

RAIN BARRELS

A HOMEOWNER'S GUIDE



Southwest Florida
Water Management District





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INTRODUCTION

This booklet is designed to educate homeowners on harvesting rainwater by using a small rain barrel. Harvesting rainwater allows the homeowner to supplement other irrigation sources at a minimal cost. Storing rainwater also aids in the reduction of stormwater runoff, which can lead to reduced levels of pesticides and fertilizers in stormwater ponds, streams, lakes and bays. As the region continues to have extended periods of below-normal rainfall, having extra water on hand is a good idea.

This booklet focuses only on storing rainwater for nonpotable outdoor uses as a supplement to natural rainfall and other sources of irrigation. Rainwater harvesting for potable uses, such as drinking, cooking and bathing, is possible and is done in many parts of this country and throughout the world. However, using rainwater for potable uses requires filtration, treatment and routine testing for safety—all topics which are beyond the scope of this text. This booklet covers

only simple collection and distribution methods related to landscape watering.

Cisterns and rain barrels have been around for thousands of years and the time has come for more homeowners to enjoy their benefits.



Multiple barrels provide for greater water storage.



BENEFITS OF A RAIN BARREL

Rainwater harvesting is always beneficial, whether the water is used to water one houseplant or an entire garden. Also, the act of collecting rainwater can be an inspiration to find other ways to conserve water around the home.

When designing a cistern or rain barrel, you want it to be as large as your budget and location will allow. Many homeowners are making rain barrels out of 50- to 55-gallon food-grade drums that were used to carry food products, such as juices, olives, pickles, etc. Containers or drums under 300 gallons are affordable, readily available at most drum or barrel suppliers and are small enough to fit on most residential or commercial lots.

Although a small rain barrel may not provide all the water needed to sustain your plant material, it can certainly supplement your current watering schedule. Planter beds, vegetable or flower gardens and potted plants can easily be irrigated with the water from a rain barrel.



Rain barrels are one component of this water-efficient landscape.

The water savings from using stored rainwater rather than municipal or well water can be substantial over a period of time. A rain barrel can also help reduce the amount of water that may settle around the foundation of your home.



COMPONENTS OF A RAINWATER COLLECTION SYSTEM

Whether you install a large concrete cistern or a small plastic rain barrel, the following basic components are involved in every rainwater collection system:

1. **Catchment Area**
2. **Conveyance System**
3. **Storage Tank**
4. **Filtration**
5. **Water Distribution**

1. Catchment Area

A catchment area can be any area that collects or sheds rainwater. A roof is the most common and adaptable area to use for rainwater collection. Due to its already existing slope and height, a roof makes a perfect catchment area by using gravity to direct the water. Most homes and commercial buildings are equipped with a guttering system that can easily be adapted to funnel water to a storage tank. If guttering does not exist, it can be added to the side of the house or building that will be used for rainwater collection. This can be done at a relatively low cost.



A roof makes a perfect catchment area.

Other forms of catchment areas may include sidewalks, driveways and natural or man-made swales or berms in the landscape that can direct the flow of rainwater to a storage tank.



2. Conveyance System

Once the catchment area has been identified, the next step is to transport that water into the storage tank. With a roof catchment area, a guttering system is the easiest. All this may require is modifying the existing guttering system to divert the downspouts into the storage tank. Remember to keep any gutter or downspout modifications sloping downward toward the storage tank. Large diameter PVC pipe, rubber hose or tubing can also be used.

3. Storage Tank

A storage tank can be made of various materials and can be located above or

below ground. Some materials used for storage tank construction are plastic, fiberglass, concrete and metal. So water will not leak out, the material should be smooth and nonporous. Storage tanks can be elaborate concrete structures or simple plastic containers like garbage cans or barrels.

Most storage tanks are placed above ground to take advantage of the force of gravity. A below-ground tank requires a pump to get the water out. This increases the cost and maintenance of the system.



Gutters and downspouts funnel rainwater to the rain barrels.



Some common containers used for rain barrels are (left to right): 50-gallon sealed barrel, 275-gallon juice container, 50-gallon open-top barrel.



4. Filtration

Generally, rainwater does not need to be filtered for outdoor use. As water sheds off a roof or other catchment area, it may pick up leaf debris, bird droppings or chemical agents from the roof material, but these are not harmful to plants. A simple screen mesh, such as window screen or wire mesh, to keep out leaf debris and insects is all the filtration that is needed. This can be placed where the water enters the conveyance system (guttering) or just before the storage tank (downspouts or tank opening).

Although a screen will keep out most debris, a small amount of debris will get into the storage tank. It is a good idea to clean the tank periodically to avoid a large buildup of debris on the bottom. If using a submersible pump inside the storage tank, a filter will be required to keep the pump from clogging. The pump should come with its own filter or screen, or with instructions on how to make one. The filter may require routine maintenance, so easy access to the pump will be a necessity.



A window screen placed over the barrel opening (left) or a gutter strainer placed in the downspout opening (right) will keep leaves and other debris out of the rain barrel.



5. Water Distribution

Getting the water to your plants is the final step of the rainwater collection system. Due to low water pressure from most rain barrel applications, water distribution will be limited to a watering can, soaker hose or garden hose.

Water pressure at the tank outlet directly depends on the height or level of the water that is stored in the tank, so water pressure will vary. The higher the water level in the tank, the greater the water pressure will be. Elevating the tank on a platform, such as cinder blocks, can generate a small increase in pressure for any attachments hooked up to the outlet. For small storage tanks, water pressure is minimal and not enough to operate most low-volume irrigation devices. To generate any workable pressure without the use of a pump, a tall storage tank or an extremely elevated tank is needed.

A small submersible pump could be placed inside this 275-gallon juice container. Using a timer on the pump's power cord could allow you to establish an automatic customized watering schedule.

If a large area is to be watered using a large storage tank, adding a small pump may be an option to consider. Installing a pump on a small rain barrel would be impractical, as the flow rate would drain the barrel in minutes. Pumps work well on a large tank, such as the 275-gallon juice container pictured below. Having water pressure of 1025 pounds per square inch and a larger volume of water can sustain most low-volume irrigation devices such as inline drip tubing, mist sprays or drip emitters.

Note: It is important to keep any plumbing attachments to your rain barrel or cistern independent from your existing house piping or sprinkler system piping. This will prevent a cross-connection to your potable water.





HOW MUCH RAINWATER CAN I COLLECT?

For a general calculation, you can collect about a half gallon of water per square foot of roof area during a 1-inch rainfall. As an example, a house with a 2,000-square-foot roof can collect about 1,000 gallons of water (*the actual amount of rain that falls on your roof is about 20 percent more, but some is lost to evaporation, runoff and splashing*). This is a substantial amount of water, and a large cistern would be needed to collect all of it. To calculate your volume of water, use only that portion of the roof or catchment area that is actually feeding your storage tank. To get a more accurate figure on the gallons collected, you would have to take the slope of the roof into account. A roof with a steep slope would collect less rainwater than a flatter roof, even if they both have the same square foot area.

As you can see, it doesn't take much rain to fill a small rain barrel. A typical ½-inch rainfall event will fill a 50- to 55-gallon barrel. It is a good idea to add an overflow outlet/pipe near the top of the barrel. This will divert any excess water to another part of the yard, which can reduce the amount of water that settles around the foundation of your house.

To store even more rainwater, multiple rain barrels can be linked together with hard PVC or flexible hose. Although you can use small diameter pipe or even a garden hose, large diameter pipe or tubing (1.5"–2") will be able to carry more rainwater during a heavy thunderstorm and will prevent water from possibly backing up the downspout. Steps to connect an overflow outlet and link barrels together are covered later in this booklet.



Connecting rain barrels together will allow for more water collection.



RAIN BARREL CONSTRUCTION

First decide where to place the storage tank. This, along with your budget, will determine the size of the storage tank. Remember, try to obtain the largest tank the location will allow. This will enable you to do more things with the water by having more water volume and possibly more water pressure.

When choosing a location, you should keep in mind how the water is going to get from your catchment area to the storage tank. Most rain barrels will be placed adjacent to the home to tie into existing downspouts. Placing your storage tank closer to the area you want to water, such as your garden or planter bed, may provide easier access to the water, but may be impractical if long lengths of piping are needed to get the water to the storage tank.

If you do not have gutters and do not want to add them to the house, the rain barrel can be placed directly under an area of the roof that sheds a lot of water (such as a valley in the roof). In this case, a screen can be placed over the barrel to keep out debris, small animals and insects. This type of barrel can also be placed in any part of the yard to collect falling rain. It will take a lot longer to fill, but may be more practical if the area you want to water is a good distance from your house.

Elevating the rain barrel on a platform, such as cinder blocks, will give additional water pressure and will provide clearance for connecting a hose or filling a watering can.



A barrel covered with window screen can be placed under a roof valley to collect rainwater runoff.



A good spot for a rain barrel.



ASSEMBLY AND INSTALLATION STEPS

The following are basic steps on how to install a rain barrel or similar storage tank on your property. All rain barrels or cisterns, regardless of size, will have an inlet for the water (usually a gutter downspout or similar piping) and an outlet (hose spigot, valve, bulkhead fitting, etc.).

Step 1. Clean the rain barrel

Be sure to select only food-quality containers. Do not use containers that held harsh chemicals. Before installing your rain barrel, take a few minutes to rinse the inside of the barrel. Many barrels have food or juice remnants that should be removed before using it to store water. Use a mixture of $\frac{1}{8}$ cup of bleach and 5 gallons of water as a cleaning solution.



Use $\frac{1}{8}$ cup of bleach mixed with 5 gallons of water to clean the rain barrel.



Thoroughly rinse out the barrel before using.



Step 2. Install the outlet (hose spigot)

In this application, we are going to install a $\frac{3}{4}$ " hose spigot. For this you will need to drill a $\frac{1}{8}$ " hole for the spigot threading. Drill the hole a few inches (4"-6") from the bottom of the

barrel. This will provide a few inches of clearance for attaching a hose or filling a watering can. This also allows room for debris that enters the barrel, such as leaves, to settle below the level of the outlet, which prevents clogging.



First, drill hole near bottom of barrel.



When the spigot is in about halfway, apply a liberal amount of PVC cement to the exposed threads. Continue to screw in the spigot until it is snug and pointing toward the bottom of the barrel.



Next, screw in the hose spigot about halfway. Make sure the threading is going in straight, as this will help prevent leaking.



The rain barrel outlet is now complete.



Cinderblock platform

Step 3. Build a platform for the barrel

Concrete cinder blocks provide a strong, stable platform for your rain barrel. If you use more than one

layer of blocks, stack them in a crisscross pattern so they won't tip over. Make sure the blocks are level and even so that the barrel will not lean.

Step 4. Connect downspout to barrel

Once you have your barrel positioned and at its set height, you can measure where you need to cut or disconnect

your downspout. In most cases, you can disassemble the downspout at the gutter by taking out screws or drilling out rivets. This will avoid cutting the gutter or downspout. If you do have to make a cut, use a fine-toothed hacksaw blade (24 or 32 teeth/inch) or a pair of tin snips.

To make the transition from the gutter/downspout to your opening in the rain barrel, you can fabricate a crosspiece out of downspout material or purchase a flexible downspout extender. The flexible downspout extender eliminates the need for exact measurement because it bends and stretches to the length you need. Make sure the downspout extender fits the size of your downspout.



Mark downspout for cutting



Downspout connections



Flexible downspout extender



Step 5. Cut barrel opening

Once you have completed your downspout connection, place it in the barrel. If your barrel comes with a lid, or if it has a sealed top, you will need to cut a hole in it.

Start by tracing the outline of the downspout or pipe that will be entering the barrel.

Next, cut out the hole you just traced. You can use a handsaw, but a jigsaw works best. Drill holes in each corner to provide access for the saw blade. Cut exactly along your trace line, as this will provide a nice tight fit for the downspout.

Put the rain barrel in position and place the downspout into the hole. Your rain barrel is now complete.





OVERFLOWS AND MULTIPLE BARRELS

Now that you have your first rain barrel installed, you may want to connect an overflow pipe or link multiple barrels together. An overflow pipe will carry excess water that would normally overflow the barrel to another part of the yard or into another rain barrel. Diverting excess water to another part of your yard can be beneficial by reducing the amount of water around the foundation of your house during a rainstorm.

Overflow Outlet

You can use PVC pipe, rubber tubing or even a garden hose as an overflow. In this example, we will use 2" PVC pipe as our overflow. Although smaller piping or hose will work, large diameter piping will handle even the biggest thunderstorms.



We first start by drilling a 2 1/4" hole for the 2" male adapter. Since this is an overflow, it will have to be near the top of the barrel.



The 2" male adapter is screwed in to make the transition to our overflow pipe.



A 90-degree elbow and a length of 2" PVC pipe are added to carry the water away from the house to a nearby planter bed.

PVC cement is generally not needed because the pieces should fit tightly together and a little leakage is okay. It also makes it easier to disassemble the pieces for cleaning or maintenance, if necessary.



Linking Multiple Barrels Together

There are various methods you can use to connect rain barrels. The process is similar to making the overflow outlet, but your pipe or hose will lead to another barrel instead of another part of the yard. The connections between barrels can be made at the top or at the bottom. Follow the steps for adding the overflow outlet and make the connections with the piping or tubing of your choice. You can link as many barrels together as space allows. It is still a good idea to put in an overflow pipe on the last barrel.

If you make the connections at the top, you will need to have an outlet on each barrel. Once the water level drops below the connection pipe, there will be no other way for the water to drain out of the barrel without an additional outlet. If the connection is made at the bottom, only one barrel will need an outlet because the water level in the connected barrels will drop equally as water is let out. For bottom connections, an outlet can also be placed in the pipe or tubing connecting the barrels, instead of the barrels themselves.



Types of connections: flexible hose clamped on PVC fittings (top left), garden hose (top right), 2" PVC pipe connected at bottom of barrels (bottom left), 2" PVC pipe connected at top of barrels (bottom right).



USES FOR COLLECTED WATER

If you currently have a standard irrigation system, you may be able to turn off sprinkler zones that are in planter beds or gardens and use stored rainwater instead.

The low water pressure generated from a small rain barrel is not adequate to operate any type of in-ground sprinkler or low-volume devices, such as mist sprays or inline drip tubing. However, a

soaker hose or a length of PVC pipe or garden hose with holes punched in it may work with these low pressures.

If using a soaker hose, take out the pressure-reducing washer to allow more water to flow through the hose (*bottom right*). Filling a watering can to water plants around the yard is always an option. You can also use the water to keep your compost bin moist or to rinse off gardening tools.



Hand water plants.



Use to keep compost bin moist.



Attach a soaker hose to water nearby plants.



Remove the pressure-reducing washer from the soaker hose.



EXAMPLES OF CISTERNS AND RAIN BARRELS

In 1996, a 15,000-gallon cistern was constructed at Hillsborough County's main courthouse. This project was approved by the Board of County Commissioners, with cooperative funding provided by the Southwest Florida Water Management District. This cistern demonstration project is named

Hydria, the Greek word for water jar. Rainwater is collected from the courthouse roof and is stored in an underground tank. Water-using items, such as garden hoses, spigots and watering cans are in the base of the cistern. This cistern was designed to supply water to the surrounding landscape.

The Florida House Learning Center in Sarasota, Florida, has two cisterns that each hold 2,500 gallons of rainwater.



Hydria cistern

One cistern is used for irrigation, the other for irrigation and flushing toilets. The cisterns are one component of the Florida House's public education efforts that teach about water and energy conservation, recycling principles and products, and healthy house concepts, including least toxic building materials. Contact information is at the back of this booklet.



These cisterns at the Florida House Learning Center each hold 2,500 gallons of rainwater.



Many county Extension offices have rain barrel demonstration exhibits where you can see examples of rain barrels that any homeowner can install. The Extension offices also provide an abundance of information on plants, gardening, composting and water conservation. Most county Extension offices offer workshops on all of these subjects.



Hillsborough County Extension Service has a demonstration rain barrel.



Rain barrels may be painted to increase their aesthetic value.





PAINTING YOUR RAIN BARREL

When it comes to being creative, you're only limited by your imagination! Painting your rain barrel is not only fun, but it will also help to protect the surface of the barrel from breaking down due to the harsh effects of the sun. Painting a rain barrel is a great activity for children and can introduce them to the importance of conserving water.

Outdoor acrylics and spray paint work well, but the barrel must first be primed so these materials adhere properly to the surface. A product on the market is a spray paint designed specifically for outdoor plastic furniture, but it will work on almost any plastic surface. The benefit to this product is that the barrel does not have to be primed before applying the spray paint. If using spray paint but need to paint small details, spray some paint into a small cup, making a liquid puddle. This paint can be brushed on.



This barrel was painted to match the house color.

Regardless of what type of paint you choose, it is a good idea to apply one or two coats of polyurethane to your finished barrel to protect it.

To prime your barrel:

1. Thoroughly clean the exterior surface of the barrel by wiping away excess dirt and grime with a clean rag soaked in a 1:1 mixture of vinegar and water.
2. Using a fine- to medium-grade sandpaper, rough up the surface of the barrel. This helps the paint adhere to the plastic barrel.
3. With a dry cloth, wipe the barrel again to get rid of any fine plastic shavings.
4. Apply one coat of outdoor primer. Primer is typically white, but it can be mixed with another paint color or tinted to match the final design color of the barrel. Allow the primer to dry according to the directions on the container.

Now the barrel can be painted any way you like — by stencil, a pattern, freehand, etc. Allow the paint to dry completely before applying one to two coats of polyurethane. Allow the polyurethane to dry between coats.



FREQUENTLY ASKED QUESTIONS

Do I need a permit?

Check with your county to see if a permit is required to install a small rain barrel on your property for nonpotable uses, such as landscape watering. If you live in an area or subdivision with deed restrictions, you should review them before installing a rain barrel in your yard. Some deed restrictions do prohibit them. You can also check your local plumbing or health codes for guidance.

When constructing a large cistern, either above or below ground, check with your local plumbing, building and health departments to see if a permit or backflow protection device is required or if there are recommended guidelines.

Important Note: Rain barrels or cisterns should not in any way be connected to your in-house plumbing. This will prevent a cross-connection to your potable water.

If you plan on connecting a pump or attaching plumbing or irrigation lines to your rain barrel or cistern, contact your local plumbing or building department. A backflow protection device may be required on the potable water service line in these situations. Stored rainwater is **not** potable water and should not be used for drinking, bathing, pets or recreation.

What about water quality?

The quality of rainwater shedding off a roof or gutter system is more than adequate for plants. In fact, it can be beneficial due to the lack of chlorine and a lower pH level than utility-provided water. As rainwater sheds off a roof or other catchment area, it can carry with it some levels of algae, roofing chemicals or bird droppings. These are not a concern for nonpotable uses or occasional contact by the homeowner.



Is maintenance required with my rain barrel?

If your rain barrel is properly installed, it should require very little maintenance. Periodic inspection of the tank for cracks or buildup of debris on the bottom may be all that is needed. Some barrels, especially light-colored or clear ones that are in direct sunlight, may become brittle over time. They can be painted to make them last longer.

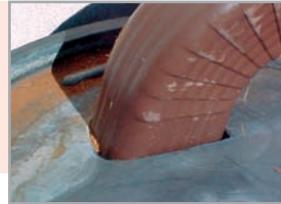
If you have placed a screen in the downspout or over the barrel opening, this will require periodic inspection and cleaning to ensure a good water flow.

What about mosquitoes?

Mosquitoes and other insects are always attracted to standing water. If you have a tight fit where the downspout enters the barrel, there should be little problems with mosquitoes getting into the barrel. Small gaps or holes can be filled with caulk or covered with window screen. Also, make sure the guttering is sloped properly and free of debris to prevent standing water where mosquitoes can breed. If keeping mosquitoes out of the tank is impossible, there are products

available at home centers or pond supply stores that will prevent mosquitoes from breeding. The most common product is found in tablet form and contains *Bacillus thuringiensis*, a biological larvicide. Just a small amount in the barrel will last 30 days or longer.

Having a tight fit where the water enters the barrel will keep out mosquitoes.



Will my rain barrel tip over?

Water weighs a little over 8 pounds per gallon, so a 50-gallon rain barrel will weigh over 400 pounds when full. If you have small children or pets and are concerned that the barrel might tip over, you may want to strap or attach the barrel to a nearby wall or other stable structure (fence, tree, etc.). Any type of frame can be built around the barrel, or straps can be wrapped around or screwed to the barrel and then anchored to a wall or other stable structure. If the barrel sits on a level and stable platform, tipping over is not a problem.



RESOURCES

Rain Barrel Supplies

To find barrels or drums to convert into rain barrels, look in the Yellow Pages under drums, barrels or containers. At your local drum supplier, there are several types of drums and barrels that can easily be converted into a rain barrel. Make sure you purchase plastic food-grade containers. Local plumbing suppliers or home centers will sell all the necessary fittings such as spigots, PVC adapters and piping to finish the assembly.

There are companies that sell pre-constructed rain barrels. These pre-assembled kits come with the inlet and outlet already installed. They will also carry the necessary tubing for connecting barrels together. If you cannot find one locally, check the Internet for a supplier. The Internet is also a good resource to find an abundance of information about rainwater harvesting, rain barrels, cisterns and suppliers.



This barrel supplier has hundreds of barrels in varying sizes available to the public.



CONTACT INFORMATION

Your county Extension office can provide more information on rain barrels and water conservation. For contact information, look under your county's telephone book listing or visit solutionsforyourlife.ufl.edu/map/.

For more information on water conservation, contact any of the following agencies:

Southwest Florida

Water Management District

2379 Broad Street

Brooksville, FL 34604

1-800-423-1476 (FL only) or

(352) 796-7211, ext. 4757

WaterMatters.org

Southwest Florida
Water Management District



WATERMATTERS.ORG • 1-800-423-1476

Florida House Learning Center

4600 Beneva Road South

Sarasota, FL 34233

(941) 316-1200

sarasota.extension.ufl.edu

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TR Drum in Plant City, Florida, for the use of their facilities

Rain barrel artwork done by Cindy Paulhus, Master Gardener



NOTES

Make your own notations as you build your water storage system:



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The Southwest Florida Water Management District (District) does not discriminate on the basis of disability. This nondiscrimination policy involves every aspect of the District's functions, including access to and participation in the District's programs and activities. Anyone requiring reasonable accommodation as provided for in the Americans with Disabilities Act should contact the District's Human Resources Director, 2379 Broad St., Brooksville, FL 34604-6899; telephone (352) 796-7211 or 1-800-423-1476 (FL only), ext. 4702; TDD 1-800-231-6103 (FL only); or email ADACoordinator@WaterMatters.org.