

Australia, the most arid inhabited continent, can provide only a limited amount of fresh water. As our population grows, so too do the rates of water extraction and pollution. To ensure future supplies of fresh, clean water we must start to think more carefully about how we use it.

Good building design can greatly reduce the amount of water we use and the degree of contamination we cause.



The following fact sheets show you how to use water in a sustainable way.

See specific information on following fact sheets:

- > Reducing water demand.
- > Rainwater harvesting.
- > On-site wastewater reuse.
- > Waterless toilets.
- > Stormwater management.
- > Outdoor water use.
- > Water Case Studies.

The application of each of these will depend on whether you live in the city or the country, in the tropics or the warm temperate south. Examine the options presented and decide which design solutions would improve your quality of life and reduce your impact on the environment.

## REDUCING WATER DEMAND

**Taps, toilets and showers** are key areas where water consumption can be reduced by installing appropriate fittings. Simple changes can reduce the pressure on reticulated water supplies and reduce your water bills.

**Fit AAA rated** showerheads.

**Replace** your toilet cistern with a 6 litre/3 litre dual flush cistern if you don't already have one. This usually requires changing the toilet bowl as well, since the 6/3 dual flush requires a differently shaped bowl.

**Fix** leaking taps.

The environmental benefits include:

- > Lower water use.
- > Decreased sewage volume.
- > Reduced CO<sub>2</sub> emissions.

**Install appropriate taps.** Mixer taps in showers can reduce the potential for scalding and save large quantities of hot water. But because mixer taps over basins and sinks are often left in the middle position, most models waste hot water. Separate hot and cold taps are preferred in these situations.

## RAINWATER COLLECTION AND USE

**Rainwater tanks** can provide a useful sole or supplementary water supply in most regions of Australia. These systems are especially recommended in areas where water supplies are limited.

**Rainwater** can be used for drinking or for watering the garden. Drinking rainwater is not a health risk in most areas of Australia, providing the system is maintained.



Photo: Paul Kahrau

## ON SITE WATER REUSE

**With appropriate treatment**, and if local regulations allow wastewater can be used to flush toilets, water the garden and even to wash clothes.

**Greywater** is wastewater which does not contain human excreta.

**Blackwater** is wastewater containing human excreta. Blackwater is sometimes mixed with greywater but there are distinct advantages in keeping grey and blackwater separate.

**Wastewater reuse** options for greywater, blackwater and combined wastewater use are discussed in detail in this fact sheet. A detailed analysis of common options is presented. The fact sheets address issues such as:

- > Greywater for garden use and toilet flushing.
- > Septic tank systems for black and greywater.
- > Aerated wastewater treatment systems (AWTS).
- > Reed beds and sand filters.
- > Wet and dry composting systems.

**Final disinfection systems** are also discussed, including:

- > Active and passive treatment systems.
- > Wet weather storage systems.
- > Ultraviolet filters, reverse osmosis.
- > Soil purification, carbon filters.

**The fact sheet** also describes how to maintain and operate these systems. The most appropriate choice of system depends on:

- > Where you live, your soil and climate.
- > How much space you have.
- > Whether you are connected to the sewer.
- > How much water you use.
- > What you put down your drains.

The fact sheet will show you how to choose the best system for your requirements and describe the economic and environmental benefits of water reuse.

## WATERLESS TOILETS

**Waterless toilets** or 'dry sanitation' systems do not use water to treat or transport human excreta. If appropriately designed and operated they conserve precious water resources and avoid disposing of effluent and pollutants into waterways and the wider environment.

**The best way** to simplify wastewater treatment is to avoid mixing it with human excreta. Blackwater is the most difficult form of wastewater to treat due to the presence of pathogens.

## STORMWATER

**Stormwater** is the term given to pure rainwater, plus anything the flowing rainwater carries along with it.

**Avoid cut and fill** on your block when preparing the building foundations. Attempt to maintain the existing topography and drainage pattern. If you do have to cut and fill, stabilise the soil and revegetate as soon as possible.

**Retain vegetation**, particularly deep-rooted trees that can lower the water table, bind the soil, filter nutrients, decrease run-off velocities, capture sediment and reduce the potential for dryland salinity.

**Retain stormwater** on your block with permeable paving, pebble paths, infiltration trenches, soakwells, lawn, garden areas and swales.

**Minimise** impervious surfaces such as paved areas, roofs and concrete driveways.

## OUTDOOR WATER USE

**Up to 60 percent** of household water is used outdoors. Using water conservation techniques in the garden will ultimately save you money, time and effort.

**Minimise lawn areas.** In most gardens, lawns consume up to 90 percent of outdoor water and most of the energy used outdoors. To reduce outdoor water use replace lawns with groundcover plants or mulched garden beds.

**Mulching** around plants conserves water by preventing evaporation and reducing run-off.

**Plant drought tolerant species.** Australian natives, succulents, cacti, olive trees and some exotic ornamentals are suitable.

**Improve soil.** The addition of organic matter, gypsum, sand and other compounds can improve soil condition, water retention and drainage. Hardy, deep-rooted plants can help break up poor soils.

## CASE STUDIES

**Selected case studies** show how various projects have applied many of the systems and strategies discussed in the fact sheets.