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Toilet Solidarity

Compost Toilets for All

Mary Mellet reviews different designs, including the treebog, urine separators and simple container loos

There are many things to love about compost toilets; they're low cost and cycle nutrients back to the earth rather than flushing away as waste. But how do you navigate the different designs and styles? Over the last six months, Re-alliance has helped build different types of composting toilets with refugee communities in Uganda and Kenya. Our aim is not to promote individual technologies, but to enable a choice for the most appropriate design in a given context. Instead of toilet 'equality' where the world follows the Western model of polluting and wasteful flushing toilets, we're advocating for toilet 'solidarity', where the Western and majority world transition in tandem to regenerative sanitation solutions. These work with the nutrient cycle to create health and abundance from our waste instead of pollution and harm. Unless you built your own house, you probably didn't get to choose which type of toilet it had; the majority of houses in the UK come with a flush toilet connected to the sewage network. But we do get a choice in any subsequent toilets, the toilet for the home office down the garden or the second toilet you install to accommodate a growing family. These extra loos could all be compost toilets. Here we look at two designs our partners have built in East Africa and then overview options that you could adopt for your own project – there's a compost loo to suit most contexts.



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The Treebog in Kakuma Refugee Camp, Kenya

More than 182,000 people live in Kakuma refugee camp in Kenya, which was formed in 1992. Farming and Health Education, our local partner, is a community-based organisation which uses permaculture design principles to increase resilience by working with people to grow their own fresh food. Working with degraded soils and without the money for external fertilisers, growers in Kakuma understand the advantages of healthy soil and so the compost and fertility created by the treebogs are valued. In this pilot, two double treebogs were built and productive trees were planted around the toilets. Because these toilets are for communal use, it is useful that the treebog design does not include urine separation, to ensure little change in behaviour is needed from the toilet users. A carboniferous cover material, such as wood shavings or leaves, is added after using the toilet. The cover material prevents odours and flies, as well as maintaining the required carbon to nitrogen balance for healthy composting.

We worked with Jay Abrahams, who invented the treebog, and he explained, “A treebog is a platform mounted toilet seat or squat, in a cubicle, surrounded by closely planted, fast growing and productive trees and shrubs. This arrangement enables the faeces and urine to be deposited on the soil surface in an aerobic chamber underneath the platform where the solids are composted into soil and the liquids soak into the earth below, feeding the root zone of the planted species surrounding the treebog. The trees enhance liquid take-up and composting of the solids and can also produce fruit, nuts and coppiced wood. When full, treebogs are closed and the contents are left to compost, being safely emptied after about a year to 18 months, once the wastes have been fully composted to soil. Depending on the amount of users, some treebogs never need to be emptied and the composted waste just continues to feed the trees. The trees and shrubs also create a habitat for wildlife, increasing the biodiversity of the area.”



Above and right: © Winnie Tushabe, YICE

Ecosan Toilets in Nakivale Uganda

In the Nakivale refugee camp in Uganda, refugees are given a small plot of land to build a dwelling and farm food on. Our partner organisation YICE (Youth Initiative for Community Empowerment) is working with families to create kitchen gardens but yields are limited because the soil is poor. We worked with YICE to build eight urine diverting dry toilets (or ‘ecosan toilets’) for families. By separating the urine and faeces, the volume of composting waste is reduced, extending the capacity of the compost chamber and giving an immediate source of fertiliser in the form of urine, which, when diluted 1:20 with water, is an excellent fertiliser rich in nitrogen, potassium and phosphorus. Diverting the urine away stops the compost chamber from becoming anaerobic and smelly and the addition of wood ash, after using the toilet, acts as a dehydrating cover material. This design used recycled plastic barrels as containers for the faeces, which ensures no ground pollution. Once nearly full, the barrel is moved aside and replaced with a fresh barrel. With the hot composting achieved inside the barrels, compost can be created in under 12 months in the Ugandan climate. The compost is used to enrich the soil around fruiting trees and bushes.

Closed Loop Sanitation

'Create no waste and produce a yield'

Re-alliance is not alone in advocating for compost toilets as a sanitation solution; Oxfam, Wateraid and Tearfund have also built compost toilets at various scales and the South African government is building them at a national level. However, when these projects are viewed solely as a sanitation solution, the production of compost is often seen as a problem to dispose of rather than a resource and the toilets are not well accepted. By integrating the toilets with existing food growing projects, the outputs are more likely to be valued and used for soil enrichment, increasing food security and biodiversity in tandem with improving sanitation. As YICE director Noah Ssempijja commented recently, "At last we may have found a solution to our poor soil fertility".

However, caution, careful management and observance of national and regional regulations are needed as untreated human excreta can transmit diseases. The myth to resist though, is that water-based systems are more hygienic than composting systems. With colonialism, the West exported the idea of flushing toilets as a clean, safe means of disposing of waste. But this denies the fact that adding human waste to water is a vehicle for pollution and disease if the water is not properly treated. The United Nations' 2017 World Water Development Report stated, "In all but the most highly developed countries, the vast majority of wastewater is released directly to the environment without adequate treatment, with detrimental impacts on human health, economic productivity, the quality of ambient freshwater resources, and ecosystems."

Unfortunately, the problem continues in the UK, with Surfers Against Sewage stating in their 2022 Water Quality Report that "Over the course of 2020 and 2021, sewage has been dumped into the ocean and rivers around the UK more than 770,000 times". With proper siting and management, compost toilets are safe, as is the compost they create. Joseph Jenkins writes in his well researched *The Humanure Handbook*: "As long as they are combining their humanure with a carbonaceous material and letting it compost, thermophilically or not, for at least a year (an additional year of ageing is recommended), they are very unlikely to be creating any health problems."

Advice on the use of compost varies, many types of food have been grown safely from humanure compost, and Jenkins argues for its use on most food crops, but harm caused by mismanagement can also be imagined. As a result, the Centre for Alternative Technology recommends its use only on fruit bushes and trees, which don't absorb pathogens up their woody trunks, and on ornamental plants.

Whichever system you choose, the benefits remain attractive: less expensive, less polluting and a creator of compost and fertiliser. Below is a guide for choosing a compost system, with references you can go to for more information. I do hope you find a loo that suits you, and, if you are considering a second toilet in your household, you might take the dive and go waterless. You're sure to learn a lot along the way while saving money and water, reducing pollution and feeding plants.



Winnie Tushabe and Jean-Paul from YICE with compost from Ecosan Toilets

Which Composting Toilet is Best for You?

For all the solutions listed here you will need an outside space for the compost to be made and/or stored and used, this could be a garden or courtyard.

Container-based Compost Toilet inside an Existing Home or Building where Space is Limited

This scenario would also include compost toilets inside mobile homes and boats. Here you can create a DIY solution or buy an off the peg unit. Both have limited capacity so are suitable for household scale use, but not larger scale frequent use. Pee, poo and toilet paper are held within a sealed container, such as a plastic bin, and covered with sawdust or other organic cover material. The container contents are emptied into a compost bin or bay, ensuring the top is well covered by organic matter. You can choose to include urine separation which reduces the volume of waste and creates a plant fertiliser; most off-the-peg solutions use urine separation. Several compost bins or bays will be needed to rotate between – one curing the other filling.

Advantages: Cheapest and simplest solution to build. Useful in places with limited space. Can create fertile compost and urine fertiliser.

Disadvantages: Emptying and management of composting system required.

Examples of off-the-peg designs: Loveable Loo, Trobolo, Wee Hooses Compost Toilets.

RESOURCES

Best book

The Humanure Handbook: Shit in a Nutshell, 4th edition, by Joseph C. Jenkins
<http://humanurehandbook.com> for pdf downloads

Best online resources

HumanureHandbook.com

How to build a simple compost toilet

https://humanurehandbook.com/downloads/Loo_Construction.pdf

Best overview of composting system

How to Make Humanure Compost with a Composting Toilet, Happen Films

<https://youtu.be/JAcEvs3Bxjs>

More on compost loos:

'Long Drop Toilet – Just Add Worms' (PM108)

'The Ecological Toilet' (PM70)



Compost Chamber Systems

Here, the composting happens within the toilet structure, so more space is needed for building. The toilets are usually elevated above the compost pile, with composting occurring at ground level. The contents are usually emptied once composting has occurred, after 12-24 months or sometimes just left to rot down. Often designs include a 'twin chamber' system, where one chamber is filled while the other is left to compost. Rotated large containers can also be used to receive the wastes and then switched over for composting (as in our Ugandan Ecosan examples). Most designs include urine diversion, with the treebog as a notable exception.

Advantages: No handling or transportation of wastes needed. Fertile compost created. Urine fertiliser can be used to improve plant growth.

Disadvantages: Compost chamber usually needs to be emptied after 12-24 months (although with infrequent use, emptying is reduced). Toilet seat is elevated so steps or a ramp are needed for access.

RESOURCES

Best book

Lifting the Lid: An Ecological Approach to Toilet Systems
by Peter Harper and Louise Halestrap

Best online resources

Centre For Alternative Technology, Composting Toilets
<https://cat.org.uk/info-resources/free-information-service/water-and-sanitation/composting-toilets>

Best video

Centre for Alternative Technology, Webinar:

Compost Toilets, an introduction, by Louise Halestrap
<https://youtu.be/mrdxd0o6sqA>

For the treebog, see PM25, Autumn 2000 and also:

www.stewardwood.org/resources/DIYtreebog.htm

Next issue:

'The Poo Palace – How to build a Treebog'
with plans by Maddy Harland

Re-alliance is a UK registered charity, who work with local partners in refugee camps around the world to create regenerative projects which enrich the health and wellbeing of people and the natural environment. www.re-alliance.org

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