



Climate-Friendly Gardening

Greenhouse gases in our atmosphere have created a warmer world. Our use of fossil fuels and unsustainable farming and forestry practices have produced an overload of carbon dioxide and other heat-trapping gases. Most scientists agree we can avoid the most harmful effects of climate change—worsening human health, continued loss of plant and animal species and the escalation of heatwaves, droughts, crop failures, fires and floods from superstorms and sea-level rise—if we cut our carbon dioxide emissions to net-zero by 2050. We can do this by transitioning to clean energy, improving energy efficiency, and adopting sustainable use of our lands.

Store Carbon in Garden Soils and Plants. Gardeners can help reverse the accumulation of heat-trapping gases by growing plants and building healthy soils. How? Plants use the sun's energy to pull carbon dioxide out of the air. They use it to make the sugar glucose needed for plant growth. Their roots secrete glucose and other carbon compounds to feed soil microbes that enhance plant health. The soil microbes also feast on decomposing plants and animal waste. As soil microbes die, their remains accumulate to create humus, the dark organic matter responsible for soil fertility. The carbon-rich humus in fertile soils keeps carbon out of the atmosphere for many years. Better management of our soils can capture and remove 21 percent of annual greenhouse gas emissions in the U.S.

Every gardener can help. Climate friendly gardening on the 136 million acres of residential land in the U.S. can make a considerable difference in reversing climate change. The following gardening techniques help store carbon in soils and in plants and trees.

Use Composting, Vermiculture and Biochar. Home composting helps reduce methane and other greenhouse gases from landfills. Leaves, grass, woody clippings, dead plants and food scraps make excellent compost. Garden compost feeds the soil microbes that sequester carbon and improve soil fertility. You can use compost in your garden as a substitute for synthetic fertilizers, usually at a rate of one-half to three inches of compost per year. Compost also makes excellent mulch and can substitute for peat-based potting or seed-starting mixes. Don't make it yourself? Some cities collect yard and food waste to turn into commercial compost. Alternately, try vermiculture, the use of a worm bin to turn your food scraps into worm castings. Or consider [biochar](#), a charcoal-like residue from the high-temperature firing of dead plants to make biofuels. Soils amended with biochar are better able to sequester carbon and retain water and nutrients.

Practice No-Till Gardening. A healthy soil microbial community stores large amounts of carbon in the soil. Soil bacteria and mycorrhizal fungi are adept at making minerals and other nutrients more available to plants. Avoid practices that disrupt the vital soil community; do as little digging or tilling as possible. Layer organic matter such as mulches or compost on top rather than turning it into the soil.

Maintain Climate-Friendly Lawns. Lawns act as net carbon emitters over the long-term, contributing to climate change. They often require large amounts of water, fertilizers and pesticides. The manufacture of fertilizers and pesticides from fossil fuels produces carbon dioxide emissions. Application of synthetic fertilizers generates nitrous oxide, a potent greenhouse gas. To reduce the climate impact, use recommended amounts of fertilizer to establish new lawns followed by decreasing amounts as the lawn ages. Decrease the frequency of watering and mowing, cut the grass higher, and do not bag the clippings. Replacing some lawns areas with the plants described below further reduces greenhouse gas emissions and lowers watering requirements.

Plant Trees & Shrubs. Consider replacing some of your lawn with trees or large shrubs. Their woody structures provide excellent carbon storage over many years. Trees in U.S. urban and community areas store 1.4 billion tons of carbon, and continually take up more than 26 million tons a year. Planting them near buildings creates windbreaks and shade that reduce heating and cooling energy demands.

Plant Edibles. Growing your own herbs, fruits and vegetables is a good way to make your garden more climate friendly. Home-grown food increases soil carbon and decreases carbon emissions from food packaging, refrigeration and transportation. Rotating annual crops helps maintain soil microbial health and prevent plant disease.

Grow Plants for Pollinators. Bees and other beneficial insects pollinate most plants needed to curtail climate change. Growing flowering plants helps attract and sustain declining bee populations; consider lavender, mint, borage, sage, thyme, oregano, onion, sunflower and rose. Use caution with insecticides, particularly neonicotinoids, that kill bees.

Plant Cover Crops, Including Nitrogen-Fixers. Keep soil covered with living plants, cover crops or mulches made of organic matter. Cover crops suppress weeds. They increase the soil's water-holding capacity; this prevents erosion and helps crops withstand drought. When returned to the soil, cover crops provide carbon-containing organic matter and nutrients for later plantings. Peas, beans, clovers and legumes are nitrogen-fixing cover crops that reduce the need for synthetic fertilizers.

Grow a Diversity of Plants. Choose a wide variety of species. Diverse plant life helps cultivate a soil ecosystem that can better store carbon, capture runoff and improve plant productivity and health. Perennial plantings may include ornamentals, ground covers, native plants and perennial vegetables and herbs. Consider drought-resistant varieties that are better able to withstand hotter, drier summers.

These steps can decrease your carbon emissions while gardening:

Avoid using gas-powered equipment. Weed, prune and rake leaves by hand. Consider using a push mower or electric mower instead of a gasoline-powered one. An average gas-powered lawn mower puts 90 pounds of carbon dioxide—and 50 pounds of other pollutants—into the air every year.

Minimize use of synthetic fertilizers and pesticides. Their manufacture and transport require a lot of energy from fossil fuels. When applied to soils, synthetic fertilizers emit the potent greenhouse gas nitrous oxide into the air. Instead, minimize synthetic fertilizers, insecticides, and herbicides when possible. Beer bait for slugs, insecticidal soaps, neem oil, Bt bacterial toxin and other non-synthetic pesticides are more climate-friendly than synthetic ones.

Use peat-free potting soils and seed-starting mixes. Peat bogs store large amounts of carbon. Leaving them undisturbed—instead of mining the peat moss—is an effective strategy to help reduce climate change.

*The research-based references used to draft this Tip Sheet are available
<https://extension.wsu.edu/king/mg-home/gardening-resources/tip-sheets/>*

Additional Master Gardener Tip Sheets, including "Gardening Websites" and "Gardening Publications" are available at

<https://extension.wsu.edu/king/mg-home/gardening-resources/tip-sheets/>

Also see WSU's "Gardening in Washington State" at

<https://mastergardener.wsu.edu/resources/gardening-in-washington-state/>

and free downloads of WSU gardening publications at pubs.extension.wsu.edu

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