

Fracking the Farm

Part 2: Impacts on Farming and Crop Production

—Sue Smith-Heavenrich

This is the second of a three-part series of articles concerning the possible impacts of industrialized shale gas drilling on New York's foodshed.

In June, the Pennsylvania Association for Sustainable Agriculture (PASA) asked Pennsylvania's governor and legislature to place a moratorium on unconventional gas extraction (commonly called hydrofracking). Like NOFA-NY, PASA asked that hydrofracking be halted until studies could determine that the industrialized drilling practice will not harm farms, the food

A "Safe" Distance

As far as certification goes, NOFA-NY Certified Organic, LLC allows organic farmers to lease their land for drilling—as long as they provide a "safe" buffering distance between drilling activity and their organic fields. But what is "safe"? That's what Bret Morris and Stephanie Roberts of Hemlock Creek CSA want to know. They lease the Skoloff farm in Susquehanna County, just south of the NY/PA border, where they grow vegetables for their 60-member CSA, two farmers markets, and a local restaurant.

There's no drilling near the farm, but Morris and Roberts are worried about a future well to be drilled a mile or so east—and uphill. They're concerned about potential water contamination, because they depend on shallow wells and springs to irrigate their crops and water their animals—100 laying hens, a couple of cows, and a pair of draft horses. So each week they head out with a test kit to monitor their water, so that they can establish that their water is uncontaminated and remains so. They test for dissolved solids, pH, and conductivity—"red flag" indicators that would alert them to potential pollution. So far, their water is clean.

A few people have raised concerns about organic food being grown in a "drilling area," says Roberts, but most of their customers trust them. "They

know that we're committed to growing safe food." While drilling won't happen on the Skoloff Farm itself, Morris and Roberts worry that drilling on neighboring land may affect their farming endeavor. How close is too close when it comes to growing food near a gas well?

For Adron Dell'osa, that distance ended up being a quarter of a mile. He and his wife, Mary, leased land just south of Dimock, PA, where they grew organic vegetables for a CSA, farmers market, and local restaurant. Just one month after they moved in, a well was drilled half a mile away. A year later another well was drilled, this one a quarter mile away and located uphill from the farm. The family experienced headaches, burning eyes, and hives. It often smelled like a mix of bleach and diesel, said Dell'osa. But he hoped those problems would disappear once the drilling ended.

Then, last summer his well water changed color. When Penn State Cooperative Extension tested the water, they indicated that the color changes "could be related to drilling," said Dell'osa. But the testing wasn't extensive, and the results seemed inconclusive. Dell'osa remembers that the tests showed barium and high iron levels, but they weren't warned against using the water. The family used spring water to drink and cook, but they depended on the well for irrigation and washing the produce. "I never sold anything I didn't eat myself," said Dell'osa.

A procession of pipeline-related equipment travels along one of Bradford County's rural roads.



they produce, and the people who eat that food.

Both NOFA-NY and PASA call for the federal government to hold the oil and gas industry to the same environmental regulations as other industries. Currently, drillers are exempted from key provisions of the Clean Air Act, Clean Water Act, and Safe Drinking Water Act. Both organizations call for drillers to report publicly what chemicals they are using and to be held accountable for negative impacts.

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“But there’s an emotional weight of trying to grow pure food and fearing that it might be contaminated.” By the time their well cleared up, they had decided to leave Pennsylvania. “We want to farm where we don’t have to wonder about the safety of our water,” said Dell’osa.

Soul of Soil

Healthy soil is vital for organic farming, but drilling and related activities can compromise soil health. Brine is the salty well waste fluid that flows out of shale after drilling. Four years ago a nursery owner in Texas lost 500 oak seedlings when brine leaked out of a pipeline that was carrying the brine to an underground injection well for disposal. There’s more than just salt in brine; there is also benzene, heavy metals, and radioactive compounds. XTO Energy, the company responsible for the leak, ended up trucking more than 3,000 cubic yards of contaminated soil to a regulated landfill.

The shale oil rush in North Dakota has brought soil trouble to farmers, too. Like the Marcellus, the Bakken shale must be fracked to release the hydrocarbons. Like shale gas wells, fracked oil shale wells produce briny waste fluids. But data shows that a lot of that waste never makes it to regulated disposal sites—it is spilled or dumped along the way. Last year there were 1,000 “accidental releases” of waste fluids—almost as many as in the previous two years combined—and, according to state regulators, additional unreported releases along the roads. These spills have sterilized acres of farmland. One spill alone covered 24 acres with 2 million gallons of brine. A year after remediation efforts, nothing grows on that land. Not even weeds.

Dimock—famous for water contamination—is now facing soil contamination too. According to the July 7 *Pennsylvania Bulletin* (the state’s official gazette for information, rulemaking, and agency notices), Cabot Oil and Gas will begin remediation efforts at one of their well sites in Dimock. A study found the soil to be “impacted by VOCs (volatile organic chemicals), SVOCs (semi-volatile organic chemicals), metals, and ethylene glycol due to a release from the reserve pit and a release from the mud shelf.”

Leaking pipelines can impact crops, too. Methane and other hydrocarbons leaking into soil displace air, thus depleting the oxygen. That in turn can change soil pH and influence the microbial habitat. The result is severe retardation of crop growth and, sometimes, early senescence or death.

The Air Plants Breathe

Air quality is becoming an issue where drilling is ongoing. Even in rural areas of Wyoming and Utah, ozone levels as high as 125 to 140 parts per billion (ppb) have been recorded—much higher than EPA’s standard of 75 ppb and exceeding the smog levels in Los Angeles. In the area of the Texas Barnett shale, ozone levels reach 135 ppb, and in Fort Worth, gas drilling produces as much ground-level ozone as all the cars and trucks in the city.

Though we don’t have shale gas drilling, New York is not immune. Chautauqua County, home to about 6,000 mostly conventional gas wells, boasts the second highest ozone level in the state.



A staging area for construction activity on the Tennessee pipeline near Troy, PA.

Where does all this ozone come from? Emissions from drilling pads, truck traffic servicing those pads, and the compressors and other equipment related to drilling. Yes, the Clean Air Act regulates ozone emissions, but the oil and gas industry enjoys exemption from those regulations.

High in the atmosphere, ozone is beneficial, protecting the earth from harmful ultraviolet rays. But at ground level it’s a major pollutant, causing more damage to crops than all other air pollutants combined. Each year it’s responsible for an estimated \$500 million reduction in crop yields—and that’s just in the United States.

Ozone enters leaves through leaf pores during normal gas exchange, like oxygen, but is more reactive. It can cause spotting and bleaching of leaves, affecting plant growth, flowering, fruiting and yield. Ozone damage can make some crops unmarketable, as in the case of spotting on spinach leaves.

Grapes are particularly sensitive to ozone, says Art Hunt, owner of Hunt Country Vineyards on the northwestern shore of Keuka Lake. Before the Clean Air Act went into effect, air pollution caused spots on his leaves. That, in turn, affected vine growth, fruit ripening, and yield. Large scale industrialized drilling, he says, could roll back the gains

OZONE-SUSCEPTIBLE CROPS

Some crops are more susceptible to ozone damage than others. Even within a crop, different varieties may withstand higher levels of ozone than other varieties. Crops reported to suffer when exposed to high levels of ozone include:

- ◆ beans (string and snap)
- ◆ beets
- ◆ carrots
- ◆ corn
- ◆ grapes (wine and juice)
- ◆ melons (cantaloupes and muskmelons)
- ◆ peaches
- ◆ peas
- ◆ pinto beans
- ◆ potatoes
- ◆ squash
- ◆ strawberries
- ◆ tomatoes
- ◆ turnips
- ◆ watermelon

Ozone also affects grains, including wheat and rice, as well as tobacco, soybeans, alfalfa, sorghum, and cotton.

For more information on ozone damage, you may want to read the following:

“Effects of Ozone Air Pollution on Plants” by USDA Agriculture Research Service at <http://tinyurl.com/usda-ozone>

“How is ozone pollution reducing our food supply” by Sally wWilkinson, et al., *Journal of Experimental Botany*, Oct. 2011, at <http://tinyurl.com/jxb-ozone>

made as a result of clean air regulations.

Ozone can also make crops more susceptible to pathogens and pests and, in the case of clover and other crops, retard root growth. For farmers, high ozone levels may mean lower nutritive value of their forage crops. It may alter how well herbicides work, promote the growth of perennial weeds, and create opportunities for invasive species to move in.

Seeking the Middle Way

For all the potential losses, farmers—at least those with more acreage—may see some financial benefit from drilling. But farmers have to be vocal advocates for organic culture. Kim Seeley, who helps run the family dairy at Milky Way Farm in Troy, PA, is grateful for the money they received from the gas industry. It’s allowed them to rebuild after a fire and incorporate energy efficiencies into the farm.

Milky Way is a grass-based dairy farm that practices organic methods but isn’t certified. While there are no gas wells on the farm—their lease specified stringent restrictions to adhere to their organic practices—17 wells surround them. The nearest one is

200 feet from the farm’s property line. And the farm does have two gas pipelines running across the land.

Seeley explains other stipulations that allowed the farm to continue operations. One was to erect fencing with gates so that he could move his cows to new pastures (most companies erect fencing that has no gates in it). Another was to pay the farm to reseed the pipeline right-of-way after the company leveled the soil.

The Seeleys use gas on the farm, so they didn’t feel right excluding gas exploration or pipelines. But they did take the time to add clauses to their leases that would protect the land, water, and organic practices they value. The big problem, says Seeley, isn’t gas development. It’s the rush to do it all at once. That’s why he worked hard to help draft the PASA moratorium statement.

“The lack of planning and too much drilling contributed to the methane migration and water problems,” says Seeley. “We need a moratorium to slow down the drilling activity.”

Agriculture and environmental journalist Sue Smith Heavenrich wrote about the potential impacts of gas drilling on livestock in the Spring 2012 issue of *New York Organic News*.

Wind turbines sit atop the ridge behind the Tennessee Gas Pipeline compressor station just south of Troy, PA. Across the fence from the compressor station, the view is completely different.

