

Water Efficiency in the home and garden

In the face of a looming world water shortage and the spiralling cost of supplying water, water authorities are moving from building dams and reservoirs to reducing demand.

Just as the energy crisis of the 70's led to a major push for energy efficient appliances and a change in attitude to energy wasting practices, innovative water management strategies and new water-using technologies are now being developed to counter the water crisis.

Some strategies depend on government approval, but most do not. There are a myriad of things that can be done by individuals and communities anywhere to reduce water use while maintaining quality of life. Often it is poor design and a lack of common sense that has led to waste. In this feature we have skimmed the surface of these grassroots solutions but hopefully given an indication that the first step to water efficiency is an easy and cost effective one.

In the Kitchen

Choosing water efficient appliances, and using aerating taps in sinks, is a good start. For those that use a dish washing machine - compare models carefully for water usage, then use them sparingly - once a day or only when they're full - rather than after every meal. As for grinding machines fitted to the sink drainpipe (such as 'Insinkerators') - they use a lot of water, and after all, those scraps are valuable additions to the compost heap or nutritious delicacies for the chickens.



Re-using Grey Water

It is a tremendous waste of resources to irrigate with water pure enough to drink, when your landscape plants can withstand, and even flourish in, much dirtier water. Garden landscapes are water guzzlers, responsible for 52 to 80 percent of the average (Californian) home's total water demand. Between 60 and 80 percent of this is used on the ubiquitous suburban lawn.

Re-using the household grey water (from sinks, showers, baths, and laundry) means taking full responsibility for a part of the water cycle in your own backyard. Water from the kitchen sink is usually too difficult to filter and use, except in the case of a double sink with two separate drain pipes, the grey water system only receiving the rinsing water. Official attitudes on grey water vary from state to state, and country to country, so please check with your local council before taking action. It is best to irrigate below the soil surface to avoid human contact with greywater, and also to make sure you do not apply more than the soil and plants can take up.

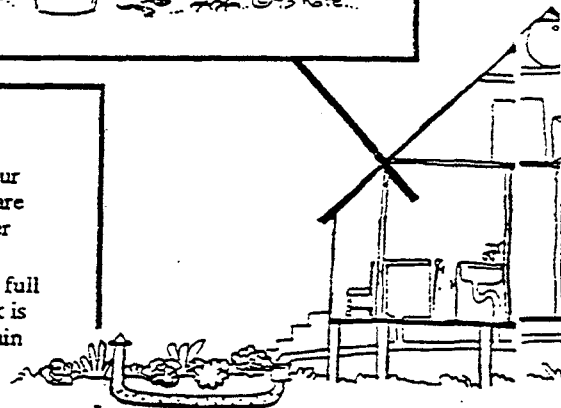
Creative Plumbing

By converting some of the plumbing beneath the house, grey water may be switched back and forth from the sewer line to the garden as needed. Modern plastic pipes can be easily cut with a hacksaw, and new fittings simply glued together. To permit switching between systems, metal ball valves are used (avoid gate valves as they tend to clog up). In most places it is illegal to do this yourself. After fitting the ball valves, a discharge pipe is routed toward a large drum which can either gravity feed or, with the addition of a sump pump, pump water into the garden. A screen is needed to filter incoming water, a shallow basket made from hardware cloth and hung inside the top of the drum is suitable, and will need regular cleaning. Attach a plastic garden hose to the drum and you are ready to distribute the grey water. (See article over the page on irrigating gardens.)

Water Quality

Once you have begun to use grey water, you must think more carefully about what goes down the drain. Simply put, you must get back to basics, and use only simple soaps and detergents. Apart from a slight risk of spreading pathogens, the only problem to worry of is your local council ordinance, which may lead to a 'grey area' of government bureaucracy. In times of water scarcity, a grey water system may be the only means to keep your garden alive.

Extracted from Grey Water Use in the Landscape: how to help your landscape prosper with recycled water, by Robert Kourik. (See publications section in Access for details of this and other books on water).



Don't get into Cold Water

Where feasible, locate the solar hot water heater tank directly above hot water taps, over the kitchen and/or bathroom. Remember, the heater must face the sun. This reduces the amount of cold water that lies in the hot water pipe between the heater and the taps and which is wasted while waiting for hot water to flow.

In the Toilet

If you have a regular flush toilet system, there are a number of things you can do to reduce water usage. Firstly, check for leaks down into the bowl - this can waste thousands of litres per year. Try putting some food colouring in the cistern and see if it leaks into the bowl.

To reduce the amount of water used in flushing without affecting the quality of the flush, get a couple of one-litre plastic drink bottles, fill them with water (or sand), close the lid and place them carefully in the toilet cistern compartment, making sure they don't interfere with the working parts of the cistern.

Another way is to carefully bend the cistern arm (providing it is not a plastic one) down so the float sits lower in the cistern. To reduce the number of flushes per day, you can use the rule: 'If it's yellow, let it mellow, if it's brown, flush it down.' There is also the option of converting to a dual flush system, which is a very easy and quick process, or installing an aeration treatment system (such as Envirocycle), which includes secondary treatment - and the waste water can be used for garden irrigation.

Water Free Toilets

The use of composting toilets saves an enormous amount of water. There are several commercial types available (eg. Clivus Multrum and Rota Loo) which have been approved by various health authorities. The Clivus Multrum was developed in 1972 in Sweden, but designs in southern Asia date back thousands of years. Composting toilets are widespread in Scandinavia, mostly in holiday and rural locations. The next major challenge is whether composting toilets can in the future be an accepted part of urban living. (See the article this issue on an owner built composting toilet.)

Urine can be easily collected and diluted (recommended 1:5) to use as a liquid fertiliser in the garden and as a compost additive, but care needs to be taken in its application as it can burn leaves.

In the Laundry

Waste water in the laundry can be reduced by using front loading washing machines, which generally use 40 percent less water than top loading washers.

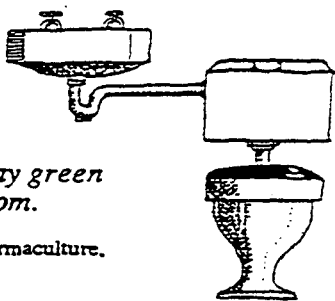
Other tips are: check the water efficiency rating on any new washing machine you buy; reuse your washing water if possible; if you live in an urban area or on a community, have a go at doing your washing at a laundromat rather than at home. This can make washing a social event where you meet neighbours over a cup of tea. In traditional societies around the world, washing has been a focal point of community interaction. Another idea is for laundromat proprietors to install mini water treatment plants that could recycle grey water onto community gardens and orchards.

An old bush idea for doing the laundry is as follows: On your next trip to town for supplies, fill a pickle drum or similar tightly-sealed container with water, washing powder, and your dirty clothes. Pop it into the boot of your car and drive to town. Empty the water onto some lucky street tree or shrub, wring out the clothes, refill the drum with fresh water and the clothes, and drive home. Water some other lucky tree at home and hang out your washing.

Note: This method is especially effective for those who live on bumpy dirt roads. Viva la pothole!

In the Bathroom

Aerating taps in hand basins, re-using hand basin water by diverting it into the flush of the toilet (see diagram*), control flow shower roses, recycling grey water - all ways to preen, stay clean, and stay green in the bathroom.



*Introduction to Permaculture, Tagari Books

Water Quality

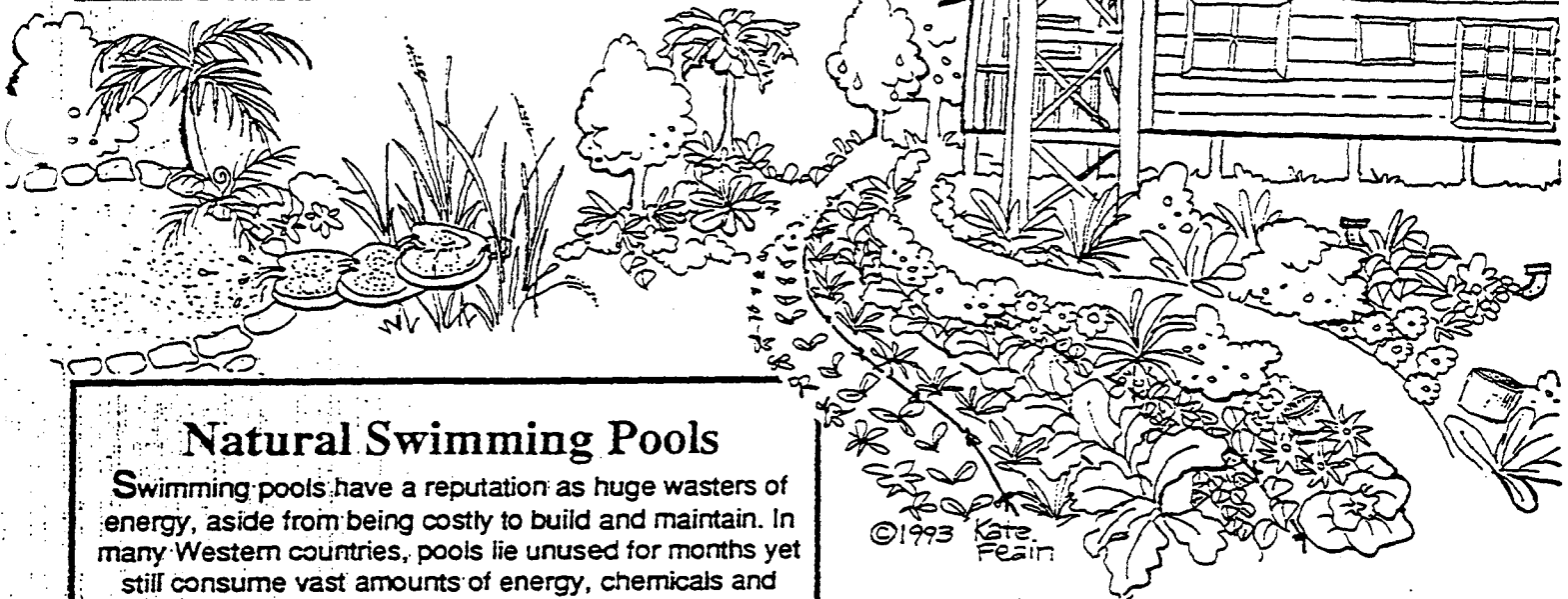
Centralised water supplies may be a great convenience, but many people are choosing to install rainwater tanks, or buy their water, in preference to receiving chlorinated and fluoridated water.

Some simply prefer the taste of untreated rainwater, others are concerned that there may be a health danger in the addition of chemicals. To install a rainwater tank you will need a roof free from contaminants such as rotting leaves (trees should not be planted near the roof) and airborne dusts and pollutants.

Methods for avoiding contamination by birds, dust, native fauna droppings and industry include installing a diverter to reject the first flow-off of water from the roof, for use in swales or gardens. (Swales are earthworks cut on the contour, designed to capture and absorb runoff in situ.) In the city you must keep a careful watch on airborne pollutants such as lead. Although some are a problem for drinking water, they may still be safe on gardens.

Swales and Mulch

The use of swales to trap and store rainwater in the garden will reduce irrigation needs, particularly for fruit trees. (See article this issue on natural drainage.) Mulch and thick ground covers are invaluable for retaining moisture in the soil around plants and help to prevent evaporation from sun and wind.

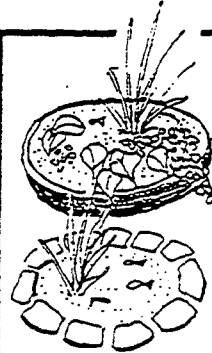


Natural Swimming Pools

Swimming pools have a reputation as huge wasters of energy, aside from being costly to build and maintain. In many Western countries, pools lie unused for months yet still consume vast amounts of energy, chemicals and maintenance time to keep them 'sparkling' clean. Innovative pool designers now filter natural pools below a base pebble bed, using the pebbles as algal/bacterial cleaners, then cycle it through a reed bed to remove excess nutrients before cascading it back through flowforms, freshly oxygenated, into the pool. Such pools can be delightful, with tame fish, rock ledges and over-arching ferns. They also can be used as reserves for fire fighting, barriers to fire, emergency water supplies rechargeable from the roof, and can be recycled by photovoltaic (solar) pumps. Natural swimming pools are still in the experimental stages but offer a great alternative to costly chemicals and endless servicing.

Ponds and Water Gardens

Overflows from roofs and other structures can be designed to fill ponds and water gardens. Such ponds can become aquatic delights, providing visual and edible returns. (See article on ponds in this issue.)



'Xeriscapes' for Water Conservation

Xeriscapes are attractive and practical examples of water conscious landscaping that can achieve major outdoor water savings. Pronounced 'zerryscape', the concept was first developed and later registered as a trademark by the Denver Water Department and by Melbourne Water Corporation, and simply means water-saving landscaping.

The major principles of xeriscaping are: proper attention to planning and design according to regional and microclimate considerations; analysis and improvement of soils as necessary; carefully placed practical turf areas involving low water demanding grasses; appropriate plant species; generous use of mulches and/or thick groundcover plants; efficient irrigation systems and appropriate maintenance regimes.

The Water-Wise Garden

When planting your water-wise garden there are several strategies to adopt. Group plants together with similar water needs. Create different zoning areas - only plant shade-loving plants in the shade, place water-loving species at the bottom of slopes, and so on.

Planting times should coincide with rainy spells. When planting, incorporate a jelly of 'water crystals' (water retaining polymers), and add fertiliser with the soil when backfilling holes. Always use lots of organic matter, applied as sheet compost or cover crops, to aid water retention.

Xerophytic plants

Xeros is the Greek word for dry, and xerophytes are low water using plants. Some examples of useful and edible xerophytes include: • **herbs** - aloe vera, rosemary, yarrow, lavender, wormwood • **groundcovers** - sweet potato, pigweed (*Portulaca oleracea*), New Zealand spinach (*Tetragonia tetragonoides*), pigface (*Carprobatus glaucescens*) • **grains** - buckwheat, sorghum • **fruits** - olive, date palm, jujube, carob, pomegranate, prickly pear, Australian quandong • **nuts and seeds** - oak, stone pine, pistachio, almond, *Acacia aneura* and *victoriae*.

For more information contact: In the US, National Xeriscape Council, PO Box 767936, Roswell, GA 30076-7936. Tel: international +1 +404 9985899. In Australia, David Arelette, Manager-Demand Management, Melbourne Water Corporation, 625 Little Collins St, Melbourne 3001.

Lawns

Lawns can be vast consumers of water, energy and chemicals. As a consequence, many people are beginning to replace lawn with gardens and native plants. Householders are also learning to make and maintain healthy lawns with less water by using timers and water gauges, and leaving grass clippings on the lawn to supply much of its fertiliser needs. Other techniques are to grow water-conserving grasses, low groundcovers, or herb lawns. Use your grey water to water the lawn, or wash your car on the lawn - no matter how much you water the driveway, believe us, it won't grow! A great alternative is to sheet mulch most of your lawn and to plant food, especially when children who used the lawn to play on, have moved out of home.



Irrigating gardens

Drip irrigation is an efficient way of watering the garden. Strips of pantyhose can be tied over the drip emitters to prevent clogging. New innovations exist, such as 'Leaky Pipe' or 'Water Weeper' - a porous pipe made from recycled rubber/tyres, which, when buried, 'weeps' water to the roots of plants instead of soaking the surface of the soil and encouraging weed growth and evaporation. Narrow-necked porous clay containers can be buried up to the neck in soil - water, or grey water, is then poured in to seep slowly to the roots of the plants. The same can be done with plastic drink bottles by removing the cap, cutting the bottom off and inverting them.

One technique for grey water distribution in the garden is to run the water through a perforated drain pipe into 'mini-leachfields' (see diagram). Bury the pipe slightly below ground level in a trench filled with gravel, no longer than three metres (the water can't travel much further than that). It's good to allow these leachfields to dry out between irrigations, and so locate them around the garden and rotate the hose between them. Keep a cap on the top of these pipes to deter animals from entering.

Planting windbreaks around gardens can be a very effective way of preventing evaporation. Instant windbreaks can be created by trellising (with beans, vine crops etc) or stretching shadecloth or a similar material over frames or fences.

Garden devices for water saving include: trigger action hose guns; timers on hoses; flow controllers and rain sensors on automatic irrigation devices.