

Rain Water Harvesting



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History of Rain Water Harvesting

- The need for water is a basic human essential for maintaining life, without it, no civilization could have prospered.
- The long history of rainwater collection, can be traced (in recorded history) as far back as ancient times some 3,000 years ago (850 BC) if not even farther.
- Evidence of rainwater harvesting can be seen in the ancient societies of the Philippines, Thailand and other parts of South-east Asia, Egypt, Rome and beyond.
- Romans also used their systems as air conditioners by creating a cooling effect from water evaporation.
- Cisterns were used to store water from catchment systems.
- In the 1970's storm water was stored in well storage tanks in the form of different sized ponds.
- Urbanization has declined the popularity of rain water harvesting with the demand for more centralized water supply systems.
- Watersheds and pipelines came into use and running water became one of the world's greatest inventions.

Rain Barrels

This method is the most common and one that many people are familiar with. This involves installing a barrel at a gutter downspout to collect rainwater. The actual barrel may be a recycled barrel or a new commercially available rain barrel.

Pros:

- Easily implemented by anyone at any residence
- Barrels are readily available in your community or at various stores & websites
- Barrels don't take up much space so they can fit into any situation

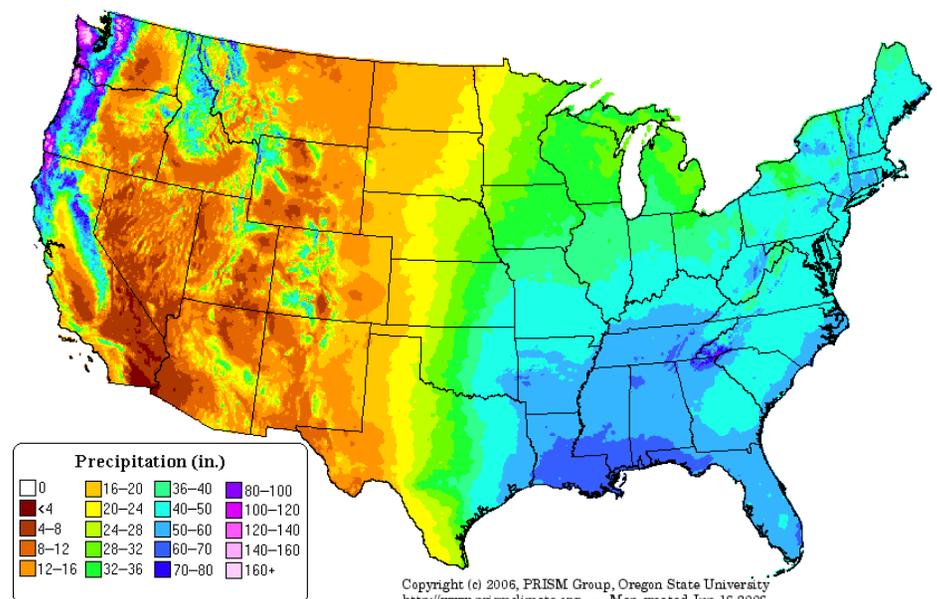
Cons:

- Capacity is generally only 50 to 100 gallons
- [Easily overflows](#) and wastes collection opportunities



Benefits of Rain Water Harvesting

- Rainwater is a relatively clean and absolutely free source of water
- You have total control over your water supply (ideal for cities with water restrictions)
- It is socially acceptable and environmentally responsible
- It promotes self-sufficiency and helps conserve water
- Rainwater is better for landscape plants and gardens because it is not chlorinated
- It reduces storm water runoff from homes and businesses
- It can solve the drainage problems on your property while providing you with free water
- It uses simple technologies that are inexpensive and easy to maintain
- It can be used as a main source of water or as a back up source to wells and municipal water
- The system can be easily retrofitted to an existing structure or built during new home construction
- System are very flexible and can be modular in nature, allowing expansion, reconfiguration, or relocation, if necessary
- It can provide an excellent back-up source of water for emergencies



Materials for Construction of Water Harvesting System

Tools:

- Drills
- Hole saw attachment or jigsaw
- Screw Drivers
- Hammer
- Level
- PVC saw and metal hacksaw
- Tin snips or sheet metal shears
- Crimping tool and cable cutting tools



Gutters:

- Gutter lengths
- Leaders and bends
- Pre-fabricated gutter hangers
- Plumbing strap (for securing pipes to wall)
- Flexible, accordion style expandable plastic pipe
- Tube of gutter sealant and caulk gun to apply it
- PVC cleaner and cement
- Teflon tape (for creating a water tight seal on threading bushings)

Barrel storage system

- Tanks and PVC parts or other materials to construct the manifold.
- Window screen or screened vents for mosquito proof vent
- Bulk head fittings (An elongated compression fitting, which will allow pipe, to run through a bulkhead)
- Platform material such as treated lumber, plastic lumber or concrete blocks
- Eyebolts (for securing tank)
- Spigot
- Metal flanges of corresponding size to spigot and

Sources:

<http://www.grownyc.org/files/osg/RWH.how.to.pdf>

<http://www.watercache.com/education/rainwater/>

<http://www.rain-barrel.net/rainwater-collection.html>

How much rain can I collect?

The amount of rainfall that you can collect is governed by the following formula:

$$1" \text{ of rain} \times 1 \text{ sq. ft.} = 0.623 \text{ gallons}$$

Or put in an easy form to remember :

$$1" \text{ of rain from } 1,000 \text{ sq. ft. will provide } 623 \text{ gallons}$$

“Dry System”

This method is a variation of a rain barrel set-up, but it involves a larger storage volume. Essentially, the collection pipe "drys" after each rain event since it empties directly into the top of the tank.

Pros:

- Can store a large amount of rainwater
- Great for climates where rainfall happens with infrequent, larger storm events
- Can be inexpensive to implement
- Less complicated system so maintenance is easier

Cons:

- The storage tank must be located next to your house



“Wet System”

This method involves locating the collection pipes underground in order to connect multiple downspouts from different gutters. The rainwater will fill the underground piping and the water will rise in the vertical pipes until it spills into the tank. The downspouts and underground collection piping must have water-tight connections. The elevation of the tank inlet must be below the lowest gutter on the house.

Pros:

- The ability to collect from your entire collection surface
- The ability to collect from multiple gutters and downspouts
- The tank can be located away from your house

Cons:

- More expensive to implement due to underground piping
- Sufficient difference between gutters and tank inlet must be available

