Methods of using "toilet compost" in agriculture

Peter Morgan

What is '"toilet compost"

The word 'compost' originally meant a mix of manures, including human 'wastes" and added vegetable matter and soil. Compost is a living material containing many beneficial bacteria and fungi. It has important properties which are valuable for plant growth. Toilet materials (urine and faeces) can be transferred to compost heaps for processing.

Other sources of toilet compost

Toilet compost can be derived from alternating shallow pit (Fossa alterna) composting toilets. In these toilets a mix of excreta, soil, ash and leaves has been added. In such cases a year should have elapsed after the last addition of excreta before the material is removed. After 12 months of composting the material is generally safe to add to top soil in vegetable gardens.

Sources of toilet compost

Toilet material be derived from single or double vault urine diverting toilets. In these cases the material is not true compost but dehydrated faeces. To get compost some form of secondary treatment is required. This normally involves removing the material from the toilet system and placing it in an environment where composting is accelerated.

Urine diverting vault material.

The material in urine diverting toilets vaults may be sterile if a lot of ash has been added. It will contain much potash and some phosphorus but less nitrogen.

It is best mixed with more living soil and organic material like leaves and buried in shallow trenches where it is out of reach of children.

Then a process of composting can take place. The material is more useful to plants if it is "living" and contains good soil bacteria and other microbes.

Promoting the composting

The process of composting human excreta is greatly assisted by adding soil, ash and plant material such as leaves etc to the material. The volume of soil added should almost equal the solid volume of faecal material .

- **The process takes place more effectively if the excreta is well mixed and interspersed with soil, ash and other vegetable matter.**
- **In urine diverting toilets faeces are first combined with soil and wood ash. This material is then later transferred to a “secondary composting site” and more soil is added.**
- **The efficiency of composting and the texture final product is greatly improved by adding leaves.**

Toilet compost from the Fossa alterna

On the left a mix of faeces, urine and soil. On the right a mix of faeces, urine, soil and leaves. The addition of vegetable matter like leaves adds air and microbes into the system and also reduces the density of the material. This aids the composting process.

Toilet compost transformation

Faeces turns into soil over a 4 to 6 month period if in close contact with soil. These photos show the transformation.

Double composting pits

The material can also be transferred in small lots into alternating shallow compost pits where soil, and leaves are added to help the process.

The Tree Pit

A mix of fully composted or semi composted faeces, soil , ash and paper from a urine diverting toilet vault or shallow pit composting toilet can be transferred into a shallow pit in which a tree or shrub will later be planted. Extra soil and plant material can be added during the transferral.

The transferral time is brief and the material exposed for a relatively short time.

This transferred material is covered with more soil (about 15cm deep) and a young tree planted in the soil.

Placing urine diverting vault material in trenches

The trench is dug out and soil left in a heap nearby. The trench should be about 40cm wide and 25cms deep. The vault material is added to the bottom of the trench and levelled out to half fill it (depth about 10 -15cms).

Composting vault material in trenches

The top soil is then placed back into the vault leaving a slight mound over the site. This mound identifies the area treated. The mound is then watered. Leafy vegetable seedlings can be added after watering.

Secondary composting in sacks or bags

If there is doubt about the quality of compost taken out of the toilet or shallow pit, it can be added to sacks. Here again additional soil and leaves or other vegetable matter can be added to the sack as it is filled. The sack and its contents are then stored for an additional period. The resulting material is of improved quality and safety.

Reuse of toilet compost

Toilet compost is a valuable material.

Nutrient levels in toilet compost taken from Fossa alterna pits compared to local top soils

Soil	Nitrogen	Phosphorus	Potassium
Top soils (Harare area) (N = 9)	38 ppm	44 ppm	0.94 ME/100 gms
Toilet compost *(Fossa alterna)* (N = 10)	275 ppm	292 ppm	4.51 ME/100 gms
Toilet compost (Urine diverting)	232 ppm	297ppm	3.06 ME/100 gms

- ***Reuse of toilet compost***
- **The simplest method of using toilet compost is to plant a tree or shrub in soil placed on top of a pit filled with composting excreta. This can be achieved directly by placing the toilet slab and structure over the pit as in the *Arborloo,* which moved from one site to the next**

- **Even compost derived from alternating pit toilets or urine diverting toilets can be used in this way. Programmes in South Africa and Namibia advise that compost derived from UD toilets can be placed in shallow pits which are then planted with a tree or shrub.**

Plant a tree!

Enhanced vegetable growth using "pit toilet compost"

Lettuce (left) is shown growing on poor local topsoil (left bucket) and a 50/50 mix of local top soil and pit compost taken from Fossa alterna pit (right bucket) after 30 days growth. Similar increases in production were observed on spinach (right).

Backyard gardening

The backyard gardening scenario is particularly suitable for recycling human excreta. In countries like Malawi, Mozambique, Zambia and Zimbabwe, backyard vegetable and maize production is commonly practiced, even in urban and peri-urban areas. Such gardens are a vital food source for the inhabitants.

Use of toilet compost on vegetable garden

Toilet compost can be dug out of shallow pit composting toilets and applied to existing vegetable gardens nearby. In this case an vegetable garden measuring 5m X 3.5m was prepared on an existing garden site. Toilet compost was dug in to the topsoil to enhance the nutrient level in the soil.

Use of toilet compost on vegetable garden

The garden was then planted with spinach and rape, watered and protected against animals. The plants were harvested in different sections after 30 days of growth .

Use of toilet compost on vegetable and maize gardens.

Toilet compost can be dug into “planting stations” of maize seed ready for the rains. Also it can be dug into and mixed with topsoil. Care is required to ensure it is fully composted. Dig into shallow trenches and cover with soil if in doubt about safety.

Use of toilet compost as potting soil

Seeds germinate well in toilet compost and young plants thrive as the photos below show. The compost is best sieved before use.

Toilet compost as a planting medium

Toilet compost makes an excellent medium in which to plant seeds, especially in areas of poor top soil. It provides valuable phosphorus without excessive nitrogen and also potash and other minerals. Being humus-like it contains more air than fine sandy soil and this leads to improved germination and healthier young plants. It also retains more water in periods of lower rainfall.

Overall conclusions

- The compost derived from ecological toilets is a valuable material which can enhance the production of vegetables and other important crops. It also strengthens the growth of seedlings planted in it.

- Where there is uncertainty about of the quality or safety of the toilet compost , secondary treatment is required. This can often take the form of adding more soil and vegetable matter to the compost and extending the composting time. This can take place in shallow pits or trenches or in sacks. It is then placed out of the reach of children.

- The effect of toilet compost is enhanced considerably by the application of urine. This can be applied diluted with water. The effect of urine on the growth of plants like green vegetables and maize, which are hungry for nitrogen, is stunning.

- When harnessed together both toilet compost and urine have enormous potential for enhancing food production in both rural and urban areas.