WHY HARVEST RAINWATER?

Rainwater harvesting saves money for you and for your community. Collecting and using rainwater means you aren't buying potable water to use on your landscape. Rainwater harvesting helps to reduce the need for new water treatment plants and water storage facilities, which helps to keep the cost of publicly supplied water manageable.

Rainwater harvesting saves water resources. According to the California Urban Water Conservation Council, on average, half the water used in a single family home in the United States goes to the landscape. Using rainwater for landscapes leaves our treated, potable water for human needs such as drinking and cooking and conserves the precious water resources of our aquifers, lakes, and streams.

Rainwater is good for your landscape plants. According to the Texas A&M Texas Water Resources Education website, "rainwater is good for plants because it is free of salts and other minerals that harm root growth. As rainwater percolates into the soil, it forces salts down and away from root zones, allowing roots to grow better and making plants more drought tolerant."

Rainwater harvesting has been practiced for thousands of years all over the world. Many people, especially in rural areas, have revived the practice of rainwater harvesting and are using it for all their household water needs. This booklet describes how to plan and install a non-potable rainwater harvesting system designed for use in watering landscapes. The examples cited refer to the non-potable system designed for and installed at the offices of the Barton Springs/Edwards Aquifer Conservation District.

Before you begin to plan your own rainwater harvesting system, check with your local government agencies and homeowner associations for any applicable regulations.

BASIC COMPONENTS OF A RAINWATER HARVESTING SYSTEM

Rainwater harvesting systems come in all shapes and sizes, from a simple container under a downspout to potable systems with thousands of gallons of storage and complex filtration features.

All rainwater systems, no matter what size, have a few components in common:

Catchment area:
Your catchment area will likely be the roof of your house. Metal roofs work best, and any roof will work for a non-potable system.

A transport system for directing water into the tank:
Gutters, downspouts, and a pathway of PVC pipe make up this system.

Leaf screens and roofwashers:
You can use screens or mesh to keep leaves, twigs, and animals out of your gutters, downspouts, and barrel or tank. A roofwasher diverts the first flush of rainwater before it enters the tank.

A storage tank:
A tank may be a rain barrel or a cistern made of various materials such as wood, masonry, concrete, metal, fiberglass, or polyethylene.

A system to deliver the stored water to your landscape:
A rainbarrel may have a simple spigot at the base. For more elaborate systems, you may use a pathway of PVC pipe and hose bibs. You may be able to take advantage of gravity only, but most systems benefit from a pump for delivery of stored water to your landscape.

The District collects water off a 640-sq. ft section of roof. The water is gravity-fed into a 1550-gallon black polyethylene tank, which becomes nearly full after a 4 in. rain. We chose this lightweight, dark-colored tank in order to prevent the growth of algae. It measures approximately 7'-6" in diameter by just under 6'-0" high.

DESIGNING YOUR HARVESTING SYSTEM

Calculate how much water you can collect.

Calculate the square footage of your total catchment area (your roof). Multiply that figure by .6 gallons of water per column inch of rain.

For example: The District collects from 640 sq. ft. of roof available; therefore, 640 x .6 = 384 gallons of rainwater per column inch of rainfall.

Analyze your site
Survey your landscape and calculate the amount of storage capacity you will need to handle your irrigation needs in the event of a severe drought. Consider the size of your yard, the amount and type of turf grass, the number of flower or vegetable beds, and the average rainfall you can expect. Your budget, space constraints, and calculated usage will determine the tank's ideal containment capacity. (We felt comfortable with a 1550-gallon tank because it could store 4 inches of rain.)

You also need to determine what components (e.g., gutters) you need to upgrade or purchase and where you want to place your storage tank. You can place the tank under the eaves of your home or you can place it farther away in your yard. Consider the height of your gutters and the slope of your yard. If you will be installing a pump, you will need to place the system near an electrical outlet.

Tips:

- Once your tank is full you cannot collect additional rainfall. You might be tempted to buy a big tank, but most rainwater consultants remind new harvesters that added storage can easily be added if desired.
- Remove tree branches that might fall on your gutters or might deposit large amounts of debris.
- Consider that a gallon of water weighs 8 pounds. Multiply 8 pounds by the capacity of your tank and you will quickly see why it is important to have a strong, level base to support the weight of your tank.

Our tank is installed on a bed of tamped, crushed granite. We fashioned a framework of landscape timbers to contain it. (At nearly 8 pounds per gallon, we have to support over 6 tons of water, so a proper level foundation is needed.)

Once you have calculated the amount of storage needed and where you would like to place your tank, it is time to design the details of your system.

Select a tank

Many types and sizes of tanks are available, and many may be purchased at area ranch and farm supply stores.

Tips:

- A dark-colored tank or rainbarrel prevents the growth of algae.
- Most rainbarrels have spigots at the base for filling a watering can or attaching a hose.
- Inspect the pad site for your tank. Make sure it is solid, level, and smooth.
- If your tank is open, cover the top with mesh to keep out leaves, twigs, and animals.

Design the water intake transport system

Trace the path from your downspout to the tank. If your tank (or especially a rainbarrel), is located under the eaves, you will not need to run PVC pipe. If your system requires piping, design the PVC pipe path so it has the fewest turns and angles.

Tips:

- The most efficient gutters are seamless aluminum, but any will work.
- Shorten the downspout over the tank and orient it to allow water to enter easily.
- Place your overflow tube (and/or hose) so that it empties away from your foundation and into your yard.
- Water flows more easily in straight paths, so minimize the number of turns and angles.

Design the water delivery system

Design the PVC pipe path with the fewest turns and angles. Decide how many hose bibs you will need and where you will place them in the path.

Mary Helen Quinn, Master Naturalist, helps dig the ditch for the PVC piping. Due to drainage issues, the tank needed to be located away from the building and downspout.

- If you have a rainbarrel, elevate it to create higher outlet pressure and allow easy access to the spigot. If you have a large storage tank and your landscape is far away, you might need to install a pump.
- Install a hose bib near the tank as well.

Installation

Most of the small parts needed for your installation can be found at your local hardware store or plumbing supply store. Other items, such as the tank itself and the pump, may be purchased at a ranch or farm supply store or home improvement center.

Tank pad

Install your pad site for the tank. Use a masonry level to make sure your site is level and smooth. You may want to build a pad with landscape timbers and crushed granite. Tamp down the granite before placing your tank on top.

Transport system components

Lay out the PVC pipe and all the connecting joints. When everything is in place, begin to dig the trench that will house the pipe(s).

Next, prepare to install your downspout converter. This device should be located at a higher point than the tank's intake opening.

When connecting your pipe, make sure to apply ample PVC cement to dry, clean PVC.

The 5" seamless aluminum gutter and 3" x 4" downspout, at the rear of our office, are the main transport components. From there the downspout converter is coupled with a 4"-diameter reducer to connect the 2"-diameter, schedule 40 PVC pipe used to get the water into the tank. PVC piping will be connected using Weld-On™ PVC 705 cement.

Roofwasher

A first flush of unwanted debris is accomplished by the use of the adjustable FloTrue Smart-Valve Rainwater Diverter™ mounted just before the tank inlet.

Delivery system

Water exits our storage tank via a 1"-diameter, schedule 40 PVC pipe and passes by a hose bib, through a ball shut-off valve and a one-way flow valve before it enters the 3/4 HP Red Jacket™ water pump. (Consult our schematic drawing and photographs for the proper installation order of valves, hose bibs, etc.)

Rainwater is drawn into our pump at the flick of a switch, and exits through an array of PVC pipe that connects to the Well Mate™ 40-psi pressure tank, a bronze hose bib, and a buried 1" PVC water line that terminates at another hose bib.

Finishing touches

We built a small roofed structure to house the water pump, the pressure tank, the on/off and electrical pressure switches, and the required pressurized outlet water plumbing.

Al Janelle, Master Naturalist, constructs a well house for the pump and tank.

CARING FOR YOUR SYSTEM

Regular maintenance will improve the efficiency of your new rainwater harvesting system. Remember to do these things regularly, and you will be rewarded with clean, dependable water for irrigating your landscape:

- Remove branches that hang over your gutters to prevent damage, debris, and roosting birds.
- Clean your gutters and empty your tank yearly. This will help keep your system from clogging and keep your tank from developing odors.
- Use mosquito dunks to control mosquitoes. Dunks can be bought at local nurseries and farm supply stores.

Rainwater harvesting does require some work, but many people find it well worth their efforts. The District installed a non-potable system with 1550 gallons of water storage and a pump with which to disperse rainwater for approximately $2000. Please feel free to contact the District at any time for more information or a tour of the system.