The Schools Ecological Sanitation Programme
1. An introductory lecture

Peter Morgan and Annie Shangwa

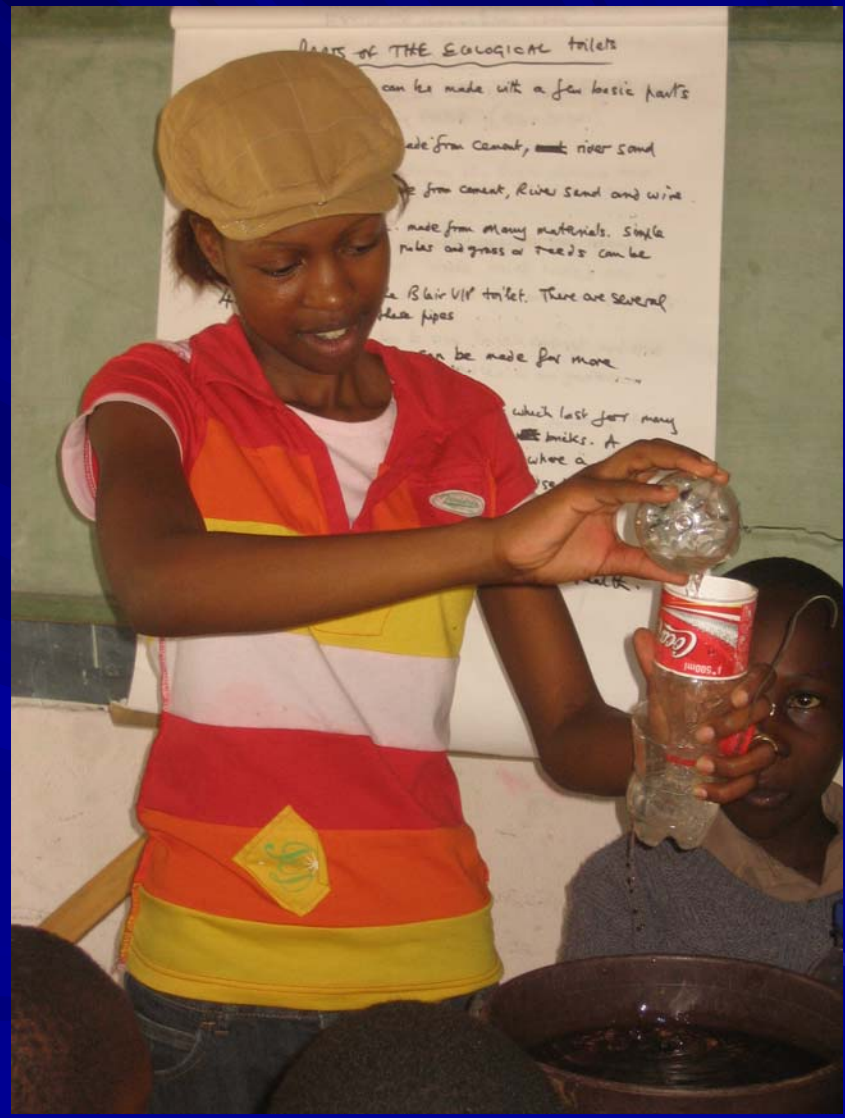
Every family needs a toilet!

Simple ecological toilets which can be improved to VIP toilets can be made cheaply if the method is known.

Why not teach the method at school!

The school is an ideal environment in which to teach these new methods to new generations of young Zimbabweans and also to senior members (teachers) of the communities.

Skilled educators are required also from a younger generation.



Introductory talks

Mrs Annie Shangwa is the trainer/educator on this project. She has much experience in this area of work. Introductory talks were undertaken in the classroom. Models and a flip charts were used as educational tools.

“Flip charts”

These described many aspects of ecological sanitation – toilet design and the concept of recycling human excreta

"Eco-san" in brief – an introduction

How to build simple toilets and use the toilet compost and urine formed to grow healthy vegetables and trees

Peter Morgan and Annie Shangwa

How we can benefit from ecological sanitation

1. We get a family toilet!
2. The toilets are simple and relatively cheap
3. The simple “eco-toilets” are almost fly and odour free
4. The parts of the toilet can last for many years
5. It is possible to upgrade and improved the simple toilet over time
6. Valuable products come from the toilets such as toilet compost and urine
7. Toilet compost is rich in nutrients and can enrich poor soils
8. Urine is very rich in nutrients especially nitrogen and can be mixed with water to make a good plant food

Types of toilets used in Eco-san

1. Arborloo
The toilet that becomes a tree

2. Fossa alterna
The toilet that makes compost

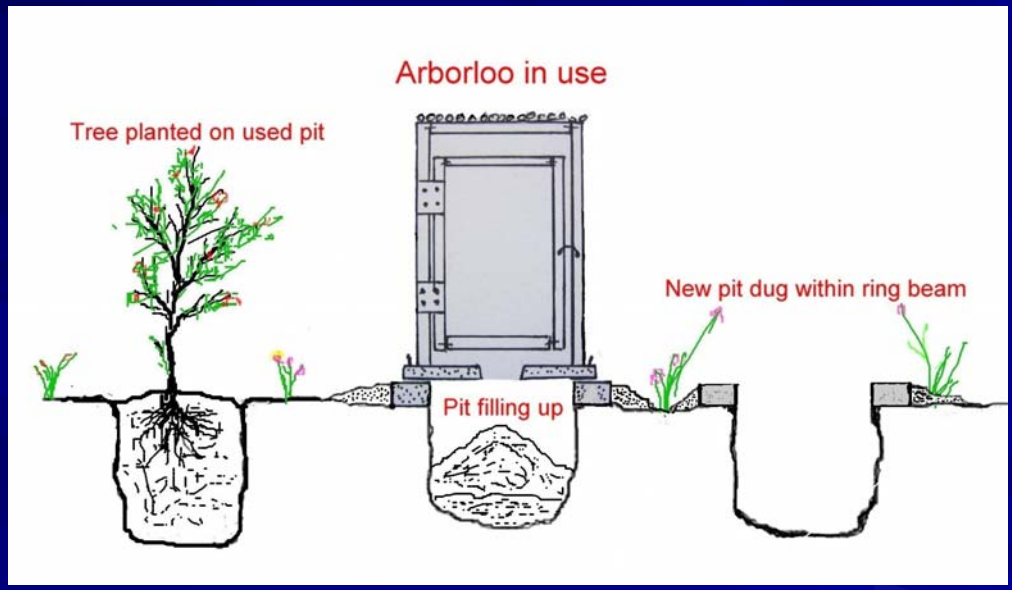
3. The ecological Blair VIP toilet
The Blair toilet that makes compost

4. Urine diversion toilets
These separate urine and faeces

The simplest and cheapest are the Arborloo and the Fossa alterna. Both can be made into Blair VIP toilets by upgrading.

The Arborloo

This toilet moves from one shallow pit to the next on a never ending journey. A young tree is planted on each shallow pit filled up and topped up with soil

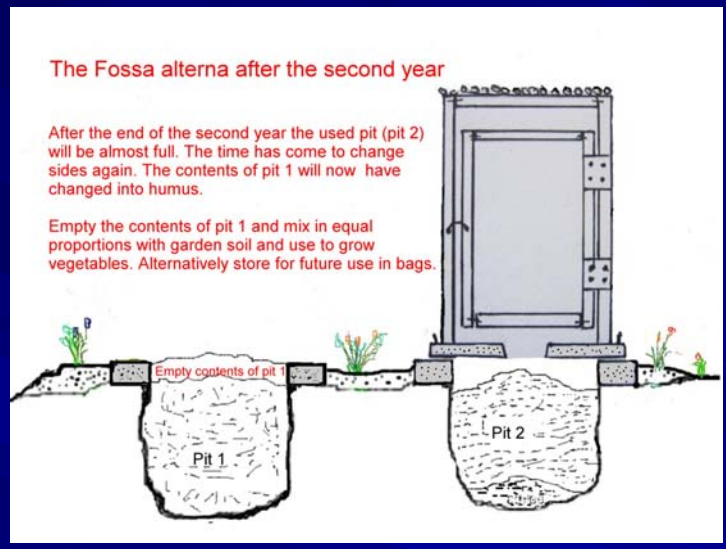


* The pit is shallow – about one metre deep
- Soil and ash are added to the pit with the excreta. This helps to make compost and helps to control flies and odours
- Once the toilet is nearly full move the parts of the
- toilet (structure, ring beam and slab) too the next site.

* Cover the pit contents with a thick layer of good soil and plant a tree

The Fossa alterna

This uses two shallow pits which can be protected with "ring beams" or lined with bricks. The toilet slab and "house" alternate between one pit and the other at yearly intervals. Only one pit is used at one time. The toilet house is designed so it can be moved easily.



*Dig and protect two pits at time of construction. Pit 1 is dug about 1.2m deep. Pit 2 is dug shallow

* As the pit is used add soil, wood ash and leaves.

* do not add rubbish into the pit

·Once Pit 1 is nearly full, dig down the second pit to 1.2m deep and move the toilet slab and house to the empty pit.

* Cover the contents of Pit 1 with soil and leave to compost for one year

Use of the toilet compost

The compost from the Fossa alterna can be dug out after a year. There are several ways of using it.

1. Dig and new pit for a tree (“tree pit”) and move toilet compost into this pit and plant a tree.

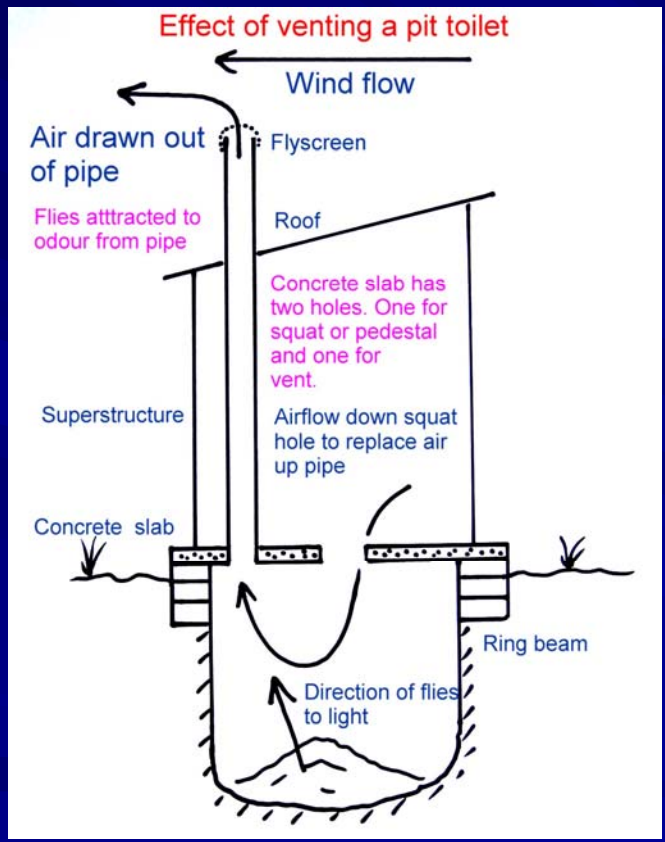
2. Mix the toilet compost with equal volume of poor soil in a container and plant vegetables

3. Mix the toilet compost with the topsoil of vegetable and flower beds

4. Place the toilet compost in sacks ready for use. It can be dug into maize plantations during the rainy season.

The Ecological Blair VIP Toilet

A Blair VIP (Ventilated improved pit) toilet is a pit toilet fitted with a ventilation pipe. The pipe is fitted with a fly- screen to trap flies. This is how it works.



Both the Arborloo and Fossa alterna can be upgraded to a Blair VIP.

What is important for the Blair VIP

1. The toilet house should have a roof and the inside should not be too light. If a door is fitted it should be self closing. Or a spiral (door-less) structure should be used.

2. A vent pipe should be used and fitted into a hole in the toilet slab. There are several ways of making low cost vent pipes.

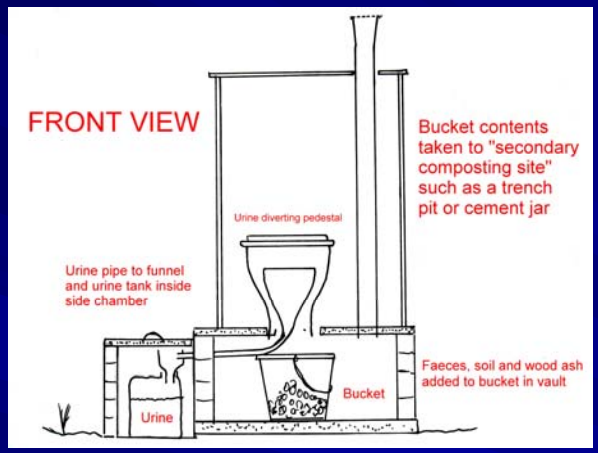
3. The vent pipe should have a screen to trap flies. This is best made of aluminium which does not corrode.

4. The ecological Blair VIP toilet can be used in the same way as the Arborloo and Fossa alterna.

5. If a long life is required the pit can be made much larger and lined with bricks. Then a brick house can be fitted. There are economical ways of lining pits with bricks and fitting the same concrete slab as used on the Arborloo.

Urine diversion toilets

These are special toilets where the urine and faeces are separated from each other. The faeces fall into a bucket or vault together with soil and ash which are added.
The urine is led off through a pipe into a plastic container.



The container of feaces and soil and ash is removed when full and placed in a composter with more soil. It turns into good compost.
Urine which contains a lot of nitrogen can also be collected in plastic bottles or "eco-lilies" a plastic container with a funnel at the top. The boys can pass urine into the funnel (Lily) and the urine is collected in that way.

How to use urine as plant food

There are several ways of using urine to make plants grow faster and larger. Normally the urine is diluted 3 parts of water to 1 part urine for use on vegetables.

Ways of using urine:

**Add diluted urine to young green vegetables planted in buckets, basins, ring beam gardens or vegetables gardens.*

**For a 10 litre bucket add about 400mls urine + 1200mls water twice or three times a week. Also water at other times.*

•For a ring beam garden add about one litre urine with
•3 litres of water once or twice a week. Water at other times.

•For maize add diluted or neat urine to each plant in hole nearby.
•About 100mls urine per plant per week during the growing season.

Parts of the ecological toilet

Simple eco-toilets can be made with a few basic parts:

1. ***The concrete slab made from cement, river sand and wire.***

2. The "ring beam" made from cement, river sand and wire

3. The "toilet house" made from many materials.
Simple structures made from poles and grass or reeds can be very neat.

4. Vent pipe for the Blair VIP toilet. There are several ways of making these pipes.

5. Pedestal for sitting can be made for more comfort.

6. Brick lining of pit. For large pits which last for many years the pits are best lined with bricks. A method known as "corbelling" where a wide pit can be fitted with a small slab is a useful technique.

7. Hand washing devices. These are essential parts of any toilet. Improvement of personal hygiene is very important for health.

Conclusions

During this course we will learn how to make simple compost making toilets (eco-toilets).
These include the Arborloo, the Fossa alterna and the ecological Blair VIP toilet.

We will learn how to make concrete ring beams, concrete toilet slabs, simple “toilet houses,” hand washing devices, simple vent pipes, and simple pedestal seats.

We will also learn how to use “toilet” compost and urine to increase the growth of vegetables in our gardens.

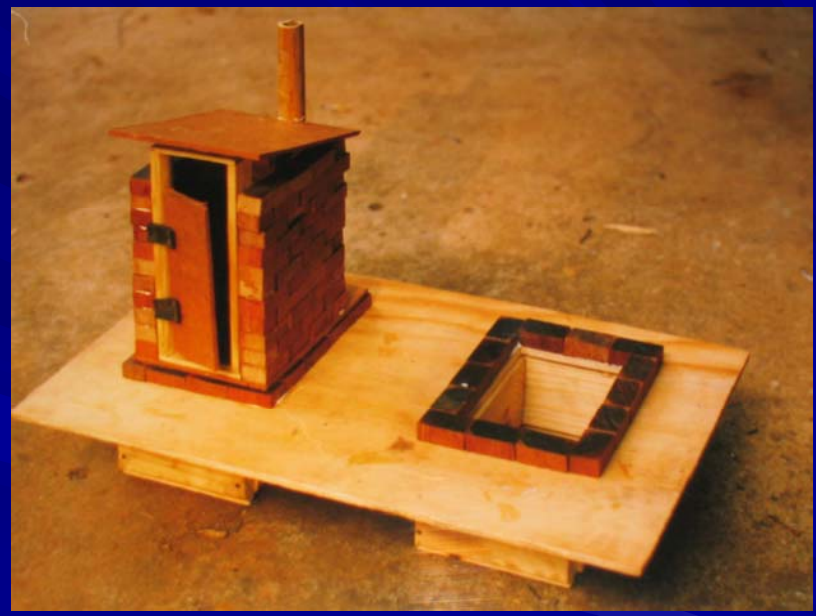
We will also learn how to plant and raise important trees in our gardens using toilet compost.

All these things are important in our lives and can improve the way we live.

MODELS for TRAINING

Models are very valuable training aids

Here are a few examples



Teaching ecological sanitation in Kufunda Village in Ruwa.
Model of a *Fossa alterna*

MODELS for TRAINING

Demonstrating the *Arborloo* principle

Soil, ash, leaves and excreta are added to the shallow pits. The ring beam, slab and structure move on a "never ending journey." Trees are planted in their place.

MODELS for TRAINING

Demonstrating the *Fossa alterna* principle

The toilet alternates between two permanently sited pits. They can be unlined in firmer soils or lined with bricks in looser soils. Soil, ash, leaves and excreta are added to the pit which is being used. The use of pits is alternated at yearly intervals. The addition of soil ash and leaves accelerates the rate of composting in the pit. Pit compost is dug out each year – leaving an empty pit for the next years use.

MODELS for TRAINING

Demonstrating the “corbelling technique” of lining pits with bricks.

The courses of bricks are stepped in nearer the top of the pit. A smaller slab can then be fitted on a lined pit of greater volume.

MODELS for TRAINING
Demonstrating the urine diversion principle

The urine diverting pedestal or squat plate is mounted over a vault which is built above ground level. Urine is separated from faeces. Urine is led into containers or seepage areas around trees. The faeces together with soil and ash fall into buckets or the vault and are periodically removed and transferred to secondary composting sites, trenches or pits.

MODELS for TRAINING
Demonstrating the venting effect in the VIP toilet

The action of the vent pipe of VIP toilets can be shown in models. A slab mounted over a sealed pit (tin can or model with bricks) as shown here. The slab is made with squat and vent holes. A short tube which acts as the vent is fitted to the slab. Leaves and paper placed in the can are lit with a match – making smoke. The smoke will rise out of the pipe, indicating air flows in the system.

The lecture also included a lesson on how to make simple hand washing devices. These should be fitted to every toilet. The use of alloy and tin cans and plastic bottles make excellent demonstrations.

There are many ways of making low cost or zero cost hand washing devices

The introductory lecture makes the best possible starting point to introduce ecological sanitation into the schools.

From then on, the action is practical and takes place outside the classroom!