

INTRODUCTION

REASONS TO HARVEST RAINWATER Harvesting rainwater makes sense for a variety of economic and environmental reasons:

- Rainwater is an economical alternative to public water, especially for exterior water uses such as landscape irrigation that require minimal filtration. Although initial equipment installation can be significant, long-term costs are minimal.
- Rainwater can supplement limited ground water resources. With reduced extraction rates, low-yield ground water wells and springs can last indefinitely. Rainwater can also supplement surface water resources threatened by rapidly growing municipal water use. Rainwater harvesting could significantly reduce water extraction rates from rivers during critical summer months, ensuring adequate water remains to support native ecosystems.
- Rainwater is often the only viable water source in arid regions or on islands where other water sources may be high in salt, limited in availability, or very expensive.
- Rainwater is low in minerals, so it is ideal for laundry, dishwashing, hair washing, and car washing. Since it contains no chlorine, rainwater is also ideal for filling garden ponds and irrigating sensitive plants.
- Rainwater is not regulated by municipal water restrictions. During periods of drought, rainwater can protect investments in landscaping, garden ponds, and swimming pools.
- Rainwater can cause leaky basements, eroded foundations, overflowing sewers, soil erosion, and water pollution. Harvesting rainwater can eliminate these problems while eliminating the need for expensive stormwater controls.

Following is a very general introduction to rainwater harvesting. Please contact our technical staff for assistance in specific system design for your climate and needs.

RAINWATER AVAILABILITY: Although rainwater can be harvested from virtually any surface, bare rooftops generally yield the best quality rainwater with the least treatment. Not all of the rainwater that strikes a roof can be captured: water is lost from evaporation, blowing wind, overflowing gutters, and leaky collection pipes, first-flush devices, and self-cleaning filters. The net available rainwater from a bare roof can be roughly estimated as follows:

$$\text{available rainwater (gallons)} = 0.5 \times \text{rainfall (inches)} \times \text{area (square feet)}$$

Monthly and yearly rainfall data for 300 weather regions of the United States, Puerto Rico, and the US Virgin Islands can be found in the table AVERAGE RAINFALL at the end of this publication. As a general observation, in the continental US yearly rainfall averages 10 to 30 inches in the western states, 20 to 40 inches in the central states, and 30 to 50 inches in the eastern states, with widely varying amounts in some mountain and coastal areas such as the Pacific Northwest. Consequently, in terms of roof area, the available annual rainfall would be

available rainwater, eastern states = 15 - 25 gallons per square foot

available rainwater, central states = 10 - 20 gallons per square foot

available rainwater, western states = 5 - 15 gallons per square foot

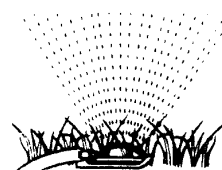
In the eastern states rainfall is relatively evenly distributed throughout the year; in the western states rainfall is concentrated in the winter months; and in the central states rainfall is concentrated in the summer months. This has important consequences for rainwater system sizing.

SIZING A RAINWATER HARVESTING SYSTEM: On average, Americans use 70 gallons per person per day to operate toilets, showers, clotheswashers, sinks, and other water-using fixtures and appliances. By replacing fixtures and appliances with modern water-efficient versions and repairing leaks, water usage can be reduced to less than 50 gallons per person per day. Comparing demand for water with the availability and pattern of rainwater yields the following very rough "rules of thumb" for rainwater systems used to provide a meaningful percentage of household water demand:

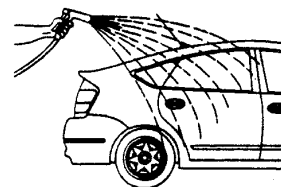
for each person, eastern states: 500 square feet of roof + 1000 gallons of storage

for each person, central states: 750 square feet of roof + 2000 gallons of storage

for person, western states: 1000 square feet of roof + 4000 gallons of storage



watering plants



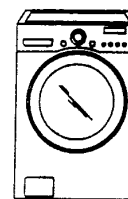
washing cars and boats



filling pools and ponds



flushing toilets



washing clothes



showering and bathing