Stock Tank SIP Demonstration

Water Conservation Garden, El Cerrito
July 12, 2025
*SIP = Sub-Irrigated Planter

Tools

- Scissors
- PVC cutters or hacksaw
- Measuring tape
- Box cutter
- Cable ties

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Process to Convert Stock Tank to a Sub-Irrigation Planter

1. Ensure that tank is level.
2. Line tank with filter fabric, securing almost up to the inside lip with duct tape.
3. Prepare fill pipe
    a. Cut a 1-inch PVC pipe long enough to extend vertically from the bottom of the tank to about one foot above the soil level.
    b. Cut the bottom of the pipe at approx. a 45-degree angle to allow for easy water flow into the tank.
    c. Cut a hole into a crate in a corner on the top. Make the hole just big enough for a snug fit to the pipe so it will be well supported vertically.
4. Wrap the two crates together with filter fabric, securing them together with cable ties first. Then place them in the tank.
    a. Cut a hole in the filter fabric to free up the hole for the fill pipe.
    b. Seal off the pipe with duct tape to prevent soil from entering the reservoir in the crate.
5. 3-inch drainpipes
    a. Cut four 3-inch drainpipes to the exact length they need to be with a box cutter.
    b. Slide each one into a filter sock and secure the ends to keep soil out.
    c. Place two lengths of drainpipe on each long side of the crates
6. ¾-inch PVC overfill pipe on side of tank
    a. Apply Teflon tape to elbow threads.
    b. Screw elbow in.
    c. Glue PVC pipe into the elbow.
    d. Cut the pipe to 1 inch below the top of the crates.
7. Install PVC fill pipe
    a. Cut a hole in top of a crate so the PVC pipe can sit vertically and protrude from the topsoil level tall enough to be obvious.
8. Fill the tank with soil
    a. Ensure all areas inside the tank are secure and in place.
    b. Mix three parts veggie-mix soil blend with one part vermiculite or perlite
    c. Add the above mix to the tank evenly, tamping it down as you go to lightly compact it.
9. Fill the tank with water (approx.11 gallons)
    a. Use the PVC fill pipe to fill the reservoir
    b. Use wood dowel inside ¾" PVC drainpipe to gauge water level

Materials

Quantity	Item	Supplier	Cost
1	Stock Tank - 2' x 2' x 4' Behlen tank	Home Depot	$139.00
2	Hudson Exchange 19" x 13" x 11" mesh commercial grade milk crate	amazon.com	$69.95 (set of 3)
15 ft.	3" Poly Flex Drainpipe Perforated (single wall)	Irrigation supply store	$17.55
20 ft.	3" Christy DRAIN-EEZ Drain Sleeve Sock	Irrigation supply store	$12.35
36" x 75' roll	Vigoro Drainage Trench Filter Fabric	Home Depot	$27.97
1 ft.	¾" Schedule 80 PVC street elbow (male pipe-threaded x female slip)	Irrigation supply store	$3.98
3 ft.	¾" Schedule 40 PVC Pipe	Hardware store	$13.00
1 can	PVC Cement (solvent weld)	Hardware store	$11.96
1 roll	Teflon Plumber's Tape	Hardware store	$1.99
1 roll	Duct Tape	Hardware store	$26.87
0.4 cubic yards	Veggie mix soil blend (same as for raised beds)	Bulk soil supplier	$10.00
		TOTAL	**$334.62**

***Note:** Brand names, suppliers, and sizes of materials listed above are changeable. These are the materials and suppliers we used for this demonstration. No endorsements of brands or suppliers are implied.

****Note:** Materials other than the ones depicted could be used in many cases. Function is more important than form. It's important to ensure the planter is set up correctly. See resources below.

Resources

Albopepper YouTube channel is super helpful.

https://www.youtube.com/watch?v=CXyV-XsQWNE&list=PLkTlGtPvkBBgL-MagKivYpZAv8kXOstqO

Albopepper: How to Build Better: Self-Watering 5-Gallon Buckets (DIY Wicking Planters)

https://www.youtube.com/watch?v=FOXDCFSKdNo&list=PLkTlGtPvkBBgL-MagKivYpZAv8kXOstqO&index=2

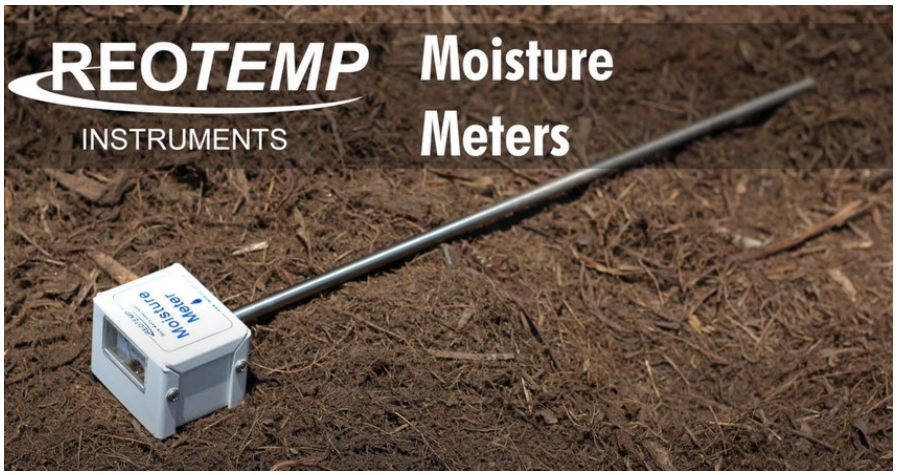
Photos of Selected Materials

2’ x 2’ x 4’ Behlen tank

Vigoro Drainage Trench Filter Fabric

Hudson Exchange 19” x 13” x 11” mesh commercial grade milk crate

3” Poly Flex Drainpipe Perforated (single wall)



Example of moisture meter for knowing when to add water to reservoir

Sub-Irrigated Planter Data

Total Volume of Stock Tank

Tank Volume = 2' x 2' x 4' = 16 cu. ft.

Tank Volume = 16 cu. ft. x 7.48 gallons per cu. ft.

Stock Tank Volume = 120 gallons

Crates Water Storage Volume

19" x 13" x 11"

1.58' x 1.08' x 0.92' = 1.57 cu. ft. per crate

1.57 cu. ft. x 7.48 gallons per cu. ft. = 11.7 gallons x two crates = **23.4 gallons total for crates**

3-inch Drainpipes Water Storage Volume

Volume = Area x Height

Volume = pi x radius squared x height

Volume = 3.14 x 0.016' x 3'

Volume = 0.15 cu. ft. x 7.48 gallons per cu. ft. per pipe

Volume = 1.12 gallons per pipe x 6 pipes = **6.72 gallons total for drainpipes**

Total Capacity of reservoir

Total volume of reservoir = 23.4 gal. + 6.72 gal. = 30.12 gallons = **30 gallons**

***Note:** The reservoir capacity ended up being **37 gallons** when we filled it after completing the conversion.

Summary

In 2024, the three sub-irrigated wooden planters at the Water Conservation Garden (Alpha, Beta, and Dr. Pepper) were filled to capacity by winter and spring rains. The veggies in these beds were given minimal top-watering through the dry season (from May 11 through the end of September). They did not require any additional water added to their reservoirs until August 11. All told, rainfall supplied an average of 88% of the veggies' required water for the dry season in these planters.

We suggest monitoring the moisture level of the soil regularly with a moisture meter. Pictured on the previous page is the one we use at the garden. Also, inspect the plants visually to determine their vigor before adding water to either the top of the soil or the reservoir. With mulch covering the soil, and with the water reservoir full from rainfall, very little supplemental water should need to be added.

Based on the above experience of sub-irrigated planters in this garden, we have high expectations that the sub-irrigated stock tank will perform in a similar way. We're excited to see how this plays out, and how much water we save using this sub-irrigation system. Watch our website to see the progress of our findings in 2026.

https://ucanr.edu/site/uc-master-gardener-program-contra-costa-county/water-conservation-garden

***Non-endorsement disclosure:** "No endorsement of these products/companies is intended, nor is criticism implied of similar products/companies that are not included." UC Cooperative Extension