

Basics on Irrigating Vegetables

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Key Components of Irrigation System

- ◆ Water Supply - Consider
- ◆ Source of water
- ◆ Quantity and quality of the
- ◆ Energy requirement
- ◆ Distribution from source to field
- ◆ Method of applying water

Source of water

- ◆ Ponds - may require filtration
- ◆ Streams or rivers - may require filtration
- ◆ Wells - filtration generally not required
- ◆ Public water - potable, no filter

Ponds



River



Drilled Wells



Water Quality

- ◆ pH between 5.8 - 6.8
- ◆ No residual chemicals especially herbicides
- ◆ Dissolved solids less than 500 ppm
- ◆ Bacteria (plate count/ml) less than 10,000
- ◆ Hardness as CaCO₃ less than 150 ppm

Water Quantity

- ◆ Total water demand of a crop equals crop water use consisting of daily evapotranspiration (ET) rates. ET rates are affected by radiation, humidity, air temperature and wind speed. Calculating the crop water requirement will help determine the quantity of water that will be required daily.

Gross irrigation Requirement (GIR)

- ◆ GIR = net irrigation requirement divided by irrigation efficiency.
- ◆ Irrigation efficiency accounts for losses in storage, distribution and application as well as operational and management losses.

Irrigation Scheduling

- ◆ Predicting when to irrigate and how much to irrigate.
- ◆ Observing plants - water before plants wilt.
- ◆ Measuring soil moisture content
- ◆ New computer software programs

Measuring Soil Moisture

- ◆ Soil moisture can indirectly be measured with tensiometers, resistance blocks or neutron probes.
- ◆ Direct measurement of soil moisture can be by weighing or the gravimetric method.
- ◆ The simplest and most practical method is to estimate the moisture content by the feel and appearance of the soil.

Energy Requirement

- ◆ If the water source is above ground or from a well, pumps are required to move the water from the source to the field and crop that requires irrigation.
- ◆ If the water source is on a hillside, gravity feed may be adequate in flow rate and pressure to feed irrigation system.

Irrigation Systems

- ◆ Overhead
- ◆ Drip

Overhead irrigation

- ◆ Because overhead irrigation systems need a plentiful supply of water at a relatively high pressure, they vary greatly in complexity and cost depending on the acreage you're covering. Another important thing to keep in mind is that, with overhead irrigation, the foliage of a crop does get wet. If the leaves remain wet for an extended period of time, anywhere from as little as 10 and up to 24 hours, this can cause problems with fungi and bacterial disease.

Overhead Irrigation Types

- ◆ Center Pivot
- ◆ Lateral
- ◆ Rolling
- ◆ Water Gun
- ◆ Solid set

Center Pivot

- ◆ Center-pivots can range in length from 500 yards (circle radius) to the more common quarter-mile. The sprinkler arm is fed with water from the pivot point at the center of the circle. An outside set of wheels sets the master pace for the rotation, typically once every three days.

Center Pivots

- ◆ Older center pivots, with the sprinklers attached directly to the pipe, operate at relatively high pressure (60-80 psi), with wide water-spray patterns. They require 800 to 1,200 gallons per minute water source.

Drip Irrigation

- ◆ Low water volumes - 30 to 60 gallons per minute
- ◆ Low volume - header pressure 15-20 psi - drip line pressure - 8-10 psi
- ◆ Does not wet foliage
- ◆ Can inject fertilizers for accurate placement in soil

Drip Irrigation Components



Filtration Required for above ground water source

- ◆ Screen Filters
- ◆ Plastic Disk Filters
- ◆ Sand Filters
 - ◆ Swimming Pool
 - ◆ Stainless Steel Media
 - ◆ Ceramic

Screen Filters

- ◆ Screen filters are used to clean water from wells and public water systems, but not for surface water containing algae and other debris. Generally screen filters have a mesh size of 150.

Disk Filters

- ◆ Disk filters are designed to clean dirty water for drip irrigation systems. Disk filters handle up to 3 times more dirt and debris than screen filters. Disk filter design is a stack of disks pressed together that have tiny grooves in the disks to allow clean water to pass through. Mesh size generally 120.

Disk Filter

Eurodrip Disk Filters

These high quality disk filters from Eurodrip are built to last and provide many years of service. The filter's construction provides easy access to the filter cartridge for cleaning with a smooth action clamp that is easily opened and closed. These disk filters are a true value for the price. Replacement filters are also available.

<p>2" Eurodrip Disk Filter 120 Mesh • 112 Max GPM 145 Max PSI</p>  <p>\$160</p>	<p>3" Eurodrip Disk Filter 120 Mesh • 220 Max GPM 145 Max PSI</p>  <p>\$195</p>	<p>Replacement Filter</p>  <p>2" - \$75 3" - \$95</p>
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Sand Filters

- ◆ Sand Filtration employs a simple technique of water filtering down through a bed of sand and any solid particles like debris and dirt are trapped in the sand. To clean the filter, the sand is backwashed to remove all debris and dirt.

Choose the Correct Sand



Swimming Pool Sand Filter

QuickTime™ and a
TIFF (Uncompressed) decompressor
are needed to see this picture.

Stainless Steel Sand Filters



Fertilizer Injectors

- Fertilizer injectors apply water and nutrients directly to the root of the plant at a controlled rate. By using fertilizer injection products effectively, you can feed roots, not weeds. Drip irrigation coupled with a fertilizer injector will decrease fertilizer and chemical leaching and minimize weeds problems and labor requirement in the field. Drip irrigation and injection of nutrients into the system will increase the size and quality of plants, conserve water and lower utility bills.

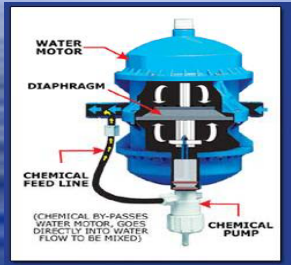
Fertilizer Injector Types

- Injectors work on one of two principles. Venturi-type injectors use a pressure difference between the water line and the stock tank to draw concentrated solutions into a faucet connection and mix them with water in the hose.

Venturi-type Injector



Positive displacement Fertilizer Injector



Drip Irrigation Tape

- Drip tape varies greatly in its specifications, depending on the manufacturer and its use. Depth of tape placement, distance between tapes, emitter spacing and flow, and irrigation management all must be chosen carefully based on crop water requirements and the soil's properties.

Wide selection of drip tape



Any Questions?

