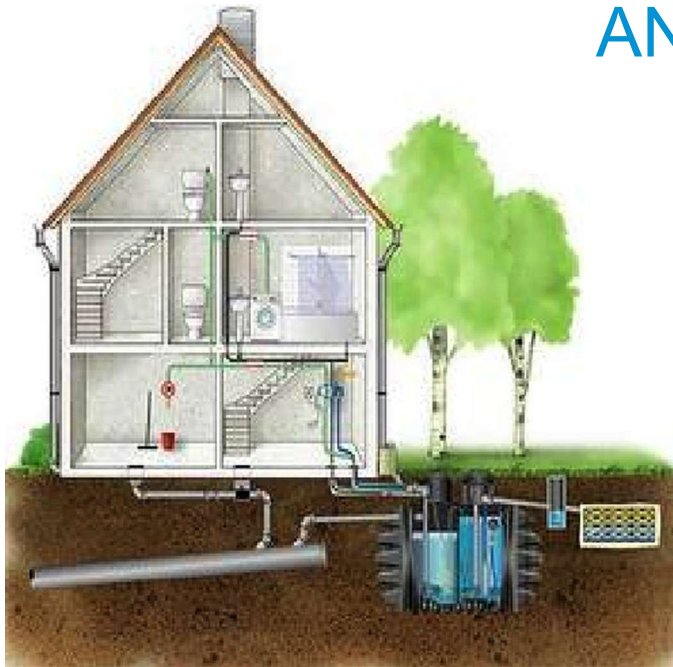


# GREENHOUSE INFORMATION SHEET

## GREY WATER RECYCLING AND COMPOST TOILETS

*All proceeds from the sale of these leaflets help us print more*

**SUGGESTED DONATION 50p**



*Grey water systems should be a standard part of all new buildings. Retrofitting systems can be complex and constrained by the inherited design and materials.*

In the UK, mains water is purified to drinking water standards. We waste a third of drinking water simply flushing it away! With water so readily available in the home it is difficult to remember how vital a resource it actually is. According to World Health Organisation / UNICEF, over 1 billion people are still without access to safe drinking water.

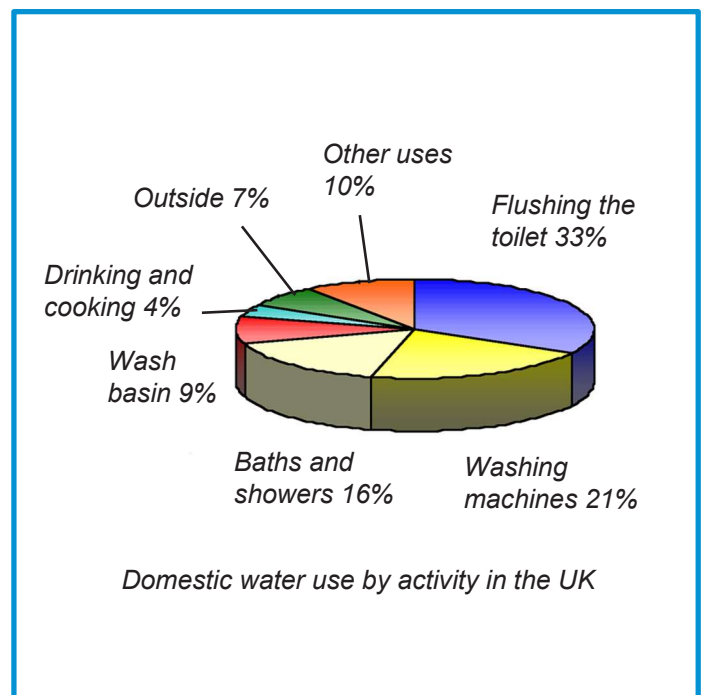
Reducing demand through recycling water and using composting toilets can save energy, money and conserve one of the planet's most precious resources, fresh water.

Careful management of the water you use, through recycling wastewater from sinks, baths, showers and washing machines and using compost toilets, means that large quantities of fresh water can be saved. Energy and CO<sub>2</sub> used to produce water to drinking standards can be saved.

Even though approximately 70% of the earth is water, only 2.5% of that is actually fresh water. Over two thirds of this fresh water is frozen in glaciers and polar ice caps. The remaining 97.5% of water on the Earth is salt water.

The illustration on the right shows the breakdown of water use in the average home in the UK. Over 50% of water supplied to the home does not need to be of drinkable quality.

Reusing grey water or installing a compost toilet will significantly decrease the amount of water you use.



The average person in the UK now washes away a staggering 1,000 litres a week. Domestic water use in the UK has doubled in the last 40 years from 75 litres per person per day in 1960 to 150 litres per person per day in 2006.

# Grey Water Recycling

## GREY WATER VS. BLACK WATER

Waste water from all sources other than toilets is known as grey water. Black water is heavily polluted water containing faecal matter and urine.

Grey water comes from a variety of sources such as kitchens, baths, hand basins, washing machines and dishwashers. The quality varies with regard to the cleanliness, level of organic matter and temperature. In most houses all the wastewater goes to the sewer and is mixed with the black water from toilets and therefore makes all the water effectively sewage.

If grey water is kept separate to the black water it contains nutrients which can be used as a fertiliser in the garden. Most grey waters are much easier to treat and recycle than black waters, due to their lower levels of contamination.

## HEALTH HAZARDS

Grey water from baths, showers, and washing machines contains pathogenic organisms, which can multiply rapidly if water is stored in warm conditions for more than 24 hours. Using grey water without any storage or treatment has a number of advantages – avoiding smell from storage of the grey water and avoiding the breeding of pathogenic organisms.

## COMPLETE GREY WATER RECYCLING

Commercial grey water recycling systems which purify and decontaminate the water are available. These systems are usually about the size of a small wardrobe. £3000 is the realistic price for a domestic-sized system. These purpose-made systems have many benefits but running costs, e.g. energy use and maintenance, will offset a proportion of financial and environmental savings from lower water use. An additional UV filter will be required to bring the water to drinking water standards if required.

Overall grey water systems that are retrofitted are far more complex and problematic than expected. We recommend using simple cheap methods to help reduce the use of clean water.

## The Greenhouse Story

The kitchen grey water is connected to the main drainage/sewage system as the location of the Greenhouse kitchen does not provide us with the capacity to filter grey water. During long hot periods, the garden, which is mainly plants and herbs in tubs, is watered using both rainwater and the washing up and rinsing water from the kitchen, which we carry out in bowls and buckets.

The residential flat on the second floor also remains plumbed directly to the sewer system. The caretaker can use a simple home-made system (gravity fed hose pipe) to siphon water from the bath and sink to the garden for immediate use on the plants.



**Direct uses:** *Grey water can be used directly for watering the garden and this is a low technology option for everyone.*



# Composting toilets

Composting toilets (also called biological, dry or waterless toilets) are systems that treat human excrement through biological processes, turning it into organic compost material that can be used to fertilise the soil. They are small-scale, complete sewage processing systems not connected to the mains sewage system. The Chinese have been using composting toilets for hundreds of years, but it is only since the 1960s that they have become popular in the rest of the world.

The bacteria that break down the solids require a balance of nitrogen and carbon. Urine is high in nitrogen, potassium and phosphorus and if excrement is too wet the bacteria will get rid of excess nitrogen in the form of ammonia, which makes the toilet smell.

Compost toilets, like all sewage systems require ventilation and a drain to take away excess liquid. A well managed compost toilet requires the user to understand the process. A very simple way of keeping any compost toilet free of smell is to throw a handful of straw or sawdust in each time the toilet is used.

Collecting pee separately is useful if you have a garden or area of land. Nitrogen is a fertiliser, which when mixed with rain-water to a ratio of 1: 10 can be used to improve soil quality.



*Privies, outhouses, thrones, thunder boxes, castle, white house, whatever name you give them, dealing with sewage is an important aspect of civilised living.*

Is Humanure safe? The rules of thumb are:

- *vegan poo = safe to use on your allotment after it's been composted for one year*
- *vegetarian (ovo-lacto) poo = safe to use after three years*
- *meat eater's poo = safe to use after seven years*



*Compost toilets can be as comfortable as any other. Collecting poo & pee together requires awareness of what you are doing!*

Fully composted poo is much like any other proper compost - crumbly, dark, pleasant smelling and safe to handle. Of course, just as with any toilet system you need to wash your hands after you've finished.

## ENVIRONMENTAL BENEFITS

- ✓ *The solids are dealt with on site. This reduces the volume of sewage being treated with chemicals.*
- ✓ *You can stop using drinking water to flush away waste that is potentially very useful.*
- ✓ *You can produce your own organic matter, to return to the soil, improving local soil structure and nutrition.*

As long as the decomposition is aerobic there are no greenhouse emissions.

# Types Of Composting Toilets Available

## BUCKET TOILETS

Bucket toilets are the cheapest and most basic kind of dry toilet. The waste needs to be emptied into a suitable container for composting. There are now more 'civilised' versions of these and as they are fairly compact and portable. They can be put in almost any location.



## DE-WATERING TOILETS

De-watering toilets are more expensive, and use fans or electric elements to dry the waste. They use disproportionate amounts of energy and don't compost the waste, so generally they are not recommended.

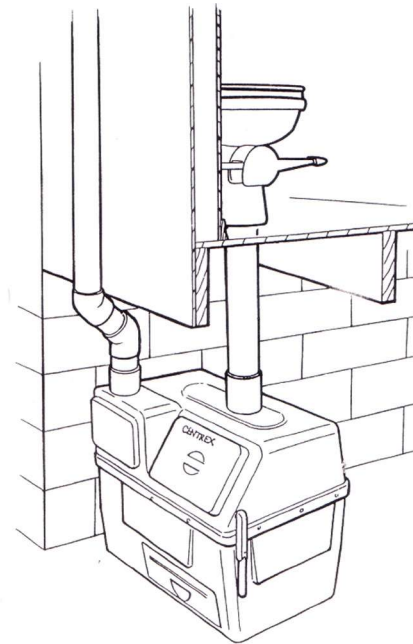
## DUAL-CHAMBER COMPOST TOILET

To avoid having to handle raw sewage, you can buy or build a dual-chamber compost toilet. Each chamber is sized to fill up over a year. The seat can be switched between chambers, so that the second is filled whilst the first chamber composts down completely.

## The Greenhouse Story

The original design for the building included a composting toilet for the caretaker's flat on the top floor. The practical location of the compost chamber meant that the chamber would have been directly alongside the ground floor kitchen window. So many myths existed about the efficiency of composting chambers that it was hard to engage the local authority with the safe collection of human waste.

In addition, the building is a mix of private and public space, which increases the stringent levels of bacteriological monitoring. With this and the complexities of installing a chamber on a site that doesn't lend itself to easy use of the technology, the idea was abandoned.



*Centrex composter: in this diagram installed below floor level to allow urine and faeces to separate and drop separately into the compost chamber.*



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