



Rainwater Harvesting

"When the well's dry, we know the WORTH of WATER."

Benjamin Franklin



CONSERVATION
in your
BACKYARD
WE CAN ALL HAVE A HAND IN IT



Photo courtesy of Innovative Water Solutions, Austin

Increasing population and droughts in Texas, coupled with decreasing water supplies, have made water conservation measures even more critical. Rainwater harvesting has become a popular solution in Texas.

Rainwater catchment is an alternative to using ground or surface water and it's an innovative approach anyone can use for efficient water management that provides many financial and environmental benefits.

What is Rainwater Harvesting (RWH)?

Rainwater harvesting (RWH) is the collection and storage of rain, instead of allowing it to run off. Rainwater is collected from a roof-like surface and redirected to a tank, cistern, deep pit (well, shaft, or borehole), aquifer or a reservoir with percolation. Its uses include watering gardens and lawns, indoor plants, washing vehicles and if treated, it can be used as potable water.

The State of Texas offers financial incentives for rainwater harvesting systems. Senate Bill 2 of the 77th Legislature exempts rainwater harvesting equipment from sales tax, and allows local governments to exempt rainwater harvesting systems from ad valorem (property) taxes. For more information, visit the Texas Water Development Board website at www.twdb.texas.gov.

Benefits of Rainwater Harvesting



Provides water in dry times

Rainwater harvesting will increase the retention of water that is received during the rainy periods to be used during the non-rainy periods. Even in dry times, moisture can be collected from dew on the rooftops.



Environmental stewardship

The biggest benefit is reducing the burden on the water supply. It also prevents a valuable resource from washing what is in the yard and street down the drain. Plus, its eco friendly and socially acceptable.



Saving money in the long run

Harvesting and using rainwater for yard and garden can save money and water. It may take some time to recoup the cost of installing the rainwater harvesting system, but the water savings alone makes the system a good alternative.



Estimating rainwater capture

First you need to calculate the amount of space from which you will be collecting rainwater, sometimes referred to as the “footprint” of your roof, like a “bird’s eye” straight overhead view.

You can use the dimensions of your house, adding a bit for overhang. You will also need to estimate the runoff coefficient.

The runoff coefficient accounts for the water loss resulting from evaporation and minor infiltration; most impervious surfaces, such as roofs or nonporous pavement can lose 5% to 20% of the rain falling on them. For general purposes, it is estimated that the runoff coefficient for asphalt roofs is .90, meaning it will lose about 10%.

When you calculate the amount of rainfall from one rain event, put the amount in feet, not inches. For example a half an inch of rain is .04 ft.

The equation to calculate the approximate amount of rainfall from your roof is:

$$\text{_____ ft}^2 \times \text{_____ ft.} \times 7.48 \text{ gal/ft}^3 \times .9 = \text{_____ gallons}$$

(catchment area) × (rainfall) × 7.48 gal/ft³ × (runoff coefficient) = gallons

For example, you are putting up a rainwater collection and harvesting system on a detached double garage (22 x 24) - 528 ft². You need to add approximately 92 ft² for overhang, so the footprint is approximately 620 ft².

If it rains ½ inch, you will collect approximately 167 gallons of water from the roof of your garage:

$$620 \text{ ft}^2 \times .04 \text{ ft} \times 7.48 \text{ gal/ft}^3 \times .9 = 167 \text{ gallons}$$



Sources:

- Texas AgriLife Extension Service
Rainwater Harvesting
- The Texas Manual on Rainwater
- Harvesting Rainwater Volumes from
Roof Runoff



Rainwater Harvest Systems

Rainwater harvesting systems can be as simple as a retrofitted food storage barrel to as elaborate as a certified installed system with purification and underground storage.

It is not difficult or expensive to install on a home or other buildings. There are different sizes, shapes, materials and colors to fit your watering needs and personal style.

All systems have basic components, which include a catchment surface, conveyance system, storage, distribution, and treatment. Parts can be purchased from home improvement stores, farm and ranch supply stores as well as online.



Rainwater is of superior quality: zero hardness, sodium free, and nearly neutral pH and rain is free!



Rainwater is the best natural source to nourish plants.



Elevating rain barrel allows gravity flow and also room to put a watering container under the spout.



Rain Gardens

Rain gardens are another way of capturing or slowing down rainwater that is environmentally and aesthetically friendly.



Photo courtesy of Texas AgriLife Extension and Dickson Bayou Watershed Partnership.

A rain garden is a bowl-shaped depression designed as a garden to capture, hold, and absorb rainwater and can prevent flooding and erosion. Rain gardens are often located at the end of a roof gutter or drain spout, as a buffer between the lawn and the street. Rain gardens slow the flow of rainwater from roofs, sidewalks, streets, parking lots, and other impervious surfaces, allowing the water to penetrate the soil.

The soil cleans the water of pollutants before it enters the storm drain and empties into our bayous and bays. This process helps keep more of the rainwater, and the storm water that finally enters the storm drain is cleaner.



Choose native plants based on need for light, moisture, and soil. Vary plant structure, height, and flower color for seasonal appeal and butterfly habitat. A typical rain garden is between four and eight inches deep. This depth, proportionate to surface area, helps assure water will infiltrate quickly and not pond. A rain garden is typically 5 to 10 percent the size of the impervious surface that generates runoff. A good soil mix for rain gardens is 60 percent sand, 15 percent topsoil, and 25 percent compost.

When designed properly, water in the rain garden should stand for no more than 24 to 48 hours, too short a period for mosquitoes to hatch.

Another benefit is rain gardens serve as habitats for wildlife such as birds and butterflies. They are useful for residential, commercial, and public areas. Above all, a rain garden is a landscape amenity, blending beauty and function—an attractive solution to water pollution.

Sources:

Rain Gardens by Texas AgriLife Extension
Texas Rain Garden Plant List
Rain Gardens



Farm and Ranch Use



Water and Cost Savings

The USDA-NRCS can help develop a conservation plan for gutters and tank rain catchment systems that capture the rain runoff from barn roof and other agricultural structures. Just like in the backyard, the stored water can be used for irrigating vegetables to conserve water and electricity use.

Soil, plant and crop protection

High tunnels can protect plants from high intensity rains that can damage plants and the crop and wash away valuable topsoil. Gutters on high tunnels can capture rainwater for storage in rain catchment systems where it can be used for irrigating when needed.



Rain gardens are like wetlands

Rain gardens are like miniature natural wetlands that slow down, capture and absorb water into the ground, reducing runoff that can overload streams and cause flooding. Runoff also can carry sediment, chemicals and other substances that can impair waterways — but rain gardens and wetlands trap them, protecting water quality.



Incentives

The Texas Legislature allows the exemption of part or all of the assessed value of the property on which approved water conservation initiatives, such as rainwater harvesting, occur. For more information on these incentives visit the Texas Water Development Board at <https://www.twdb.texas.gov/innovativewater/rainwater/index.asp>.



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