A dirty way to fight climate change

A promising strategy: Store carbon in the soil.

By Steven I. Apfelbaum and John Kimble

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Brodhead, Wis.; and Lincoln, Neb. - Switch to compact fluorescent light bulbs and plant a tree – these are the most popular strategies for mitigating climate change today.

Yet world leaders gathering for the climate-change summit in Bali, Indonesia, next week should consider an alternative. It's one of the most overlooked yet most effective and inexpensive strategies available: Store carbon in the soil.

This is one way the earth has managed carbon since it began. The earth's soil contains the second-largest quantity of carbon, where it has been the most stable and least vulnerable to fires and climate changes. (The largest amount is dissolved in oceans.)

Planting trees sounds like a flawless solution: Trees absorb carbon, after all. But it can actually be quite harmful, even dangerous. Soil needs "riches" such as carbon, organic matter, and mineral nutrients, and they come in

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part from the "litter" left by plants that grow and die annually on the land. By planting trees in soils that were created by other, more productive plants (e.g., prairie and wetland plants that used to occupy some of today's farmland), less litter is produced. That means less carbon and organic matter are contributed to the soil, causing it to deteriorate.

In some areas, planted trees can dewater the soil. They can also release nitrogen and phosphorous in runoff that enters rivers, lakes, and estuaries and hurts water quality. More worrisome, some forested areas are becoming more vulnerable to wildfires, because changing precipitation patterns and the associated drying effects are creating a tinderbox. These changes appear to be resulting in bigger and more frequent fires (e.g., very recently in California).

Ecological lesson No. 1 is that we should plant trees only where the soils will benefit from it.

The corollary, lesson No. 2, is not to plant trees where inappropriate, for example, in farmland that used to be wetlands and grasslands. Native, deep-rooted plants should be grown in those areas instead, since they enrich the soil – with carbon, among other things – more quickly.

Lesson No. 3 is that, in the face of drought and increased wildfires, rebuilding soils is a safer strategy for storing carbon.

There are two ways to do this. First, restore conservation lands – which are not used for farming – with deep-rooted grassland or wetland plants, which sequester carbon more effectively than trees do. Second, rebuild America's soil systems in farmland, where the soil's riches have been depleted by intensive growing of crops. Few farmers are going to give up their livelihood to fill their land with grassland and wetland plants. But they can still help increase carbon soil through techniques such as "no-till" farming, in which farm-seeding equipment inserts crop seeds into slits cut into the soil. Tillage farming, by contrast, involves plowing and disrupting the soil, which releases carbon.

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Scientific analyses show that recapturing atmospheric carbon into soil and plant communities is the easiest and least expensive method for mitigating climate change and that it provides many other economic, cultural, and ecological benefits. Restoring soils in currently farmed land can rein in 10 to 15 percent of the annual carbon emissions Americans create. Replanting native grasslands and restoring drained wetlands can reduce up to another 20 percent.

These techniques can also produce usable bioenergy crops, food, and fiber supplies. This enables energy, food, and commodities to be produced locally, thus reducing transportation and distribution costs and their associated carbon emissions.

Farmers have reported that no-till agricultural practices delivered savings in just 2 to 3 years and increased crop yields by 10 percent. It also reduced fossil-fuel use for farm machinery by 90 percent.

Because it leaves leftover plant matter on the land, no-till agriculture could add 1.3 inches of soil materials and organic matter per acre over the next 50 years. The many feet of new soil would be a sponge to hold back runoff and nutrients from entering rivers and lakes and hurting potable water supplies. It would also help reduce costly, damaging floods.

We need to follow nature's lead and put carbon where the earth has securely stored it for millions of years – in the soils. Among many other benefits, this will cleanse the atmosphere, taking a big bite out of the existing greenhouse-gas loads.

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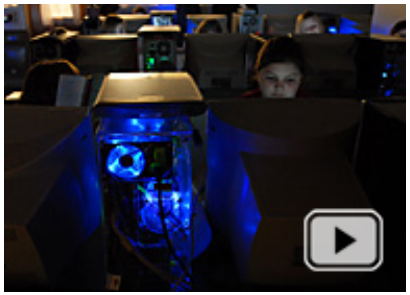

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