

## 14. Summing up

This book has described the fundamental principles of ecological sanitation and provided a detailed description of how to build and manage a small range of lower cost eco-toilets where the recycled products can be put to good use. Ample evidence has been provided for the value of both humus derived from human excreta and also the urine for enhancing the production of a range of food crops. The greatest effect is normally achieved by combining the use of both humus and urine. Methods of growing vegetables using recycled human excreta have also been described. The importance of combining the use of recycled human excreta and other recycled organic materials like garden compost has also been emphasised. A number of gardening and constructional techniques which assist eco-san based projects have also been described. The health implications of using processed human excreta, has also been summarised.

The techniques described here cover only a very small, and as yet little known range of on-site options for lower cost sanitation. Many large scale projects based on ecological sanitation are being undertaken around the world and these are receiving much attention. The techniques and methods described here are less well known and intended for use by poorer members of the community, who may in the past have used only the pit toilet or no toilet at all. However it is this proportion of the world's population which is perhaps the largest, the least served and the most in need of improved facilities. It is hoped that this extended range of lower cost options will help to increase the coverage of this underprivileged segment of the population.

Ecological sanitation can also assist where people have used conventional water born systems like the flush toilet before, but where these systems are failing due to a lack of water or lack of maintenance of sewage processing systems. Overburdened or poorly maintained conventional sanitation systems can also pollute the environment considerably. These conditions apply mostly in the cities and peri-urban areas surrounding these cities. Where there is space, the systems described in this book may be useful. There are many projects currently being undertaken all over the world, where these same basic problems are being addressed by the application of ecological sanitation. GTZ and Sida/EcoSanRes are at the forefront of such work internationally.

There are a few central themes on which this particular approach to low cost sanitation, described in this book, 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 toilet systems described in this book, 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 inventor of the process is Nature itself.

\*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.

\* 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.

Ironically this method of using soil to process excreta was first used in the form of the “earth closet” over 100 years ago. This technique preceded the use of water born sanitation as we know it today. The concept of using earth, rather than water, quickly went out of fashion however, after the invention of the flush toilet. As we have seen the “earth closet” and its variants still have considerable merit and greatly deserve revival.

All organic material can be composted. Thus leaves are recycled by making leaf compost. Organic vegetable matter, derived from both kitchen and garden are recycled to make garden compost. Manure derived from animals is recycled to enter the compost heap. The composted materials from all sources, of both animal and plant origin, are applied back into the soil, which becomes enriched. Thus it is the combination of recycled leaves, manure, vegetable matter, kitchen scraps together with recycled human excreta which are used to form a medium which is mixed with topsoil to enhance the growth of food crops.

Put simply, eco-toilets form part of an ecological approach to managing the garden and home in a holistic way. Even used water (grey water) can be recycled in such a way that it can enhance the production of food. The home and garden becomes part of an eco-home and eco-garden. Recycling in all its forms is encouraged. That is how Nature works!

The question then remains, what if I am not a gardener and have no interest or time to produce my own vegetables? Many may have no garden, but this will rarely apply to those for whom this book has been written. If this is the case, these eco-toilets will at least save water if the alternative is a flush toilet. If the alternative is a deep pit toilet, this new approach will provide an alternative facility which is safe, relatively cheap and pleasant to use. The fact remains that all pit toilets will eventually fill up and must be replaced sooner or later. For those millions who use pit toilets, low cost eco-toilets may provide a good answer for the future. For many, it will be the low cost of the simpler toilet systems described in this book which will have the greatest appeal. For others, it will be the ease of construction and the possibility of self sufficiency which will appeal. For others, the selling point may be that for the first time a toilet can do more than just dispose of excreta.

There is also the possibility that once put to use, the production of humus from the eco- toilet, together with the re-use of urine, may encourage the home owner to consider growing vegetables or enriching flower beds or growing more fruit trees. My own interest in gardening and the organic approach was much encouraged when I started to use an ecological toilet and reused the humus formed and the urine.

In this study I have been constantly amazed by the conversion process - how all these materials which in their prime state could never be classified as soil, easily turn into a product which can only be described as soil. Thus leaves turn into soil, organic wastes from the kitchen turn into soil, vegetable and manure turns into soil and even human excreta turns into

soil. Soil is surely the beginning and the end of it all. In this discipline, the answer does indeed lie in the soil.

But even the richest soils need rejuvenation when they have yielded their nutrients up to the growing plants and a method of constantly re-introducing the nutrients derived from urine and humus into the soil is required. Thus compost or processed manure should constantly be introduced into the vegetable garden. Where jars, basins or other containers are used, once the vegetables have been harvested, the used soil can be tipped out into a pile, sieved and introduced into a fresh pile of soil to which fresh compost or eco-humus is added. So there is constant rejuvenation of the soil which is used.

I subscribe to the view held by Louis Bromfield, that there is nothing wrong with carefully combining different techniques in the garden, provided that the soil is enriched, biologically, and plant life is helped to flourish. And careful use of organic and even inorganic plant foods, even those available on the market can also be used carefully in combination with the methods described.

## **Conclusions**

This book attempts to provide practical information 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 East and Southern Africa, where there is space, where back yard gardening is practiced and where the climate is warm and wet seasons are interspersed with dry.

The basic principles outlined in this book are the most important. 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.



*Eco-toilet in an African setting. Ruwa, Zimbabwe*

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.

The methods described in this work represent new ventures into the world of low cost sanitation, and there is still much to learn. This work has been written by a researcher, who dabbles at the fringe of understanding. There is an ocean more still to learn. The methods described are intended to add on to the sanitary range of options already available and not compete with them. The pit latrine, currently the commonly used excreta disposal system in the world, has survived over the centuries because, along side its many potential deficiencies, it has great merit. The flush toilet and related waterborne systems have brought with them the possibility of people living together in cities, and of greatly reduced incidents of disease which has made modern life possible. Thus the application of waterborne systems made possible a huge rise in living standards for countless millions of people. And this continues to be the case. All sanitary systems have their place. Both the pit and flush toilet systems will remain as major excreta processing systems for as long as we live. They will be joined by urine diverting systems and variants of both the flush and pit toilets which make recycling possible.

One thing has become clear to me, since I have undertaken this work. This new approach to sanitation has come just in time to add a new perspective and dimension to sanitation itself. The low cost alternatives described in this work, offer really practical solutions for providing acceptable sanitation on a small budget. Very often it is the simplicity, ease of construction and low cost of a method which may appeal at first to the user. The additional benefits of recycling may only become apparent later on. Such an awakening takes time.

***ONLY TIME WILL TELL!***

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