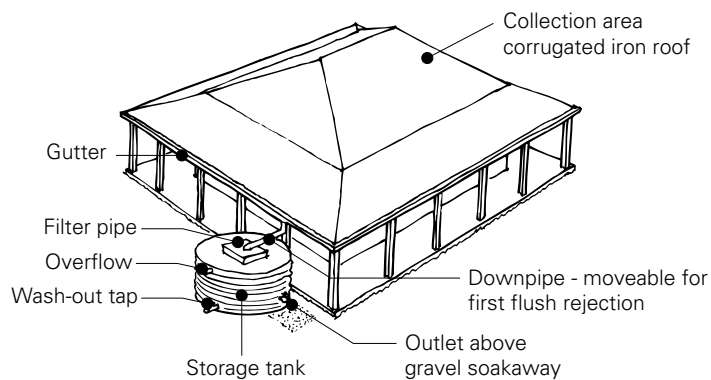


Rainwater



Rainwater is a valuable natural resource that can be collected for household use. Using rainwater can reduce your water bills, provide a supply of restriction free water, and reduce community infrastructure costs.

Opportunities for rainwater collection and use vary according to where you live. Urban households already have a connection to a centralised, or reticulated, water supply system, whereas rural households typically have to source their water on their property.

Consequently, the regulations and guidelines concerning the collection and use of rainwater vary according to your location. Check with your local council or state health authority for advice on the current regulations and guidelines in your area.



In urban areas water bills will be lowered or eliminated by installing a rainwater tank.

ADVANTAGES

Rainwater can aid self-sufficiency, providing a back-up supply in case of water restrictions.

On rural properties, rainwater can provide a better quality potable supply than river, bore or dam water.

Rainwater tanks can also provide cost-effective on-site detention of stormwater.

Depending on tank size and climate, reticulated water use can be reduced by 50 per cent in urban areas. This can help:

- > Reduce the need for new dam construction.
- > Protect remaining environmental flows in rivers.
- > Reduce infrastructure operating costs.

Tank water rebates are currently available from all state and territory governments, with the exception of Northern Territory which offers plumbing rebates for connecting raintanks to the house. Some rebates are also available from local councils. The rebate amount depends on how the tank is connected to the house and often there are minimum capacity requirements. Contact the relevant government agency to find out more.

DISADVANTAGES

In areas with reticulated water supply the main disadvantage of installing a rainwater tank is the financial cost. This is particularly the case if your water supplier charges a fixed charge for the centralised supply service, regardless of whether or not you use it.

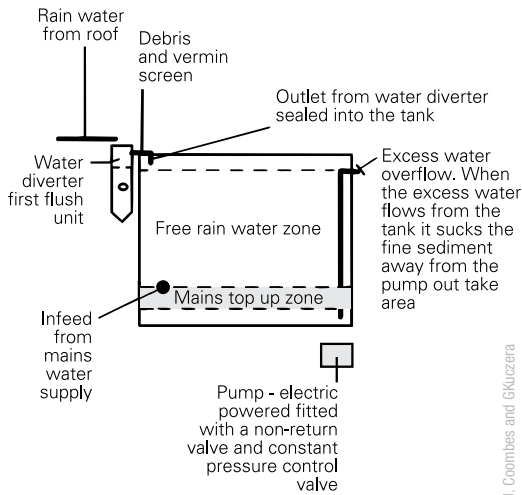
A rainwater tank will cost (in 2007) a minimum of \$500 for a small 400L tank to around \$8000 for a 100,000L tank. Costs will vary considerably depending on the tank material, shape and installation and delivery requirements.

Regular maintenance, such as checking and cleaning gutters, is required. See 'System Maintenance' for further details. Health risks can arise if maintenance is not carried out.

Reliability, ie. small tanks may not have sufficient water available in mid-summer.

HEALTH AND SAFETY

- > Cover and thoroughly screen tanks to exclude mosquitoes, birds and animals, especially in areas where mosquito-borne disease is an issue.
- > Design tanks to overflow to gardens, infiltration trenches or the stormwater system.
- > Desludge your tank periodically with a tap installed at its base.



P.J. Coombes and Gkuczera

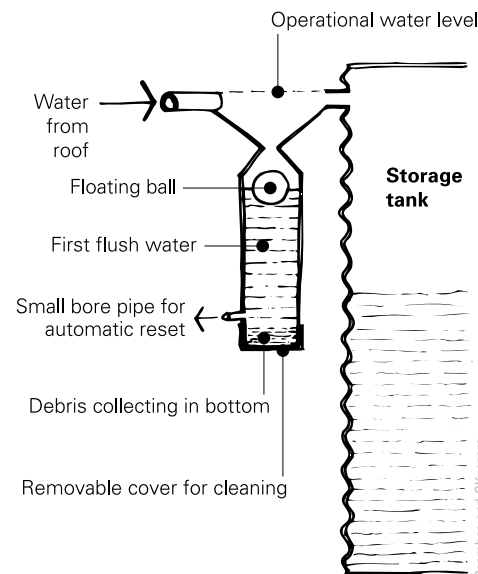
SYSTEM MAINTENANCE

Regular maintenance is very important to ensure that your rainwater will be safe for all requirements around the home, particularly drinking.

One contamination risk comes from animals or birds leaving droppings on the roof and gutters or accidentally entering the tank and becoming trapped. Another potential contaminant is the roofing and roof flashing materials, for example lead flashing on older roofs.

In urban areas there is also a risk of contamination from airborne pollutants. To minimise these risks you should:

- > Check your roofs and gutters for vegetation and debris on at least a weekly basis.
- > Keep the roof clear of overhanging vegetation.
- > Check and maintain screens around the tank.
- > Drain and clean your tank every few years to remove sediment.
- > Install a first flush diverter. This device fits onto your tank inlet and prevents the initial flow of contaminant-laden water from the roof entering the tank when it rains.



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BUYING YOUR RAINWATER TANK

One determinant of tank size is whether or not you have access to a centralised water supply system. If not you will need a tank that is sufficient for all your needs throughout the year. The size required will vary depending on the local climate.

If you have access to the internet you can establish the annual rainfall in your area by visiting the Bureau of Meteorology website (see Additional Reading). However, in many areas of Australia the rainfall is highly variable. This can lead to supply security problems.

Other factors that affect the size of your tank include:

- > The intended use of the rainwater. You will need to decide if your tank water will be used outdoors only or indoors as well. To use tank water indoors, a plumber will need to connect the mains supply to the tank to ensure minimum water levels. Check with your local council, state health authority or rainwater tank supplier for guidance on connecting your rainwater tank to your home.
- > The typical water consumption for these uses. For example, the water used for car washing, washing machines, or toilet flushing. This information should be available from your water supplier.
- > The area of your roof. This determines if the water captured would be enough to meet your needs.
- > The security of water supply you desire. The bigger the tank, the more water available.

In general, for toilet flushing and use on a small garden, the tank should hold a minimum of 2,000L. For non-potable domestic use and holding stormwater, a minimum of 5,000L is recommended.

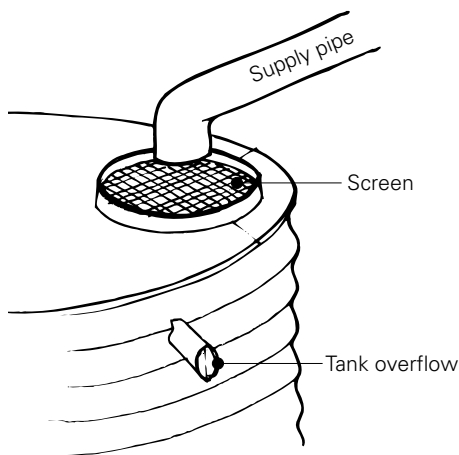
Various websites are available to help you calculate a suitable tank size depending on your needs and geographical location see Additional Reading for more information.

If rainwater and mains supply are both used then mains water must be isolated from the rainwater system by a valve mechanism or tap. Exact specifications vary across Australia. Contact your local council or state health department for advice.

Protect water in tanks from sunlight, which can stimulate algal growth. Plastic tanks may allow light to penetrate so they should be kept out of the sun or painted.

Chemical disinfection or filtration of your rainwater is not necessary if you only use your rainwater for non-potable uses.

Drinking rain water is not advised where potable supplies exist, particularly in urban areas where rainwater can contain higher contaminant levels.



If you drink your rainwater it is recommended that you install a filter. Pathogens such as cryptosporidium and giardia may be present in rainwater, and in urban areas there is a risk of chemical contamination from lead and other compounds. Check with your local council, state health authority or rainwater tank supplier for guidance on the type of filter you should install.

First flush devices can also be used to reduce the contaminants by preventing the initial roof-cleaning wash of water from entering the tank. It is also important to regularly check the first-flush device and to ensure the catchment area is clean.

TANK MATERIALS

The most common tank materials include plastic (polyethylene), concrete, and galvanised steel. The type of material you select for your tank depends on your budget, the size of tank required and water use.



Galvanised steel is the most common type of tank material in Australia. It is the least expensive, but its lifespan is limited by corrosion.

Concrete tanks are strong and long lasting. They are typically constructed on-site and can therefore be designed to meet specific site and householder requirements.

Plastic tanks are available in a range of sizes and colours. They are tough and durable and relatively lightweight.

In recent years a range of innovative systems have been developed, specifically aimed at providing adequate rainwater storage capacity in situations where space is constrained. These include storage walls, bladders and modular systems.

Storage walls are modular slimline tanks (typically plastic) that fit together and double as a wall system.

Bladders are sealed, flexible sacs that are particularly suitable for tight sub-floor spaces (in areas with as little as 750mm height clearance). Their installation is a little more technically involved than a standard tank, but they can be especially good for renovations where space is limited.

Modular underground tanks are also available. Some systems are capable of capturing rainwater and stormwater, the latter via infiltration through the lawn or garden. The tanks are covered by a material that filters the stormwater as it enters.

CHOOSING THE RIGHT SYSTEM

There are many shapes and sizes available that can be integrated into walls or underground to economise on space. In general:

> Above ground rainwater tanks are usually the cheapest. Consider slimline and wall line tanks that which can fit tight narrow spaces.



> Underground tanks save on space and have greater catchment potential than above ground tanks. However this option can be more expensive and requires excavation. Some authorities also require annual testing of backflow prevention device. Consider modular systems that capture water via infiltration through the grass lawn or garden.

> Underfloor bladders save on space and may have greater catchment potential than above ground tanks. Installation is also more technically involved. Consider sealed flexible bladders which can be installed side by side or end to end depending on space.



Tanks sizes of 400 to 1000L will cost (in 2007) roughly \$500 to \$800, including installation. A tank size of 2000L will cost between \$1000 and \$1400, while a tank size of 5000L can cost around \$1500, depending on the tank style and material.

A small pump is usually required to provide pressure. If the house is significantly elevated above the garden then a pump might not be necessary, saving on energy usage.

Install a filter. For advice see 'Health and Safety'.

Garden watering

Fit a tap directly to the rainwater tank for watering the garden, washing cars and for other outdoor uses.

A sprinkler will require a pressure pump.

While the amount of water required in your garden will vary with climate, the size of the garden and the type of plants it contains, an average household requires a tank with approximately 2000 to 4000L capacity to water their garden year round. This will cost from \$1000 to \$2000, including installation.

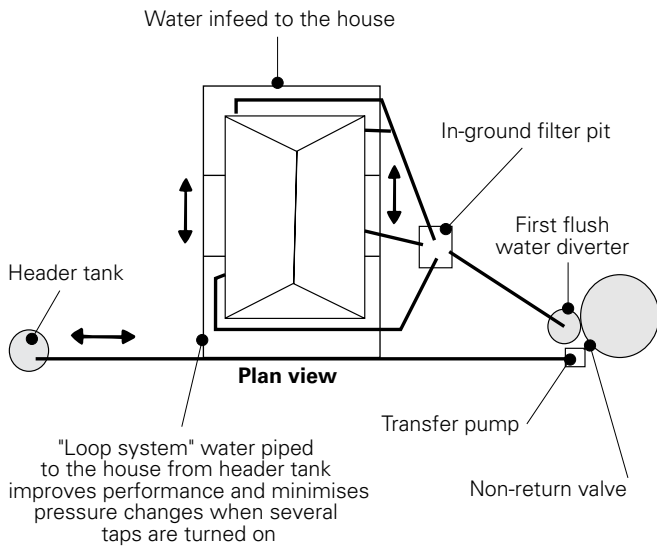
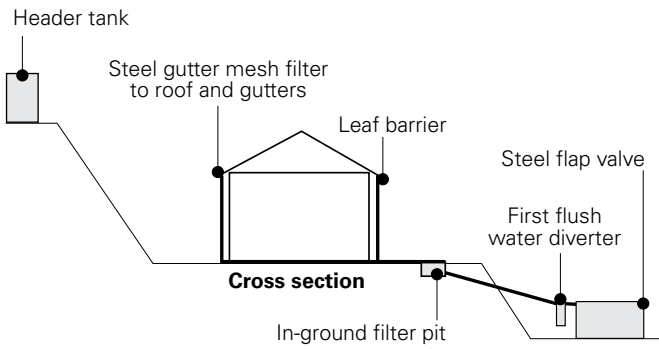
Total household water supply

If rainwater is to be your sole supply you will need a tank with a capacity of 50,000 to 100,000L. This capacity will cost from \$6000 to \$8000, including installation and delivery.

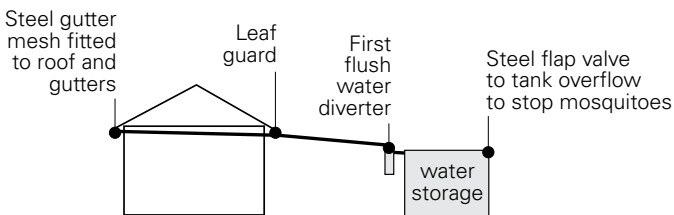
The most economic large tank is normally a concrete tank built in situ.

RAINWATER SYSTEM CONFIGURATIONS

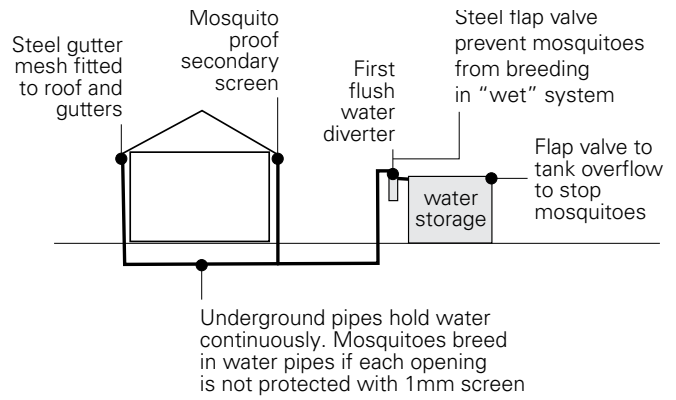
1. Gravity fed system with pump (can be solar)



2. Dry system



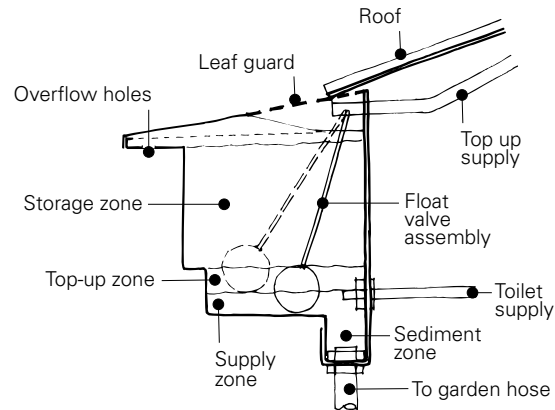
3. Wet system



4. Gutter storage systems

Gutter storage involves directing and storing rainwater in specially constructed large capacity gutters surrounding a house. Gutter storage systems are best suited to new houses, as the cost of the gutters can be offset by savings in building materials.

The system is designed to gravity feed non-potable water for toilet flushing and garden watering.



ADDITIONAL READING

Contact your State / Territory government or local council for further information on rainwater tanks, including what rebates are available. www.gov.au

Australian Government National Health and Medical Research Council, (2004), *Water Made Clear*. www.nhmrc.gov.au/publications/synopses/_files/eh33.pdf

Bureau of Meteorology. www.bom.gov.au/climate/averages

Mobbs M (1998), *Sustainable House: living for our future*, Choice Magazine, Sydney.

Save Water Alliance (2007), *What size tank will I need?* www.savewater.com.au

Stuart McQuire. (2007), *Water Not Down the Drain: A guide to using rainwater and greywater at home*. www.notdownthedrain.org.au

Wade R (1999), *Sustainable Water: How to do it and where to get it*, Choice Magazine, Sydney.

Water Sensitive Urban Design. www.wsud.org/literature.htm