



# Colorado MASTER GARDENER

## Water Conservation in the Vegetable Garden no. 7.845

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In vegetable production, an adequate supply of water during the growing season directly relates to produce quality and yields. Many vegetables become strong flavored with water stress. Unlike bluegrass and other landscape plants, vegetables can't go dormant when the water supply is inadequate. However, there are several techniques that significantly reduce the water requirements of the home vegetable garden.

Always follow efficient irrigation practices. The following practices will allow you to have a productive vegetable garden and still reduce water consumption.

### Water Conserving Techniques

#### Soil Amendments

In the vegetable garden, the routine addition of organic soil amendments, such as compost, will optimize potential yields and produce quality. The goal in soil management is to increase the organic content to 4 to 5 percent, over a period of years.

On sandy soils, organic matter holds over 10 times more water and nutrients than the sand. On clayey soil, organic matter glues the tiny soil particles together into larger aggregates, increasing pore space. This process over time increases soil oxygen levels, improves soil drainage, which in turn increases the rooting depth allowing roots to reach a larger supply of water and nutrients.

Organic matter also encourages the beneficial activity of soil organisms and helps remediate soil compaction.

Incorporate organic mulches into the vegetable garden soil in the fall after frost ends the growing season but before the soil freezes for winter. The standard application rate for compost, manure, or compost made from manure is 1-inch per season.

Be sure that the organic matter is thoroughly cultivated into the soil. Leaving chunks of organic matter will interfere with seeding, root spread, and water movement through the soil profile. To reduce soil compaction and help conserve moisture in the soil during the winter, cover the newly cultivated garden with mulch.

In the vegetable garden, do not plow in woody materials such as bark or wood chips. They can interfere with seedbed preparation and deplete soil nitrogen.

Due to a health issue (*E. coli* contamination), fresh manure additions should be made at least four months prior to the harvest of any edible crops. In other words, apply fresh manure only in the fall after crops are harvested.

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For additional details on soil improvement, refer to the following fact sheets:

7.720	<i>The Living Soil</i>
7.721	<i>Earthworms</i>
7.722	<i>Managing Soil Tillage</i>
7.723	<i>Estimating Soil Texture</i>
7.724	<i>Soil Compaction</i>
7.726	<i>Soil Tests</i>
7.729	<i>Saline Soils</i>
7.730	<i>Plant Nutrition</i>
7.731	<i>Understanding Fertilizers</i>
7.732	<i>Calculating Fertilizer Rates</i>
7.733	<i>Organic Fertilizers</i>
7.741	<i>Organic Soil Amendments</i>
7.742	<i>Using Manure</i>
7.743	<i>Using Compost</i>
7.744	<i>Cover Crops and Green Manure Crops</i>

Manure and compost made from manure may be high in salts that will interfere with crop growth. Do not add more than 1 inch per season without conducting a soil test to evaluate potential salt build-up.

Another method to add organic matter is to replant the fall garden with a green manure crop such as winter rye or Austrian peas. Some of these cover crops fix small amounts of nitrogen in their roots that is tilled into the soil for plant use.

### Drip Irrigation and Mulching

Use of a drip system on a mulched garden reduces water need by around 50 percent.

For details on efficient irrigation (including drip irrigation), refer to the fact sheet 7.843, *Irrigating the Vegetable Garden*.

For details on mulching, refer to the fact sheet 7.844, *Mulches for the Vegetable Garden*.

As part of an efficient irrigation system, check soil moisture regularly. Squeeze soil in your hand. If it sticks together, it is moist and should not be irrigated. If it does not stick together, then it is time to irrigate. Irrigate in the morning when temperatures are cool but rising.

### Other Water Saving Techniques

- Plant in blocks, rather than rows. This creates shade for roots and reduces evaporation. For details, refer to the fact sheet 7.842, *Block Style Layout in a Raised Bed Garden*.
- Control weeds that compete with vegetables for water.
- Group plants with similar water needs in the same section of the garden for easy irrigation. Cucumber, zucchinis and squash, for example, require similar water applications.
- Protect plants and soil from wind with windbreaks to reduce evaporation.

## Critical Water Periods for Vegetables

You can target the timing and amount of water to add. As a rule of thumb, water is most critical during seed germination, the first few weeks of development, immediately after transplanting, and during flowering and fruit production. The critical watering periods for selected vegetables follow.

**Asparagus** needs water most critically during spear production and fern (foliage) development. Less water is needed after ferns reach full size.

**Cole crops** (broccoli, cabbage, cauliflower, collards, Brussels sprouts, kale and kohlrabi) need consistent moisture during their entire life span. The quality of cole crops significantly reduce if the plants get dry anytime during the growing season. Water use is highest and most critical during head development.

**Beans** have the highest water use of any common garden vegetable. They use 0.25 to over 0.50 inch of water per day (depending on temperature and wind) during blossoming and fruit development. Blossoms drop with inadequate moisture levels and pods fail to fill. On hot, windy days, blossom drop is common. When moisture levels are adequate, the bean plant is a bright, dark, grass-green. As plants experience water stress, leaf color takes on a slight grayish cast. Water is needed at this point to prevent blossom drop.

**Carrot and other root crops** require consistent moisture. Cracking, knobby and hot-flavored root crops are symptoms of water stress.

**Corn** water demand peaks during tasseling, silking and ear development. Water stress delays the silking period, but not tasseling. Under mild water stress, the crop may tassel and shed pollen before silks on ears are ready for pollination. The lack of pollination may result in missing rows of kernels, reduced yields,

or even eliminate ear production. Yield directly relates to quantities of water, nitrogen and spacing.

**Lettuce and other leaf vegetables** need water most critically during head (leaf) development. For quality produce, these crops require a constant supply of moisture.

**Onion family** crops require consistent moisture and frequent irrigation due to their small, inefficient root system.

**Peas** need water most critically during pod filling.

**Potato** tubers will be knobby if they become overly dry during tuber development.

**Tomato family** (tomatoes, peppers and eggplant) needs water most critically during flowering and fruiting. Blossom end rot (a black sunken area on the bottom of the fruit) is often a symptom of too much or too little water. The tomato family has a lower water requirement than many vegetables and plants are often over-watered in the typical home garden.

**Vine crops** (cucumbers, summer and winter squash, and assorted melons) need water most critically during flowering and fruiting. Vine crops use less water than many vegetables and are often over-watered in the typical home garden.

## Restricted Irrigation Intervals

- Restrictions that allow for thorough watering only twice a week should not have a major impact on the vegetable garden. With adequate soil organic content, a standard in vegetable production, the garden should be able to go two to seven days between irrigations. Follow recommendations listed above.
- Avoid heavy water use crops such as beans and sweet corn.
- Grow only what you need. Consider that one tomato plant can yield over 20 pounds of fruit.

## No Water Allowance

- Don't plant a vegetable garden. Vegetables do not go dormant like Kentucky bluegrass lawn. Consider planting containers with vegetables (if restrictions allow) and plant non-or-minimally-irrigated cover crops in the vegetable garden area. For information on growing container vegetables, refer to fact sheet 7.849, *Vegetable Gardening in Containers*. For information on cover crops refer to fact sheet 7.744, *Cover Crops and Green Manure Crops*.

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