



## Landscape Methods

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**E**fficient water use is increasing in importance. With the state's growing population and limited supply of groundwater and surface water, Texans must use water wisely. Rainwater harvesting can help them as an innovative approach that anyone can use to capture rainfall.

The easiest way to use stored rainwater is for landscaping. In many Texas communities, 40-60 percent of the total water use during peak summer months is for landscape irrigation. If that demand for a limited natural resource can be reduced, everyone benefits.

Rainwater harvesting utilizes water management strategies to capture a greater quantity of the rain falling on a site. Typically, people envision a rainwater harvesting system as a container holding water. While container systems are popular methods for harvesting water, some landscaping practices also can increase the volume of rain held on the site.

### Benefits of Rainwater Harvesting

The following are ways that rainwater harvesting can help:

- **Saves you money.** Rainwater can reduce the quantity of water you purchase to meet your

water needs. The money saved from not purchasing water can offset the cost of implementing a rainwater harvesting system.

- **Reduces potable water demand.** Municipal systems provide potable water for residential use. Harvesting rainwater can reduce the quantity of water used from the municipal supplier. As a result, this reduces the demand for potable water and the need to develop additional water infrastructure.

- **Uses a valuable resource efficiently.** Rainwater is high quality water that can be captured for direct use in the landscape. Stormwater leaving your site enters the surface water system that goes downstream in a river or lake, where it can enter a water supply system. Holding the water on the site uses the water directly or can assist in recharging local groundwater supplies.

- **Reduces flooding, erosion and surface water contamination.** As land is developed for new houses and businesses, more land is covered with impervious surfaces like parking lots, buildings and roads that cannot absorb water. Instead, rainwater runs off into storm drains, streams and rivers. Impervious surfaces increase the rate and volume of stormwater runoff which increases urban flooding, and erodes

the banks of rivers and streams. Urban runoff also carries many pollutants, including sediments, fertilizers, pesticides and fecal coliform bacteria into streams and rivers.

### Harvesting Methods

Rainwater capture and storage systems, raingardens, and soil storage and infiltration systems are three approaches to rainwater harvesting that can prevent flooding and erosion. They also turn stormwater problems into water supply assets by slowing runoff and allowing it to soak into the ground.

### Rainwater Capture and Storage Tank Systems

Rainwater capture and storage tank systems collect rainfall from roofs and other impervious surfaces, storing it for later use. Storage tanks range in capacity from 5 gallons to 50,000 gallons, depending on water needs. Their main function is to store water for use during periods of limited rainfall. This stored water helps balance the supply-demand equation.

A typical rainwater capture and storage system consists of a catchment surface, gutters, downspouts and piping, filtration, a storage tank, and a distribution method. The catchment surface sheds rainwater, while the gutters, downspouts and piping divert the rainwater to the storage tank. Many home systems use existing gutters



A 2,500 gallon collection tank.

and downspouts, requiring minimal tools and equipment for installation.

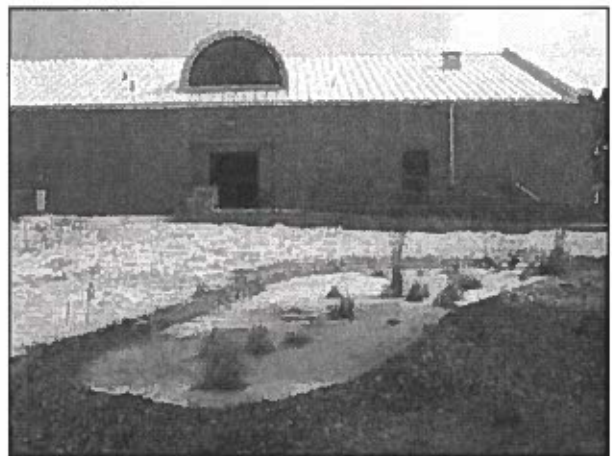
Systems intended solely for surface landscape use will typically only require a roof washer and filter basket to keep leaves and debris clear of the tank. They also need to have screens over any other opening to prevent mosquitoes from entering the system. Garden hoses, pipes or drip irrigation systems are commonly used to move the water from the storage tanks to where it is needed.

### Raingardens

A raingarden is an artificial depression in the landscape that collects and stores stormwater runoff until it can infiltrate the soil. The soil stores the water for use by vegetation. The water may also move through the soil, recharging groundwater or surface water systems.

Raingardens are not ponds. When correctly designed, water should not stand for more than a few hours after most storms. They are usually planted with native vegetation that is hardy and attractive.

Besides being functional, a raingarden can be a beautiful and creative addition to a new or existing landscape. Plants in a raingarden can give color to the landscape throughout the year. Raingardens can be designed for an individual yard or a neighborhood, providing a habitat for birds, butterflies and other insects, for example.



A recently constructed raingarden.

## Soil Storage and Infiltration Systems

A soil storage and infiltration system collects rainfall runoff from the roofs of buildings. It then directs runoff underground, where it infiltrates into the soil. This system, which also provides water for vegetation and recharge, consists of the following: gutters and downspouts to collect roof runoff, a catch basin to capture trash and fine particles, underground trenches that store the water while it soaks slowly into the soil, and an observation port to aid in maintenance.

When the trench is filled with water during a storm, excess water flows from the gutter and onto the ground surface. A soil storage and infiltration system decreases the volume of runoff, contains potential pollutants and increases the amount of water entering the ground to recharge our groundwater systems.

A soil storage and infiltration system can be installed fairly easily at numerous homes and businesses. Most buildings already have gutters and downspouts. At many sites the storage and



Installation of a soil storage and infiltration system.



Final landscaping over a soil storage and infiltration system.

infiltration trench can be located relatively close to buildings. This system is typically not used in areas with expansive soils due to soil saturation and soil shifting issues.

## Resources

Rainwater Harvesting (<http://rainwaterharvesting.tamu.edu/>)

Texas Cooperative Extension Bookstore (<http://tcebookstore.org>)

- Rainwater Harvesting (B-6153)
- Harvesting Rainwater for Wildlife (B-6182)
- Rainwater Harvesting: Raingardens (L-5482)
- Rainwater Harvesting: Soil Storage and Infiltrations System (B-6195)



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New



# Rainwater *Harvesting* in Texas

Billy Kniffen, Water Resource Specialist, The Texas A&M System

**R**ainwater harvesting was a common method of providing water for many of the first settlers in Texas; however, much has changed in the past 100 years. As urban areas grew, wells and lakes were dug and municipal water supplies were established. But with the growth of the population and the demand for fresh water, spring flow was reduced or dried up, and rivers became polluted and their flow diminished.

Population growth and urban sprawl has led to more buildings, pavements and other impervious cover. Rangeland is dominated more by woody plants and shorter grasses because of livestock grazing and the absence of fire. These factors increase stormwater runoff, decrease water absorption into the soil, and affect water quality in Texas.

Captured rainwater can save large amounts of water both outside and inside the home. As Texas' population grows, conserving water becomes more vital. Capturing rainwater is one tool in this process because of:

- The need to have enough high-quality water available now and in the future
- Environmental and economic costs of providing water through municipal systems or wells
- Health concerns linked to the source and treatment of water
- The relatively low cost of rainwater harvesting
- Rainwater's high quality

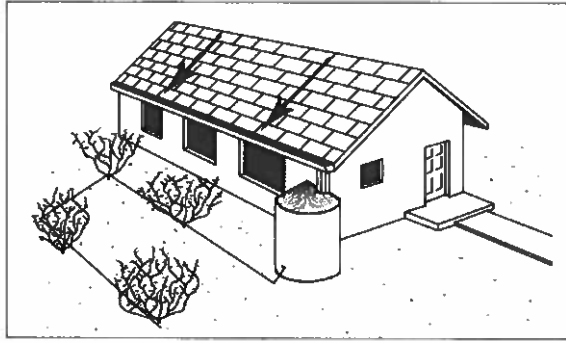
## Collecting Water for Potable and Non-potable Uses

Captured rainwater can be used on landscapes and gardens, and for pets, wildlife and livestock. Rainwater can be filtered, disinfected and used in homes and businesses in place of other sources of water. The process is simple and often less expensive than drilling a well.

## How Much Rainwater is Available for Collection?

Use this formula to estimate the amount of rainwater that can be harvested from a catchment surface—defined as any surface used to collect rainwater, such as a roof: About 0.6 gallons of water falls on each square foot of roof area in a 1-inch rain. That means a 1,000-square-foot roof could yield 600 gallons of water for each inch of rainfall.





**Complex water harvesting system with roof catchment, gutter, downspout, storage and drip distribution system.**

## Water Uses

**Landscape:** Drip irrigation is the most practical way to use rainwater on landscapes because it can be applied by gravity alone or used in combination with mechanical equipment.

**Wildlife:** Water guzzlers are rainwater collection systems built in remote areas to provide water for wildlife. A roof, storage tank and watering device are the only items needed. Rainfall also can be collected off existing barns, deer blinds or other structures.

**Water for livestock and pets:** One horse or cow can consume 7 to 18 gallons of water per day; collecting enough rainwater from roof surfaces for large herds of livestock would be difficult. But rainwater can be used for livestock in addition to a low-water production well and large existing storage tank. Smaller herds, individual animals or pets could benefit from the collected rainwater.

**Water for the home:** Rainwater supplies many homes worldwide and is becoming more common for homes in Texas. The storage capacity of a rainwater harvesting system must be large enough to provide several months' supply of water.

Select rainwater harvesting components to reduce the risk of contaminants in the water. The system must include pre-filters, pump, pressure tank, filters and a sanitizing device such as an ultraviolet light to provide high quality water for drinking and cooking. Nonpotable uses for the home include commodes and clothes washers.

In Texas, rainwater harvesting has been encouraged through the elimination of the sales tax on collection system supplies. Several cities have waived permit fees, offered rebates on tanks, waived property taxes and provided rain barrels, irrigation audits, low-flow toilets and/or demonstration sites to help encourage and educate the public. Check with local officials and visit these Web sites for more information:

*Texas AgriLife Extension Service Rainwater Harvesting:*  
<http://rainwaterharvesting.tamu.edu/>

*The Texas Water Development Board:*  
<http://www.twdb.state.tx.us>

*American Rainwater Catchment Systems Association:*  
<http://www.arcsa.org/>

*Texas Rainwater Catchment Association:*  
<http://www.texrca.org/index.html>

The Texas AgriLife Extension Service bookstore at <http://agrilifebookstore.org> has these publications available:

*Rainwater Harvesting*, B-6153

*Harvesting Rainwater for Wildlife*, B-6182

*Harvesting Rainwater for Livestock*, E-450

## Other resources:

*Texas Manual on Rainwater Harvesting:*  
<http://www.twdb.state.tx.us/>

*Harvesting, Storing, and Treating Rainwater for Domestic Indoor Use:* <http://www.tceq.state.tx.us>



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