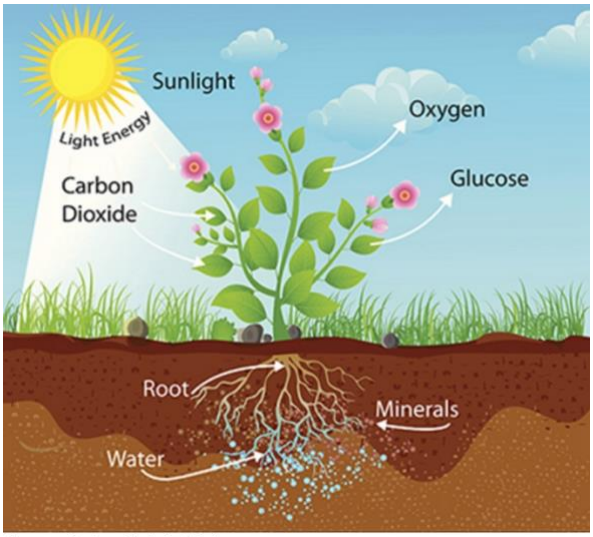
Carbon Gardening (Part 1): Introduction to Sequestering Carbon
by Will Bakx, soil scientist

This is the first article in a four-part series. In the second we will look at the use of compost to store carbon in the soil. The third article will focus on the use of mulch and the last will introduce the Landscape Carbon Calculator, an app that estimates the net carbon footprint of professional landscaping activities.

Carbon gardening is gaining momentum. It is modeled after carbon farming, where the emphasis of design and management is not on feeding the plant but rather on feeding the soil to store, or sequester, carbon. Carbon sequestration uses the process of photosynthesis to transfer atmospheric carbon to the soil or plants. Nothing new there. Plants, using sunlight as the energy source, transform carbon dioxide from the atmosphere, together with water and minerals, into organic compounds to build their structure.



Source: Carbon Cycle Institute

Most of the scientific world agrees that global warming has caused an increase in natural disasters such as extreme fires, flooding, long-term droughts and other climate changes. This happens because we have too much carbon in the wrong place: the atmosphere. Yet that same carbon is the foundation for healthy soils that produce beautiful, resilient landscapes. Enhancing carbon sequestration in the garden or landscape enhances the global ecosystem while reducing the carbon footprint of landscape design and maintenance. (Part 4 will delve into the net carbon sequestration equation.)

How can you maximize carbon sequestration in your landscape?

Test your soil to quantify your soil-carbon baseline and nutrient pool
To store carbon in the soil, it is helpful to know what the current organic carbon, or organic matter, content of your soil is. This allows you to track how much carbon you are pulling down from the atmosphere as you build healthy soil over time. At the same time, you can get an understanding of what the fertility status of your soil is and make adjustments as needed to optimize the drawdown of carbon from the atmosphere through healthy plant growth.

Avoid petrochemical fertilizers, herbicides and pesticides
Synthetic, or petrochemical fertilizers, herbicides and pesticides are derived from, or through the use of, fossil fuels. When we use these products, we are releasing ancient, stored carbon from the earth into the atmosphere, contributing to global warming. In addition, the use of petrochemical nitrogen fertilizers releases nitrous oxide into the atmosphere. According to the

EPA, nitrous oxide is 298 times more potent as a greenhouse gas than carbon dioxide and accounts for 47% of greenhouse gas emissions from agriculture[1]. Shifting to organic alternatives not only leaves fossil fuels in the earth, it reduces emissions of nitrous oxides and, as we will see in Part 2, helps build healthy soils that conserve water, improves soil structure, and contributes to a diverse microbial population as a tool in IPM.

Grow plants that can root deeply

Plants, through photosynthesis, convert atmospheric carbon into simple sugars in order to grow. In turn, plants release more than 40% of this carbon into the soil. In doing so, they support a healthy microbial population around their roots. These microbes will convert nutrients into a plant-available form, build improved soil structure so that it is easier for roots to penetrate the soil, conserve water by increasing water holding capacity in sandy soils, and improve drainage in heavy clay soils.

Plant more trees and shrubs

Trees and shrubs store much of their carbon in their biomass, both above and below ground. This is carbon that has been removed from the atmosphere, and it can be sequestered in plants for many decades.

Use compost and mulches

In the next 2 parts we will explore in detail how the use of compost and mulches can help landscapers create beautiful, resilient landscapes that benefit the climate.

For further information on how to incorporate carbon-friendly practices into your gardening, visit the Carbon Cycle Institute, which also offers suggestions applicable to larger, commercial landscapes, farms and ranches.

Will Bakx is a soil scientist, soil health consultant and compost expert based in Sonoma County. He is co-owner of Sonoma Compost and Renewable Sonoma and is committed to bringing back high-quality, affordable compost to the community.

[1] USEPA. 2015. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2013. EPA 430-R-15-004