

# Restoring the resource

### *A healthier soil bank can pay big financial dividends*

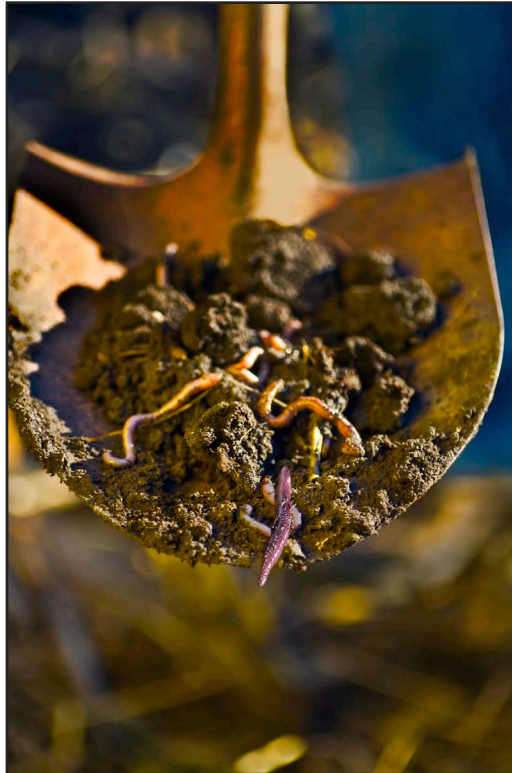
By Julia Ahlers Ness

I coordinate a project in western Minnesota that is based on the idea that producing positive environmental impacts in a watershed can happen without having to remake the entire region's landscape. Scientific studies and on-the-farm experience suggest that just a 10 percent increase in diverse crop rotations, grasses and other perennial plant systems can be enough to meaningfully improve the safety of the water, reduce flood potential, restore wildlife habitat and stimulate a thriving local and regional foods economy. This is especially true if we can target fields that are particularly sensitive to problems like erosion.

A major driver behind the Chippewa 10% Project—a collaboration of the Land Stewardship Project and the Chippewa River Watershed Project—is finding ways of making targeted conservation pay economically for farmers. We're researching, among other things, how local food systems and raising perennials for biofuel production could provide market-based incentives for more diversity in the watershed.

But what about the rest of our landscape—those row-cropped areas that may not be especially vulnerable to erosion and other forms of environmental degradation, but are still a key part of a sustainable future? I see clear signs of widespread soil degradation on row-cropped acres across the watershed: poor soil structure, loss of topsoil, poor water infiltration, wind- and

water-caused soil erosion on fields with little slope, and signs of disease and nutrient stress in crops. I'm seeing such problems even in the areas with the "best" soils. When we focus on an initiative like the Chippewa



**Feed them and they will come—the presence of earthworms is a sign that soil is full of organic matter.** (photo by Judy Olausen)

10% Project, are we accepting that the rest of the landscape is some sort of sacrifice zone, an area that will be pushed to produce maximum yields no matter what the long-term impacts on the resource are?

No. Carrying such a strategy to the extreme threatens to create a landscape where acres that have been targeted for conservation are islands awash in a sea of dead soils. Eventually, the environmental degradation on those intensively farmed soils will creep into even the most sustainably managed area, wiping out the positive impacts of all that targeted conservation. Such a strategy is an acceptance that the majority of our soils will be degraded, with a few spots here and there that are preserved.

"When we accept that our soil is a degraded resource, we think all we can do is minimize the degradation," says Jay Fuhrer, the district conservationist for the USDA's Natural Resources Conservation Service in Burleigh County, N. Dak.

Such minimizing involves utilizing Band-Aid solutions like terraces, grassy waterways and petroleum-based fertilizers to maintain the damaged soil's productivity from year-to-year. These stopgap measures may keep a field producing corn in the near term, but it comes at a cost, both economically and environmentally, and is not sustainable in the long term.

Fuhrer is part of a growing group of natural resource professionals, scientists and farmers who are recognizing that building soil health is the key to long-term sustainability across the agricultural landscape. Fuhrer is working with farmers in North Dakota who are taking a holistic approach to land management and are building soil health utilizing cover crops, minimum tillage, diverse rotations and livestock disturbance. Their focus is not on how to make that soil a kind of "plant stand" for a crop, but how to build a supportive environment for the myriad of soil organisms—bacteria, fungi, nematodes, protozoans and arthropods—that are responsible for the creation and maintenance of healthy soil, and therefore healthy plants.

When I visited Burleigh County last year (see the No. 4, 2011, Land Stewardship Letter, page 25), the excitement among farmers who were proactively building soil health was palpable. It was clear they were no longer accepting the fact that a productive agriculture requires continually adding energy-intensive inputs to an increasingly sick soil. As Fuhrer puts it, once the focus becomes taking a holistic, big-picture view and restoring that base resource, then many

## Soil health workshop Sept. 21; soil field days Sept. 22

The Land Stewardship Project and numerous partners are co-sponsoring a free soil health workshop Sept. 21 in Morris, Minn.

The workshop will be available via video link at various locations. Featured will be presentations by, among others, Jay Fuhrer (see story above) and Kristine Nichols, a soil microbiologist who has been quoted extensively on practical ways to build soil health. In addition, there will be a farmer panel discussion on the economics of soil health.

For more information on the workshop,

contact LSP's Julia Ahlers Ness at 320-269-2105 or [janess@landstewardshipproject.org](mailto:janess@landstewardshipproject.org)

### On-farm field days Sept. 22

LSP is organizing two complementary on-farm soil health field days in western and southeast Minnesota on Sept. 22 as follow-ups to the Sept. 21 soils workshop. For more information about the western Minnesota soil health field day, contact Ness. For information about the Southeast Minnesota soil field day, contact Caroline van Schaik at 507-523-3366 or [caroline@landstewardshipproject.org](mailto:caroline@landstewardshipproject.org).

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of the problems that consume a farmer's thinking, energy and money tend to disappear.

"When you look at it from the approach of restoring the soil and re-building its own biological ability to produce crops, it's a much more positive approach for the farmer," he says. "Instead of just treating the symptoms, you're taking a proactive approach."

### Hitting pay dirt

But increasing soil health on the majority of our intensively-cropped acres faces the same problem that targeting conservation in just 10 percent of a watershed does: what short-term incentives do farmers have for adopting practices that will have a long-term impact on sustainability?

Just as we've made market-based economics a major part of the Chippewa 10% Project, we need to talk about the financial payoffs that can come with building soil health. Such talk of the financials related to healthier soil is key if more farmers are to adopt systems that provide better homes for all those billions of microbes, and in turn a more sustainable environment for all of us.

The pay-offs that can come from healthier soil are starting to catch the attention of "mainstream" agriculture. For example, magazines such as *Successful Farming* and *The Furrow* recently unearthed some nice financials related to higher soil quality:

- ◆ The value of the services provided by soil organisms is estimated to be \$1.5 trillion annually.
- ◆ Organic matter makes up less than 6 percent of the soil, but it controls more than 90 percent of the soil's function.
- ◆ North Dakota farmer Gabe Brown estimates that soil with 1 percent organic matter contains 1,000 pounds of nitrogen and 100 pounds each of phosphorus, potassium and sulfur per acre. At today's fertilizer prices, that makes those organic matter-fueled nutrients worth \$650 per acre, estimates Brown.
- ◆ By improving soil health through cover crops, diverse rotations, livestock disturbance and minimal tillage, Brown says he's increased organic matter levels to around 4 percent in his soils. According to his calculations, that means those top six inches of soil are holding \$2,600 worth of crop nutrients per acre. By the way, farmers like Brown are proving

that cover crops, those plantings that are made after the main cash crop is harvested, can pay off in the near term. The conventional wisdom is that small grains like rye may protect and build the soil, but offer little immediate economic payoff. But when livestock such as cattle are brought into the picture, they can add value to cover crops via grazing.

The connection between higher soil quality and good profits is also being noticed in the financial community. Fuhrer says that his local Farm Credit Services office reports anecdotally that farms that focus on building soil health are more prosperous.

Scientists and farmers say what we know about soil biology and the potential for improving soil quality would fit into a teaspoon. There *is* a lot to learn. For one thing, we need better ways of measuring soil quality and determining if the farm practices we are utilizing are degrading or improving it.

"The days of taking soil tests for N, P and K and looking at it as a chemistry test

are over," says Fuhrer. "We need to take a biology test."

We also need to hear more from farmers and natural resource professionals who have taken concrete, practical steps to improve soil quality, and are seeing real results. As with most innovative farming practices, the best ideas in the area of soil health and economics can be gotten from the people who are on the land every day. That's one reason LSP is co-sponsoring special soil health workshops and field days in September that will feature Jay Fuhrer, among others (see sidebar, page 26).

It's time to not only stop treating our soil like dirt, but to begin treating it like a living, self-sufficient organism that pays dividends long into the future. □

*Julia Ahlers Ness coordinates the Chippewa 10% Project. For more information, contact her at 320-269-2105 or janess@landstewardshipproject.org. More information is also available at <http://chippewa10.org>.*

## Monitoring soil health

→ Monitoring soil quality is a major component of the *Monitoring Tool Box*, a 161-page Land Stewardship Project resource. Developed by the Monitoring Team, a collaboration of farmers, scientists and natural resource professionals, the *Monitoring Tool Box* also provides practical, how-to information on monitoring quality of life issues, farm sustainability and financial data, as well as birds, frogs and toads, streams and pasture vegetation. This is a comprehensive, accessible guide for farmers and others trying to be intentional about why and how they manage their land. Packaged in a three-ring binder, the *Tool Box* was developed in the field over a three-year period and has been tested and refined by crop and livestock producers throughout the Midwest.

To order a copy and for more information, see [www.landstewardshipproject.org/mtb/lsp\\_toolbox.html](http://www.landstewardshipproject.org/mtb/lsp_toolbox.html), or call LSP's Karen Benson or Caroline van Schaik at 507-523-3366.

→ To download a recent NRCS fact sheet on soil health, "Farming in the 21<sup>st</sup> Century: A practical Approach to Improve Soil Health," see [http://soils.usda.gov/sqi/management/files/21st\\_century\\_soil\\_health\\_tech\\_doc.pdf](http://soils.usda.gov/sqi/management/files/21st_century_soil_health_tech_doc.pdf).

