

# The Dirty Dozen: Tips for Building Healthy Soil

## How to Carbon Farm in Your Own Backyard

by the Sierra Club, Loma Prieta Chapter, Soils Committee



Follow these easy tips to nurture a thriving garden while helping to fight climate change. Your garden will blossom as your plants begin pulling increasing amounts of carbon dioxide from the air and storing the carbon in the ground, forming rich, dark, fertile soil. And for every 1 ton of carbon stored in your soil, more than 3 tons of carbon dioxide will have been removed from the air. Healthy soil not only supports vigorous plant growth but also creates more nutritious fruits and vegetables, minimizes plant diseases and bug blight, and holds up to 30% more water.



### **DON'T USE HERBICIDES AND PESTICIDES**

Herbicides and pesticides kill not only “bad” bugs like aphids but also “good” bugs like ladybugs, bees, and butterflies, not to mention beneficial worms, fungi, and soil microbes, as well as birds, lizards, and other creatures. The more microbes in your soil, the more vigorous your garden, and the more resistant your plants are to blight and disease.

*For more information:*

[https://en.wikipedia.org/wiki/Environmental\\_impact\\_of\\_pesticides](https://en.wikipedia.org/wiki/Environmental_impact_of_pesticides)

<http://nativeplantwildlifegarden.com/how-chemicals-affect-your-soil/>



### **DON'T COMPACT YOUR SOIL**

Stick to designated paths. Walking on soil causes compaction, which hurts and kills soil life forms, which require air and water. Living soil is often spongy because soil microbes build pockets to capture air and water in the soil. Living soil can hold at least 30% more water than weak, sterile soil, making your garden virtually drought resistant.

*For more information:*

[www.allthingsdiscussed.com/Gardening/Why-compacted-soil-is-bad-for-plants](http://www.allthingsdiscussed.com/Gardening/Why-compacted-soil-is-bad-for-plants)

<http://www2.ca.uky.edu/agc/pubs/ho/ho93/ho93.pdf>



### **LEAVE LEAVES ON THE GROUND**

Rather than raking up, bagging, and throwing away leaves, pine needles, and other organic debris, leave them on the ground—it's “free mulch” and will increase the life in your soil and the health of your garden. This is a case where less (less work) is more (a thriving garden).

*For more information:*

[www.ecosystemgardening.com/life-in-the-leaf-litter-dont-throw-a-good-thing-away.html](http://www.ecosystemgardening.com/life-in-the-leaf-litter-dont-throw-a-good-thing-away.html)

[www.king5.com/story/news/local/2014/11/18/do-not-rake-your-leaves/19248923/](http://www.king5.com/story/news/local/2014/11/18/do-not-rake-your-leaves/19248923/)



### **MULCH**

Cover most of the exposed soil in your garden with one to three inches of organic mulch. Mulch feeds the beneficial soil life forms that build healthy soil, moderates soil temperatures, and conserves water, which benefits your plants and increases their drought resistance. Be sure to leave a three-inch mulch-free diameter around your plants.

*For more information:*

[www.clemson.edu/extension/hgic/plants/pdf/hgic1604.pdf](http://www.clemson.edu/extension/hgic/plants/pdf/hgic1604.pdf)



### **DON'T DIG UP OR TILL**

Don't dig up or till your garden. This disturbs or kills soil fungi, worms, and other microbes and also releases lots of carbon dioxide into the air. Dig a sufficient hole only to plant something. Placing organic compost on top of your soil, covered by mulch, and following the other tips noted here will begin building living soil for your plants.

*For more information:*

[www.waldeneffect.org/blog/Disadvantages\\_of\\_tilling\\_and\\_bare\\_soil/](http://www.waldeneffect.org/blog/Disadvantages_of_tilling_and_bare_soil/)

<http://eartheasy.com/blog/2009/01/no-till-gardening/>



### **DON'T USE SYNTHETIC FERTILIZERS**

Synthetic fertilizers kill life in the soil. As plant roots begin to rely on synthetic fertilizer for nourishment, the roots stop working with natural soil life forms, which causes them to die off. Salts from synthetic fertilizers also harm or kill soil microbes. This weakens and destroys soil life forms, making plants increasingly dependent on manmade chemicals.

*For more information:*

<http://grist.org/article/2010-02-23-new-research-synthetic-nitrogen-destroys-soil-carbon-undermines/>  
<http://healthwyze.org/index.php/component/content/article/100-how-chemical-fertilizers-are-destroying-your-body-the-soil-and-your-food.html>



### **REMOVE YOUR LAWN AND PLANT CALIFORNIA NATIVES**

California native plants are best. They evolved to thrive in our soils and dry climate and, unlike lawns and popular exotic plants, they require less water and support California's endangered bugs—like butterflies, grasshoppers, and beetles—along with the birds, lizards, and other creatures that eat these bugs.

*For more information:*

[www.nps.gov/plants/restore/pubs/intronatplant/whyusenatives.htm](http://www.nps.gov/plants/restore/pubs/intronatplant/whyusenatives.htm)  
<http://essig.berkeley.edu/endins/listed.htm>



### **ENCOURAGE FUNGI IN YOUR SOIL**

Soil fungi (or mycorrhizae) work with and “extend” roots, maximizing plants’ ability to draw nutrients from the soil. Applying organic compost and compost extract to your soil as well as careful pruning will encourage and support soil fungi, which are vital to the health of your soil.

*For more information:*

<http://www.motherearthnews.com/organic-gardening/creating-your-own-mycorrhiza-zbcz1403.aspx>



### **PLANT COVER CROPS**

Cover crops, or plants in the legume, grass, and forb families, nourish and rebuild depleted soils by increasing soil life and aeration along with nitrogen, phosphorous, and other vital plant nutrients. Among the many cover crops are sweet peas, fava beans, California lupine, California barley, wheat, and wild rye.

*For more information:* <https://www.ars.usda.gov/ARSUserFiles/30640000/pdf/cccv1-2.pdf>  
<http://plantcovercrops.com/why-plant-cover-crops/>  
<http://www.ucanr.org/sites/intvit/files/24446.pdf>



### **GROW NUMEROUS AND DIVERSE PLANTS**

The greater the diversity and number of plants you grow, the healthier your soil. This is because the biodiversity of plant life above ground mirrors the biodiversity of soil life forms underground. Deep-rooted plants, such as native California grasses, are especially beneficial, as they work with a larger volume of soil, forming networks with more fungi, bacteria, and microbes.

*For more information:*

“Diversity of Soil and Soil Organisms,” <http://soilquality.org/functions/biodiversity.html>



### **USE ORGANIC COMPOST**

Organic compost can be made by putting kitchen food scraps, yard cuttings, coffee grounds, tea bags, or shredded newspaper and cardboard into a pile or bin in your backyard. Keep the compost slightly damp and turn it with a pitchfork or shovel about once a week. Worms, beetles, fungi, and other soil microbes will eat the waste, transforming it into excellent fertilizer. Apply the fertilizer only to the surface of your soil and, for best results, cover with mulch.

*For more information:*

<http://anrcatalog.ucdavis.edu/pdf/8367.pdf>



### **MAKE COMPOST EXTRACT**

Use your compost to make an extract, the fastest way to improve soil health. Add a few trowels of compost to a bucket of water, stir vigorously, then pour it around your plants. This not only boosts the life in your soil and increases plant growth, it suppresses disease and bug blight.

*For more information:*

<http://permaculturenews.org/2012/07/11/compost-teas-and-extracts-brewin-and-bubblin-basics/>