



Questions People are asking...

- **Why are we talking about reducing household and landscape water usage?**

Water conservation for the entire household, inside and out, is always good practice: it saves money and one of the planet's most precious natural resources. The Environmental Protection Agency has determined that landscape irrigation accounts for more than 30% of all residential water use and that as much 50% of outdoor water is wasted due to inefficient watering methods. Significant savings in outdoor water usage could be achieved with proper garden design, plant selection/care, soil management and irrigation practices.

Water conservation is even more important in years with little rainfall. California and Marin County are facing the driest year on record. The current drought, which follows dry seasons in 2011 and 2012, may turn out to be the worst ever. Governor Brown has declared a statewide drought emergency and has asked residents to voluntarily reduce water consumption by 20%. Marin Municipal Water District has asked its customers for a voluntary reduction of 25%. In Spring 2014, depending upon reservoir reserves, Marin's multiple water districts will determine if mandatory water restrictions are necessary.

- **Should I even plant an edible garden this year?**

That depends upon a number of factors: how deep the restrictions might go, how many existing plants you want to maintain in your landscape and how much you reduce your indoor water use. After review of your water bills for the past few years, and a few calculations, you can determine how much water you have available for an edible garden this year. If you have an excess allocation after household use and after watering key plants in your existing landscape, you will be able to plant an appropriately sized edible garden.

Most vegetable crops require one inch or more of water each week during the growing season—this equals about 3/4 of a gallon of water per plant. In hot, dry conditions vegetables may demand more water. Even so, growing food at home is more water efficient than growing food commercially. So, if you grow a food garden, you may be using more water from your personal hose bib, but you are using less water than it would take to purchase the same food at the market.

Home edible gardens contribute to sustainability of the planet. The challenge for home gardeners is to learn to be as water efficient as possible, not just in the garden but, everywhere in the home. Reducing water consumption, harvesting water and or using graywater to irrigate ornamental landscapes are tested strategies we can employ in our homes so that we can save water and have an edible garden too.



UC Marin Master Gardeners

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Reducing Water Use in Your Edible Garden

33 things you can do to save water this year.

CONSIDER DESIGN

1. Grow only what you need.
2. Locate garden away from prevailing winds. Use fences or tall plants as windbreaks.
3. Group crops with similar water, soil, and sun needs into "hydrozones."
4. Group crops with similar root depth: deep-rooted crops such as: asparagus and artichoke (roots 4'+); medium-rooted crops such as summer squash and cucumber (roots 3'+); and shallow rooted crops such as spinach, kale and lettuce.
5. Layout in blocks, not rows, to shade roots and reduce evaporation.
6. Plan a spring garden with edibles that use residual water in the soil: Asparagus, Broccoli, Peas, etc.
7. Plan to use edibles that mature quickly—50-60 days: Emerite Runner Beans, Chard, Lemon Cucumber, Early Girl, Stupice and Sungold tomatoes, etc.
8. Grow high producers: Chard, Salad Greens, Curled Kale, Strawberries, Zephyr Summer Squash, etc.
9. Choose water wise vegetables, fruit and herbs: Sorrel, Mulberries, Rosemary, etc.
10. Incorporate water wise *native edibles*: Blue Elderberry, Golden Current, etc.
11. Choose dwarf and mini cultivars that use less water: Lemons, Apples, Fig, etc.
12. Use advanced tactics: swales and berms for passive water collection, rainwater harvest, graywater, and hydroponics.

CONSIDER PLANT CARE

13. Care for your most valuable plantings first: usually mature fruit trees, shrubs and or perennials.
14. Water when needed. Check soil moisture with finger or moisture meter. Irrigate when dry 2-4" deep.
15. Fertilize less.
16. Control weeds, as they compete with edibles for water.
17. Thin plants on time. Thin seedlings when they are 1-2" tall. Trim unwanted seedlings at soil level. Thin fruit trees when fruit is young.
18. Harvest crops on time. Take crops at peak of growth and flavor.
19. Know the signs of water and heat stress: wilting foliage, curled or yellow leaves and sunburned edges.
20. Water according to need: seeds, young and shallow rooted plants need frequent, shallow water; flowering and fruiting plants need less frequent, but deeper water.

CONSIDER THE SOIL

21. Know the soil in your garden, its texture and water holding capacity.
22. Before planting, double dig the garden to loosen soil.
23. Incorporate aged compost to increase water-holding capacity of the soil.
24. Mulch on top of soil to reduce watering needs up to 50%. Mulching reduces evaporation, moderates soil temperature, insulates roots, suppresses weeds, reduces soil compaction and prevents erosion.

CONSIDER IRRIGATION

25. Repair leaks and check regularly for new leaks.
26. Irrigate in the morning when temps are cool but rising.
27. Water deeply and less frequently.
28. Water according to plant needs and soil type.
29. Apply water slowly, to the base of plants, under mulch.
30. Avoid overspray and runoff.
31. Use low-volume drip irrigation.
32. Use emitter lines for closely spaced plants. Use individual emitters for widely spaced plants.
33. Install a WaterSense labeled smart irrigation timer. (And get a rebate from your water district.)



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Growing together!

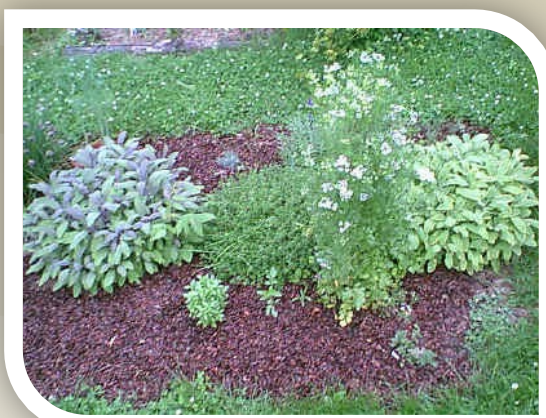
To calculate how much water is available to irrigate your seasonal edible garden: Review your water bills for the last two-three years. Chart water usage in **average gallons per day** for each month. (This number is shown on your bill.) Notice how usage increases as the weather warms and as more water is used in your landscape. Notice water usage in the winter months when landscape water is turned off. That number is your **baseline household use**. Subtract your **baseline household use** from the total water usage during the months when you are irrigating (usually May – October). The difference is the amount of water used for landscape irrigation. Reduce this number by your Water District's suggested/mandated water reduction. The result is the **average gallons per day** available for landscape and or edible garden irrigation.

Use drip irrigation. For **closely** spaced plants use in-line drip. For **widely** spaced plants, Master Gardener Steve Albert recommends: setting 1-gallon per hour (gph) emitters about 1½ feet apart for loam; and ½-gph emitters about 1½ feet apart for clay. For containers with potting soil, depending upon size, set one or more ½-gph or 1-gph emitters in each container.

How can I grow edibles with less water?

Here are four basic concepts for growing a water efficient edible garden:

1. **Grow a smaller garden.**
2. **Grow edibles that need less water including:**
 - Plants that use residual moisture in spring soil
 - Plants that mature quickly
 - Drought tolerant plants
3. **Compost and mulch**
4. **Irrigate more efficiently:**
 - Fix leaks
 - Water early in the morning
 - Water deeply and less frequently
 - Avoid overspray
 - Use a smart irrigation controller



“The watering of a garden requires as much judgment as the seasoning of a soup.”
 Helena Ely (1858-1920)
 Founder of the Gardening Club of America

What are the most water efficient edible plants?

Favorite water efficient edibles from Master Gardener Steve Albert:

- Amaranth:** green leaves used as vegetables
- Garbanzo Beans (chickpeas):** humus
- Bean (Tepary):** dry bean, tasty, nutritious
- Black-eyed Pea, a.k.a. cowpeas:** salads, soup
- Bean Yard-long Asparagus:** long, crunchy
- Chard:** grows in cool weather conditions
- Black Aztec Corn:** roast black kernels
- Eggplant:** stew, roast, fry or bake
- Mustard Greens:** tangy, spicy salad green
- Purslane:** use as a salad green
- New Zealand Spinach:** grow in spring
- Pearson Tomato:** used often for canning
- Early Girl Tomato:** medium size, tasty
- Super Roma Tomato:** good for sauce
- Golden Nugget Tomato:** great for salads

Rick Flores from UCSC Arboretum recommends water wise native edibles:

- Blue Elderberry** *Sambucus Mexicana*
- California Hazel Nut** *Corylus cornuta ssp. Californica*
- Thimbleberry** *Rubus parviflorus*
- Huckleberry** *Vaccinium ovatum*
- Golden Current** *Ribes aureum*
- California Wild Grape** *Vitis californica*
- Sierra Gooseberry** *Ries roezlii*
- Native Strawberries** *Fragaria chilonesis*
- Yerba Buena** *Satureja douglasii*

Pay attention to critical watering periods...

- **A sparagus** needs water most during crown set and transplanting, spear production and fern development. Will withstand most droughts.
- **Broccoli, cabbage, Brussels sprouts, kohlrabi and cauliflower** water needs are highest and most critical during head development.
- **Beans** have the highest water use of common garden vegetables, using 0.25 to over 0.50 inches of water per day. Beans need water most when flowering and setting fruit. Some beans are drought tolerant: Moth Bean, Black-eyed pea, Garbanzo Bean, Tepary Bean and Asparagus Bean.
- **Carrot and other root crops** need consistent moisture during root expansion. Cracking and knobby growths are symptoms of water stress, as is a hot flavor in radishes, rutabagas, turnips.
- **Celery** needs continuous moisture. Moisture deficit can stop growth.
- **Lettuce and other leaf vegetables** need water most during head development. For quality produce supply consistent moisture.
- **Onion** family crops require consistent moisture during bulbing and bulb expansion. Frequent irrigation is necessary due to small, inefficient root systems.
- **Peas** need water most during flowering.
- **Potatoes** need water most after flowering. Tubers will be knobby if they are overly dry during tuber development.
- **Tomatoes, peppers and eggplant** need water most during flowering and fruit expansion. Watch for overwatering.
- **Cucumbers and summer squash** need water most during flowering and fruiting and can be sustained with water 1-2 times per week. Moisture deficit can drastically reduce yield.

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