

## Introduction to Dry Toilets



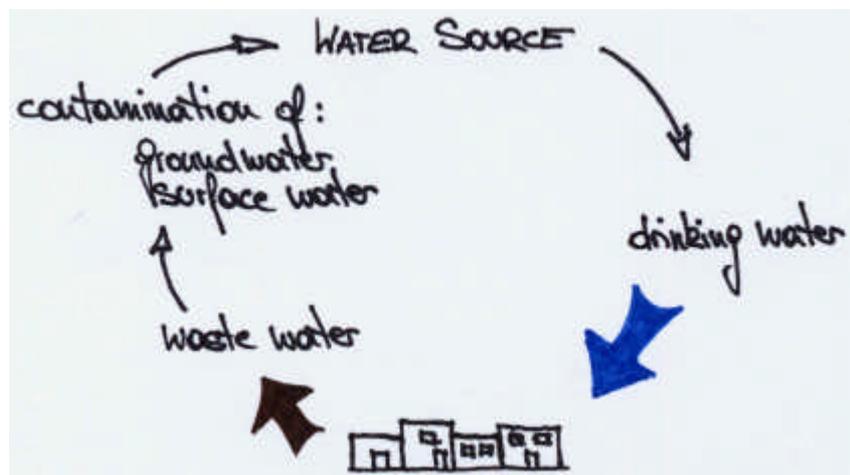
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## THE PROBLEM OF WASTEWATER

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Sewage, in form of human excreta (urine and faeces) and wastewater from bath, showers, basins and kitchen sinks are harmful substances if not treated in an appropriate way. Especially the mixture of urine and faeces (with water) contains pathogens that cause diseases. These organisms (can) contaminate drinking water sources, like groundwater, rivers and lakes, and are often responsible for (fatal) health problems.



**Figure 1:** The contamination path of water.

On the other hand the main components of human urine and faeces are nitrogen (N), phosphorus (P) and potassium (K). These nutrients are a valuable resource that can be used as manure in agriculture, instead of chemical fertilisers.

Only adequate wastewater systems can solve the problem and reduces:

- spreading of diseases
- pollution of (drinking) water sources
- loss of valuable nutrients for agriculture
- costs

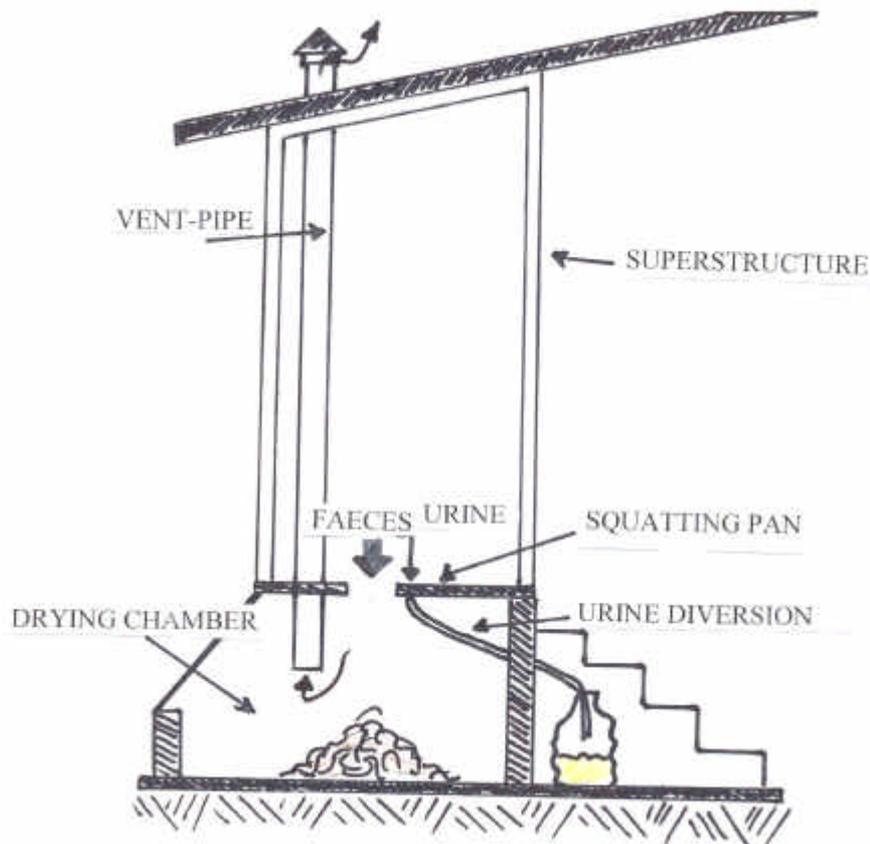
## THE ADVANTAGES OF DRY TOILETS

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Dry toilets are a modern but simple technology which is based on a separation of human liquids (urine) and solids (faeces). The designs are manifold and different types of dry toilets can be found in many countries and regions of the world.

The main advantages of dry toilets can be summarised as follows:

- uses no water
- protects the environment, especially (drinking) water sources
- prevents diseases and reduces health risk
- has a permanent structure, which can be constructed near the house or even indoors
- the design is flexible and therefore adaptable and affordable for everybody
- collected nutrients are a valuable fertiliser



**Figure 2:** The main components of a dry (diversion) toilet.

## DRY TOILETS: HOW IT WORKS

The principles of dry toilets are the separation of liquids (urine) and solids (faeces), the separate storage, (pre-) treatment and reuse of human excreta.

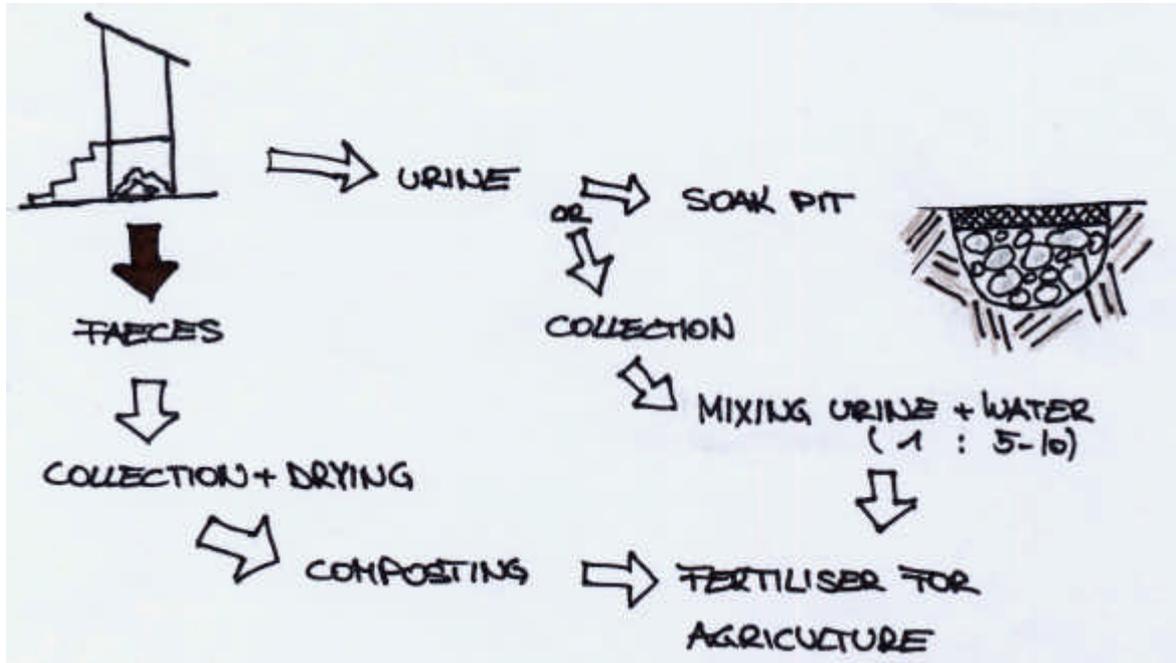


Figure 3: Reuse of separated urine and faeces.

**“DON’T MIX”** is the fundamental law of a well working dry toilet, which means **never mix urine with faeces**. A specially designed squatting slab (or sitting mould) divides the two fractions. The dividing wall separates urine, which passes in front of the wall, from faeces, which drop down behind the wall.



Figure 4: Squatting pan.



Figure 5: Sitting mould.

**Urine** passes through the small hole of the front bowl and flows via a pipe to a soak pit which infiltrates the urine into the ground. **Faeces** pass through the big second hole and are collected, stored and dried (e.g. in wooden weaved baskets) in a chamber under the toilet.



Figure 6: Collection of separated urine and faeces.

After every long call a handful of dehydration (drying) agent, preferably wooden ash (or lime, sawdust), should be poured to the faeces. Ash as well as (toilet) paper absorb the surplus liquid and prevents fly breeding and bad odours.

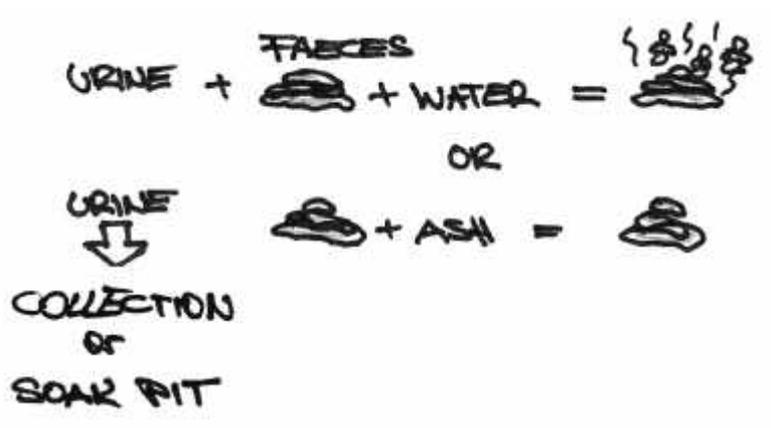


Figure 7: Processing of urine and faeces.

### **How to use a dry toilet correctly:**

**Step 1:** Open the door of the toilet and go inside.

**Step 2:** Turn around and close the door.

**Step 3:** Step on the marked places with your feet  
(look towards the door) and squat down.

**Step 4:** Urinate into the front small hole and defecate  
into the big second hole.

**Step 5:** Throw **used (toilet) paper into the big defecation hole.**

**Step 6:** Pour **one handful of ash** after every long call.

**Step 7:** Go outside and close the door.

**Step 8:** Don't forget to wash your hands.

Thank you for using a dry toilet!

## WHAT HAPPENS WITH URINE AND FAECES?

If the **main principle “don’t mix”** is followed properly, the collected **faeces** get dried and the material should be odour-free and fairly dry. When one of the chambers (or baskets) is full, it has to get emptied (or changed with an empty one). The collected faecal material gets dried for another 6-8 month and afterwards composted with organic waste (like kitchen refuse, dry grass, clippings). The end product is a soil-like, odour free, dry and safe to handle as manure for agriculture.

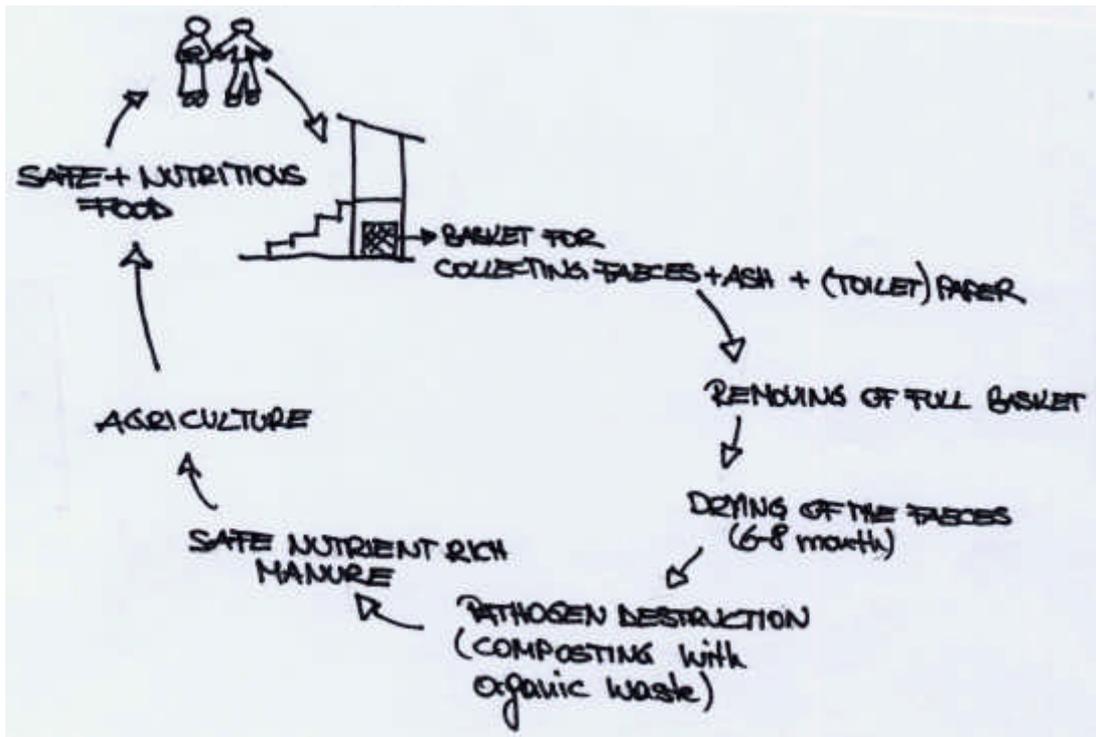


Figure 8: Reuse cycle of human faeces.

The separated **urine** flows into a soak pit and gets infiltrated into the ground. An additional possibility is to collect the urine, store it in a covered tank and to use the urine mixed with water (1 part urine plus 5-10 parts water) as manure.

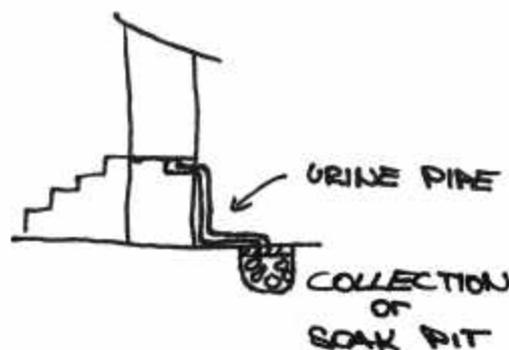


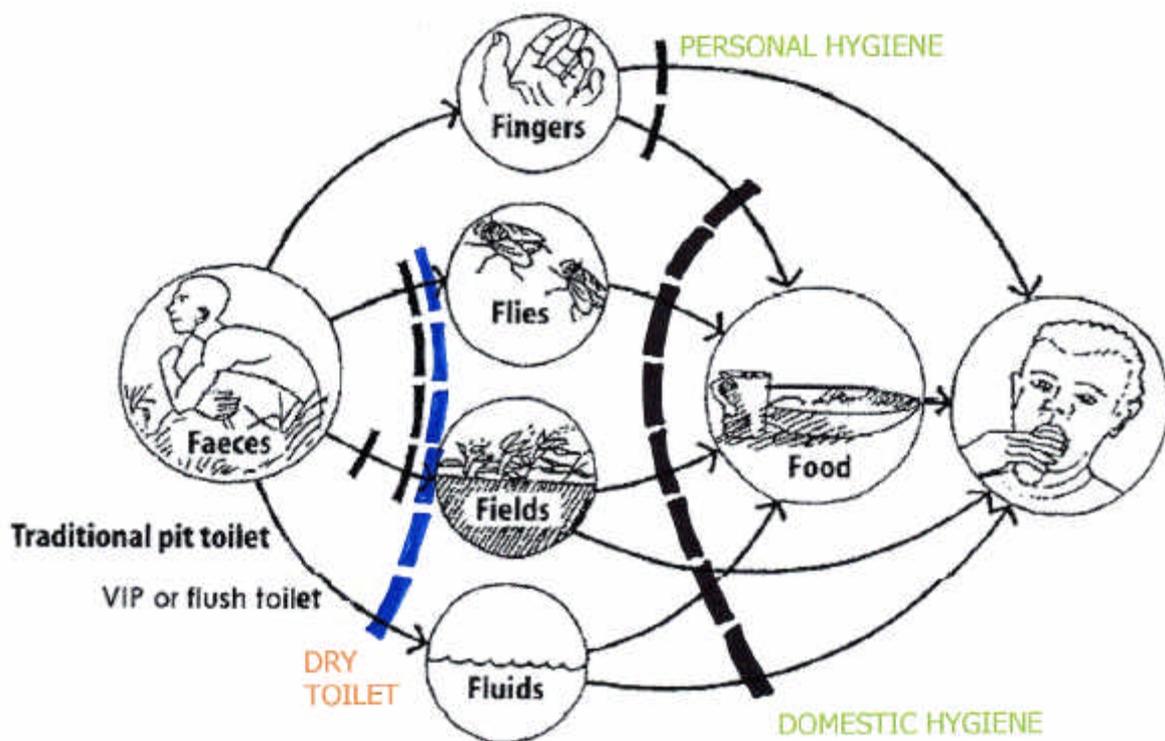
Figure 9: Reuse of human urine.

## HYGIENE BEHAVIOUR

Wide variations of diseases like diarrhoea, cholera, bacillary dysentery, giardiasis, intestinal parasites (like hookworm, tapeworm) or typhoid are spread by pathogenic organism. Obviously, safe drinking water supply and safe excreta disposal is not sufficient for an effective and long-term reduction of spreading diseases and preserving health. The main sources of human infection are contaminated fingers, fluids, fields, flies and foods (the 5 F's). These risks can be reduced or stopped by using barriers to prevent pathogens being transferred. A primary barrier (e.g. dry toilets) prevents faeces from coming into contact with flies, fluids, fields and foods.

One of the most important personal hygiene measures is **hand washing with soap** after every toilet use (hand washing facilities should be available next to the dry toilets) and before handling with food.

For domestic hygiene safe handling of food and drinking water are of great importance for health and should not be neglected.



**Figure 10:** Transmission ways of pathogens (Source: Winblad, U. and Dudley, E., 1997. Modified EcoSan Club, 2003).





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