Rainwater Harvesting

As we all know, Texas ground water resources are being increasingly strained. Yet there is a plentiful supply of high quality water which falls from the sky. It does not contain calcium and other dissolved minerals, salts, metals and pollutants except in trace amounts, but in any case a tiny fraction of that found in groundwater.

A rainwater collection system can provide all the water any household reasonably needs. It is simply a matter of collecting, storing, filtering and sterilizing the rainwater. Glassware comes out of the dishwasher spot free, lesser amounts of detergents and soap are needed (helping your septic work better), and no deposits build up on faucets and shower heads. The water tastes sweet and is odor free.

Best of all, costs can be quantified and can be much less than drilling a well. All of the equipment is above ground and can be serviced much more conveniently and cheaply than a submerged pump at the bottom of a well.

Also, in drilling a well, there is no guaranty that water will be found, or if found, in sufficient quantity or acceptable quality.

* Better water
* Potentially lower cost to build the system
* Lower cost to maintain
* What's not to like**?**

One might ask, what about the periodic droughts? It is simply a matter of determining your probable daily water use, and building sufficient storage to carry you through periods of low rainfall. It takes much less storage capacity than you might imagine. In the unlikely event that you run low, water can be purchased at reasonable cost, trucked to your house and put in your storage tanks.

The Cibolo Nature Center in Boerne has regular classes on rainwater collection and there are specialists in this area who are experienced in building rainwater systems.

**Issues to consider with Rainwater Harvesting**

The major issue in setting the cost of the system is the amount of water used. Major uses include domestic use and landscape irrigation.

**Domestic use**

The average per capita household domestic use rate in the US is about 70 gallons/day. Typically, this amounts to 100-300 gallons/day per household. Major contributors would include potable use, clothes washing, toilets, baths/showers. Since storage capacity is the major cost of a harvesting system, most homes using rainwater learn to manage on lower usage.

# Water Use Statistics: Daily ***indoor per capita*** water use is 69.3 gallons. Here is how it breaks down:

|  |  |  |
| --- | --- | --- |
| **Use** | **Gallons per Capita** | **Percentage of Total Daily Use** |
| **Showers** | 11.6 | 16.8% |
| **Clothes Washers** | 15.0 | 21.7% |
| **Dishwashers** | 1.0 | 1.4% |
| **Toilets** | 18.5 | 26.7% |
| **Baths** | 1.2 | 1.7% |
| **Leaks** | 9.5 | 13.7% |
| **Faucets** | 10.9 | 15.7% |
| **Other Domestic Uses** | 1.6 | 2.2% |

[Source: Residential End Uses of Water](http://www.waterrf.org/ProjectsReports/Pages/default.aspx) (Denver, Colo.: Water Research Foundation,1999).

By installing more efficient water fixtures and regularly checking for leaks, households can reduce ***daily indoor per capita*** water use by about 35% to about 45.2 gallons per day Here's how it breaks down for households using conservation measures:

|  |  |  |
| --- | --- | --- |
| **Use** | **Gallons per Capita** | **Percentage of Total Daily Use** |
| **Showers** | 8.8 | 19.5% |
| **Clothes Washers** | 10.0 | 22.1% |
| **Toilets** | 8.2 | 18.0% |
| **Dishwashers** | 0.7 | 1.5% |
| **Baths** | 1.2 | 2.7% |
| **Leaks** | 4.0 | 8.8% |
| **Faucets** | 10.8 | 23.9% |
| **Other Domestic Uses** | 1.6 | 3.4% |

Source: [Handbook of Water Use and Conservation](http://apps.awwa.org/ebusmain/OnlineStore/ProductDetail/tabid/55/Default.aspx?ProductID=6471), Amy Vickers

**Irrigation**

Irrigation use can amount to 1 inch of water/ft2/week of landscaped area for a traditional sprinkler system on a turf yard and can amount to several times the amount of water required for domestic use. Outside water demand can be managed through the use of drought tolerant native plants, efficient drip systems and limited use of high demand landscaping.

Rainwater harvesting system capacity

Once the planned daily use is determined, the storage capacity is determined by looking at the time between rainfalls on a historical basis. This includes seasonality and historical drought periods in the calculation. There are many methodologies that can be used to calculate the required storage capacity and they can result in storage tank requirements from 60-200 days capacity, depending on the severity of drought period assumed and degree of conservatism applied.

**System Components**

There are several important parts of the rainwater harvesting system including:

1. Collection system
	1. -Roof
	2. -Gutters
	3. -Piping
2. Storage system
3. -Poly tanks
4. -Lined tanks
5. -Concrete tanks
6. Distribution system
7. Pump
8. Purification

A more detailed description of the various components and issues associated with them can be found here: <http://www.twdb.state.tx.us/publications/reports/RainwaterHarvestingManual_3rdedition.pdf>

**Costs**

Total costs can vary widely, depending on the size of the system. Since the storage tank is the largest park of the cost, typical costs are in the $1.00-$2.00/gallon of storage range for the entire system.

**Other issues**

Siting of the storage tank can be an issue for concerns around visibility and impact on neighbors’ views. The tank siting, appearance, and screening should be approved by the Architectural Control Committee prior to construction.

IMPORTANT NOTE: Rainwater is slightly acidic (our groundwater is alkaline). During construction, brass plumbing connectors need to be installed, not the usual copper as rainwater will attack copper over a long period. This needs to be specified when you put your plumbing contracts out for quotation.

**Contractors**

There are several rainwater harvesting contractors in the Boerne/San Antonio area. Rainwater harvesting systems are major expenditures and proper due diligence is important to get a good system at a reasonable cost. Compare several contractors’ designs and experience before committing.

**Neighborhood Experience**

Several residents in Diamond Ridge have supplemental rainwater collection systems, and two residents have only rainwater collection with no well. Robert Hurley, resident on Crown Jewel will provide rainwater information to any DR owner planning to build here. Just send an email to the board as provided elsewhere on this website with your name and phone number and he will call you to arrange a time to get together.