

# Saving Water and Reducing Pollution at Home

## 10 Water Saving Actions at no/little cash cost

1. Ration the garden - water early morning or late evening; water every 3 – 5 days and only if required; don't cut grass too short; use mulch to reduce evaporation; use a timer on any sprinklers, use a hardy grass type.
2. Wash the car and house windows from a bucket, not a hose. (To reduce pollution, wash cars when parked on grass, or use a commercial carwash)
3. Use less water when flushing the toilet by displacing water in the cistern with a container of water or brick.
4. Don't use the loo as a wastewater bin.
5. Check for leaks (eg; toilet cistern, tap washers) and get them fixed. Check outside taps too.
6. Turn taps off – don't run continuously when washing veges, or cleaning teeth.
7. Share baths or have a shower. Reduce water flow from an existing shower fitting a flow reducer behind the shower head at very low cost.
8. Use the fridge to chill water and defrost frozen food in the fridge rather than by running water over it.
9. Drains are only for rain – protect streams from water-borne pollutants.
10. Do you have a free water saving tip? – if you do, share it with others.

## Low Cost Actions to Save Water

1. Buy a device to reduce the amount of water a toilet uses in a single flush.
2. Switch to an aerator or low flow shower head – this will save energy as well as water.
3. To water the garden, use a hose with a dripper system or a soak hose, ideally with a timer.
4. Divert "greywater" for garden use.
5. If you have a wastewater disposal unit in your sink consider removing it and establishing a composting system instead.
6. Insulate hot water pipes to reduce the amount of water you have to run off before the warm water reaches the tap.
7. Sweep paths clean rather than hosing down or using a water blaster.

## Further Actions – making longer term water efficiency investments

1. Collect rainwater from the roof for garden use.
2. Make some beds of your garden 'no-watering' areas. Replace "thirsty" plants with more drought tolerant species.
3. Think about water efficiency (as well as energy efficiency) when choosing a new dishwasher or a clothes washing machine. Look for water- conservation rating of AAA or higher.

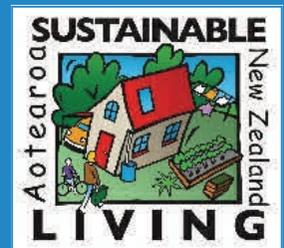
**For further information on sustainable living topics such as waste, water, energy, shopping, gardening and transport go to [www.sustainableliving.org.nz](http://www.sustainableliving.org.nz)**



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# VALUABLE WATER



**MARLBOROUGH  
DISTRICT COUNCIL**

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# V aluable Water - An Introduction

Water is essential to life on Earth. At first impression, it seems plentiful on this 'blue' planet. It covers 71% of the earth's surface. However, less than 3.5% of this is fresh, salt-free water and much of it is frozen in glaciers and ice-caps, leaving only 1% as potential drinking water in streams, lakes and in underground reserves. Much of this 'fresh' water is inaccessible to people or has become too polluted for use without treatment.



The freshwater store in underground aquifers is in many areas being extracted for human use faster than nature recharges those aquifers, creating a problem for future years. This may be compounded in some regions by the effects of climate change. It's a precious resource that we cannot take for granted—see <http://thewaterproject.org/?gclid=CNyh9q7kr7UCFUxcpQodg3MARQ>.

People can not live without water. We value it to drink, to cook, to wash with and to swim in, for livestock and gardens, for its appearance, sounds, coolness and distinctive touch. Natural water systems provide key services to the functioning of the planet, such as moving energy (heat moving within oceans drives the weather patterns), spreading nutrients, dispersing pollutants and clearing rain-floods. Flowing freshwater supports plant life and fish and provides home to many creatures, disperses plant seeds and animal young (eg; insect larvae and young fish).

Flowing water has been valued for many centuries by the first people of Aotearoa (*Tangata Whenua*) for its life force (*mauri* – a spiritual concept meaning essence of being or the power that makes it what it is). *Te Reo Māori* uses different words to distinguish types of water (*momo wai*) of varying quality.

Water from these different sources should not be mixed, and there are cultural traditions and practices (*tikanga* and *matauranga*) focussed on keeping water clean and protecting its *mauri*. Māori traditions avoid release of human wastewaters to water, even if treated, preferring land disposal. From their perspective some of the greatest dangers to water quality are from harmful agricultural and urban activities, and water shortages created by seasonal over-use below minimum flows, which

## Additional reading and websites:

You may be interested in taking your understanding of water issues, both local and global further. Below are a range of resources - great for sharing with your family and friends.

Te Puni Kokiri, 2004, *Māori cultural values and the national importance of waterbodies*. Wellington.

Allan Windust, 2003, *Waterwise House and Garden*. Victoria: Landlinks Press.

Wendy van Dok, *The Water efficient garden: a guide to sustainable landscaping in Australia*. (Good for principles but note many plants differ).

The Guardian Weekly often has articles on the world's looming water shortage such as the following: <http://www.guardian.co.uk/environment/2005/jul/22/water.environment>.

The issue of bottled water is profiled here:

<http://www.foodandwaterwatch.org/water/Alerts/bottled-water>  
<http://www.bethechange.org.nz/pledge/drink-tap-water>

To help you think about gathering rainwater, see an American site: <http://www.rainwaterharvesting.org>

The *Valuable Water* pages of the '4 million careful owners' website, hosted by NZ Ministry for the Environment: <http://www.4million.org.nz/> and chapter three of their booklet *Gentle Footprints* is available as pdf at <http://www.mfe.govt.nz/publications/ser/gentle-footprints-may06/index.html>.

To understand more about the national standards for drinking water see: <http://www.mfe.govt.nz/laws/standards/drinking-water-source-standard.html>.

Global Education Centre has resources on many issues and dedicated three resources to a discussion of water issues. The resources can be downloaded from: <http://www.globaled.org.nz/globalissues/index.php?pubsPage=2>.

The NZ Hydrological Society produced a very detailed teachers' kit about water for schools. There is a great deal of interesting and useful information within that kit. Access it here: <http://www.h2know.org.nz/posters.html>.

For background information on the possible impact climate change may have on NZ pick up pamphlets from, or visit the websites of:

Ministry for the Environment: <http://www.mfe.govt.nz/issues/climate/>  
 NIWA Climate Change Centre <http://www.niwa.cri.nz/ncc/clivar/ipcc> and read the IPCC Fourth Assessment Report.

Overflow, when the tank is full, should be anticipated, and go to gravel soak-aways or storm drains. Some households use stored rainwater for toilet flushing as well as garden watering, but to do this you'd need extra plumbing professionally installed in parallel to (not connected to) the original 'mains' cold water system and get Minor Works Building Consent permission from the local authority.

The Government has guidelines on this topic to protect your health. Read *Household Water Supplies* (Updated 1997, Booklet Code 4602 Ministry of Health) and the leaflet *Water Collection Tanks and safe household water* (code 10148, August 1999) or firms that supply complete rainwater harvesting systems see New Water [www.newwater.co.nz](http://www.newwater.co.nz) who import systems from Australia or visit the Australian parent site [www.newwater.com.au](http://www.newwater.com.au) or [www.aquareviva.com.au](http://www.aquareviva.com.au).

2. **Make some beds of your garden or yard 'no-watering' areas** by moving out the most thirsty plants and adding drought tolerant types, such as the scented Mediterranean herbs (eg; lavender, sage), pinks, geraniums, cacti, succulents and some drought-tolerant NZ native plants (eg; kowhai, akeake, lancewood). A surface cover of light-coloured stones, gravel, bark or mulch may help to shade their roots and reduce water evaporation. Do not use black plastic sheet as it overheats the roots and restricts air movement. Beware drought-tolerant weeds that will also get established in mulch if you don't remove them early: eg; oxalis and thistles.
3. **Think about water efficiency (as well as energy efficiency) when choosing a new dishwasher or a clothes washing machine.** The information to help you do this is supplied by manufacturers as a 'Water Conservation Rating'. Look for a rating of AAA or higher. Front-loading **clothes washers** use less water and less detergent than top-loading machines, and also, as they have no agitator, wash more gently but slowly, which helps clothes and bedding to last longer. Front-loaders can spin faster (to 1000 rpm), which extracts more water than a top-loader and speeds up line drying, especially in the winter: so you would not need an electric dryer.

Modern **dishwasher** machines should use no more water than hand washing for a full load and about half that of 1980's models. With the re-design, their power consumption has reduced from about 2.5 kWh per load to 1.5 kWh.

For comparative independent reviews of **dishwashers** by manufacturers such as AEG, Asko, Westinghouse, Bosch, and Fisher & Paykel see *NZ Consumer* magazines and similarly for **clothes washers**, including some made by these firms.

If you are keen to study natural stream-life, with family or school involved, get information from Environmental Monitoring and Action Project See their website <http://www.royalsociety.org.nz/>.

MDC has a Waikorero Kit available for schools.

## Water Supply

Different cities across New Zealand have quite different water sources. In Marlborough clean water is pumped from underground natural aquifers, fed by mountain-snow-melt river water.

Once we have used this water in our homes, most of it goes back into rivers or estuaries, and eventually the sea. The largest part of liquid wastewaters from toilets, washing, bathing, etc. goes through a wastewater treatment plant, while some surface flows go directly into the rivers through the stormwater system, without any treatment. The water going through the wastewater treatment plant again causes costs and the release of treated water into a river or estuary increases the load of contaminants such as nitrates and phosphates it has to cope with.



Conserving water by reducing domestic demand will not only help protect our natural ecosystems, but will result in reduced water supply energy cost.

## The Water Cycle

Drinking-quality water is a scarce resource globally (only 1% of the total), but nature steadily renews the supply through rainfall, particularly on mountains that catch the prevailing ocean winds.

In New Zealand, about two-thirds of our community-piped water supplies are taken from lakes and rivers, and a third from groundwater 'aquifers'. Both surface and underground waters can easily be polluted by human activity. Pollution sources include pastoral and crop farm nitrogen fertilisers, herbicide sprays and animal manures (in New Zealand, farm animals in total produce 40 times more urine and faeces

than the human population, mostly onto land but some washes into waterways). Soil erosion into rivers is common in deforested pastoral hill-country, especially after storms and cyclones. Untreated wastewater discharges from abattoirs and dairy factories; household chemicals such as moss-killers, herbicides, detergents, oil and paints; wood preservative chemicals, mine drainage and spoil heaps, as well as other industrial activities can affect groundwater and streams. Impacts can last, sometimes for years after a mine or industry closes. Also, in populated areas, oily and metal-polluted run-off in the 'stormwater', gathered from roads and urban hard surfaces after rain, reduces stream quality.

In some areas treated wastewater is discharged into estuaries or the sea. Check out how the wastewater is disposed of in your area.

### What happens upstream will affect downstream ..... inevitably

All the land area supplying a particular stream is known as the **water catchment** of the stream. Rain falling on healthy soils is absorbed and usually remains clean as it flows downhill. Sediments are trapped or filtered out by natural wetlands (metaphorically like the kidneys of the land), but few wetlands have survived pressures for land development near urban areas. It is very important, therefore to be aware of where our liquid wastewater materials flow, as they can easily pollute water catchments, especially through surface stormwater. Roadside drains are only intended for rain!

Here is a little of the science relating to urban water pollution and stress on its natural life:

- If dissolved oxygen in the stream or river falls below 60% of saturation, fish will die, and below 40% most everything else. Materials that are decaying, such as sewage effluent, soil and plant debris (including algae), will use up oxygen fastest.
- Phosphate levels, from detergents and sewage, can be raised to 10 times above natural levels in urban streams. It feeds fast algae growth in warm weather, which can suddenly use up oxygen (a process called eutrophication, which kills animal life in that water).
- Nitrogen compounds from fertiliser run-off, sewage and decaying organic matter, at 100 times higher than in nature in some urban streams, also feed algae and can be toxic to stream animals.
- Low flow and un-shaded streams can more easily overheat, killing aquatic life, starting with the native fish (over 17°C) and invertebrates (over 21°C).

country.

A rainwater tank(s) total capacity of 4,550 litres (1000 gallons) could be sufficient for urban gardening and toilet flushing use, unless you live in a very dry region. Mains water trickle-top up is an option, but a backflow prevention valve is essential.

Many councils are encouraging environmentally-friendly ways of using rainwater around the home and garden. For more information ask your local authority.

Special guttering designs and inserts are available that filter out leaves and debris if you are building new or replacing old gutters and spouting. If plastic mesh is used ensure it is UV-light stable or you will be generating plastic water within a few years.

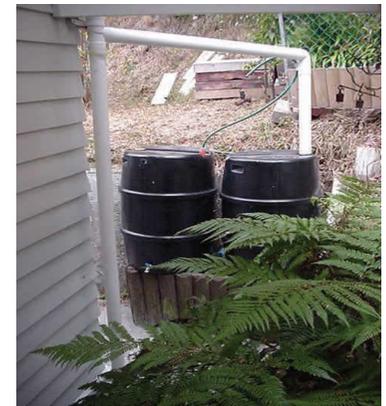
The rainwater tank needs a lid, for peoples' safety and to keep out the light, preventing green algae growth. Locate it in the shade. There are a variety of devices available that trap or divert the first 'flush' of water when it starts to rain (carrying wind-blown soot pollution, paint debris and bird-droppings from the roof) after which you can collect in the tank somewhat cleaner water. The first-flush diverter may need to be an adjustable design as how much you should divert depends on the likely pollution levels and rainfall frequency.

Makers of rain diverters include three Australian firms: SmartFlo <http://www.smartflo.com.au/> Rain Harvest <http://www.rainharvesting.com.au/> and Safe Rain <http://www.saferain.com.au/>. Firms in New Zealand include Marley (for *leafslide*) 0800 627 539, <http://www.marley.co.nz>.

You also need a metal mesh strainer to keep mosquitoes out of the pipes.



2000 L rainwater holding tank on house wall



NZ-made rain-water storage barrels by RainSaver Systems of Nelson 03 548 7044 [www.rainsaver.co.nz](http://www.rainsaver.co.nz) are fed by the spouting. In the best systems a 'first-flush diverter' sends the initial rush of dirty water away from the tank, after which it collects until the tank is full, then overflows additional rain to storm drains.

7. **Insulate the hot water pipes, starting from the top of the hot water tank and moving towards the taps** – this will reduce the length of time to get warm water flowing at the tap, which reduces the water wastage, as well as saving money on water heating. If there is a very long distance from the hot water tank to one particular hand-basin hot tap, consider installing a small ‘instant’ electric water heater under that basin. This would be plumbed into the cold supply, and you could then close the hot water supply to that area. This could be a cost-effective investment after a few years.



Water blasting strips off tar and accumulated surface chemicals as well as algae and lichens, and all are likely to wash into streams via storm drains.

## Further Action: Making longer-term Water-efficiency investments

1. **Collect rainwater from the roof for garden use** by intercepting the downpipe (spouting) flows and storing in a tank, preferably filtered first. If a ground-supported outdoor water tank has capacity over 25,000 litres you will need to use a registered plumber and get a Building Consent, and similarly if the base is more than 2 metres above the ground and it exceeds 2,000 litres capacity. If it is over 2.5 metres in height and over 5,000 litres capacity it will be noticeable by neighbours and you might also need a Resource Consent – if in doubt ask the local authority, as rules vary around the

- Sediment reduces water clarity, reduces food production efficiency of plants and clogs the gills of fish.
- Oil films and paints are visible by colour sheens when they enter streams. However, the invisible pollutants are often the most deadly: for example, dissolved metals such as zinc and copper, acids, detergents, herbicides and pesticides.

NB: If you see a pollution incident, or abandoned chemical containers in water, contact the council.

### Wastewater

Wastewater from toilets is known as ‘**black water**’, or ‘**foul water**’. It contains bacteria that are naturally found in all people’s digestive systems, but capable of multiplying rapidly in numbers to become a health hazard. It needs to be treated, to make it less hazardous, before the water carrying it is released, whether to land, river or sea. Therefore if you have a septic tank in use at home, rather than a sewer pipe connection, it is important to have the tank pumped out at no more than two-year intervals, or as your Council specifies, to reduce the risk of overflow and stream pollution by ‘raw’ sewage.

The Ministry for the Environment has published a State of the Environment Report on issues in river water quality around NZ; and also proposals for human drinking water source standards. For information contact: MfE 04 917 7511 or 7400 or see website <http://www.mfe.govt.nz/issues/water/>

Another important issue is keeping stormwater downpipes (from the roof) out of the gully traps beside the house that collect water from sinks, baths, and washing machine and send it to the sewers. Not every DIY house-renovation and extension project gets this right, and the impact is overloaded public sewer pipes after heavy rain. They should feed into the stormwater drains. Building inspectors look out for this construction error.

Wastewater from baths, showers and laundry contain some bacteria, plus water softeners and detergents, but are less hazardous than sewage and are known as ‘**greywater**’. Greywater should therefore not be stored, or the bacteria in it will multiply. There are, however, systems which can filter and store the water for reuse in the toilet and garden. (See [www.ecoplus.co.nz](http://www.ecoplus.co.nz), [www.newwater.co.nz](http://www.newwater.co.nz) or [www.aquareviva.com.au](http://www.aquareviva.com.au)).

## Current Practice

Piped water supplies and sewerage systems, maintained by local authorities and companies which they own have contributed to greatly improved public health by controlling water-borne diseases. In 2004, only 74% of the New Zealand

A new Bill, **The Health (Drinking Water) Amendment Act 2007**, was enacted in October 2007 and its commencement date was 1 July 2008. It aims to protect public health by improving the quality of drinking-water provided to communities

For information on water grading where you live, see the *Register of Community Drinking Water Supplies in New Zealand*, available at your library, or ask at the local Council offices.

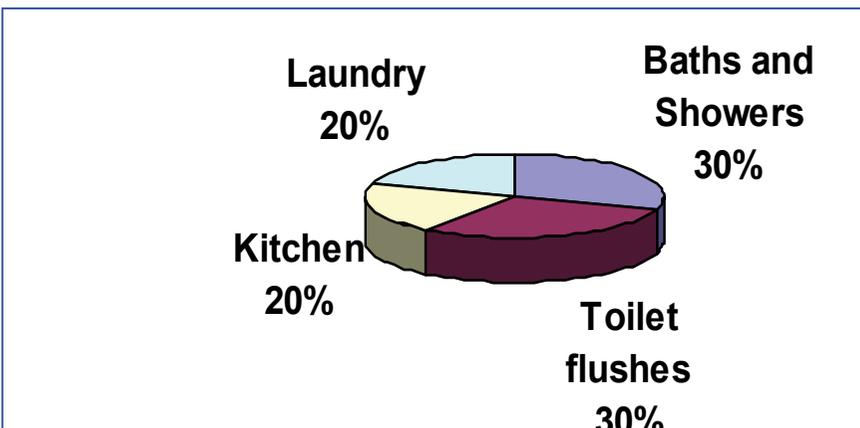
population had connections to safe drinking water supply systems, and 11% were not connected to a community supply – using their own well, rainwater from roof collection or a tanker supply. Despite improvements in water treatment, by 2004 there were still over a 900,000 New Zealanders whose drinking water supplies did not meet national health standards. The main culprits are diarrhoea-causing E.coli bacteria (from animal faeces) and other micro-organisms such as Cryptosporidium and Giardia.

Annual water use per person has increased hugely in the past century. This is mostly because of demand from garden and farmland irrigation, large livestock numbers for meat and dairy production, industrial processes, water-borne sanitation (flushing toilets) and the water-hungry appliances we have.

## Wastewater Use Indoors

Typically, *inside* a NZ home:

NB: This chart excludes outdoor and garden uses, which are water-hungry!



tank before use, as the bacteria would quickly multiply there in the nutrients from the detergent residues. (The filter will also harbour these bacteria: so use rubber gloves when handling it). Add a top dressing of compost or mulch to any garden areas frequently receiving greywater, to help in the control of flies and odour, and do rotate greywater with freshwater irrigation.

Beware over-watering, especially in the winter when plants take up less water, or on clay soils, which tend to accumulate chemical residues faster. Do not run greywater down dripper or seeper hoses as it blocks the small holes. Phosphate levels can be reduced if you only use detergents without phosphorus-based water softeners; and avoid all bleaches: see also the *Shopping* information in this series.

When choosing an aerator shower head, and mixers or flow regulators, ask about their **water efficiency rating**. This Australian system codes AAA or higher as water efficient. Many bathroom-construction firms in NZ do not yet offer water-efficient showers as standard, so you may have to ask at a plumber's merchant. New Zealand makers of adjustable flow shower-heads include Methven and Felton. Imported brands include Aqualoc, Brewers, Caroma, Con-Serv, Flexispray, Niagara and Rye. An example available by mail order from Negawatt Resources of Petone is shown below. <http://www.nrl.co.nz/>



- If you have a wastewater disposal 'insinkerator' or 'guzzler' installed below the kitchen sink, consider taking it out** and using instead a compost bin, EM Bokashi or worm-composting for the kitchen organic wastewaters. The advantages of compost-making include producing useful free fertiliser for your plants and saving 20 to 30 litres of clean water each day, plus a small electric power saving, and less damaged cutlery!



The chopped organic matter from a wastewater disposal unit added to the sewage flow speeds up the filling rate of your septic tank or increases the oxygen demand at the municipal treatment works, hence those useful nutrients which should be destined for the land are washed out and lost to the river or sea.



BW032CH original watersaver

- Don't hose down or 'water-blast' the yard or paths** - buy a strong-bristle yard broom to sweep them instead. This helps to keep you fit, saves water and is far more energy-efficient than using a petrol-powered or electrical motor (and it's quieter for your neighbours than an air blower or waterblaster too).

3. **Buy a garden hose with drippers or a seeper hose** and use

branching garden-plumbing connectors, ideally fed by a timer that will allow you to set a limit to how long water can flow. A managed irrigation system can guide water to the areas that most need it and deliver the right amount they need. Checking if soil is dry (10 cm underneath mulch) each time before watering, saves unnecessary water use in the first week after rain. It's easy to over-water when piped irrigation is installed! Those with \$200 to spare could get automatic water moisture and rain detectors and a micro-chip controlled watering system with 'zones' that you can program – the technology exists.



Above: Clockwork water cut-off timers for hoses (makers include Gardena and Darlac) are a nice gift idea for someone who tends to turn on the sprinkler or other garden irrigation and then forgets that it's on!

4. **Divert 'greywater' for garden use**, via a valve from the back of

washing machine or shower tray outlet. Use a wide-diameter un-branched hose and a filter is essential (this must be easily removed and regularly cleaned). This soap-containing water from showers, baths or final spin only of machine clothes washing, but not kitchen sinks, can be used on soil but only around mature trees or perennial flower beds. It can be useful there in times of drought. However, this 'greywater' will be alkaline, typically contains traces of phosphates and borax and inevitably some bacteria, making the greywater hazardous for direct application onto leaves of vegetables or soft fruit. As it is alkaline, keep it off acid-loving plants such as rhododendrons and azaleas.

Below: Example of dripper, on 19mm pipe.



It requires natural treatment by the soil and is best not stored in a

Around our homes this translates to between 180 and 260 litres of water per person each day. Note that a garden sprinkler can deliver up to 900 litres an hour. Summer garden water use can raise total average demand, inside plus outside, to 1,200 litres per person per day. Contrast this to parts of India, where people are limited to what they can carry, about 25 litres/day!

A slowly dripping tap can waste water 1 to 10 litres of water a day, whilst a major leak in the underground pipe supplying your house could lose huge amounts.

What water use do our home appliances and activities require?	
Water efficient (approx 40% better)	... compared to water inefficient
Front-loading clothes washer 60 litres/load	Top-loading washer 170 litres/load
Half-flush on toilet cistern 6 litres	Full flush 11+litres
A low-flow shower 35 to 55 litres	A bath 180 litres, full-flow shower 130 litres
10 litre bucket to wash car or house windows	Hose running at 15 litres per minute
Cleaning teeth using mug of water for brush	Tap running at 15 litres per minute.
Modern dishwasher 40 litres per load	Old dishwasher 50 litres

**Options for Improvement**

Some local authorities have introduced a charge for water by metered flow instead of a flat rate related to house value. This is usually done by allowing the first few hundred litres per day for a base or fixed charge, plus a charge by volume for all water used above that level. In these areas, annual water demand has dropped. It makes sense, and saves the household useful cents, for us to take some extra care and make a few changes of habit or of equipment to conserve this liquid asset. We can make a difference in our homes, by conserving the water we use and making sure that what we tip down the drain isn't going to harm the natural water environment.

For challenging information on global contrasts in water use, see Anita Roddick's book *Troubled Water*, or Vandana Shiva *Water Wars*; or Tony Clarke & Maude Barlow *Blue Gold*. Examples:

- 2,500 gallons of water per pound of beef steak produced in USA;
- 50 glasses of irrigation water to produce one glass of orange ;
- 5 million people die each year from contaminated drinking water, equivalent to population of Canada;
- Western Europeans consume an average 85 litres of bottled water per person per year (46% of world consumption) at a price hundreds of times higher than tap water, per litre.

For more information on global water issues visit:

<http://www.un.org/waterforlifedecade/>

## Water Actions - Saving Water and Reducing Pollution at Home

As in the Energy information materials, we have grouped suggested actions according to their likely cost to the household. Free actions come first, followed by ones that will cost a little (but where water supply is charged by volume, and for those that involve water heating, they'd pay for themselves over time). Finally we cover the water-saving impact of larger expenditure choices, such as 'whiteware' appliance purchases, or factors to consider when choosing your home to buy or rent.

We encourage wider awareness of the global scarcity of freshwater, so that water conservation becomes 'the right thing to do', whether or not it is locally rationed by price. You know how expensive bottled mineral water is – similar to petrol, per litre, at present – so be conscious of how lucky we are to have valuable tap water that's cheap, safe and not rationed. We rely on it, so don't take it for granted.

### 10 water saving actions, at little or no cash-cost

1. **Ration the garden.** If you have a 'thirsty' lawn and flower-beds, make your watering effort much more efficient, by:
  - (a) When you water, applying it in early morning or later evening, outside the heat and winds of the day, to cut evaporation losses.
  - (b) Water no more often than once every three to five days that pass without rain. Photo above shows handy equipment to get water direct to plant roots: a dripper system, or a porous rubber 'leaky' hose, which can be buried, or a trigger controlled hand-held hose - instead of scattering over 800 litres per hour into the air from a sprinkler.
  - (c) Some lawn grass mixtures, in areas not given hard wear under foot, can be allowed to dry and go yellow in the dry summer months. They will recover and 'green' in the autumn. Avoid cutting them short before withholding water. If you set the mower cutting height above 40 mm in the drier months your lawn will need less watering to stay green, too. Allowing the grass to grow longer leaves will produce deeper roots to reach soil water.

12. A reminder, to protect living streams by not washing paints, solvents, oil, detergents or chemicals down storm drains. Water from these drains does not reach the sewage treatment plant: it goes into the same waterways that we fish and swim in. Drains are only for rain!

## Low Cost Actions to Save Water: (Some good Investments)

1. If you have a pre-1990s single-flush **toilet cistern** and are not already using other methods, **buy a flush saver device or gizmo to ration water use.** Devices available to cut water use by about 2 litres per flush, and costing only a few dollars, include:
  - *Water Stop* flush control weight (made by Tiller Holdings of Auckland).
  - *Selecta Flush* (made by BB Water Saver Systems of New South Wales).
  - A strong plastic bag design called *Hippo* (UK import to NZ, for info: phone 03 546 9962 or email: [hippo.nz@xtra.co.nz](mailto:hippo.nz@xtra.co.nz)).

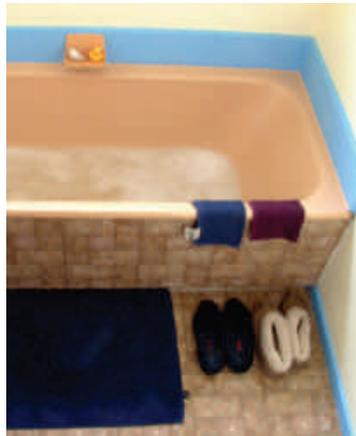
One of these bags or gizmos is not required if you already have a modern dual-flush (two button) toilet cistern or have already reduced some of the flush volume within the cistern by inserting a water-filled and sealed container, such as a code 2 plastic.

2. **Switch to an aerator or low-flow shower head.** Does your existing shower head supply over 12 litres of water per minute? (*To find out, collect full flow into a bucket for a timed 15 seconds, find out how much water fell using a kitchen measuring jug, then multiply by four to calculate the flow in one minute*). It could be as high as 24 litres a minute! If so, you could save significant amounts of water and money on heating by using a low flow shower head that supplies about 7 to 9 litres/minute. The new one must match the screw-thread of the shower head you take off, and be suitable for the water pressure available in your house. (You could save over 20,000 litres per person per year if by habit you currently take a seven minute shower, daily). A similar approach applied to the sink mixer taps can save water there. These devices are also valuable for their money-saving on hot water: they pay for themselves in power-bill savings over two years, so you'll read about them in our energy efficiency information too!

water tap that's leaking, as you will be heating cold water replacing it in the tank. New tap washers are much cheaper than a larger annual power bill, and quick to fit! Don't forget to turn off the water supply valve before you dismantle any taps.

8. **Check outside taps** and garden hose installations too, especially after frosty weather, when bursts are possible. If you live in a cold region, wrap insulation on the outside tap and pipes to protect them from frost.
9. **Turn off the tap once you have collected enough for the task** in a bowl (or in a sink with the plug fitted). This might be to wash your hands, or to rinse plates or clean vegetables or to run enough into a clean mug for tooth-brushing or for shaving. There is no need to leave the tap running. About 6 to 10 litres will fill a bowl, after which you save tap water at 15 litres per minute.

10. **Share baths, or use shower more often than taking baths.** Stay clean while using up to 50 litres less water per person each time. Time yourself in the shower too – see if you can limit showers to five minutes or less. Showers use 7 to 24 litres a minute depending on the system pressure and the shower head design. You'll save money on hot water bills too! Reduce water flow from an existing shower 20%, 35% or 50% by fitting a flow reducer behind the shower head (choice of three simple plastic washers with holes in them; just a few dollars from Plumbers' merchants).



A shared bath uses similar water volume and water heating, per person, to both having a long individual shower (Photo: Angela McLroy)

As you wait for the shower to warm up you can collect water in a bucket, to use in the garden later.

11. **Use the fridge to cool water and as the place to thaw frozen foods.** Is there someone in your house who on a summer's day regularly runs the tap for half a minute to get their half-litre of cold water, wasting 6 litres in the process? Beat this by keeping a jug or bottle of water ready-chilled in the fridge. Another waste is running tap water over frozen food packages to thaw them – just a little planning ahead can put frozen foods on a plate in the fridge (which is at about 4°C) to thaw. Their initial frost also helps to keep the fridge cool, which is energy efficient.

- (d) Around trees, on flower and vegetable garden beds (not seed beds), add a surface layer of mulch up to 100 mm deep. Wheat or pea-straw, gravel, composted bark or grass clippings can be used to reduce summer evaporation losses from the soil. Avoid mulching very close to living plant stems, to protect against rot. Gradual decay of the mulch will feed the soil, too. Beware slugs!



Using a hand-held hose with a trigger, to control which plants will get water. Aim for soil not leaves, especially if using tap-water that has chlorine added. Avoid watering leaves in the hottest part of day.

(Photo: Angela McLroy, Papanui HS, 2002) A lower-volume alternative to spraying is a seeper or 'leaky' hose - pictured below .

- (e) If you still use a sprinkler, time it when in use (or use a clockwork timer near the tap, see photo on later page), and also put out a tin or jar to collect a sample of the actual water depth that has fallen. Approximately 2.5 cm water depth per week, in the combined total of rainfall and watering, is sufficient for lush green lawns. Don't try to put this on all at one soaking or you will waste much of it! Remember that clay soils absorb water more slowly than sandy soils, and that water soaks in less on slopes, so excess water will simply puddle or run off.



Watering the lawn and garden for one hour can use as much water as a full day's worth of other household activities for a family of four.

We look next at another common household use of the outside tap!

2. **Wash the car and the house windows from a bucket.** It requires only a few buckets of 10 litres each instead of a hose sending out 15 to 20 litres a minute, running for up to half an hour! A rubber squeegee, a soft sponge and newspaper (for cleaning glass) will do the job as well as a hose fitted with glove or brush, for a fraction of

the water volume. A little white vinegar added to the water improves window cleaning.

To reduce pollution of local streams with detergents, oils and toxic metals, don't wash and rinse the car when it is on the road seal or concrete driveway, but when parked on a permeable surface such as gravel or lawn. The grass and soil will trap these pollutants and are themselves less vulnerable to such pollution than stream life. If you have no grass surface on which to wash a vehicle, use a commercial car wash (such as BP) where water should be recycled and pollutants will be trapped. Ask, to check this.

Also, don't tip garden chemicals, paint, thinners or waste oil down the stormwater drain – they can be safely recycled at local authority facilities. For this, store and present in labelled screw-top containers.

3. **If a toilet is the fixed single-flush type, reduce the water consumption** for each flush by displacing water. To do this put a water-filled, sealed, 1 to 1.5 litre plastic bottle (or a plastic container such as the 'Hippo' bag) inside the toilet cistern, which reduces the volume of water available to flush away each time. Watch the mechanism working while the lid is off the cistern to make sure that nothing snags on moving parts. If you prefer to buy and fit a 'flush saver' weight (that will allow you to regulate the length of time of the flush by how long you hold down the flush button). See the low cost ideas list over the page.

4. **Don't use the loo as a wastewater bin.** Used pocket tissues and sanitary products can safely go out with solid refuse, so

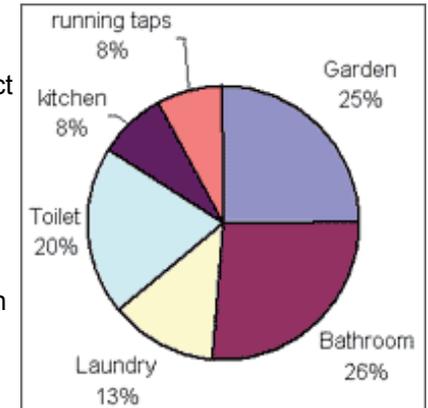


Wash the car on the lawn rather than the drive or roadway. Soil filtering protects streams, into which the road stormwater gratings would drain detergents direct.



If you have dual-flush already fitted in the cistern, use the half-flush whenever appropriate. It saves many litres a week.

you could have a small, lidded, wastewater-bin handy alongside the toilet. To avoid wasting water, restrict toilet flushing just to human wastewater that needs watery transport to safe treatment in the septic tank or at the sewage works. (As an aside, some male gardeners also add urine onto a lemon tree or the compost heap, as a nitrogen-rich 'activator' that helps it to work. The hormones present in women's urine make it less suitable in this role.)



Total household water use in drier parts of the country, such as Christchurch, can be greatly influenced by garden use in a dry summer. The chart above shows 'typical' annual use of 25% on the garden, but statistically that average calculation includes the households with no garden. If you've a garden it could be your largest water user.

5. **Check for leaks.** Turn off taps and all water-using equipment, wait for toilet cistern and header tank to refill, and then look at the **water meter** (where fitted) outside to see if the two numbers at the far right (litres and tenths of a litre) are still turning. Check this reading again after an hour or so, provided you have not run any water. No more movement in that hour means no leaks.
6. **Sometimes toilet cisterns leak into the pan.** A good way to check for this is to add a few drops of food colouring to the water in the cistern, then see if any of this colour appears in the pan before you next flush. A leaking cistern, if it was running constantly, could waste up to 2.5 million litres of clean water a year (equivalent to 35,000 bathtubs!). Even a silent leak that you'd only detect with the food dye test could waste over 200 litres a day.
7. **Dripping taps with broken washers** can also waste large amounts of water, from 4 litres a day in small drips to a steady dribble that waste up to a litre a minute. Dripping taps are also very costly if it is your hot

