# **Turning Out Black Gold: Ecological Toilet Designs**

Composting toilets come in all shapes, sizes and designs. They all sterilize feces by either composting them or drying them out. Here's' how they do it:

#### **Composting Toilet**

o Urine may be separated out to decrease odor.

o A few handfuls of finished compost added after each use introduce microorganisms, which break down fecal matter.

o Wood shavings or similar bulky organic material added after each use create air spaces that support microbial activity.

o Venting is crucial to prevent odors and provide oxygen for bacterial decomposition.

o Pathogens are killed by predation from the microorganisms, and through natural die off, which speeds up as the temperature rises.

o Toilet paper, used sparingly, breaks down.

Final product: Moist humus similar to garden compost.

#### **Dry Toilet**

o Urine is always separated out.

 Receptacle is vented for airflow, which dries out feces.

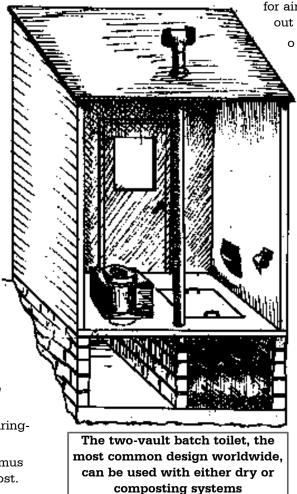
> o A cup or two of lime or ash mixed

with soil added after each use raises pH.

o Pathogens are killed by the combination of high pH and the inhospitable dry environment.

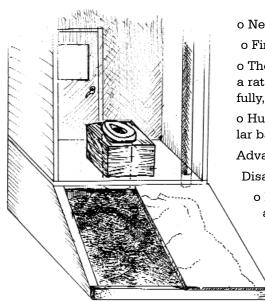
o Toilet paper won't break down in the dry environment; it is collected in a wastebasket to burn or bury later.

Final Product: A nutrient-rich soil amendment that looks like instant coffee and smells like healthy soil.



The next design consideration is whether to buy or build a continuous or batch system. There are many designs to choose from; which you choose depends on the space constraints of your bathroom or outhouse and how much maintenance you are willing to do.

## Continuous composting system



- o New material is added to the top of the bin.
- o Finished compost is harvested from the bottom.
- o The container needs to be large enough to fill at a rate that lets material on the bottom decompose fully, yet leaves room for new deposits on top.
- o Humus is harvested from the bottom on a regular basis.

Advantage: No containers to move around.

#### Disadvantages:

- o Requires space in or below the bathroom to accommodate large amounts of composting or dehydrating feces.
  - o If storage area is not sized properly, it's tricky to add more space.

- o A drum, vault, or other container is filled completely. Then it is sealed with ventilation in place and allowed to sit until contents have composted or dried out completely.
- o The process takes from six months to two years, depending on temperature and how quickly the container was filled.
- o While the full bin is curing, a new bin is being filled.

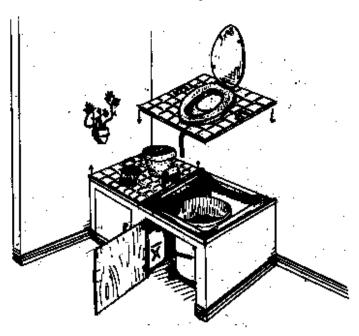
#### Advantages:

o Easy to add capacity is the need arises. If bathroom space is limited, use smaller containers and switch out the bins more often.

# Disadvantages:

o Requires space to store containers and maintenance to switch out containers.

# **Batch System**



5-gallon bucket humanure collector

# Vent Design

The final consideration is what type of vent to use. Electric vents draw air through the vent pipe with a fan, which can be solar powered. Passive solar vents use the sun to heat air inside a dark-colored pipe. The heated air rises, creating a flow of air that carries odors from toilet out the top of the pipe.

