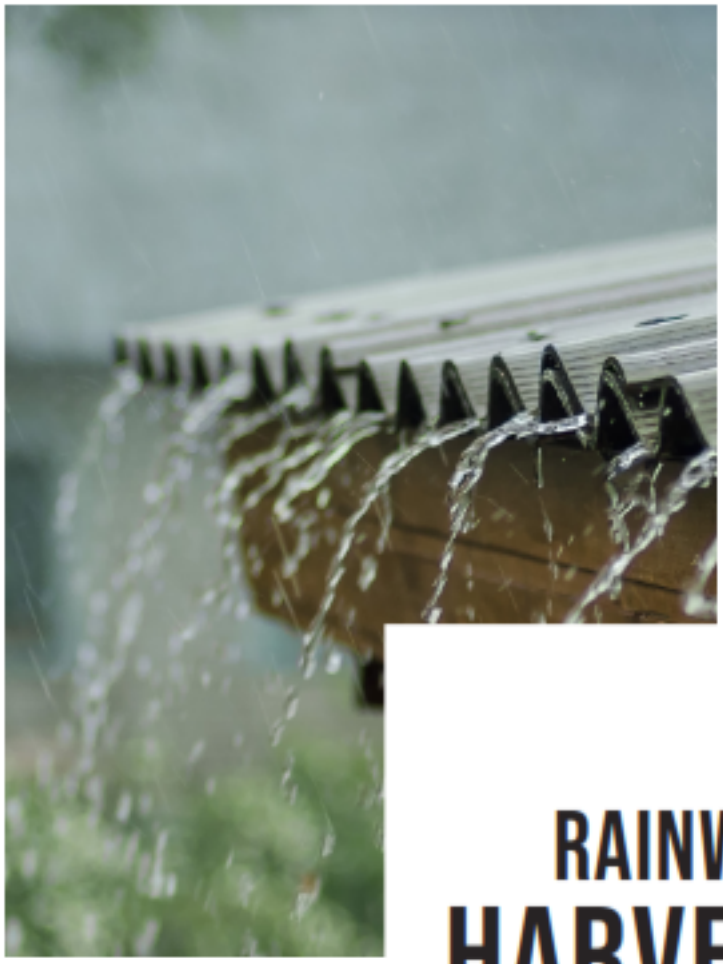
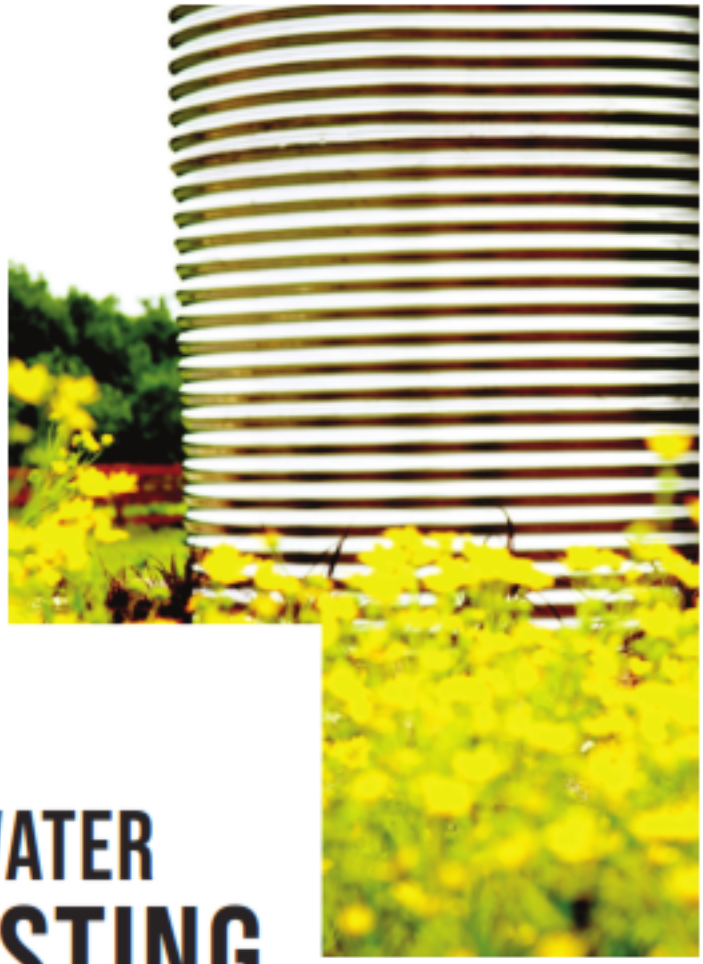




RAINWATER HARVESTING

Texas A&M AgriLife | Water University

Rainwater Harvesting

Saving from a Rainy Day

Rainwater harvesting is the process of diverting, capturing, and storing rainwater for future use. Implementing rainwater harvesting on your property not only reduces the demand on the water supply, but also reduces run-off, erosion, and contamination of surface water. Rainwater can be used for any purpose that requires water, but is especially good for plants because it is free of salts and other chemicals that can potentially harm root growth. As rainwater percolates into the soil, it forces salts down and away from the root zone, allowing roots to grow better and can even increase drought tolerance.

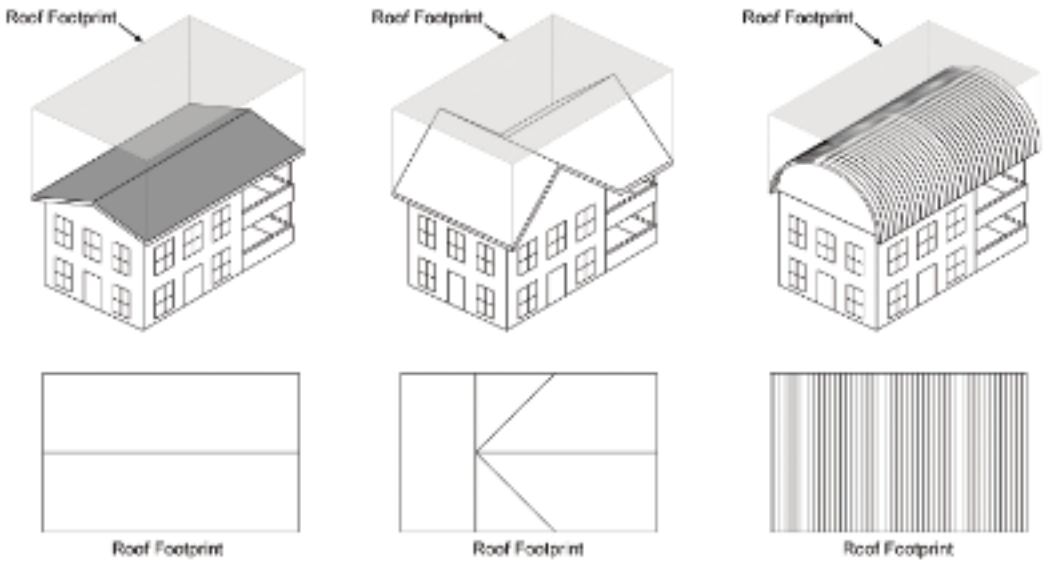
Rainwater harvesting can be used both in large-scale landscapes, such as parks, schools, commercial sites, parking lots, and apartment complexes, and in smaller residential landscapes. Whether your landscape is large or small, pre-existing or new, the principles described here can help you install a rainwater harvesting system to meet your needs. You will need to consider the supply (rainfall), the demand (water needed by plants), and a system for collecting water and distributing the water to your plants.

Benefits of Rain Barrels

1. Rain barrels reduce demand on municipal water supplies.
2. Rain barrels help make efficient use water resources.
3. Harvesting rainwater helps reduce flooding, erosion, and contamination of surface water.
4. Rain barrels SAVE YOU MONEY by reducing your water bill!

Simple Harvesting Systems

A simple water harvesting system, like a rain barrel, usually consists of a catchment, storage, and distribution system. A catchment area is just any area from which water can be collected. The best catchment areas have hard, smooth surfaces, like the roofs of homes, sheds, or other buildings. These catchment areas are also referred to as the roof footprint. Knowing your roof footprint will help you determine how much potential rainwater you could harvest, as well as where to harvest from. The amount of water that can be harvested also depends on the amount of rainfall received. Gravity moves the water from the catchment, or roof, to the storage container through gutters and downspouts, or through a roof valley. There are many different setups to modify and connect your gutter and/or downspout to fill your barrel. There are also many ways to direct the water coming off the valley of your roof to fill your barrel. It is important to understand that you will not likely be able to harvest all of the rain that falls onto your roof, nor is it necessary in home applications. Above is a diagram showing how to calculate your footprint. See "supply" on page 2 for an example calculation to estimate how much rainwater you can harvest from your catchment area.



Web Resources

Visit WaterUniversity.TAMU.edu to sign up for live courses on rainwater harvesting.

Supply and Demand

Supply

A simple calculation can be used to estimate the potential amount of rainwater that could be collected from each downspout or roof section. For most homes in North Texas, several rain barrels can be filled in a single rainfall event.

.6 gal. per sq. ft. of roof per 1 in. rainfall
2,000 sq. ft. roof X 1 in. rain = 1,200 gal. water
1,200 gal. X 37 in. rainfall per year= 44,400 gal/year

A 55 gallon barrel can be filled up by about about 100 sq. ft. of roof area in a 1 in. rainfall event

Demand

The types and numbers of plants in your landscape, along with their growth stages and sizes, determine the amount of water your plants need to be healthy. Because rainfall varies throughout Texas, different plants have become adapted to conditions in different regions of the state. Plants native to your region are the best choices for your landscape because their water requirements are usually met by normal rainfall amounts during most times of the year. There are also many adapted plants which thrive in our unique climate but are native to areas with similar soil types, hardiness zones and rainfall patterns. Visit WaterUniverity.tamu.edu for a list of our favorite native and adapted plants.

Building a Rain Barrel

Supplies

- Food grade barrel
- Insect netting
- Faucet
- 1.75 in. bulkhead fitting (.75 in. internal pipe threading)
- Drill
- 1.75 in. hole saw bit
- Jig saw (or small hand saw)
- Silicone caulk
- Teflon tape
- Bungee cord and cinder blocks (optional)

Drill the Collection Hole

Create a 5" – 6" hole: use a circle template on the lid; using drill & paddle bit for a pilot hole and jig saw or drywall saw to complete the large hole for collection.

Drill the Faucet Hole

Create a 1 3/4" hole on the side of the barrel for the bulk head fitting using a hole saw bit opposite of the collection hole.

Install Bulk Head and Faucet

Add a piece of duck tape (sticky side out) to end of a yard stick and secure the male piece of the bulkhead fitting on the end of the yardstick. Then, carefully place bulkhead male threaded piece inside the barrel and through 1 3/4" hole on side. Hold in place. Place the rubber washer and female piece of the bulkhead on male end and tighten. Apply pipe tape to faucet thread and insert gently twisting faucet in the bulk head. Use a pair of pliers to hold the bulkhead in place and turn faucet clockwise. As you tighten the faucet ,the bulk head should tighten making the connection water tight.

Install the Netting

Apply a bead of caulk around lid hole, and place netting over hole working caulk outward spreading all over netting in contact with the top.

Video

Visit tinyurl.com/aggierainbarrel for a complete tutorial on building your own rain barrel from start to finish.

Rain Barrel Tips

Overflow

Connecting separate piping to redirect overflow water away from the barrel, plants, and your foundation may be necessary. There are many methods of doing this and the bulk head fitting method may be used again. It is important to note you must protect the barrel from insect and/ or rodent access, so netting should be introduced either at the barrel connection or at the end of the pipe.

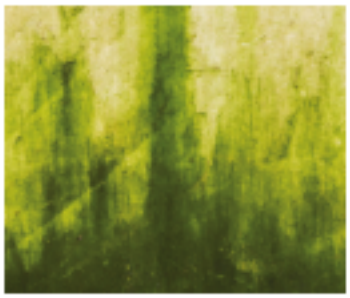
Additional Storage

Connecting multiple barrels together allows you to capture more rainwater. This should be thought of as an overflow into another barrel. Connecting the barrels at the highest point allows the initial fill barrel to overflow into other barrels chained together. Keep in mind if you connect at the top you must provide an exit point at each barrel in order to access the rainwater. Connecting the barrels at the bottom allows the barrels to slowly fill together and only requires one exit point because the water will travel between barrels as the water level lowers.

Pressure

Elevating your barrels 12"-18" increases the available pressure from the faucet. It is not necessary to exceed this height, as you do not want to create a hazard. Keep in mind the pressure is not enough to go long distances through a hose or uphill. It is, however, enough to fill a watering can or go short distances through a hose and fill some drip tubing (see drip irrigation for more information). In situations where more pressure is needed, a pump may be needed. External pumps, also known as transfer pumps, are excellent investments and will help increase your delivery distance, as well as provide versatility with drip tubing and soaker hoses. This also means water will leave your barrel faster, so make sure you are monitoring the barrel when pumps are being utilized.

Algae Growth



Some algae may accumulate in your barrel, but is not typically a problem when the water is being used and the barrel is allowed to fill with fresh water. The best practice is to protect your barrel from unwanted light and exposure. The best color to eliminate algae growth is black, so we suggest priming/painting your barrel black first, then you have a base to design or decorate however you choose.

Connecting Your Barrel

Location

Your barrel should be installed in an area in which it is convenient to use and near where the water is currently being directed. For homes without gutters, look for valleys in the roofline and areas underneath which have disturbed soil or mulch. Installing the barrel here will ensure it is filled during a rainfall event.

For those with a gutter system installed, you will need to reduce the length of your downspout as needed. Some can be shortened easily by removing a screw or rivet. Others will need to be carefully cut, using a hacksaw or reciprocating saw with a blade manufactured to cut thin metal. Downspout extensions, elbows, or adapters may also be necessary to divert rainwater into your barrel. Some PVC versions are flexible and can easily be bent towards the barrel opening. There are many other options as well which can be purchased to match the material and color of your existing gutters. Many people like the look and interest that a rain chain provides. Just be sure that your new downspout or adapter does not rub or damage your vinyl mosquito netting.

Use and placement tips

- Make sure your barrel is installed so that it is level and secure. A base of decomposed granite, gravel, or other pervious aggregate helps prevent soil erosion around the barrel.
- Elevate your barrel to take advantage of gravity flow. For example, place them at the higher end of a sloped lot, or set them securely on top of a sturdy base like cinder blocks.
- Put storage containers near plants and near or at the end of downspouts.
- Consider hiding containers in an unobtrusive place or behind a structure, screen, and/or plants.
- Because smaller cisterns are easy to handle and camouflage, place several of them around the site to be irrigated. For large landscaped areas, connect several tanks to increase storage capacity.
- If rainfall exceeds storage capacity, provide alternative storage for the excess or direct it to overflow in a safe manner, away from your foundation.

Where to Use Harvested Water

- Landscape irrigation
- Foundation watering
- Houseplants
- Pond
- Pool
- Aquariums
- Terrarium
- Birdbath
- Pets' water bowls

Quality Rainwater Attributes

- Salt free
- Chlorine free
- Calcium free
- Lime free
- pH slightly below 7

Rainwater Efficiency

There are a number of ways to increase water efficiency and help your rainwater go further. Avoid giving your plants more water than they need. Check and maintain soil moisture with a soil moisture probe, and do not water either directly after or before a rainfall event is expected. Only use your supplemental water during the time in between rain events, watering deeply and infrequently to encourage deeper rooting.

Plant Properly

Dig your hole 2-3 times as wide as the root mass and just as deep (or slightly more shallow) as the root mass. Newly planted material will need more frequent irrigation until it is established. Gradually taper off watering as plants mature to encourage drought tolerance.

Utilize Compost

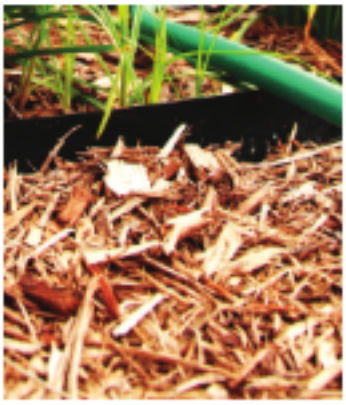
Incorporating and or topdressing with compost helps increase water infiltration and increases the soil's ability to hold water during times without rainfall.

Mulch!

2"- 4" of your favorite mulch prevents evaporation (or water loss through the soil), helps with infiltration, and prevents weeds which have the potential to compete with your plants for water.

Water the Roots

Watering closer to your plant's root zone by utilizing soaker hose or drip irrigation will increase the effectiveness of the irrigation and reduce evaporation. Adhere to manufacturer specifications for proper distribution.



How Much Your Barrel will Water

As a rule of thumb, a full rain barrel will irrigate a 10' x 10' area to a depth of about 5"-8" in the heavy clay soils of North Texas. By topdressing with compost and then applying 2"-4" of mulch around your plants, you can reduce evaporation and help your rainwater last longer between watering.

Your site's specific soil properties, the slope of your land, the amount of sunlight an area receives, and the existing soil moisture are also important considerations in estimating irrigation demands. Use a soil moisture probe or even a long screw driver to help estimate the soil moisture around your plants and avoid watering unless the soil is dry.

Beautification

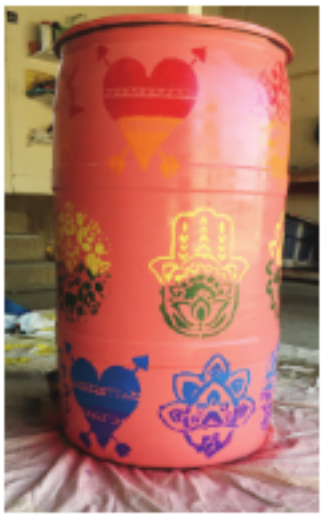
There are a number of creative ways to make a barrel your own by decorating it to suit your style or camouflaging it to match your existing landscape.

By painting your barrel a solid color or turning it into a work of art, covering it with a weather-proof fabric, or wrapping your barrel with wood boards or slats can help transition your barrel into a beautiful and functional landscape addition.

Barrel Maintenance

- Make sure your vinyl screen stays intact to prevent mosquito breeding.
- Drill 3-4 vertical holes going from the lip edge to the outside of the barrel to encourage the top of your barrel to drain.
- Cover your supply hole or leave your barrel's faucet in the open position in early spring when Oak, Pecan, or other trees are producing catkins near your gutters or barrel. This is only for a short time and will prevent acidification and yellowing inside your barrel.

Examples



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