

Understanding the concept of ecological sanitation

For most people sanitation means sitting on a toilet and flushing away the excreta to waste or simply sitting or squatting on a pit toilet and letting the waste matter build up in a pit. In both cases the excreta is disposed of and forgotten in the quickest and most convenient way. But in a world which is becoming increasingly polluted from excreta, and where many of the world's population do not have access to a decent toilet at all, it does make sense to look at excreta in another way. Ecological sanitation is a system that makes use of human excreta and turns it into something useful, where the available nutrients can be recycled in agriculture to enhance food production, with minimal risk of pollution of the environment and with minimal threat to human health. There is a growing concern about the use of ever-depleting freshwater supplies to flush away such wastes, which can often lead to greater pollution "down the line." Where there is a lack of space, even the ubiquitous pit latrine cannot easily be emptied to form space for another. And even deep pit latrines eventually fill up and must be abandoned. The problems faced in high-density urban areas are the most pressing and also the hardest to solve. And for much of Africa, the cost of an improved latrine may also be prohibitive. The answer may lie in applying the principles of ecological sanitation. There is an extended range of options that can suit a wide range of users – from the very poor to those who are well off.

Ecosan systems

Two of the three main pit-type ecosan toilet systems process the excreta in shallow pits. The third system keeps urine separate from faeces and these two products are processed separately. The methods using shallow pits are simple and relatively cheap to construct, and are thus more suited for uptake in the poorer countries of the world, where pit sanitation may already be the

standard method of excreta disposal. The world of ecological sanitation has been broadened to include very simple and forgiving methods which are similar (if not identical) in their use to the standard pit latrine – the most commonly used excreta disposal system in the world.

These systems have been given names – the Arborloo (a simple pit -toilet in which a tree is later planted) and the Fossa alterna (a twin pit toilet which forms humus). Such methods are seen as introductory or entry points into the world of ecological sanitation and the recycling of human excreta. They are particularly useful and appropriate for use in parts of Southern and Eastern Africa.

The urine diverting system is seen as an excellent but more sensitive concept – its success depending greatly on meticulous use and regular maintenance. Thus the range of options is expanded to include methods which are more forgiving and thus less sensitive to misuse. Also there is a problem of cost to consider. Urine diverting systems are more complex and costly to build and may be beyond the scope of the less well off, which on a continent like Africa, may be most. However, there are many ways of collecting the valuable urine other than separating it in a pedestal or squat plate. Urine can be collected in containers, bottles, potties and stored and later mixed with water for application to the soil. Overall, flexibility is a key component of ecosan.

Upgradeability

The concept of being able to upgrade from one system to another is also



Figure 1: A crop of spinach four weeks after planting, using processed excreta from one family, using a Fossa alterna

embraced here. It is for instance possible to start with the simplest model, the Arborloo, and then upgrade to a Fossa alterna. This too can be upgraded later to achieve a fully urine diverting system, when the concepts of recycling are fully understood and appreciated. Thus urine diversion is a system to aim for in a step-by-step upgrading process. In all cases the primary aim of ecological sanitation is to recycle human excreta in a simple, safe and effective way. Whichever method is used, the results should be both obvious to the users and useful to them.

Forming links with agriculture

The need to improve top-soils in a world where most soils are poor and unable to generate good crops is an important consideration. On a small scale, ecological sanitation can greatly assist this problem. The humus resulting from composted human faeces makes an excellent humus-like soil conditioner, admittedly not in huge quantities at the family level, but certainly sufficient to enhance vegetable production in the back yard. The aim is to mix the humus formed in toilets with infertile and worked-out soil, thus making a "new soil" in which plants can grow far better. The urine can be used as the main fertilizer source for growing crops, e.g. green vegetables and

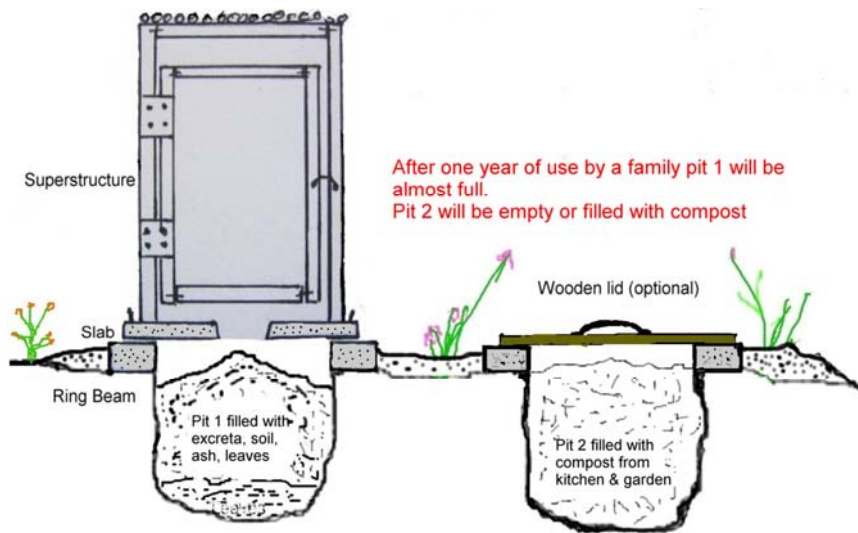


Figure 2: The Fossa alterna after one year of use

maize. Those practising ecosan should also be familiar with the methods of making garden and leaf compost so that all these fertile materials can be mixed to form an enriched soil suitable for planting vegetables. Such humus, when properly used in agriculture, helps to improve food yields considerably and hence provides more food security and improves the nutritional status of the beneficiaries.

While gardening and home based vegetable production may not be important to all potential users of ecosan, in the urban, peri-urban and rural areas of Southern and Eastern Africa, food production in the home can be an important issue, and is taken seriously by most families. However, eco-toilets can solve other problems related to conventional sanitation, not least the saving of water or ease of excavation of shallow pits. Thus important links can be made between sanitation and the worlds of agriculture and forestry.

Management requirements

The practical demonstration of the usefulness of the by-products of human excreta in agriculture is seen as an important component of all ecological sanitation programmes. Consequently the crucial step of linking toilets with a method of producing humus or urine for use in agriculture (or forestry) must be emphasised. It

is this very important management procedure which is vital to the success of ecological sanitation. In ecological sanitation, success depends on proper management, and thus user participation to a far greater extent than conventional sanitation systems. It is no longer a case of sit and flush or squat and deposit. Ecological sanitation embraces a philosophy which the users must believe in and practice daily. Such an understanding and practice takes time to fulfil.

Central themes

There are a few central themes on which this particular approach to low cost sanitation has been built:

- the toilet system itself must be thought of, not so much as a disposal system, but as a processing unit;
- soil can provide the all-important link between the toilet system and agriculture. In the soil-composting systems described in this pamphlet, soil is added to the toilet in quantity – approximately equal to the volume of solid excreta added. And for best results, the added soil should be combined with wood ash and leaves;
- the added soil, together with its companion ash and leaves, converts, purifies and otherwise hastens the conversion of the foul and dangerous mass of excreta into humus, which becomes pleasant

to handle, relatively safe and is rich in nutrients. The process is entirely biological, with beneficial organisms of all kinds tending to thrive and pathogenic organisms tending to die out;

- the end result of this natural process is a valuable humus-like soil, which can be used to enhance the growth of both trees and vegetables. Excreta, soil, ash and leaves are abundant and cost nothing. In combination and when processed they have great value; and
- the processing of human excreta (both humus and urine) is best integrated into a broader scheme of recycling all organic products in both the home and the garden.

Conclusions

Practical information is urgently needed which will allow those living in rural, peri-urban and even some urban areas of Africa to build and practice the art of recycling nutrients from their own excreta in order to gain better crops and vegetables in their own back gardens. The work is primarily intended for use in African countries, where there is space, where back yard gardening is practised and where the climate is warm and wet seasons are interspersed with dry. These principles can be adapted to suit local conditions in various countries in the sub-region. The method chosen will depend on several factors, not least the amount of money available to build a facility and the willingness of the user to engage in the practice of recycling. It should be remembered that all these eco-toilet systems require a degree of management which is far more demanding than required by users of the normal deep pit latrine or even the flush toilet. This may not always be clearly understood at first. Thus practical hands-on training and demonstration are vitally important. Often judgements about final design and processing methods may be taken only on-site where soil type, ground stability and drainage have been assessed.

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