Food Action Team Garden Group
Corvallis Sustainability Coalition

TEN TIPS FOR AN ENERGY-EFFICIENT FOOD GARDEN

It's easy to think that all the energy for your garden comes from the sun, but that's not usually the case. Home gardeners seldom consider the fossil fuel energy it takes to grow a garden, but when you add up the energy inputs required to obtain materials, prepare the soil, plant the crops, water and fertilize them, and preserve the harvest, it's surprising how much outside energy your garden can end up consuming. In fact, it's pretty easy to burn up a lot more calories planting and growing your garden than you'll ever get out of what it yields, making it possibly more sensible to buy your produce at the store or farmers market. But there are things you can do to obtain a great yield without operating at an energy deficit. In this critical moment in history when we need to wean ourselves off of fossil fuels, making an energy budget becomes an essential consideration for every gardener. Here are some tips for making your home garden more energy-efficient.

1. **WALK OR BIKE TO THE NURSERY.** A car that gets 25 miles per gallon burns 1,240 kilocalories (Calories) per mile. A 4-mile round trip to the nursery requires almost 5,000 Calories of energy. Walking or biking use kilocalories too, but fewer than driving. For comparison, a crop of dry beans yields around 4,000 to 8,000 Calories per 100 square feet. So one trip to the nursery will undo all the energy in the beans, making them a net energy-using crop. **WHAT TO DO:** Use alternative transportation for your nursery visits: enjoy a pleasant bike ride or a walk if you're close enough. Or order some supplies by mail. If you must drive, stop by the nursery on your way to somewhere else, and try to consolidate your visits into one or two per season if possible.

   Calories to drive to the nursery: 5,000 **Calories to bicycle to the nursery: 875**

2. **SAVE WATER.** 100 gallons of municipal water requires 945 Calories of energy to pump, treat, and deliver to your garden. That's more than what a typical energy-efficient refrigerator uses in a day. A 600 square-foot garden uses over 5,000 gallons of water in a typical season, consuming 57,000 Calories of energy. **WHAT TO DO:** Grow water-efficient crops, test the soil before watering to be sure it's needed, and use a 3 to 4 inch thick mulch of leaves, wood chips or similar material to reduce evaporative losses from the soil.

   Calories to water inefficiently: 57,000 **Calories to water efficiently: ~5,700**

3. **SAVE SEEDS.** Cabbage seeds for a 1,000 square foot plot require 63 Calories to produce. That's not much, but it all adds up. Saving your own seed can reduce that energy use considerably. **WHAT TO DO:** Learn how to save seed from your garden for use the following year. Have a look at *extension.oregonstate.edu/lane/sites/default/files/collecting_and_storing_seeds.pdf* for good local info.

   Calories to seed field: 63 **Calories to seed naturally: 0**

4. **START SEEDS OUTDOORS.** Using a grow light and a heating mat to get an early start on your crops can be helpful, but it uses energy. A typical 4-tube fluorescent grow light fixture consumes over 200 watts of power (that's 172 Calories per hour!). Two 20" x 20" heating mats will burn up another 100 watts or so. Heating a greenhouse uses even more energy. **WHAT TO DO:** Consider waiting until the time is right to plant seeds outdoors, using the sun's energy instead of the grid. It's a technique that has worked for growers over 10,000 years of agriculture.

   Calories to light artificially for one season: 116,000 **Calories to light naturally: 0**

5. **USE A NO-TILL METHOD**. Cultivating soil every year causes loss of nutrients, ruins soil texture, and kills off many of the beneficial soil organisms that plants need to thrive, making it necessary to add fertilizer to replace what has been destroyed. Using a gas or electric tiller makes the situation even worse, consuming fossil fuels and releasing pollutants and noise into the environment. **WHAT TO DO:** Leave your soil alone! Maintain a thick cover of leaves and other organic material. The earthworms, beneficial bacteria, fungi, and other organisms will use that material to slowly and gently improve your soil year after year, at no cost to you or to the environment. In addition to saving labor and time, you'll need to use less fertilizer and water, and your yields will likely go up significantly.

   Calories to till garden (one gallon of gasoline): 31,500 **Calories to employ a no-till method: 0**

6. **GIVE THE FERTILIZERS A BREAK.** According to the University of Nebraska, the embodied energy of 1 lb of nitrogen fertilizer is 4.9 Calories. That's not much, but it adds up over time. Additionally, 2.55 lb of CO_2 is released during the production process, as well as 0.003 lb of methane. And most fertilizers, including organic ones, come from sources that have immense negative impacts. Fertilizers are bad for the environment. **WHAT TO DO:** If you use a no-till method and return all plant "waste" to the soil in the form of compost, you don't need to use as much fertilizer, just what's needed to replace what you extracted in the form of edible food. Plant cover crops to enrich the soil using the sun's energy.
   Calories to fertilize garden: 50 **Calories to fertilize naturally: 0**
7. **ENRICH THE LIFE IN YOUR SOIL.** Until recently we overlooked the importance of beneficial soil microorganisms in building soil and making nutrients available to plants. Now we know that the soil is teeming with good bacteria, fungi, nematodes, protozoa, and other organisms. A gram of healthy topsoil contains as many as 3 to 4 billion beneficial bacteria, not to mention all the other good critters. Our gardening practices can encourage or destroy all that life. Destroying it makes it necessary to add fertilizers and to fight increased pest and disease problems too. **WHAT TO DO:** Leave soil untilled, don't use chemical fertilizers or pesticides that kill the life in the soil, and keep that good layer of organic matter on the soil surface. Nature builds soil from the top down and you can help.
   Calories used due to harming microbes: unknown Calories to allow soil microbes to develop naturally: 0
8. **COMPOST.** With healthy soil biology, you won't need to introduce as many artificial nutrients into the soil in the form of energy-using fertilizers. A top-dressing of good compost combined with the leaves and other organic matter used as a mulch will likely provide most of what you need, saving money and effort as well as energy. **WHAT TO DO:** Build a compost pile, using garden waste, kitchen scraps, and other organic matter (no animal products, please!) as feedstock. Be sure it's fully finished before applying it to your garden; visit howtocompost.org for more information.
   Calories to transport artificial fertilizers: 5,000 Calories to compost: 0
9. **PRESERVE FOODS NATURALLY.** Energy use can continue long past harvest. Using a dehydrator, canning, and storing food in a freezer all take energy. **WHAT TO DO:** Eat as much food fresh as you can; it's better for you than stored food. Try using a solar dehydrator in late summer, air-dry suitable crops, use fermentation, or build a root cellar or other storage system that will operate without energy inputs. Have a look at *motherearthnews.com/real-food/how-to-preserve-food-zm0z71zsie.aspx* for some tips.
   Calories to dehydrate for 1 month: 25,000 Calories to eat food directly: 0
10. **DON'T WASTE FOOD.** Forty percent of all food is wasted in the United States. Think about the energy waste that goes along with that! With proper planning, most food waste can be eliminated. **WHAT TO DO:** Food waste starts in the garden. Pick produce when it's ready, and protect it from predators. Store food properly so that it doesn't spoil. And keep an eye on what's in the back of the fridge, planning meals carefully to use up food before it goes bad. If you do have to toss food, put it on the compost pile, not in the trash. Share food with your neighbors, or develop an integrated neighborhood food system with each household growing the crops that do best for them.
    Calories of wasted food: 40% of available **Calories lost from not wasting food: minimal**

The bottom line? If you follow good practices, you'll get the most productivity out of your garden for the least amount of energy. You'll also enjoy a much easier gardening regime, and the food you grow will be richer in food value (not to mention flavor). Is there a downside? Not really, unless you just can't bear to let go of your old ways. So give energy-efficient food gardening a try. You'll like it, and so will the environment!

CORVALLIS sustainability COALITION

Visit the Food Action Team Garden Group at http://sustainablecorvallis.org/action-teams/food/
Data are approximate and for illustrative purposes only.