Maximum Crop for **Minimum Water** and *Almost* **No Weeds**

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Author:

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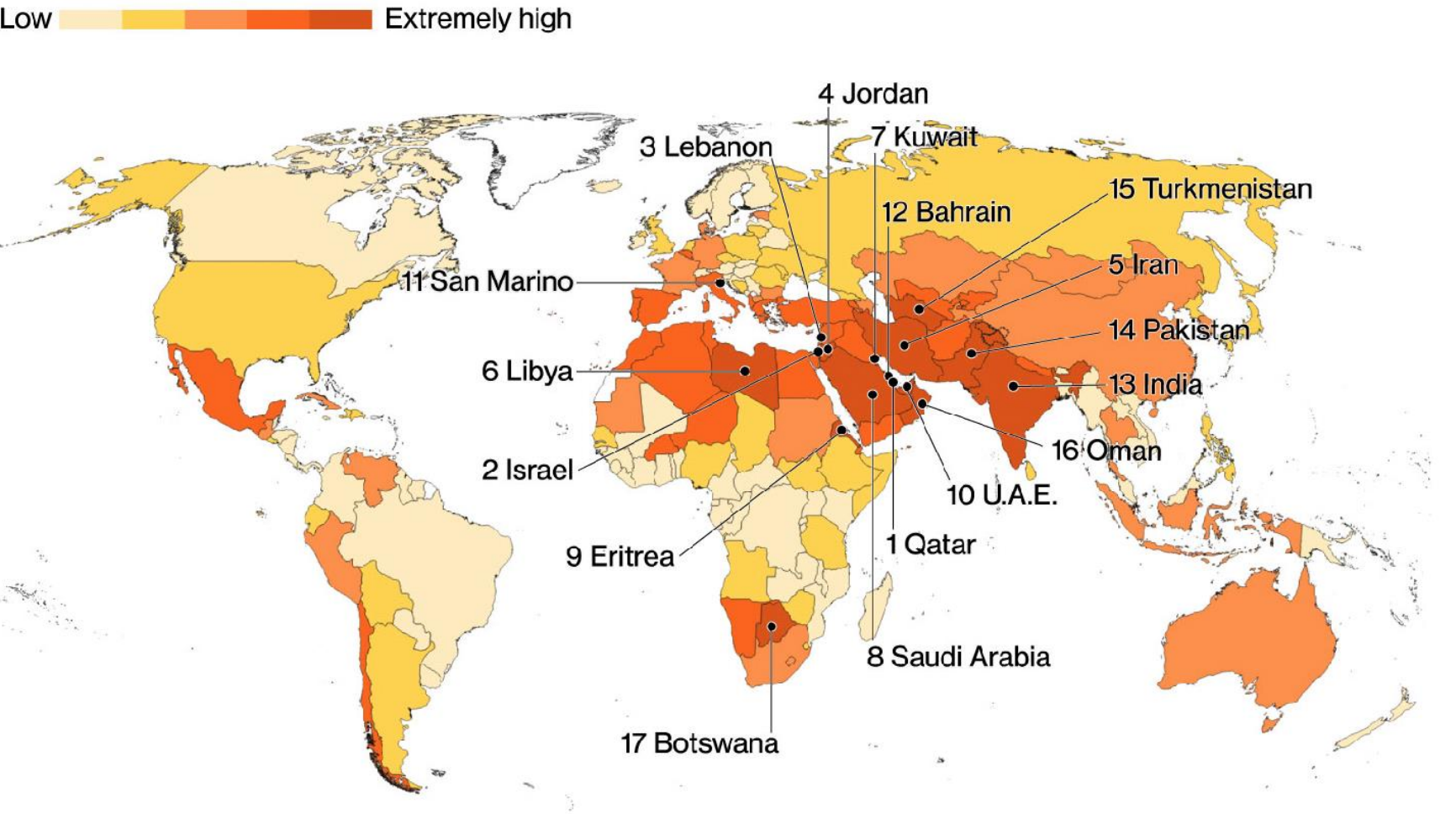
2007. ***A Guide for Desert and Dryland Restoration.*** Island Press.

Herb garden in a pot with olla irrigation

Water shortage!

- Water shortage locally and globally
- Three hundred and thirty million farmers have less than one hectare of land
- Many have little water
- Water has to be carried by hand from wells, ponds, or streams
- The Colorado River supplies are running short for 36 million people

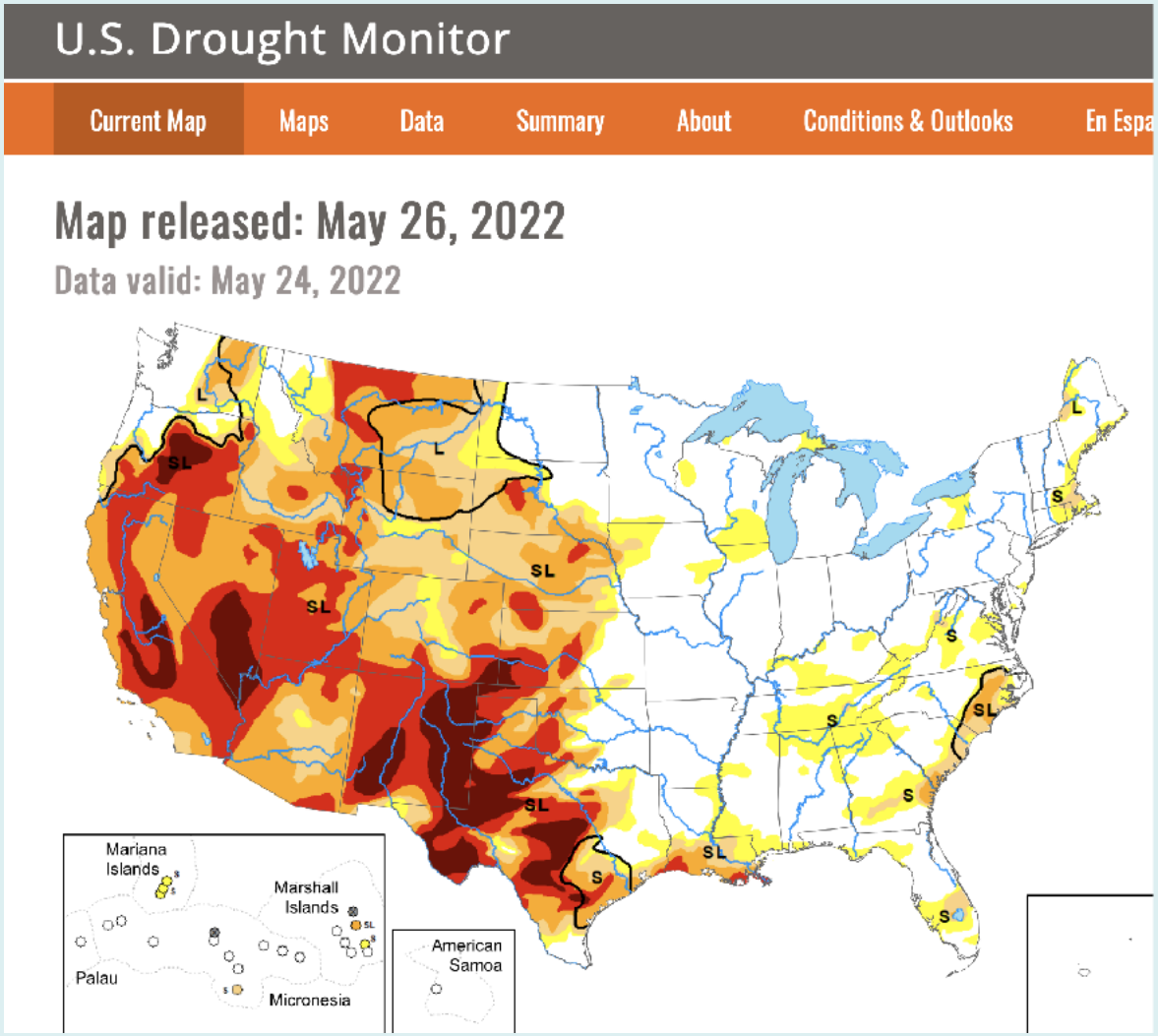
World Water Stress



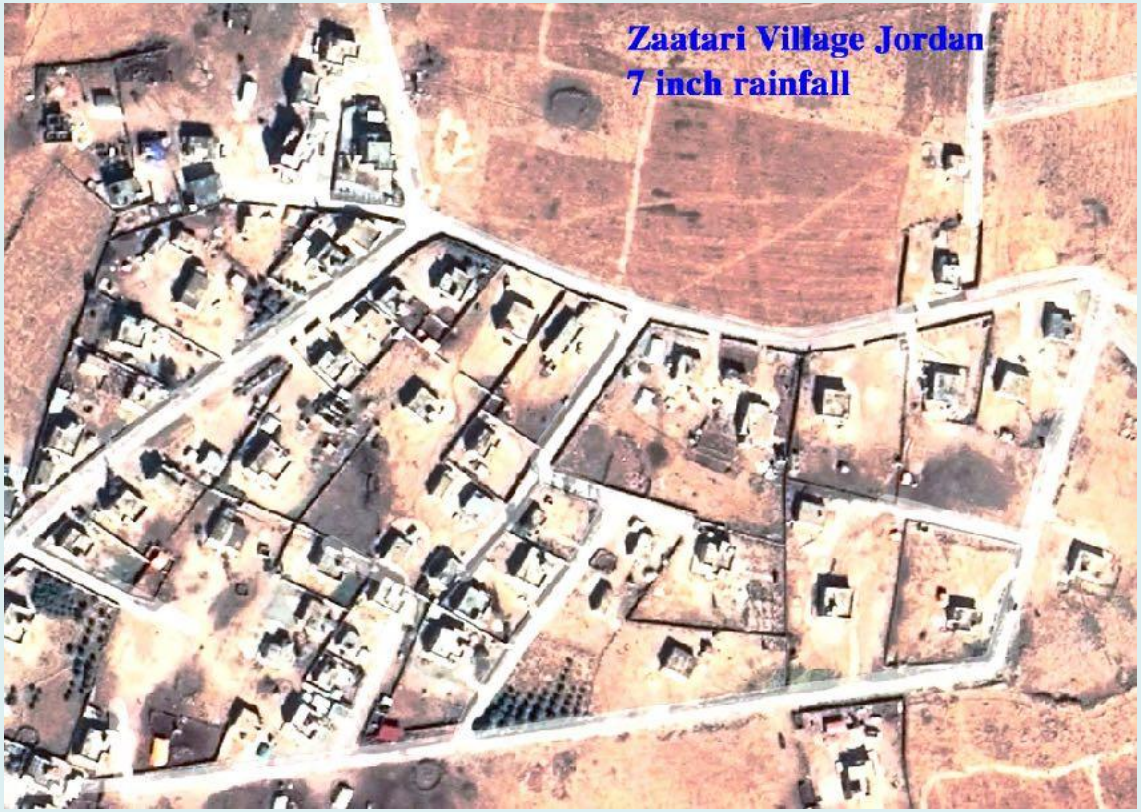
Note: Data on water withdrawal, available water and groundwater are used to calculate baseline water stress.
Source: World Resources Institute's Aqueduct Water Risk Atlas

Drought in America

» Not a pretty picture



Water shortages affect 1 billion people



More efficient irrigation

I started research in 1984 at the Dry Lands Research Institute—and found:

» Olla (buried clay pot, pitcher)

» Porous capsule

» Porous clay pipe

» Deep pipe

» Wick

All have value but buried clay pots are usually the best option

Drip

- Can be very effective but:
- Easily clogged, chewed
- Requires water pressure - pump, electricity
- Provides little protection if something fails

Fan Shengzhi

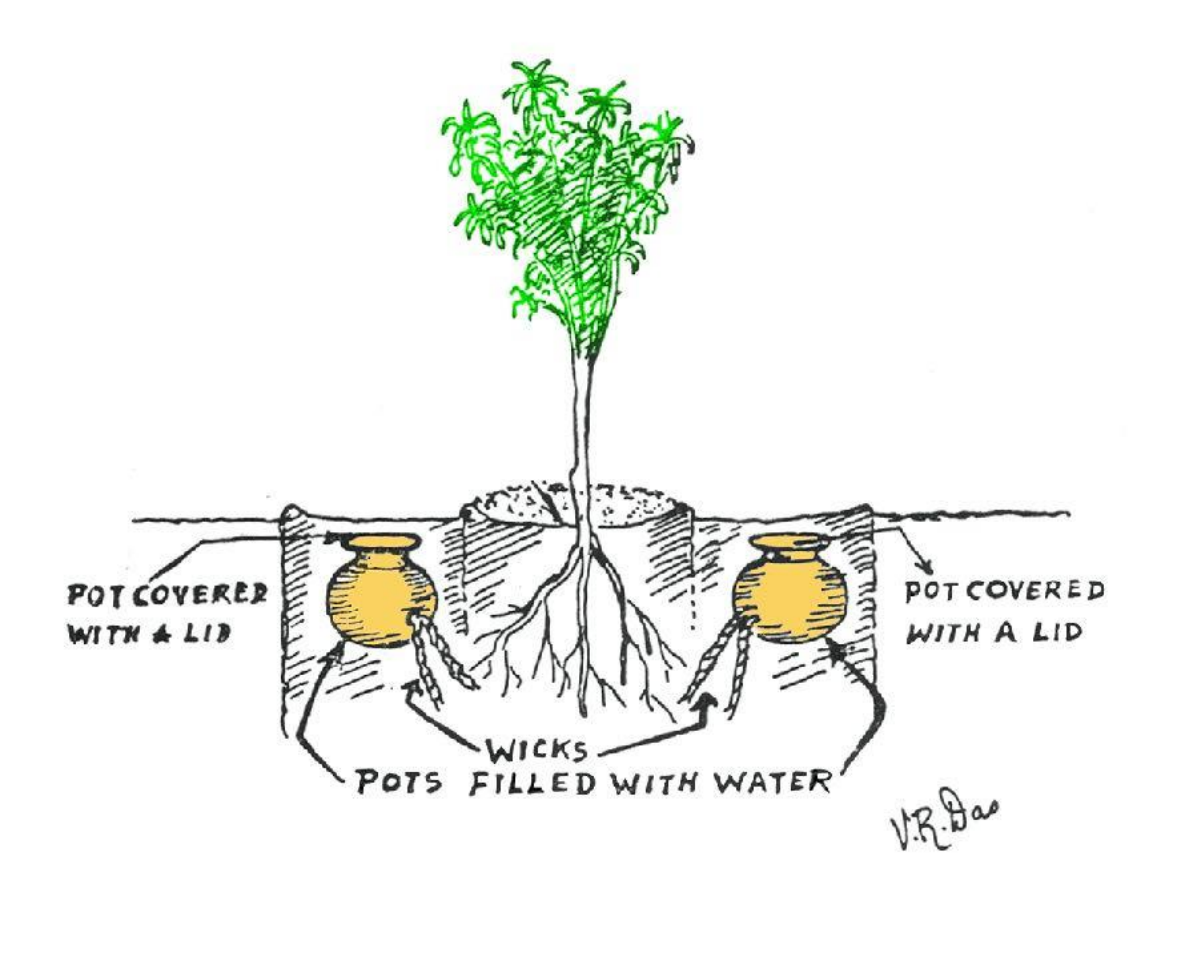
- Fan Shengzhi described buried clay pot irrigation in China more than 2,000 years ago
- He had been tasked by the emperor to provide help for farmers with too little land and too little water

2000 Years Ago

- Fan Shengzhi suggested 215 pits per acre
- A buried earthenware jar in each pit

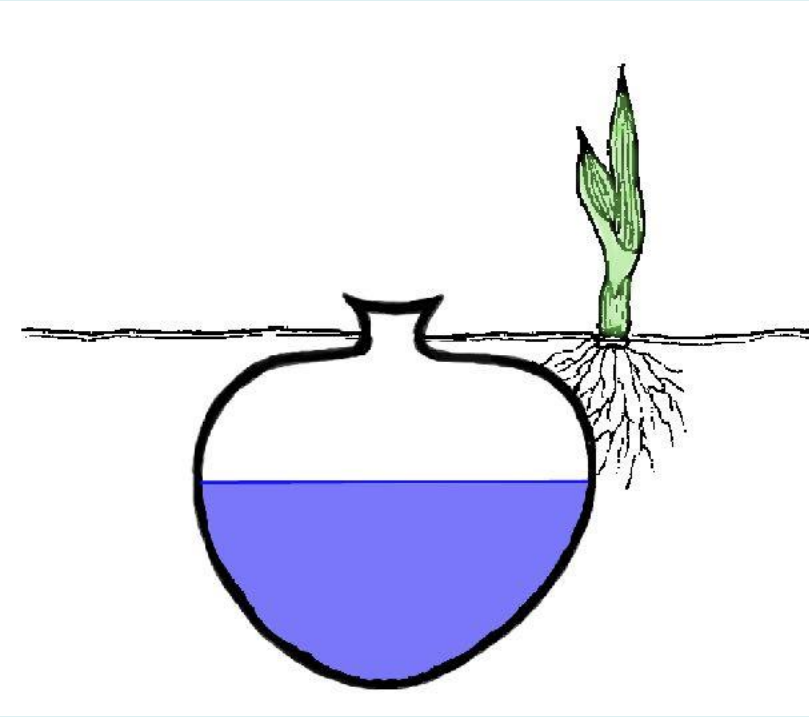
A Long Tradition

- I also found this example in India
- Here clay pots are combined with wicks
- Useful for trees as well as vegetables



Buried Clay Pot Irrigation

- The capillary flow of water through the clay walls is regulated by demand
- This makes it very efficient
- Highly recommended! For gardens, landscaping, specialty farms



Ollas

- Used in many parts of the world

Get started with clay pots

- Buy terra cotta pots 8” (20 cm) is a good size
- Rubber stoppers will fit the holes (Carolina Biological Supply) or fill with epoxy, heat melt glue, or….
- Some pot holes need to be filed or sanded to be round (wrap sandpaper on rubber stopper) and spin

Clay pots cost less

- Terra cotta clay pots for nurseries work well
- They cost much less than ollas
- Hole in lid to let in rain

Install rubber stopper

- From below or on top
- For some plants that grow large fast you may take the stopper out for deep watering

Seal Hole

Epoxy, heat melt glue, polyurethane, silicone and other sealants have been used (latex caulk may not work)

- Terra cotta pots are inexpensive
- Check to make sure they are porous
- Not over-fired or sealed

Place the pot

- Set the pot in the soil so the rim is above ground
- You don’t want dirt and leaves to wash in
- Firm the soil around the pot and plant

Spacing

- The pots can be set 1-3 feet apart depending on the crop
- Leave access to refill the pot

Seedlings or seeds?

- Either will work
- I prefer seedlings for most plants
- But seed sprouting is very good

The lid

- Drill hole for rainwater with a 1/8 or 1/4” bit
- Plates at goodwill may be cheaper

For planting

- Fill pot and let water seep into soil
- Once it is clear how far out the soil is damp plant the seedling or set the seeds

Which crops?

- Almost everything has done well with clay pots
- From flowers to tree seedlings
- Great for intercrops

Fast growing vines

» Large leaves on fast growing vines like pumpkins and squash may need bigger pots and more water

Deep Springs Olla

Refill

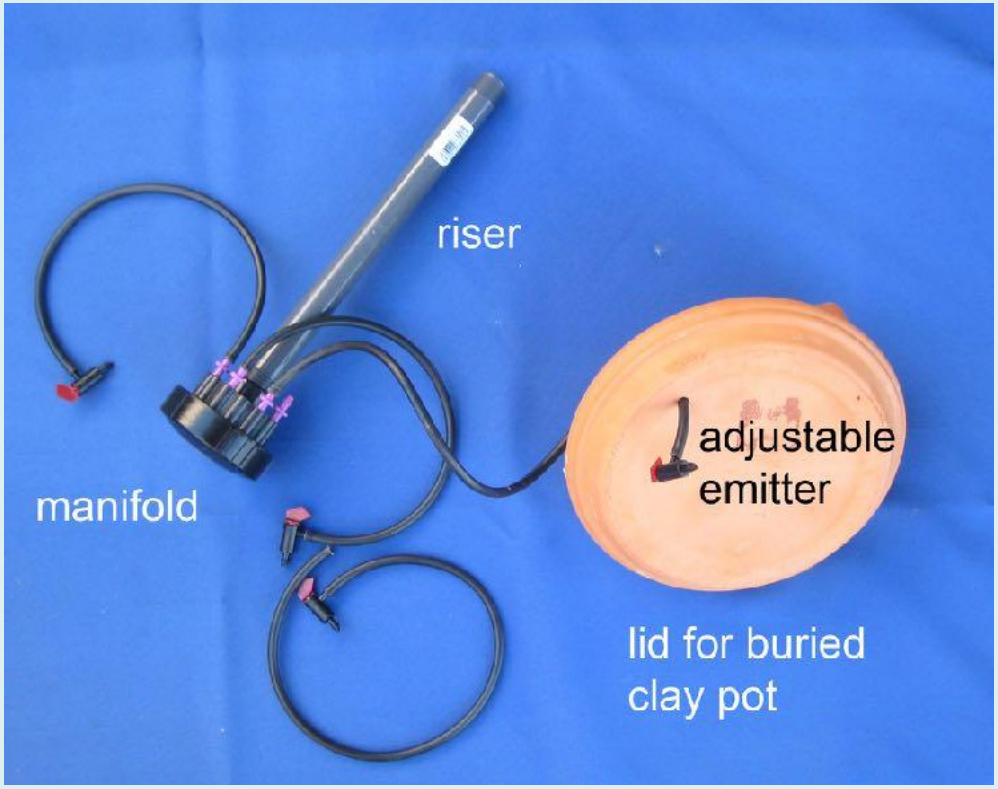
- Often just once a week
- Twice a week when plants get large
- In our desert restoration work we would only water every 2 to 4 weeks

BCP on drip system

» Buried clay pots can also be filled by drip emitters

Auto fill with drip

- A drip refill can be set up
- This can be activated by a float valve in a control pot



Fewer Weeds

- In one study weed weight was 200 lbs acre with clay pots and 8.5 tons with flood irrigation
- Less work - and less wasted water!
- The second biggest problem for small farmers after water shortage is time shortage

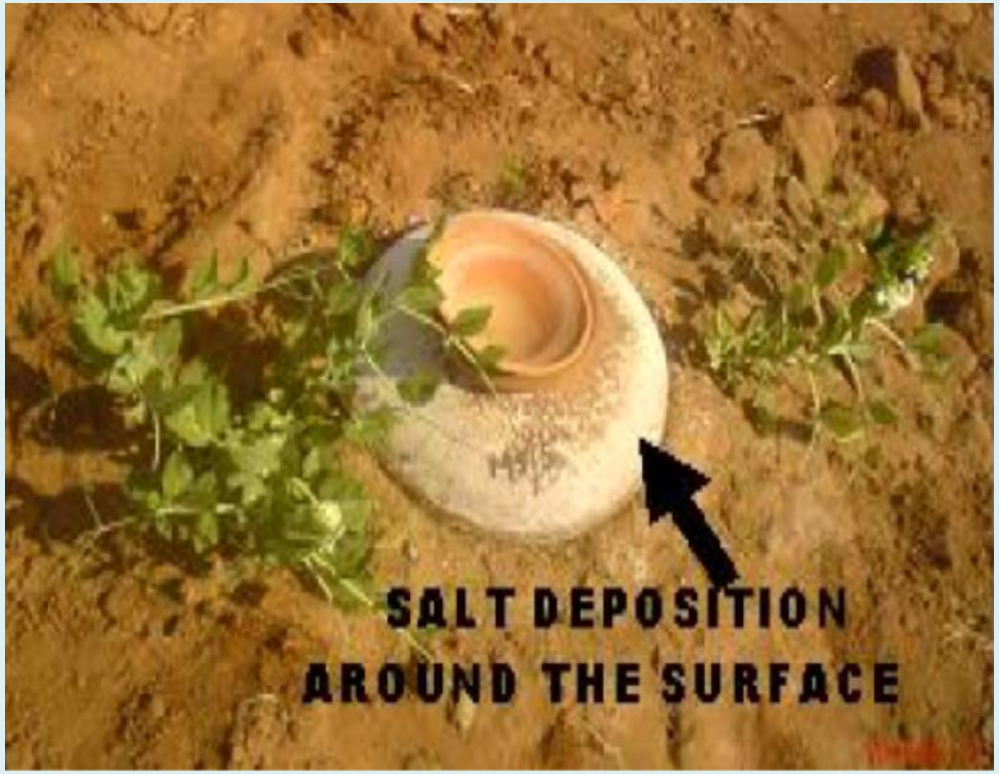
Enjoy the harvest

» Pests like slugs and snails are found right at the pot
» Easy to remove

- After the season clean the pots
- Soak in water with some vinegar
- Store upside down

Special challenges - salt

- Buried clay pots have also proved to be very effective with saline water or soil



- Double clay pots are ideal for starting cuttings
- The inner pot is sealed and filled with water

from L. H. Bailey,
The Nursery Manual 1920

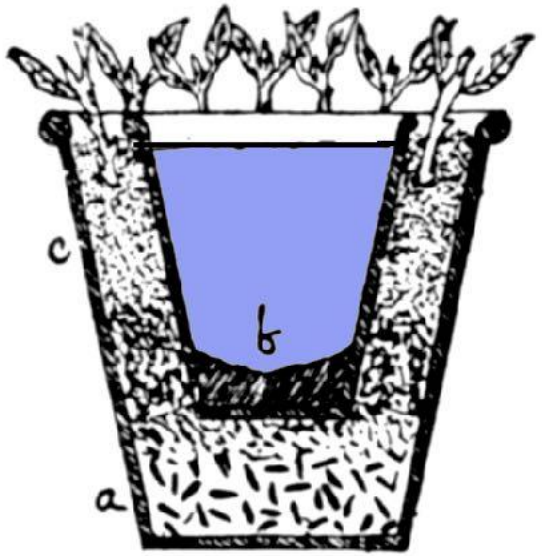


FIG. 89. Forsyth's cutting-pot.

Plant propagation

- The moisture is maintained in the soil at an ideal level
- BCP are good for starting cuttings in the field as well
- And for container plants

Container irrigation

- Less water
- Longer more robust flowers
- Less likelihood of a wet floor

Scrub and soak pots

- Scrub pots with a mild solution of vinegar in water
- If calcium deposits develop soak pot in vinegar solution overnight

Super efficient

- In a study in Kenya the clay pots cut water use for tomatoes 97%
- Increased yield 40%

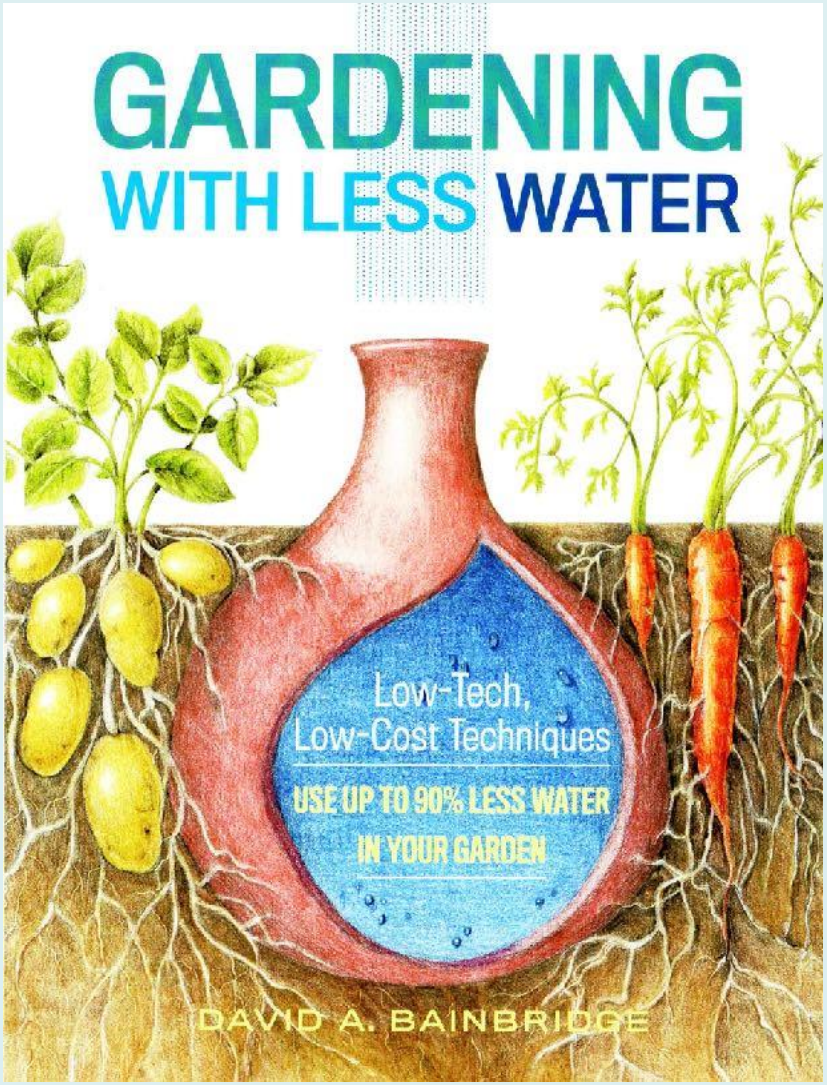
Hard to beat that!

Water use in other lands

- My goal has been to cut water use so low that it can work with water carried by hand
- Or using a donkey
- Miles from the water source

More information

- http://works.bepress.com/david_a_bainbridge/



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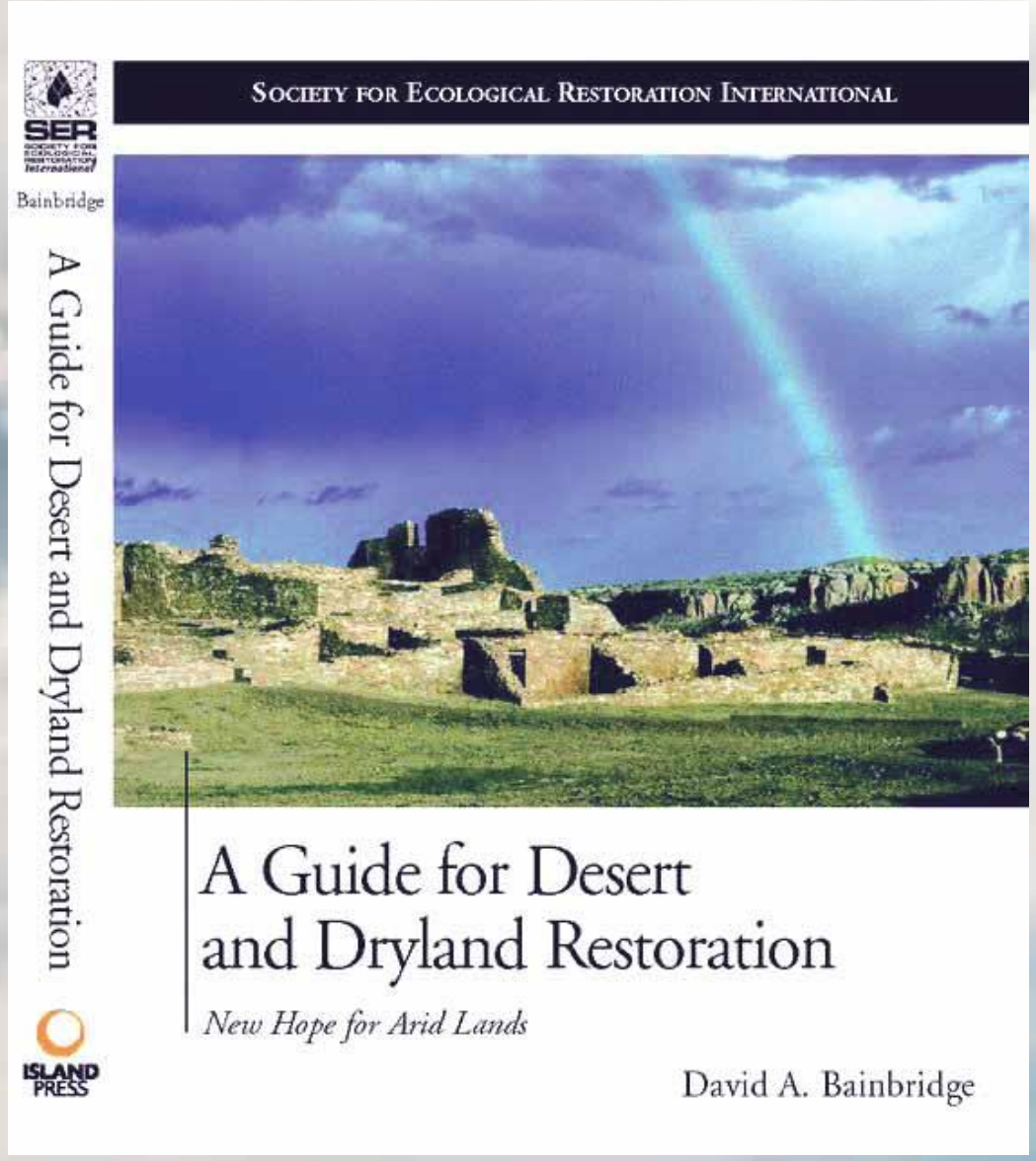

Published in 2007