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# Math Lessons for Locavores

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IT'S 42 steps from my back door to the garden that keeps my family supplied nine months of the year with a modest cornucopia of lettuce, beets, spinach, beans, tomatoes, basil, corn, squash, brussels sprouts, the occasional celeriac and, once when I was feeling particularly energetic, a couple of small but undeniable artichokes. You'll get no argument from me about the pleasures and advantages to the palate and the spirit of eating what's local, fresh and in season.

But the local food movement now threatens to devolve into another one of those self-indulgent — and self-defeating — do-gooder dogmas. Arbitrary rules, without any real scientific basis, are repeated as gospel by “locavores,” celebrity chefs and mainstream environmental organizations. Words like “sustainability” and “food-miles” are thrown around without any clear understanding of the larger picture of energy and land use.

The result has been all kinds of absurdities. For instance, it is sinful in New York City to buy a tomato grown in a California field because of the energy spent to truck it across the country; it is virtuous to buy one grown in a lavishly heated greenhouse in, say, the Hudson Valley.

The statistics brandished by local-food advocates to support such doctrinaire assertions are always selective, usually misleading and often bogus. This is particularly the case with respect to the energy costs of transporting food. One popular and oft-repeated statistic is that it takes 36 (sometimes it's 97) calories of fossil fuel energy to bring one calorie of iceberg lettuce from California to the East Coast. That's an apples and oranges (or maybe apples and rocks) comparison to begin with, because you can't eat petroleum or burn iceberg lettuce.

It is also an almost complete misrepresentation of reality, as those numbers reflect the entire energy cost of producing lettuce from seed to dinner table, not just transportation. Studies have shown that whether it's grown in California or Maine, or whether it's organic or conventional, about 5,000 calories of energy go into one pound of lettuce. Given how efficient trains and tractor-trailers are, shipping a head of lettuce across the country actually adds next to nothing to the total energy bill.

It takes about a tablespoon of diesel fuel to move one pound of freight 3,000 miles by rail; that works out to about 100 calories of energy. If it goes by truck, it's about 300 calories, still a negligible amount in the overall picture. (For those checking the calculations at home, these are

“large calories,” or kilocalories, the units used for food value.) Overall, transportation accounts for about 14 percent of the total energy consumed by the American food system.

Other favorite targets of sustainability advocates include the fertilizers and chemicals used in modern farming. But their share of the food system’s energy use is even lower, about 8 percent.

The real energy hog, it turns out, is not industrial agriculture at all, but you and me. Home preparation and storage account for 32 percent of all energy use in our food system, the largest component by far.

A single 10-mile round trip by car to the grocery store or the farmers’ market will easily eat up about 14,000 calories of fossil fuel energy. Just running your refrigerator for a week consumes 9,000 calories of energy. That assumes it’s one of the latest high-efficiency models; otherwise, you can double that figure. Cooking and running dishwashers, freezers and second or third refrigerators (more than 25 percent of American households have more than one) all add major hits. Indeed, households make up for 22 percent of all the energy expenditures in the United States.

Agriculture, on the other hand, accounts for just 2 percent of our nation’s energy usage; that energy is mainly devoted to running farm machinery and manufacturing fertilizer. In return for that quite modest energy investment, we have fed hundreds of millions of people, liberated tens of millions from backbreaking manual labor and spared hundreds of millions of acres for nature preserves, forests and parks that otherwise would have come under the plow.

Don’t forget the astonishing fact that the total land area of American farms remains almost unchanged from a century ago, at a little under a billion acres, even though those farms now feed three times as many Americans and export more than 10 times as much as they did in 1910.

The best way to make the most of these truly precious resources of land, favorable climates and human labor is to grow lettuce, oranges, wheat, peppers, bananas, whatever, in the places where they grow best and with the most efficient technologies — and then pay the relatively tiny energy cost to get them to market, as we do with every other commodity in the economy. Sometimes that means growing vegetables in your backyard. Sometimes that means buying vegetables grown in California or Costa Rica.

Eating locally grown produce is a fine thing in many ways. But it is not an end in itself, nor is it a virtue in itself. The relative pittance of our energy budget that we spend on modern farming is one of the wisest energy investments we can make, when we honestly look at what it returns to our land, our economy, our environment and our well-being.

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