

# Rainwater Harvesting for High Desert Horticulture

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## Summary by Kevin Davidson

The creation of a rainwater harvesting system consisting of two 550 gallon tanks, gutter and piping to irrigate a backyard garden to grow vegetables such as squash, zucchini and tomatoes for the cost of approximately \$1,000.

## Project Steps



As a companion project to the recently installed solar array, my fiancée Catherine, suggested we also work on creating a backyard garden to grow vegetables such as squash, zucchini and tomatoes. So, in the summer of 2009, at the beginning of the monsoon season, we began the garden layout. The first question was how do we plan to keep the plants watered? Why not install rain gutters on the shop building, connect them to holding tanks and then pipe it to the plants! After purchasing 60 linear feet of rain gutter, supports, end-caps, flexible down spouts, two 550 gallon polytanks from Ace Hardware, plus 80 linear feet of 1.5 PVC pipe,

couplings, 10 ball valves and other accouterments, the marginal cost of the first gallon of water is approximately one dollar. The benefit is that the water does not contain chlorine from municipal treatment, is not mineralized not being from an aquifer, and is pharmaceutical-free, the last courtesy of modernity.

The tanks are connected to the rain gutters with a standard flex-a-spout which can be purchased at Home Depot. Each tank has a 16" diameter lid with a 4" diameter vent. The vent lid was removed allowing the flex-a-spout to be inserted. The corrugation allows for a snug fit. On the east side of the shop, the tank rests on a 4" concrete slab. On the west side, 16 Windsor stones were placed in a 68" diameter circle and the interior packed with "native material" a.k.a. dirt, which is mostly sandy loam, and should provide ample and level support for the 2 tons of water when the tank is full. This extra four inches of elevation also allows a hose to be easily connected to the hose bib.





leakage problem, a series of 2 inch wide strips were cut from a roll of 24 gauge aluminum flashing, then drilled and fastened to the fascia, just below the drip edge and overlapping in the gutter trough.

Kingman averages some 10 inches of rain per year. Rainfall totals have varied from a high of 13.85" in 2004 to a low 4.93" in 2007. Rainfall is typically more plentiful in the winter months, except during drought, which the Southwest has been experiencing for some time, with only a few seasons of wet weather in the past decade. Even so, the 1,100 square foot roof area will fill each tank with a mere 1.7 inches of rainfall. After observing the first significant rain storm in January, I saw there was quite a bit of water leaking between the asphalt shingle drip edge and the top of the rain gutter. To solve this



Each tank was fitted with a 5/8" brass hose bib. A 1/2" poly tube was then connected to 1.5" PVC pipe T fitting which carries water to the garden trenches. The T fitting also allows the tank over-flow pipe to connect to the PVC lines. In case the tank is drained, the 1/2" poly tube may be connected to a conventional garden hose and pressured from the municipal water supply. Hopefully, the rainfall in winter and early spring will tide the garden over until the monsoon rains arrive in July.

The PVC pipe was laid in a trench with a T fitting and ball valve located at the intersection of each garden trench. This allows for the water flow to be regulated to the needs of each. The garden area is about two feet below the bottom of the tanks which allows gravity to deliver a modest head pressure of one gallon per minute, less than a low-flow shower head. Each ball valve is connected to 25' of 1/2" poly tube which can be perforated as required to the needs of each plant.





Five trenches, each 25 feet long, 15 inches deep and one shovel blade wide were excavated over a period of five months, typically after a good rain when the ground was moist for a few days. The trenches were “eyeballed” as can be seen by the bow in each but the plants shouldn’t mind.

In mid-March, when overnight freezing is rare, we planted a set of tomatoes in the first row. Watering is set on a timer for 20 minutes every other day which delivers about 10 gallons of water. As the days grow longer and warmer, the watering will be increased to everyday and for longer duration. The plants are set low in the trench to protect them from winds which can on occasion blow at 25 mph. That gives me an idea for another project . . . well let’s focus on the reality of harvesting a crop before trying to harvest the ephemeral winds.

