

RAINWATER HARVESTING

A Factsheet from Austin Energy's Green Building Program

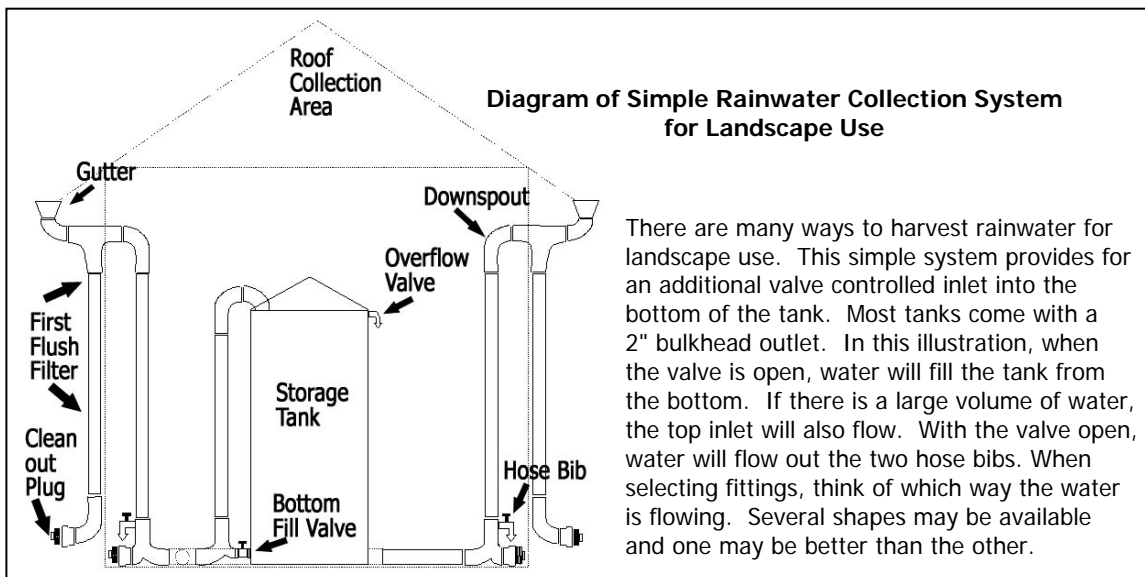
Rainwater harvesting is an old idea that is popular again. The future of our region depends, in part, on innovative approaches to water supply. In Central Texas, if you have a roof area of 2,500 square feet and a yearly average rainfall of 32 inches, you can collect almost 45,000 gallons of rainwater in a typical year. Obviously, rainwater harvesting is potentially a viable method to achieve sustainability with regards to water resources. Many old homesteads and farms had rainwater cisterns as their main source of drinking water.

Water flows downhill....

The basic concept of harvesting rainwater is simple. Rainwater is mostly collected from the roofs of buildings. It flows by gravity through gutters and downspouts into a storage tank. From the tank it can be used in the landscape as is, or be filtered and treated to become a source of high-quality drinking water. Since most of our rainfall occurs in large storm events, the ability to store collected rainwater is paramount. Farmers and ranchers know the value of stored water as evidenced by today's major sources for large water tanks— fence, ranch, and feed stores. But, garden and nursery retailers sell smaller rainbarrels and the City of Austin Water Conservation Program offers 75-gallon barrels at a subsidized cost (see 'Resources' section for more information).

All of the components for rainwater harvesting can be found in the plumbing section of area retailers. A typical system replaces metal downspouts with solvent-welded PVC piping. By making the downspouts watertight, water can be carried by gravity to a storage tank. Several downspouts can be joined together into one larger main pipe leading to the tank. This main pipe is usually buried below ground and breaks the surface again at the side of the tank. An inlet to the tank is installed as high as possible to maximize storage capacity. The inlet can be on the side or the top of the tank. Just remember, the solid PVC piping system (downspouts) at the building must be at least 6 inches (preferable 18 inches) above the highest piping at the tank. This will allow the tank to fill, as the pressure of the water will work like a "P" trap under a sink. The water will equalize and flow into the tank. This "P" trap part of the system also must have an outlet installed to allow water to drain out for maintenance and to prevent freezing.

WATER



Keeping the rainwater clean

Leaves, twigs, dust and bird droppings can be screened out of your system in several ways. The simplest method is a first-flush filter. The "first flush" of rainwater is sacrificed to make the rest of the water cleaner. Each downspout can direct the water to a plugged pipe that looks much like the typical downspout, except it has a sewer cleanout plug at the bottom. When the plug is in, the water fills the downspout until it reaches the top. From here, the water is directed down to the collection pipe, which goes into the tank. Each of these first-flush filters should be drained of debris after each rain to be ready for the next rain event. If your tank is full, just open the sewer clean-out plug and the first-flush filter works like a normal downspout.

Other devices can be used to filter the water going into a tank. Some are large, fiberglass boxes with 30-micron filters inside to screen out the particles. Since these filters require cleaning and maintenance, using the first-flush filter ahead of them increases the time between cleaning or replacement.

Using your rainwater

A gravity system uses the water from the tank via water hoses, buckets, and soaker hoses. There is only 0.43 PSI. (pounds per square inch) per foot of water elevation. So a full tank ten feet tall has less than 5 PSI. Even a drip-irrigation system needs at least 15 PSI. You eventually may want to pressurize your system using the same components you see used on water wells: pump, pressure tank and fine mesh filter. This creates a more usable system, but adds to the overall cost and maintenance. City of Austin water customers can receive a \$500 rebate for a landscape rainwater system.

Rainwater for drinking

A drinking water quality rainwater system costs about as much as the typical well. With 20,000 to 30,000 gallons of storage, a family of four can be comfortable without a well or piped water service. But, families using rainwater as their sole source of potable water seldom have lush landscapes. Just watering the grass on a quarter-acre home site one time can use more than 3,000 gallons of water. We average about 32 inches of rain per year in this area, but much of it comes in downpours and your tank(s) may be full and not able to capture all of a rainfall. The time between rains can be long, so rainwater harvesting goes hand-in-hand with water conservation.

To make rainwater safe to drink, additional filtration is needed, plus perhaps an ozone system, reverse osmosis and/or ultra-violet irradiation. You become your own water purveyor and the health of your family and guests depends on the design and safe operation of your drinking water system.

Resources

American Rainwater Catchment Systems Association (ARCSA)
www.arcsa-usa.org

International Rainwater Catchment Systems Association (IRCSA)
www.ircsa.org

Texas Manual on Rainwater Harvesting, Third Edition, published July 2005
http://www.twdb.state.tx.us/publications/reports/RainwaterHarvestingManual_3rdedition.pdf

City of Austin Water Conservation Program's rainwater rebates, rainbarrels, system installers or retailers
www.cityofaustin.org/watercon

Rainwater system manufacturers, suppliers or installers
<http://www.cityofaustin.org/watercon/downloads/rwsuppliers.pdf>