

Spoiled: Organic and Local Is So 2008

Our industrial food system is rotten to the core. Heirloom arugula won't save us. Here's what will.

—By [Paul Roberts](#)

A couple years back, in a wheat field outside the town of Reardan, Washington, Fred Fleming spent an afternoon showing me just how hard it's gotten to save the world. After decades as an unrepentant industrial farmer, the tall 59-year-old realized that his standard practices were promoting erosion so severe that it was robbing him of several tons of soil per acre per year—his most important asset. So in 2000, he began to experiment with a gentler planting method known as [no-till](#). While traditional farmers plow their fields after each harvest, exposing the soil for easy replanting, Fleming leaves his soil and crop residue intact and uses a special machine to poke the seeds through the residue and into the soil.

The results aren't pretty: In winter, when his neighbors' fields are neat brown squares, Fleming's looks like a bedraggled lawn. But by leaving the stalks and chaff on the field, Fleming has dramatically reduced erosion without hurting his wheat yields. He has, in other words, figured out how to cut one of the more egregious external costs of farming while maintaining the high output necessary to feed a growing world—thus providing a glimpse of what a [new, more sustainable food system](#) might look like.

But there's a catch. Because Fleming doesn't till his soil, his fields are gradually invaded by weeds, which he controls with "judicious" amounts of Roundup, the Monsanto herbicide that has become an icon of unsustainable agribusiness. Fleming defends his approach: Because his herbicide dosages are small, and because he controls erosion, the total volume of "farm chemistry," as he calls it, that leaches from his fields each year is far less than that from a conventional wheat operation. Nonetheless, even judicious chemical use means Fleming can't charge the organic price premium or appeal to many of the conscientious shoppers who are supposed to be leading the food revolution. At a recent conference on alternative farming, Fleming says, the organic farmers he met were "polite—but they definitely gave me the cold shoulder."

That a recovering industrial farmer can't get respect from the alternative food crowd may seem trivial, but Fleming's experience cuts to the very heart of the debate over how to fix our food system. Nearly everyone agrees that we need new methods that produce more higher-quality calories using fewer resources, such as water or energy, and accruing fewer "externals," such as pollution or unfair labor practices. Where the consensus fails is over what should replace the bad old industrial system. It's not that we lack enthusiasm—activist foodies represent one of the most potent market forces on the planet. Unfortunately, a lot of that conscientious buying power is directed toward conceptions of sustainable food that may be out of date.

Think about it. When most of us imagine what a sustainable food economy might look like, chances are we picture a variation on something that already exists—such as organic farming, or a network of local farms and farmers markets, or urban pea patches—only on a much larger scale. The future of food, in other words, will be built from ideas and models that are familiar, relatively simple, and easily distilled into a buying decision: Look for the right label, and you're done.

But that's not the reality. Many of the familiar models don't work well on the [scale](#) required to feed billions of people. Or they focus too narrowly on one issue (salad greens that are organic but picked by exploited workers). Or they work only in limited circumstances. (A \$4 heirloom tomato is hardly going to save the world.)

Such problems aren't exactly news. Organizations such as the [W.K. Kellogg Foundation](#) (which despite its namesake is a real leader in food reform) have long insisted that truly sustainable food must be not just ecologically benign, but also nutritious, produced without injustice, and affordable. And yet, because concepts like local or organic dominate the alternative food sector, there is little room left for alternative models, such as Fred Fleming's, that might begin to bridge the gap between where our food system is today and where it needs to be.

And how big is that gap? Using the definition of sustainability above, about 2 percent of the food purchased in the United States qualifies. Put another way, we're going to need not only new methods for producing food, but a whole new set of assumptions about what sustainability really means.

Food is not simple. To make it, you have to balance myriad variables—soil, water, and nutrients, of course, but also various social, political, and economic realities. But because our consumer culture favors fixes that are fast and easy, our approaches toward food advocacy have been built around one or two dimensions of production, such as reducing energy use or eliminating pesticides, while overlooking factors that are harder to define (and ditto to market), such as worker safety.

Consider our love affair with food miles. In theory, locally grown foods have traveled shorter distances and thus represent less fuel use and lower carbon emissions—their resource footprint is smaller. And yet, for all the benefits of a local diet, eating locally doesn't always translate into more sustainability. Because the typical farmers market is supplied by dozens of different farms, each transporting its crops in a separate van or truck, a 20-pound shopping basket of locally grown produce might actually represent a larger carbon footprint than the same volume of produce purchased at a chain retailer, which gets its produce en masse, via large trucks.

And for all our focus on the cost of moving food, transportation accounts for barely one-tenth of a food product's greenhouse gas emissions. Far more significant is how the food was produced—its so-called [resource intensity](#). Certain foods, like meat and cheese, suck up so many resources regardless of where they're produced (a pound of conventional grain-fed beef requires nearly a gallon of fuel and 5,169 gallons of water) that you can shrink your footprint far more by changing what you eat, rather than where the food came from. According to a 2008 report from Carnegie Mellon University, going meat- and dairyless one day a week is more environmentally beneficial than eating locally every single day.

Certainly, we can broaden concepts like food miles into more practical, ecologically honest terms. To that end, the British retail chain Tesco is testing a new labeling system that discloses a product's life-cycle carbon emissions in a per-serving figure. But even that focuses too much on a specific outcome, says Fred Kirschenmann, former director of the [Leopold Center for Sustainable Agriculture](#). Real sustainability, he argues, is defined not by a food system's capacity to ensure happy workers or organic lima beans, but by whether the food system can sustain itself—that is, keep going, indefinitely, in a world of finite resources. A truly sustainable food system is inherently resilient—more capable of self-correction and self-revitalization than its industrial rival. Unfortunately, in the real world of farming, ideas like "resilience" must compete with realities like "costs" and "profits," and producers and consumers alike gravitate toward simpler standards—even if those standards don't represent truly sustainable practices. Worries Kirschenmann, "We've come to see sustainability as some kind of fixed prescription—if you just do these 10 things, you will be sustainable, and you won't need to worry about it anymore."

This tendency to replace complexity with checklists is the hallmark of the alternative food sector. Today's federal requirements for organic food, for example, only hint at the richness of the original concept, which encouraged farmers to not only forgo chemical fertilizers but also replenish soils on-site, using livestock manure or crop rotations. The problem is that replenishing on-site is costly and time consuming. As demand for organic has grown and farmers have been pushed to gain the same *überefficiencies* as their industrial rivals, more of them (particularly those selling to chain groceries) simply import manure from feedlots, sometimes hundreds of miles away. Technically, these farms are still organic—they don't use chemical fertilizers. But is something really sustainable if the natural fertilizer must travel such distances or come from feedlots, the apotheosis of unsafe, unsustainable production? Forget about food miles. What about poop miles?

before the thought of the carbon being emitted to move manure around the country gets you down, consider that on countless farms around the world, innovative farmers are reintegrating livestock and crop operations in closed-loop, self-sustaining operations. On a seven-acre farm on the Japanese island of Kyushu, for example, polyculture pioneer Takao Furuno produces enough rice, duck meat, duck eggs, fish, and vegetables to feed 100 local families—producing, according to some measurements, an output that rivals an industrial monoculture farm's.

But even in sustainable agriculture, there's no such thing as a free lunch. To achieve such yields, polyculture requires far more intensive and continuous management than does its industrial counterpart. Furuno, for example, must carefully monitor the performance of each crop and apply any new insights the following season—

requirements that add considerably to a farmer's labor hours. [Matt Liebman](#), a polyculture expert at Iowa State University, says a reintegrated model can require almost twice the labor hours of a conventional agribusiness one.

This is a critical point: The industrial agribusiness model of simplified monoculture became dominant not only because it gave us cheap food, but because it reflected a society that was becoming more urban. Scaling up a model like Furuno's and re-creating a nation of small farmers might have appeal, particularly in the current labor market, but making it happen—that is, reversing the century-long shift away from farm labor—presents serious policy hurdles.

In fact, most of the familiar candidates for alternative food would have trouble operating on the kind of scale necessary for a world of 6.7 billion people. Consider what it would take to make our farm system entirely organic. The only reason industrial organic agriculture can get away with replenishing its soils with manure or by planting nitrogen-fixing cover crops is that the industry is so tiny—making up less than 3 percent of the US food supply (and just 5.3 percent even in gung-ho green cultures like Austria's). If we wanted to rid the world of synthetic fertilizer use—and assuming dietary habits remain constant—the extra land we'd need for cover crops or forage (to feed the animals to make the manure) would more than double, possibly triple, the current area of farmland, according to [Vaclav Smil](#), an environmental scientist at the University of Manitoba. Such an expansion, Smil notes, "would require complete elimination of all tropical rainforests, conversion of a large part of tropical and subtropical grasslands to cropland, and the return of a substantial share of the labor force to field farming—making this clearly only a theoretical notion."

That doesn't mean sustainable agriculture can't happen. But if we want to build large-scale capacity, we're going to need to broaden our definitions of sustainable practices. Suppose that instead of insisting that farmers forgo synthetic fertilizers and pesticides, as current organic regulations do, our goal was to dramatically reduce the need. We'd probably be able to recruit more conventional farmers, many of whom regard the switch to organic as highly risky. And even a small relaxation of the prohibition could open up massive potential for both crop yields and lower ecological impacts. Liebman, the Iowa State professor, has developed a farm model that uses a multiyear crop rotation (to fertilize naturally) and controls weeds naturally with populations of mice and other "seed predators" that eat weed seeds before they sprout. He uses herbicide and nitrogen fertilizers, but roughly 80 percent less than do conventional farms, while generating competitive, even improved, yields.

The local-food movement, too, must learn to bend. The reality of 21st-century America is that food demand is centered in cities, while most arable land is in rural areas. What open land remains around cities is so expensive that it either is out of reach for farmers or requires that farmers focus on high-end, high-margin products with little utility as mainstream foods. Thus, although there is great potential to increase urban agriculture (as we'll see in a minute), urbanites will always depend on rural areas for some of their food—especially given that by 2050, 70 percent of the world's population is expected to live in or near cities.

Conversely, rural areas with good farm potential will always be able to outproduce local or even regional demand, and will remain dependent on other markets. "One farmer in Oregon with a few hundred acres can grow more pears than the entire state of Oregon eats," says Scott Exo, executive director of the Portland-based [Food Alliance](#) and an expert in the business challenges of sustainability. "Attention to the geographical origins of food is great, but you have to understand its economic limits."

In short, as important as the eat-local model is, it's going to have to work within other, much larger geographic systems—especially as these geographic mismatches are only getting larger. Asia and Africa, which are rapidly overdrawing water tables, soils, and other assets essential to food production, will increasingly depend on fertile regions such as the American Midwest, whose superb soils and favorable climate can easily generate exportable surpluses—even without heavy doses of pesticides and fertilizer.

Put another way, if sustainability means food security for everyone, and not just for affluent nations, trading food over long distances is here to stay.

Yes, this pragmatism presents us with a potentially slippery slope: On the question of trade, for example, we obviously need to rethink such practices as air freighting raspberries from Mexico or salmon from Chile. And sustainability will also require a new trade model that is less vulnerable to the predatory speculation (and protectionism) that helped fuel last year's price spikes in rice and other grains. As the *New Yorker's* [James](#)

[Surowiecki points out](#), the marketization of agriculture has made the food system more efficient, but also more fragile. Restoring stability and fairness will require more state regulation—and investment.

But the risks of pragmatism must be weighed against the risk of perfectionism. We can't wait for the perfect solution to emerge; we need to start transforming the food system today—most probably with hybrid models, like Fleming's or Liebman's, that take the best of both alternative and mainstream technologies and acknowledge not only the complexity of true sustainability but the practical reality that the perfect is often the enemy of the good. And as David Swenson, an Iowa State economist, notes, the alternative food sector already operates with a certain looseness to its standards. Most organic farmers, for example, know that the legacy of conventional farming means that "it is virtually impossible to keep certain nonorganic substances out of the production processes, including modified genes." In practical terms, he says, organic is already "mostly organic." The challenge is finding some new standard that formally reflects this reality.

As this more pragmatic system emerges, it's a good bet that many of our romantic notions about alternative food production will be cast off. The vision of a nation of small farms, for example, will give way to farms of multiple scales—small farms, but also massive agricultural operations that can produce bulk commodities like grain at the lowest possible cost.

Jettisoned, too, will be the postcard image of the small farm with its neat rows of crops, vegetables, and livestock as constraints on space and resources necessitate new and quite unfamiliar designs. Proponents of vertical farms, for example, envision enormous glass-walled skyscrapers filled with vegetables, fruits, poultry, and aquaculture. Towering as high as 30 stories, and based on soilless farming, these space-age facilities would epitomize efficiency and sustainability: Water would be recycled, as would nutrients. The closed environment would eliminate the need for pesticides. Better still, the year-round, 24-hour growing season would boost yields anywhere from 6 to 30 times those of conventional dirt farms. [Dickson Despommier](#), a Columbia University public health and microbiology professor who has championed [vertical farming](#), claims that a single city block could feed 50,000 people.

Of course, Despommier's skyscraper farm would cost \$200 million to build, and skeptics question whether even a highly productive vertical farm could be profitable enough to afford pricey urban real estate. But more modest variants are already being rolled out—smaller vertical farms, as well as urban polyculture systems, such as [Growing Power](#), a Milwaukee-based farm that houses more than 20,000 fruit and vegetable plants, aquaculture tanks, chickens, goats, ducks, and bees, all in a space twice the size of a supermarket.

And in the San Francisco area, Keith Agoada is launching [Sky Vegetables](#), which partners with grocery stores to build rooftop hydroponic farms that can produce everything from lettuce to strawberries that are then sold in the stores below. Like vertical farming, Agoada's model reduces transportation, distribution, and warehousing costs—but requires a much smaller investment, since the stores already have the land. His plan is in the embryonic stage, but the potential here is massive: The nation's grocery chains have about 32,500 acres of potential "farmland"; a single [Wal-Mart](#) supercenter sits under more than four acres of rooftop—enough, according to Agoada, to produce 5.7 tons of wheat a year. The upsides, Agoada believes, will win over even those foodies squeamish at the prospect of partnering with box stores.

In the end, winning over skeptical consumers won't be enough. Given the reality of what consumers can and can't do, market liberalizers' enduring fantasy—that the collective power of tens of millions of conscientious shoppers will force suppliers to correct their bad practices—has been replaced by a grimmer understanding: Until we can make the market see all the costs of unsustainable farming, and until we learn how to temper its obsessive focus on ever greater efficiencies, market-driven sustainability will fail. This reality became evident last August, after Whole Foods recalled ground beef due to an *E. coli* scare. The problem was that Whole Foods' supplier, Coleman Natural Beef, processed its meat at Nebraska Beef, a large, low-cost plant infamous for health violations (including a 5-million-pound beef recall in July for *E. coli*). In essence, Whole Foods sought to create a new value—sustainability—without changing the supply chain.

If we're going to ask the market to pull in a new direction, we'll need to give it new rules and incentives. That means our broader food standards, but it also means money—a massive increase in food research. (Today, the fraction of the federal research budget spent on anything remotely resembling alternative agriculture is less than 1 percent—and most of that is sucked up by the organic sector.) And, yes, it means more farm subsidies: The reason federal farm subsidies are regarded as anti-sustainability is mainly because they support the wrong kind of

farming. But if we want the right kind of farming, we're going to have to support those farmers willing to risk trying a new model. For example, one reason farmers prefer labor-saving monoculture is that it frees them to take an off-farm job, which for many is the only way to get health insurance. Thus, the simplest way to encourage sustainable farming might be offering a subsidy for affordable health care.

We'll also need potent new incentives on the demand side of the equation. Sustainable food products make up only about 2 percent of our food supply in no small part because consumer demand is soft. Yes, some will pay extra for organic or local food. But for most consumers, the costs quickly exceed the tangible benefits—especially as food prices have climbed.

Given that we're not seeing spontaneous consumer demand (even after decades of consumer education by advocacy groups), we must create it via government procurement programs. Federal agencies and food programs are among the biggest purchasers of food in the world. If they didn't buy solely from the lowest-cost bidder, as they're now required to, but could instead source from local or organic producers, or farmers practicing polyculture, this massive new customer would remake American agriculture in a heartbeat. "If someone like the Department of Defense or even the VA hospitals changed how they purchased, it would be huge," says Ferd Hoefner, policy director for the Sustainable Agriculture Coalition.

But would it be sufficient? Or does sustainable food simply cost too much to be feasible? After all, industrial food is cheap not only because of the efficiencies of scale and technologies, but also because the industrial system is so good at ignoring, or externalizing, costs such as ecological degradation or poor nutrition or underpaid labor. According to the Union of Concerned Scientists, the hidden costs of conventional meat production alone are huge—each year, salmonella outbreaks cost an estimated \$2.5 billion; properly cleaning up manure leaks would cost at least \$4 billion. If our food system reinternalizes such costs—say, by shifting from feedlots to a less concentrated free-range model—food prices will rise. Grass-fed cattle can take twice as long to reach slaughter weight as corn-fed cattle and require more pastureland at a time when pastureland is in short supply—which is why grass-fed beef costs about 30 percent more than conventional beef.

Does that matter? Most Americans could afford to spend more for their food—or could afford to eat less of the resource-intensive foods. It's no coincidence that Americans, who spend less than a dime of every dollar on food—the least in the world—also consume about 200 pounds of meat per capita each year—the most in the world. But in many other parts of the world, spending more on food or cutting back on meat aren't practical or ethical options; nor are investing in vertical farms, store-top produce, or many of the other more Earth-friendly but more capital-intensive farming technologies. As Iowa State's Liebman notes, the resources for sustainable farming—not only adequate soil and water, but access to capital, technology, and market—aren't distributed fairly or evenly, which means the chances for "finding solutions in Iowa are probably a lot higher than in the Sahel."

This disparity underlines what ultimately may be the most critical question about the future of food. We may be certain that the existing food system is broken. We may also be confident that we can develop a more sustainable replacement. What we're still waiting to find out is whether sustainability is something we'll all benefit from, or whether it, too, will go to the highest bidder.