

Water Needs for Vegetables

Jonathan Propp, UC Master Gardener, SF/SF County

Vegetables are basically tasty containers of water. Most are 80-95% water content. You definitely need to irrigate your vegetable beds to have a successful crop. You can, however, do this in a way that minimizes water use.

You can get very mathematical about figuring out irrigation needs, based on type of soil, type of plant, planting density, weather exposure, and so forth. For the backyard gardener, this may be more than you care to do. You *will* need to know the flow rate of your drip irrigation system, however, whether through individual emitters or drip line with holes.

Most guides to watering vegetables will recommend 1-1.5 inches of water per week, which is not very helpful to the backyard gardener. This figures translates to 63-95 gallons per 100 square feet per week, however, which is a number we can use. So if you have a 4' x 8' bed (32 sf), then you should be thinking about giving it about 20-30 gallons of water per week. If that bed has 20 emitters that are 0.5 gph (gallons per hour), then you'll be irrigating 10 gallons per hour. You will therefore need 2-3 total hours of watering per week, depending on conditions.

Several factors will affect whether you water at the high or low end of this amount:

1. What kind of soil do you have? Heavy clay soil retains three times as much water as sandy soil. You need to water it less in total, but more frequently. With clay soil, the water takes a long time to soak in, so you can't do long, deep waterings.
2. Are you mulching? A 2" layer between plants reduces evaporation and can reduce water needs by as much as 50%.
3. What is the weather like? You will need to increase irrigation during hot, dry weather, and decrease during cool, cloudy weather.
4. What time of year is it? Evapotranspiration (ET - the loss of moisture through leaves) peaks in July and declines (by about 10% per month) as days shorten and get cooler. Some electronic controllers have a setting which automatically adjusts watering times based on ET.
5. Where are your beds located? Sunny, wind-exposed locations will require more water than shady, protected ones.



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6. What plants are you growing? Different vegetables have different water needs. Beans, corn, squash and cucumbers are the most water-needy vegetables. Tomatoes need plenty of water when they're young, but less water when fruits are ripening.
7. What stage are the plants in? Water needs differ throughout the growing lifecycle. If you're direct seeding in a bed, the soil needs to remain constantly moist (but not saturated) until germination. Transplants also need more water for a week or so until well established. Most vegetables need water the most while flowering and fruiting. Once plants are mature and fruits are established, you can reduce water usage.

How frequently should you water? While seedlings are young, they should not be allowed to dry out, so 3-4 times per week is probably warranted. As plants mature, they can be watered 1-2 times per week, depending on some of the factors above. Less frequent but longer duration irrigation allows water to permeate the soil, encouraging deeper root growth for tall plants such as tomatoes, cucumbers, and squash.

If you have multiple planting beds on the same irrigation zone, a shut-off valve for each bed allows you to deliver different amounts of water to different beds. This can be useful if you're growing different kinds of vegetables in your beds. A shut-off valve for each drip line within a bed gives you even more flexibility.

Think about grouping vegetables in beds based on water needs. Green leafy vegetables all have similar needs. Beans, cucumber and squash are heavy drinkers. Tomatoes are different yet again. Also, plant vegetables in appropriate places. Green leafy vegetables generally don't tolerate heat well, so plant them in a cooler, shadier place where you don't have to use excess water to keep them alive.

Additional Resources

Water Conservation Suggestions for Your Home Vegetable Garden
UC Master Gardeners, Trinity County

<https://ucanr.edu/collaborate/filegroups/collaborate16-Jan-14-6090-40655-59174/51790.pdf>

Reducing Water Use in Your Edible Garden
UC Master Gardeners, Marin County
<http://ucanr.edu/sites/MarinMG/files/183427.pdf>

