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## The Inefficiency of Local Food

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Two members of Congress earlier this month introduced [legislation](#) advancing a food reform movement promising to help resolve the great environmental and nutritional problems of the early 21<sup>st</sup> century. The intent is to remake the agricultural landscape to look more like it did decades ago. But unless the most basic laws of economics cease to hold, the smallholder farming future envisioned by the local farming movement could jeopardize natural habitat and climate change mitigation efforts, while also endangering a tenuous and temporary victory in the battle against human hunger.

The “Local Farms, Food and Jobs Act” sponsored by Senator **Sherrod Brown** of Ohio and Representative **Chellie Pingree** of Maine, throws about \$200 million to local farm programs. That’s a rounding error in the \$3.7 trillion federal budget. But the bill follows on a [federal rule](#) that gives preference to local farms in contract bidding for school lunches. It also builds on high-profile advocacy by **Michelle Obama**, who has become a leader of the food reform movement, joining the likes of **Michael Pollan**, the author of [The Omnivore’s Dilemma](#), and famed-chef **Alice Waters**. The bill’s introduction came as the world population [hit 7 billion](#), a milestone that provides a stark reminder of the challenge agriculture faces to feed a world population expected to grow to 9 billion by 2050. Experts estimate that in the next 50 years, the global food system [likely needs](#) to produce as much food as it did in the previous 10,000 years combined.

Amid heightened concern about global climate change, it has become almost conventional wisdom that we must return to our agricultural roots in order to contain the carbon footprint of our food by shortening the distance it travels from farm to fork, and by reducing the quantity of carbon-intensive chemicals applied to our mono-cropped fields.

But implicit in the argument that local farming is better for the environment than industrial agriculture is an assumption that a “relocalized” food system can be just as efficient as today’s modern farming. That assumption is simply wrong. Today’s high crop yields and low costs reflect gains from specialization and trade, as well as scale and scope economies that would be forsaken under the food system that locavores endorse.

### **Specialization and Trade**

Economists have long recognized the welfare gains from specialization and trade. The case for specialization is perhaps nowhere stronger than in agriculture, where the costs of production depend on natural resource endowments, such as temperature, rainfall, and sunlight, as well as soil quality, pest infestations, and land costs. Different crops demand different conditions and vary in their resilience to shocks. So California, with mild winters, warm summers, and fertile soils produces all U.S.-grown almonds and 80 percent of U.S. strawberries and grapes. Idaho, on the other hand, produces 30 percent of the country’s russet potatoes because warm days and cool nights during the season, combined with rich volcanic soils, make for ideal growing conditions.

In 2008, according to the USDA, Idaho averaged 383 hundredweight of potatoes per acre. Alabama, in contrast, averaged only 170 hundredweight per acre. Is it any wonder Idaho planted more acres of potatoes than Alabama?

Forsaking comparative advantage in agriculture by localizing means it will take more inputs to grow a given quantity of food, including more land and more chemicals—all of which come at a cost of carbon emissions.

It is difficult to estimate the impact of a [truly locavore](#) farming system because crop production data don’t exist for crops that have not historically been grown in various regions. However, we can imagine what a “pseudo-locavore” farming system would look like—one in which each state that presently produces a crop commercially must grow a share proportional to its population relative to all producers of the crop. I have [estimated](#) the costs of such a system in terms of land and chemical demand.

My conservative estimates are that under the pseudo-locavore system, corn acreage increases 27 percent or 22 million acres, and soybean acres increase 18 percent or 14 million acres. Fertilizer use would increase at least 35 percent for corn, and 54 percent for soybeans, while fuel use would climb 23 percent and 34 percent, for corn and soybeans, respectively. Chemical demand would grow 23 percent and 20 percent for the two crops, respectively.

In order to maintain current output levels for 40 major field crops and vegetables, a locavore-like production system would require an additional 60

million acres of cropland, 2.7 million tons more fertilizer, and 50 million pounds more chemicals. The land-use changes and increases in demand for carbon-intensive inputs would have profound impacts on the carbon footprint of our food, destroy habitat and worsen environmental pollution.

It's not even clear local production reduces carbon emissions from *transportation*. The Harvard economist **Ed Glaeser** [estimates](#) that carbon emissions from transportation don't decline in a locavore future because local farms reduce population density as potential homes are displaced by community gardens. Less-dense cities mean more driving and more carbon emissions. Transportation only accounts for 11 percent of the carbon embodied in food anyway, according to a [2008 study by researchers](#) at Carnegie Mellon; 83 percent comes from production.

### **Economies of Scale**

A local food production system would largely depend on long-term trends of growing farm size and increasing concentration in food processing and marketing. Local "food sheds" couldn't support the scale of farming and food processing operations that exist today—and that's kind of the point. Large, monocrop farms are more dependent on synthetic fertilizers and tilling operations than small polycrop farms, and they face greater pest pressure and waste disposal problems that can lead to environmental damage.

But large operations are also more efficient at converting inputs into outputs. Agricultural economists at UC Davis, for instance, analyzed farm-level surveys from 1996-2000 and [concluded](#) that there are "significant" scale economies in modern agriculture and that small farms are "high cost" operations. Absent the efficiencies of large farms, the use of polluting inputs would rise, as would food production costs, which would lead to more expensive food.

### **Health Implications**

A local food system would raise the cost of food by constraining the efficient allocation of resources. The monetary costs of increased input demands from forsaken gains from trade and scale economies will directly bear on consumer welfare by increasing the costs of food. And, as we try to tackle obesity, locavorism is likely to raise the cost of precisely the *wrong* foods. Grains can be grown cheaply across much of the country, but the costs of growing produce outside specific, limited regions increase quickly. Thus, nutrient-dense calories like fruits and vegetables become more expensive, while high fructose corn syrup becomes relatively cheaper.

Finally, higher costs on certain foods may be a solution to the big health

challenge in the developed world. But higher prices on any food are precisely [the wrong prescription](#) for the great health problems in the developing world, where millions remain undernourished. As the [food crisis of 2007-08](#) revealed, winning the war on human hunger requires a constant commitment to getting more food out of less land, water, and other inputs.

From roughly 1940 to 1990, the world's farmers doubled their output to accommodate a doubling of the world population. And they did it on a shrinking base of cropland. Agricultural productivity can continue to grow, but not by turning back the clock. Local foods may have a place in the market. But they should stand on their own, and local food consumers should understand that they aren't necessarily buying something that helps the planet, and it may hurt the poor.

**Tags:** [Agriculture](#), [Food](#), [locavores](#)