

gardening 101: irrigation



Low Tech & High Tech in Urban Environments: Choosing the right method for your space

To select the appropriate method for your space, consider the following:
garden location and plan, ways to improve efficiency, the budget, and any specific obstacles.

Low tech and sustainable, ways to water:

- live next to a body of water
- transport water from source to growing space
- create irrigation canals
- clay pot, or Olla, irrigation
- capturing and harvesting large amounts rainwater with gravity feeding
- wait for rain in wetter areas

High tech requires greater input of materials, maintenance and infrastructure.

- new means of transporting and delivering water, like soaker hose or "T-tape"
- pressurized system using drip irrigation

Modern Techniques for Small-Scale Growing

These days, most modern irrigation only focuses on transporting and applying water. For urban gardeners, capturing and storage ideas can be developed on almost any urban plot and offer the micro-grower or backyard farmer an important additional source of water to use.

Adapting Sustainable Solutions for your Space

About 2/5ths of all the fresh water used in the United States goes to irrigate crops. When used on conventional crops, much of this water cannot be re-used because much of it evaporates or contains chemical pesticides and fertilizers. If you consider the majority of irrigation occurs in the west where water is scarce, you can see how important to use the most efficient methods appropriate for that particular space.

Important Concepts About Water

- « Water always runs downhill. This is the key to effectively capturing water on your property: Gravity.
- « Gravity can be used to feed a manual watering approach by putting tanks on a stand. Buzz Action Neighborhood Garden is planning to install their water collection barrels in this way.
- « Any non-permeable surface can be used to collect water.
- « Water falling from the sky ('rain' they call it) will fill a 50 gallon barrel in minutes with a typical New Mexico monsoon rain. When it does rain, 200 gallons could be collected for use with the right set-up.
- « When planting on mounds or in row/furrows, water will wick sideways into the mounded soil to reach plant roots, so plant at the rows top or side for good drainage. This method grows stronger plants.
- « Evaporation of water from the soil's surface is one of our greatest gardening challenges. Water can be prevented from evaporating quickly by using organic mulch on top of the soil's surface.

HELPFUL TERMS DEFINED

Flood (furrow) irrigation: Early man would have used this "low-tech" method of irrigating crops – collect water in a container and pour it onto the fields. Today, this is still one of the most popular methods of crop irrigation. The system is called flood irrigation – water is brought to the fields and allowed to flow along the ground among the crops. This method is simple, low-tech, and widely used in less developed parts of the world as well as in the U.S. The problem is much water is wasted through evaporation, etc and only half of the water ends up on the crops. Traditional flood irrigation can mean a lot of wasted water!

Following terms describe some things that farmers are doing to be more efficient:

Leveling of fields: Flood irrigation uses gravity to transport water, and, since water flows downhill, it will miss a part of the field that is on a hill, even a small hill. Farmers are using leveling equipment, some of which is guided by a laser beam, to scrape a field flat before planting. That allows water to flow evenly throughout the fields. (Actually, this method of levelling a field is also used to build flat tennis courts).

Surge flooding: Traditional flooding involved just releasing water onto a field. In using surge flooding, water is released at prearranged intervals, which reduces unwanted runoff.

*****Capture and re-use of run-off:** A large amount of flood-irrigation water is wasted because it runs off the edges and back of the fields. Growers can capture the runoff in areas around the front and back yard, then direct it to plantings. Water collection in barrels is also a method of capture and re-use of run-off, but beware using roof water on veggies!

*****Drip Irrigation:** For irrigating fruits and vegetables this method is much more efficient than flood irrigation. Water is sent through plastic pipes (with holes and then watering heads on them) that are either laid along the rows of crops or even buried along their root lines. Evaporation is cut way down, and up to one-fourth of the water used is saved, as compared to flood irrigation.

*****Hose-in-Hand Watering:** This still proves to be a reliable standard method. For those growing in containers, this is convenient and more attractive than drip hoses hanging all over the pots. Be sure to mulch for an easier watering schedule. A watering can is handy with a water collection barrel – no water pressure needed. Just dunk it to fill.

Spray Irrigation: This is a modern way of irrigating, and requires 'machinery'. This system is used in many commercial applications. Large scale spray irrigation systems are in use on large farms today. These systems have a long tube fixed at one end to the water source, such as a well. Water flows through the tube and is shot out by a system of sprayers.

GOOD IRRIGATION PRACTICES: Don't water every day. Conserve. Pay attention to the weather.

the big picture...

Drip irrigation is an excellent way to provide water to plants in the landscape. It provides water to plants where they need it most around the root zone. The slow dripping of water allows water to penetrate the soil deeply and reduces surface runoff. Water can be distributed at different rates to satisfy plants' different needs. Evaporation common with the conventional sprinkler system is reduced, saving water. It can be run on a timer to help automate the care of your garden which can be a large hurdle in a time-starved lifestyle. Make the effort to consider both your space, as well as the resources you can realistically devote to building and maintaining a garden. (Bigger is often not better.) Sun, water, space and time are your guiding factors for assembling a plan to fit your needs.

ASK QUESTIONS!

The easy way to avoid big problems is to ask questions before a plan is in place, and definitely before you buy supplies. Irrigation manufacturers use different color coding systems and it can be confusing to sort out benefits and downsides. If doing the work yourself, you will need a shovel and some patience.

Parts will not be very expensive, but mistakes can be. Plan for simplicity and long term solutions.

parts is parts, defined in order of appearance from house to each plant

Backflow Preventers are used to prevent water from being siphoned from the garden into the house.

Pressure Regulator This lowers the water pressure to 20-30 psi. Drip irrigation is engineered to run at this pressure. Higher pressure can cause endcaps to fail resulting in a large water leak.

Screen Filter This is used to keep small debris from clogging drip emitters.

Polyvinyl Tubing - flexible black plastic tubing used as a mainline to deliver water through the garden. It comes in two sizes 1/2 inch and 3/4 inch. 3/4 inch has the capacity to deliver more water to more plants over a longer run than 1/2 inch tubing. Rolls are available in 50', 100' and 500' lengths.

Endcaps, Elbows, Couplings and Tees oh my! These parts are used to run main and distribution lines in the directions needed. They come in 1/4" 1/2" and 3/4" sizes.

1/4 inch Distribution Tubing This is used to distribute water from the mainline to the plant or area to be watered. can be purchase in rolls of 100 500 and 1000 foot lengths.

1/4 inch Barbs - pointed on two ends and used to connect the 1/4 inch distribution tubing to the mainline. Using a special but simple tool, a hole is punched into the mainline. One pointed end is inserted into the hole. 1/4 inch distribution tubing is attached to the other end. Barbs are also used to repair the accidentally cut or break in the distribution tube. Keep extras on hand for simple repairs.

Emitter - used to regulate the amount of water released from the distribution tubing. They come in multiple styles depending on the manufacturer. The biggest difference being some styles will open for cleaning while others must be replaced in case of the occasional clog. The three most common sizes are 1/2 gal 1gal & 2gallons per hour. micro sprays misters and micro bubblers are available also.

Punch tool used to punch hole in mainline for inserting barbs, etc.

Goof Plug A fantastic little thing used to plug an accidentally made hole in the mainline. If all of life's problems had such a simple solution...

A few things to remember:

Be sure to FLUSH or clear out the MAINLINE before attaching any small parts. This may sound like extraneous work but this quick duty will avoid many problems in the future, like clogs. Amazing things can find their way into the system despite the greatest of care.

TO EXTEND THE LIFE of your drip system, keep tubing just under the surface of your soil or mulch. When drip is placed under landscape fabric, it means another hole in your weed barrier for every repair. It may not be possible to protect every foot of the line, but the sections that are not exposed to extreme sun due to drying, will last much longer.