

Rainwater Harvesting

Rainwater harvesting is the practice of collecting rainwater from hard surfaces, such as roofs, in order to use the water for gardening, washing, and/or flushing toilets.

An estimated 30,000 to 60,000 people in the state of Hawai'i depend on rainwater harvesting for their water needs, with the majority of rainwater harvesting systems on the island of Hawai'i.

History of Rainwater Harvesting

Throughout history and across cultures rainwater has been valued as a resource and collected for use:

- Evidence of rainwater harvesting dates back to 1500 BC.
- Ancient Roman dwellings had cisterns for capturing storm water runoff from paved courtyards to augment water supplied by the city's aqueducts.
- Kalahari Bushmen of South Africa collected, stored, and buried rainwater in ostrich eggs.

Benefits of Rainwater Harvesting

- Rainwater harvesting improves water quality by reducing the quantity of storm water runoff from impervious surfaces and the potential for pollutants to enter the storm drain system.
- Rainwater harvesting conserves potable water supplies.
- Rainwater harvesting saves energy by reducing the need to treat and transport potable water.

Sizing

Sizing your rainwater harvesting system depends on how much water you need and how much space is available for storage.

One inch of rain on a 1,000 square foot rooftop yields approximately 600 gallons of water. To calculate how much rainwater your rooftop will produce in a month multiply the average monthly rainfall (in feet) by the square footage of your roof by a conversion factor of 7.48 (gallons per cubic feet) by a safety factor of 0.95. For example, in January it rains an average of seven inches in Wahiawa, and a house with a 1,000 square foot roof, can produce 4,145 gallons of rainwater!

If you are not able to store all of the rainwater from the roof, then ensure that there is an overflow hose directed away from the foundation of your house to a vegetated area.

Multiple barrels can be connected to increase your storage capacity.

Placement

- It is best to place your rainwater harvesting system near to where you will be using the water and under the roof downspouts.
- Place rain barrels on sturdy, level surfaces.
- If you do not plan to have a submersible pump, then you may try elevating the rain barrel(s) to increase water pressure.

Maintenance

- Place mosquito screen over open areas to prevent breeding.
- Annually, empty, clean the inside of the rain barrel with water, and allow to dry out for a few days.
- Periodically, remove debris from roof gutters.

Supplies

- Food grade, opaque plastic barrel
- Mosquito screen
- Hose bibb or shutoff valve
- Various plumbing fittings
- Teflon tape
- Overflow hose
- Drill and drill bits
- Hand saw



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Instructions

(This is one example of how to construct a rainwater harvesting system, see resources for alternative construction methods)

- Wash the barrel thoroughly inside and out.
- Clean the roof and gutters of debris.
- Cut the downspout and attach an elbow or a plastic flex hose to direct water into the rain barrel. Install a first-flush diverter.
- Drill a hole on the side of the barrel with a standard twist bit for both the hose bibb and overflow. Make sure the overflow outlet has the same diameter as the downspout and flex hose to ensure that it will function properly.
- Use the Teflon tape to wrap once around the threads of the hose bibb, wrapping with the direction of the threads.
- When threading the nipple into reducer, DO NOT OVER TIGHTEN — this will result in stripping the threads and your barrel will leak.
- You will need a friend to hold the washer and male electrical conduit on the inside of the barrel, while you screw in the female electrical conduit.
- Apply PVC cement to attach the female electrical conduit to the reducer.
- Direct the overflow hose away from the foundation to a vegetated area.
- Secure mosquito screen over open areas.

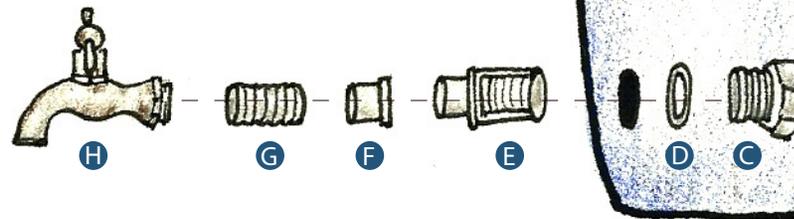
Parts

- A** Rain barrel
- B** Mosquito netting or screen
- C** Male electrical conduit adapter
- D** Rubber washer
- E** Female electrical conduit adapter
- F** Reducer (Red Bush SXT SCH 80)
- G** Nipple (X close SCH 80)
- H** Hose bibb/pipe thread shutoff
- I** Overflow hose (flexible PVC)

*If subsequent barrels are sealed, install an air vacuum relief valve.

Resources

- For additional information on rainwater harvesting, go to: <http://www.hawaiiain.org>
- For additional information on how to make a rain barrel or to find out about rain barrel workshops, go to: <http://www.boardofwatersupply.com>.
- Macomber, Patricia. (2001). "Rainwater Catchment Systems for Hawaii." Available Online.



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