# benefits of compost toilets

## reducing water pollution

Micro-organisms are much more efficient at getting oxygen than larger creatures like fish. If all the bacteria and other micro-organisms in raw sewage were pumped directly into rivers, they would use all the available oxygen, and fish would die. The main measurements of the health of a river as regards sewage are BOD (biochemical oxygen demand) – the amount of oxygen being demanded by micro-organisms, and SS (suspended solids) – meausured using a filter; large numbers of particles kill larger creatures by blocking light.

Algae is particularly problematic, as they grow very rapidly, causing ‘blooms’ which use all the oxygen and also block out the light, ensuring that watercourses become green and slimy and devoid of life (except algae of course).

Phosphates are the major cause of algal blooms (eutrophication) in rivers, by providing nutrients for the algae to feed on. About half the phosphorus in sewage plants come from human waste, and the other half is from phosphates in washing powders (they soften the water to make soaps more effective).

Nitrates are also a cause of algal blooms. Ironically, they are causing problems (or requiring sewage farms to avoid these problems) when they could be doing a useful job providing nutrients to plants on land. Compost toilets ensure that plants do get these nutrients, and then they don’t have to be dealt with as if they were a nuisance.

Compost toilets score well as regards water pollution, as solid waste is dealt with on site, and doesn’t get anywhere near watercourses, and anyway, when organic matter is composted properly, the nutrients are no longer water soluble, and so won’t leach out of the soil into groundwater. Also, the more compost toilets there are, the less water will be flushed to sewage treatment plants. This is a good idea, as the more water there is, the more chance there is of flushing nutrients through the system and into the rivers.

Depending on what happens to the urine, it could end up in watercourses. Peeing on straw-bales, leachfields and reed-beds are all good options.

Conventional sewage treatment prevents most of the nutrients and suspended solids in the sewage from reaching rivers, but not all, and uses an awful lot of chemicals and energy in doing so.

Raw sewage into watercourses is obviously the worst option. This is exactly what happens in most cases in developing countries though.

# water saving

If all the fresh water on earth was put into a cube, it's dimensions would be 95 miles on each side. If you think about the size of the planet, and the 6 billion people on it, as well as the billions of tonnes of biomass of other species, then it really is a tiny amount. And this amount of fresh water is fixed, whilst the human population, and our *per capita* water use, is growing. Water shortages are already a serious problem in drier parts of the world, and will become more so in future, possibly sparking resource wars. As long as less-developed countries are following the Western model of flush toilets (and they are seen as a measure of development for everyone to aspire to), then this problem is going to get a lot worse. As more and more water is extracted from rivers for sewage transport, less is available for wildlife, and sometimes the flow of the river itself can be threatened.

It's up to all of us to try and use less water and avert these potential problems.

Around 32% of domestic water use is for flushing toilets, and so installing a compost loo can immediately save one-third of your water use. An average western family of four will flush the toilet say 15 times per day, and at around 12 litres a flush, that's 180 litres a day. Multiply this by 365 to get an annual total of 65,000 litres down the loo each year.

Low-flush toilets are available which use even less than this, but not as much as compost toilets, which don't use any water at all.

As regards water saving, compost toilets win against all other systems except no treatment (which doesn't use water, but contaminates it), as all the others use water to flush away the waste.

# soil improvement

In the twentieth century, almost half the topsoil was lost from the agricultural land of Western countries. You have to take a moment and let that sink in. A century in which half of our most precious resource was eroded due to incredibly unsustainable farming practices. The use of chemical fertilizers, especially, meant that it was no longer necessary to add organic matter to the soil to increase its fertility. You could do it instantly, in a modern, clean way by adding chemicals manfactured in factories and delivered in plastic sacks on trucks.

Unfortunately this meant that no humus was being produced. Humus is the rich dark top layer of the soil, which contains lots of decomposed and decomposing organic matter. Humus provides food for micro-organisms, nutrients for plants, it helps retain water, and very importantly, it provides structure for the soil and prevents erosion.

So as the amount of humus in the soil fell, the soil became less fertile, and so more chemicals were added until we were on a vicious downward spiral of ever-more chemicals and ever-less soil.

The human body has evolved over millions of years to thrive on food grown in rich, healthy humus. It can't change in such a short time to cope with foods grown in an artificial, humus-poor soil. Cancer is on the march everywhere in the developed world, and it's hardly surprising when we steer so far from the natural world in which we evolved.

And of course plants won't be as healthy when grown chemically rather than naturally. Humus holds a lot of water, and also nutrients that are not in solution, so plants can take either water or nutrients – whichever they need. Chemical fertilizers are water soluble, however, and when plants take water, they take nutrients too, whether they need them or not. Chemically-grown fruit and vegetables tend to be big and rather tasteless as a result.

A compost toilet of course produces compost, which reduces the need for chemical fertilizers which destroy soil structure.

It's true that there is (anaerobic) decomposition in a septic tank. We even have tiger worms busily eating the scum in ours. However, having emptied some of the scum from a septic tank, I found that its not the same level of decomposition as in a compost toilet. Compared to the crumbly compost that we get from the compost loo, what comes out of a septic tank is, well, not very nice. Neither is the anaerobically-digested sludge from sewage farms as good a soil conditioner as compost, even if you don't take into consideration the fact that it will contain industrial toxins (see below).

If an individual wanted to be self-sufficient in food, the nutrients in that person's urine and faeces, together with the composted waste from the previous crop, would be more than enough to provide all of his/her food.

# other benefits

## no chemical cleaners or bleaches

You will, of course, only use eco-friendly cleaning products in your compost toilet (for example, to clean the chute), and you would never dream of using chlorine-based bleaches, as they would kill the friendly bacteria working away down there. Unfortunately though, most people with flush toilets do just that (and toilet blocks are as bad as liquid bleaches). Chlorine reacts with organic matter to produce 'chlorinated organics' which don't break down in the environment, and so accumulate over time. They belong to the same family of chemicals as DDT and poly-chlorinated biphenyls (PCBs) - both banned in the seventies - and are toxic, and possibly carcinogenic (Greenpeace and Breast Cancer Action say they are, the chlorine industry say they're not).

## no sewage sludge problem

1.4 million tonnes of sewage sludge is generated in sewage treatment plants each year in Britain. Dumping at sea was banned in Britain in 1998, and now half is spread on agricultural land and the other half is either landfilled or incinerated. After it's incinerated, the ash goes to landfill.

Firstly, how many truck-miles and how many litres of fossil fuels are required to transport that lot around? (I don't know the answer to this one, but it's a lot.)

Secondly, in landfill, it leaches into the groundwater, and gives off greenhouse gases (to be fair, many landfills now collect the methane to burn for electricity generation; our local landfill has 10 miles of pipes inside it collecting the methane. But this isn't happening in poorer countries. A landfill I visited in Romania was not only not collecting gases, it was on fire!).

Thirdly, sewage sludge contains industrial waste, and so incineration will emit mercury, lead, cadmium and dioxins, as well as carbon dioxide, into the atmosphere. Flue gas treatment can remove some but not all of this.

So let's think about agricultural use, and the industrial waste that is part of the sewage sludge from sewage treatment plants. The waste will include heavy metals, and up to 60,000 different industrial chemicals, many of which are toxic and/or carcinogenic, and very few of which have been tested. And they talk about the risk of pathogens from compost toilets!

There was a campaign to stop sewage sludge being dumped at sea ('Surfers against Sewage' were very active), which was successful in 1998. There are now several websites dedicated to opposing the use of sewage sludge on agricultural land, but I couldn't find one that mentioned compost toilets, which is surprising because it's the only method of sewage disposal, except for reed beds, which doesn't lead to potentially pathogenic and/or toxic-waste-laced sewage ending up in the soil.

Enlightened countries such as Sweden (it's always Scandinavia isn't it?) have banned the use of sewage sludge on agricultural land; but it's difficult to think of an environmentally-friendly way of disposing of millions of tonnes of sewage sludge containing a cocktail of toxic chemicals and heavy metals. It would of course be much better not to generate the stuff in the first place, and this could end up being the best reason of all for the promotion of compost toilets.

## no greenhouse gas emissions

First a quick summary of the 'greenhouse effect': the whole spectrum of solar radiation passes through our atmosphere to warm up the earth. However, reflected radiation that bounces of the earth is long-wave only. There are some gases in the atmosphere that allow solar radiation through, but absorb the reflected long-wave radiation, stopping it from escaping into space, and so causing global temperatures to rise (glass does the same thing – hence the greenhouse effect). No climate

scientists these days argue that global warming isn’t happening, and very few think that it isn't down to humans (although those that do get a disproportionate amount of media coverage), and the International Botanical Congress and the UN Environment Programme state that current warming trends could mean the loss of up to 60% of all species of plants and animals in the next 100 years. Combine this with predicted sea-level rises of tens of metres if current trends continue, and the implications for humans are obvious – drought, famine and more ecological damage that will ultimately threaten our survival.

Methane and carbon dioxide ($CO_2$) are greenhouse gases, and although $CO_2$ is the most important because of the large amounts of it in the atmosphere, methane is better at absorbing long-wave radiation.

Compost toilets break down human waste aerobically, which although it does produce $CO_2$ (which will be taken in by the plants that the finished compost help to grow), doesn’t produce any methane. In all the other systems mentioned, the waste breaks down anaerobically, releasing methane, as well as $CO_2$.

## saving energy

Compost toilets not only save water, but they also save all the electricity used to pump it to our houses (along with all the emissions of $CO_2$, sulphur dioxide, nitrogen oxides, carbon monoxide etc. associated with electricity generation.) They also save all the energy, hardware, chlorine and other chemicals used to extract and purify drinking water.

All other systems use water to flush away the waste, except no treatment, which really isn’t a sensible option.

Compost toilets also save all the energy (and associated emissions) required to deal with sewage, including all the electricity used in sewage treatment plants, and all the fuel in the trucks that empty septic tanks and cesspools, and transport sewage sludge.

## very low overall resource use

You could spend a whole day thinking of all the resources used in conventional sewerage systems – not only water, electricity and chemicals, but trucks to move around sewage sludge, pipes to deliver water and remove sewage, heavy equipment used to lay these pipes, factories to manufacture this equipment – and so on. Suffice it to say that compost toilets don’t need any of these things.

## saving money

- no truck to remove solids from septic tank - c. £150
- no Environment Agency discharge licence (if you collect urine, or have a reed bed / leachfield system) – c. £900 / year
- reduced water charges: more and more people are on water meters, and all new dwellings have them. The average charge is between £1-2 per cubic metre. Annual family savings on flushes works out at around 65,000 litres. There are 1,000 litres in a cubic metre, so that's 65 cubic metres, saving between £65-130 per year
- low-maintenance, less need for plumbers (who can be very expensive)