Rainwater Harvesting for Landscape Irrigation
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Rainwater Through The Ages

- Rainwater harvesting practiced for over 4,000 years in desert of southern Israel
- Ancient Roman had cisterns and aqueducts
- Early 1900’s farms and ranches had cisterns
- Current resurgence of rainwater collection Lady Bird Johnson Wildflower Center
  - Currently
    - 72,000 gallon capacity
  - have plans for
    - another 25,000 gallons
- Many Caribbean nations mandate rainwater harvesting
Why Collect Rainwater?

- Rainwater pH is almost neutral
- Plants love it
- Rainwater does not have dissolved minerals from the soil
- Or chemicals from water treatment plants
- Harvesting reduces erosion
- Reduces water bill – you do not use as much expensive potable water on your landscape
Components

First Flush “Poor Man’s Roof Washer”

- PVC pipe with fittings running to the ground with a screw on cap at the bottom for clean out
- First 8-10 gallons collects debris from roof and gutters -- diverted by first flush before tank inlet
Components

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PVC Drain-Waste-Vent Fittings

- **ADAPTER**
  - FITTING CLEANOUT
    - SP x FPT (W/PLUG)
- **TEE**
  - TEST W/PLUG
    - H x H x FPT
  - SANITARY STREET
    - SP x H x H
  - 90° ELBOW
    - ALL HUB
      - (W/END)
  - T-Y
    - ALL HUB
    - (W/END)
  - PIPE INCREASE
    - ALL HUB
- **CLOSET BEND**
  - ALL HUB
    - (W/END)
- **CLOSEOUT TEE**
  - ALL HUB
    - (W/END)
  - PVC TRUE UNION
    - THREAD OR SOLVENT
  - 45° ELBOW
    - ALL HUB
      - (W/END)
  - 90° ELBOW
    - ALL HUB
      - (W/END)
  - 45° ELBOW
    - ALL HUB
      - (W/END)
  - PVC BALL VALVE
    - THREAD
Tanks are available in many sizes and configurations.
Simple System Options
Simple System Diagram
How about a pond tank?
Drinking Water Systems

Rainwater Harvesting System Components

- **Rain Catchment Area:** Footprint of rainwater collector
- **Gutters & Downspouts:** Collect and route water to tank; screens bar leaves and other debris
- **Pressure Tank:** Maintains operation pressure, allowing pump to run intermittently
- **Overflow:**
- **Water Storage:** Tank or cistern
- **Pump:** Pressurizes system
- **Water Treatment:** May include filters, UV light, and/or chemical additives

*Roof Wash System:* Diverts first few gallons of rainfall and traps debris; can be manual or automatic

*To House*
Drinking water systems require more equipment and maintenance

From “Rainwater-Collection Systems” by Peter Pfeiffer
Fine Homebuilding Magazine
Drinking water systems require more equipment and maintenance
Good source of tanks are “feed and ranch” stores

305
300
550

5,000
2,500
3,000

Triple S Feed
To reduce algae, tanks should be black, green, covered, or painted.
A 10’ x 10’ garden shed can collect 60 gallons in just a 1” rain

750 gallon fiberglass tank
Typical Underground Cistern

- Vent pipe 36 inches above final grade, with bug screen
- Manhole, 32-inch with locking device
- Fill pipe 36 inches above final grade
- Upper suction pipe 20-24 inches above road level
- Gravel shoulder
- NFPA 1231 contains a table showing cistern capacity in gallons according to inside diameter and depth
- Lower suction pipe with anti-vortex plate, anchored and raised 6 inches off bottom
- Washed stone base
37,500 gallon Ferro-cement tank

From “Rainwater-Collection Systems” by Peter Pfeiffer
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Wooden Tanks
How much will rainwater harvesting cost?

It really does vary...
- Do you already have gutters?
- If not, what type will you install?
- Type and size of tank
- Will you use a pump?
- Pad construction

This is NOT how to do it!
Components

Roof Type

- Any roof will do
  - Metal is the ideal roof - smooth and non-absorbent
  - Composite, wood shingles, asbestos…all absorb water and will break down over time

Gutters

- 30 cents per foot for plastic up to $15 per foot for copper

Screens

- Screens are not necessary unless your house has a lot of tree cover
Components

Roof Washer

Roof washers clean the water, not the roof
The first water to fall on the roof cleans away dirt and debris accumulated since the last rain. Commerically available roof washers such as the one shown here funnel the water first through a leaf basket that collects the heaviest debris. The first 35 gal. of water, which is the dirtiest, fills the quiet chamber, where it drains away slowly. Cleaner water then passes through a replaceable filter element.

From “Rainwater-Collection Systems” by Peter Pfeiffer
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Components

Roof Washer

- $300-600
- container with 30 micron filter
- water must pass through filter before filling tank
- If not cleaned regularly
  - breeding ground for bacteria
  - will keep water from entering tank
- not necessary for non-potable systems
Components

**Barrels**
- Purchased or recycled barrel
- Should be painted to keep out sunlight and prevent algae growth
Components

- Polypropylene Tanks
  - $.35 to $1.00 per gallon
  - Most common
  - Easy to install
  - Should be black, green or painted
Components

- Concrete or Ferro-cement tanks
  - $.35 to $1.00 per gallon
  - Durable
  - Can be buried
Components

- **Metal Tanks**
  - 40-60 cents per gallon
  - Short life span – rust, except with special liners
Components

- **Wooden Tanks**
  - $2.00+ per gallon
  - Ideal for remote locations, pack in the pieces
  - Can be disassembled and moved
  - Available up to 2,000,000 gallons!
Components

- **Stone Tanks**
  - Very expensive
  - Difficult to maintain
Components

Pumps

- $200-600
- install pump as close to tank as possible
- protect from freezing
- in-tank float switch
- in general 3/4 quarter horsepower is sufficient
- It will allow you to pump water 400 feet
Maintenance

- With a first flush system you will want to clean out the PVC after every rainfall.
- If you have screens, clean them after a rain when there has not been any rainfall for a period of time.
- Most people who have installed their systems over the past 5 years, have not had to clean the tank of debris.
Bt-Biological Mosquito Control
Whisky is for drinkin'…

Water is for fightin’ over!

Mark Twain

Water is a precious resource…

Use it wisely…

Harvest rainwater!

Austin History Center, St. Edward’s cadet straddling Lake Austin
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