

## The other side of global warming

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**We have plenty of solutions at hand beyond technology by Peter Donovan 28 Oct 2007**

Quite a few farmers and graziers have accomplished some spectacular and rapid reversals of this soil carbon loss, at little additional cost. That's right, reversals. In some cases this is a byproduct of their search for sustainability, for maintaining or increasing production while decreasing their dependence on fossil-fuel inputs such as fertilizers, chemicals, and tillage. Unlike vegetation (even trees), the carbon in soil organic matter is fairly stable, lasting more than a generation on average.

### **Pasture cropping**

Colin Seis, an innovative grain and sheep farmer near Gulgong in Australia, has doubled the organic carbon in his soil in little more than a decade. He didn't set out to do this. In order to make his operation profitable, and to regenerate the fertility lost by a century of misguided farming practices, he began sowing cereal crops directly into perennial pasture, thus combining farming and intensive grazing while reducing herbicides and tillage. Profits increased because inputs decreased. Another thousand Australian farmers are following his lead, and the system is spreading to North America and Europe.

"The hardest thing to change is your head. Once you've done that, the rest is easy," he says. "Don't spend a cent," he advises farmers. "Throw away your disc plow. Put your animals into large mobs and start moving them around." These approaches increase photosynthesis while slowing decay or

respiration. No, this isn't a secret technology. It's management, enhancing and working with biospheric processes instead of going to war against them. It's not abandoning all technology and modern knowledge, going back to some mythical past. It's new knowledge, based on mimicking natural patterns.

Let me repeat that -- with good management, it's possible to take carbon out of the air, rapidly and cheaply. But good documentation is scarce, because in our technology-focused society these achievements, and the tremendous opportunities they represent, are seldom recognized. Instead, we regard land use as a fixed category, and don't pay attention to how it is managed. Researchers familiar with conventional and industrial agriculture tend to underestimate the soil carbon opportunity.

Many are hoping for some kind of technology to capture carbon out of flue gases or out of the air. So far, it's not practical or economical. Reversing combustion requires energy, and any recovered carbon or carbon dioxide becomes a disposal problem. But with good management, photosynthesis can turn atmospheric carbon into valuable soil organic matter, using free solar energy.

### Energy

As you might guess, photosynthesis captures far more energy than the entire world's mechanical power. Even in the industrialized U.S., with all our spinning shafts and gas rings, and with all our plowing, paving, burning, and herbicide spraying, those ridiculously inefficient green plants capture more energy.

### Carrying capacity?

On his small grassland farm in Virginia, Joel Salatin produces more pounds of beef, chicken, eggs, pork, lamb, and rabbit than most conventional farms or extension agents would consider possible. He does

**this with few outside inputs, and builds soil, organic matter and carbon, and increases fertility in the process.**

**Salatin's methods are described in Michael Pollan's book *The Omnivore's Dilemma*. Salatin produces such quantity and quality by working with and enhancing the biospheric processes such as water cycling, nutrient cycling, solar energy flow and synergy among species (rather than separation and confinement). By selling his products directly to his loyal customers, he makes a white-collar income from his 100+ acres of grass. The Farm Bill is likely the biggest energy policy we have. It pays farmers to refuse the free gift of solar energy by subsidizing short-season annual row crops such as corn and soybeans, and a style of agriculture that keeps mostly bare ground between plants and between crops. Nebraska and Iowa look impressively green in July and August, but much of the rest of the year they are brown, with few perennial plants growing. Soil is America's biggest export, far surpassing empty shipping containers even. Much of our agricultural "production" is really consumption.**

**Instead of free solar energy, the Farm Bill encourages the heavy use of fossil energy in agriculture, again by favoring high-yielding monocultures dependent on nitrogen extracted from the atmosphere by fossil fuels, plus herbicides and pesticides. This nitrogen (usually anhydrous ammonia) contributes to the "burning" of soil organic matter, compounding the debt.**

**It doesn't have to be this way. People have figured out how to raise excellent food using mostly solar energy while building soil -- but this isn't at all popular with fossil carbon lobbyists, or with their many influential friends.**

**Water**

**Among greenhouse gases, water vapor is the gorilla. There's more of it, and it traps lots more heat. Yet the world's soils, even in their currently dried-out state, hold five times as much water as the atmosphere. With the loss of sponge-like organic matter, soils lose much of their ability to absorb and retain water. With a magnifier, compare a bit of onion skin to a grain of sand. It's like the difference between a balloon and a brick. You can wet a brick, but you can put a quart in a balloon. Add lots and lots of zeroes.**

### **The Rafter F**

**After taking a course in the Holistic Management decision framework, Roger Bowe made big changes on his ranch in eastern New Mexico by transforming his grazing management. Instead of continuously grazing his herd over a wide area, he bunched them so as to intensify grazing and then give the plants an adequate recovery period. Careful monitoring of the soil surface conditions enabled him to adjust his grazing for best results. Over ten years, plant cover doubled, undesirable snakeweed declined by 90% and pounds of beef produced per acre more than doubled. His costs decreased significantly, giving him more profit.**

**"The words water cycle, mineral cycle, energy flow, and succession became the words we used to describe the landscape," Roger says. "This is like a foreign language to most ranchers and it is sure not what I was taught in school."**

**With less bare soil, rain infiltrates better, less of it evaporates and more is available to grow plants and recharge groundwater. A well on the property, that ran dry in the 1950s, came back with 10 feet of water in it. Roger says that during a heavy rain from a thunderstorm, his rangeland soils can absorb two**

**inches of rainfall before it begins to flow across the surface. On similar land, managed in a more conventional way, rain began running off after only half an inch. If the drying of the continents keeps more heat-trapping water vapor airborne, our current rather top-down and linear climate models don't account for it. Large-scale land clearing and tillage, along with the continued desertification of rangeland soils, lets an invisible Columbia River's worth of water evaporate skyward from the soils of the American Southwest. Our federal policy either ignores this, or doesn't care.**

**Legal protections or land idleness won't fix this situation, at least not on a timescale that matters to us or our descendants. What has proven to get more water in the soil in these environments is intensive grazing, carefully managed.**

### **The opportunities**

**We've got to reduce fossil fuels. In their new book Break Through, Michael Shellenberger and Ted Nordhaus have pointed out how transforming both our energy systems and efficiency is a huge opportunity to create millions of good jobs and revitalize our industrial base, and to move toward a positive future rather than merely try and avoid a negative one.**

**But to really address the problem, we will need to look beyond technology to the way we manage land. We do not have, nor will we be able to afford, technological replacements for photosynthesis, for water cycling or for the majority of carbon cycling -- all of which support and sustain our life.**

**Transforming human land management is also a tremendous opportunity. It promises engagement, revitalization of rural economies, a better grounded food system and enhanced human and**

**environmental health. Taking full advantage of this opportunity will involve new paradigms and a new politics.**

**If we regard nature as a kingdom or category separate from humanity, the human is often seen as a habitual criminal who can be counted on to vandalize nature for personal gain. Many prosperous developed countries have adopted a policing role intended to protect nature from the human criminal.**

### **Zoetvlei**

**Near Vryburg, South Africa, rancher Sandy Speedy has been keeping records of rainfall and kilograms of beef produced since 1972. Using the Holistic Management framework, Speedy and his family have tripled the amount of beef they produce from an inch of rainfall-by managing grazing to increase soil cover, water infiltration and soil moisture.**

**"The limiting factor is not rainfall, as we have been told, but management," Sandy Speedy says. The South African government has done away with agricultural subsidies, which Sandy says will be "better for the soil, for the water cycle in a country short of water and for the agricultural community. It is an opportunity for sound agricultural management. "Though it may be a necessary stage of development or a process of maturity, this cops and robbers game offers little opportunity for creating the kind of land management we need on our working landscapes. For this we need to move in the opposite direction -- toward the results we need rather than just punishing what we don't want. This means incentives and opportunity for the farmer, the villager, the grazier, the peasant to enhance these basic biospheric processes. By tying incentives to results, rather than practices, we could empower people to come up with their own creative, locally adapted, low-cost methods.**

**The land management we need and that provides such an opportunity for addressing both desertification and global warming, brings with it a new paradigm, a new understanding of the foundation or center of gravity of what we regard as nature.**

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**This paper is a draft of the first chapter of a forthcoming short book about the opportunities inherent in global warming. See <http://managingwholes.net> for updates and links to related projects and materials.**