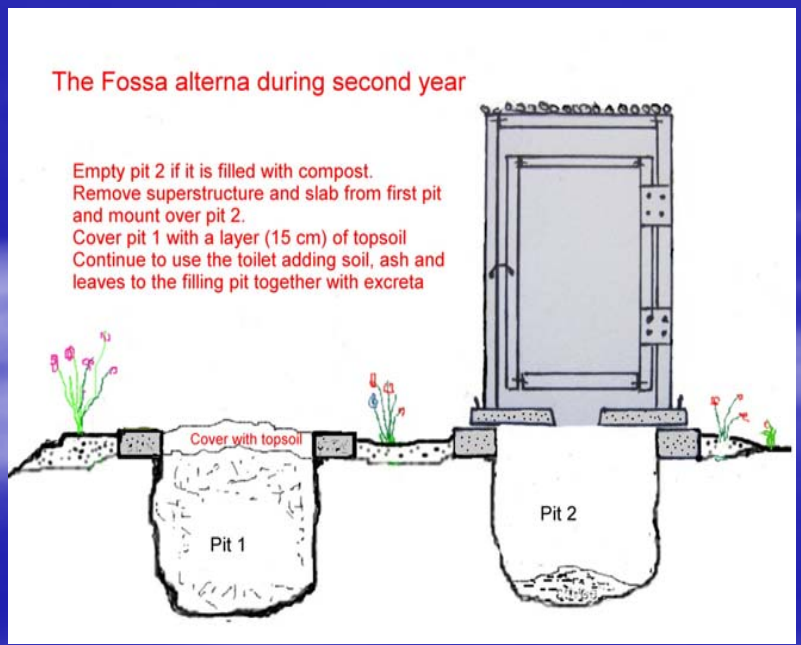
Each family has been provided with a relatively low cost ecological toilet. Because space is limited the alternating shallow pit compost toilet has been chosen for use.

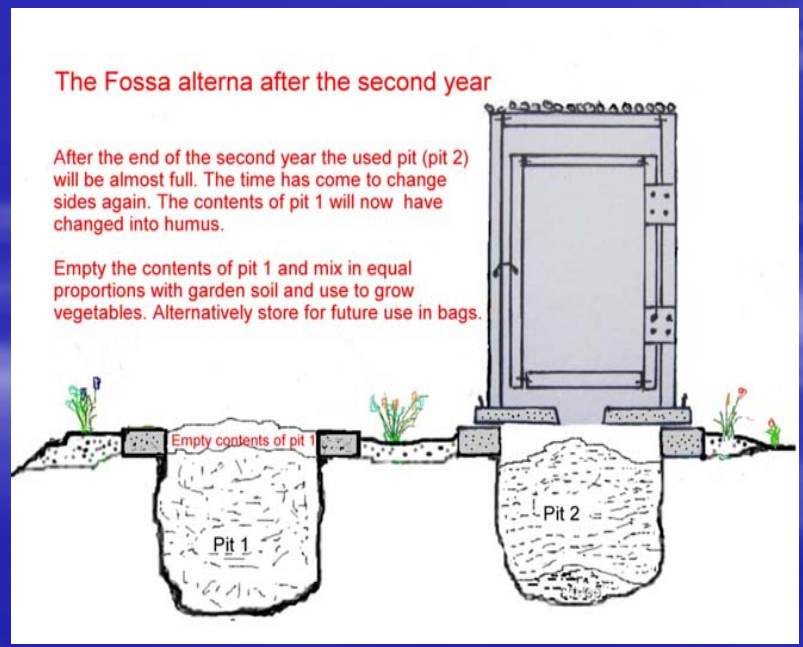
´How the alternating shallow pit system works

This uses two pits each dug about 1.5m deep. Many are brick lined but in moderately firm soil ring beams can be used and the shallow pit dug inside.

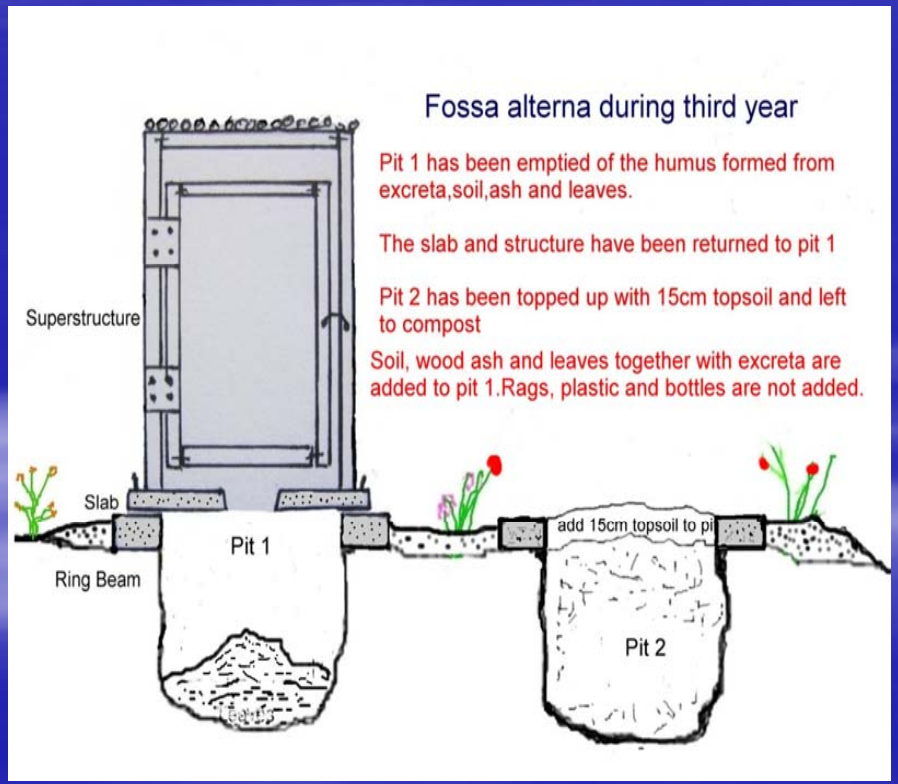


Soil and wood ash are added frequently to the pit as well as excreta. This helps the composting process and helps to reduce flies and odours.





After one year of composting a mix of excreta, soil, leaves and ash, the pit contents can be excavated. The pit shown below was excavated in 30 minutes.



Use of concrete ring beams

In this technique two concrete ring beams and a single concrete slab are made using one 50kg bag of cement and river sand. To gain speed of production, special steel moulds are used to cast the slab and ring beams.

The three concrete pieces are left to harden and cure for several days. The soil within one ring beam which will be used for the toilet is now dug down to 1.5m with the second dug down to 0.3m.

Fertile soil is added to the shallower pit and seedling vegetables (or seeds) are planted there. The concrete slab is moved over the deeper pit and sealed in place.

Then a portable structure is placed over the slab. In this community, wooden structures are used. They are light weight easily moved from one pit to the other. But many types of structure could be used to provide privacy.

The slab is made with a hole for a vent pipe. This may not be used at first, but in an upgrading process the simple toilet can be upgraded to a VIP. The vegetables in the small ring beam garden next to the toilet are watered regularly.

Local agricultural practice

In this settlement a great deal of agriculture is being practiced. Vegetables in particular are grown extensively.

Local agricultural practice

Shallow wells may be used as a source of water.

Vegetables are invariably grown from seed.

Linking sanitation to agriculture

1.Digging toilet compost into the soil

Excavated toilet compost can be dug into the topsoil of a garden directly. It can also be stored in bags for future use.

Linking sanitation to agriculture

2. The rim beam garden

The ring beam forms part of the toilet structure on simple ecological toilets. Two ring beams are used on the alternating pit system. Whilst one is used to protect the toilet pit the other can be used as a miniature garden. A wide variety of vegetables and other foods can be grown.

Linking sanitation to agriculture

Tomatoes and green vegetables are ideal for growing in ring beam gardens

Linking sanitation to agriculture

3. Applying urine

Diluted urine applied to green vegetables increases production considerably. Also neat urine can be applied to maize during the rainy season with considerable effect.

Testing for effect of urine

The application of diluted urine is known to enhance the growth of green vegetables considerably. The considerable weight of spinach grown in ring beams and jars results from the regular application of diluted urine.

Linking sanitation to forestry

4.Growing trees

Many types of tree grow well on toilet compost.

Linking sanitation to forestry

Growing trees

Trees can be planted directly on a toilet pit into a layer of soil covering the compost. This is the concept of the "Arborloo"

Linking sanitation to forestry

Growing trees

Toilet compost can be transferred from Fossa alterna pits too "tree pits" dug nearby and the compost transferred from one pit to the other. This avoids too much handling of the compost if there are doubts about safety.

Linking sanitation to forestry

Growing trees

The “tree pit” can be dug from 60cm square and deep and larger so that it accepts the required amount of pit compost. Pit compost can also be stored in bags or dug into the soil. A layer of topsoil covers the compost. The tree is planted in the topsoil.

Linking sanitation to forestry

Growing trees

Young trees can be grown in the community in nurseries.

Linking sanitation to forestry
Growing trees

A wide variety of trees will grow on these organic pits. Mulberry is useful because it can be grown in large numbers from cuttings and later provides a tasty and nutritious fruit.

Summing up

As the toilets are put into place, the community are given instruction on the re-use of the compost. With over 1000 low cost ecological toilets in Hopley Farm it is hoped that a great deal of compost with be used to grow more vegetable and fruit.