The Necessity and Possibility of an Agriculture Where Nature is the Measure

Across the farmlands of the world, climate change overshadows an ecological and cultural crisis of unequaled scale: soil erosion, loss of wild biodiversity, poisoned land and water, salinization, nitrates, expanding dead zones, the loss of farmers, and demise of rural communities. Rapid climate change seems certain to amplify the consequences, but it would be a crisis regardless. The same thing driving climate change helps drive agricultural crisis, and, until recently, helped mask it; cheap fossil fuel and the things made from it, including fertilizer and pesticides. The other driver is American commodity subsidies that focus on bushels per acre, an industrial model that much of the world wants to imitate. American agriculture is guided by a heavily entrenched set of commodity subsidies, especially through various 5-year farm bills. Export policy is the driver designed to offset our nation's balance of payment deficit, which includes the purchase of foreign oil.

We need a long-term, conserving vision. Five-year farm bills should only be mileposts for, let us say, a 50-year journey to the end of deficit spending and other degradation of our agricultural capital. Where do we begin? The United States is a big country, and the ecological mosaic is daunting. There are the soils of the upper Midwest, deep and rich in nutrients from the Pleistocene's scouring ice and watered by the moisture favorably blown from the Gulf of Mexico. What have we done with it? Soil erosion, nitrogen fertilizer, and pesticides have seriously degraded this gift of good land, the best contiguous stretch in the world.

In California rich valleys and reliable snow pack in a Mediterranean environment lessen the problem of soil erosion. But there is spraying, salinization, accumulation of toxins in the delta, and loss of farmland to sprawl.

I could continue the inventory, but the point is each region has its own problems and opportunities. So we must acknowledge that all successful corrections will be local. And that plays to an often-overlooked point: the decline of fossil fuels will require a higher eyes-to-acres ratio on the land. Cultural and ecological adaptation becomes one subject.

But looking broadly, any secretary of agriculture should see that our first order of business is to protect our soils from eroding because it is the source of most of the nutrients that feed us. And if our soils are protected, the water falling on them can be protected and properly used on its trip to the atmosphere, ocean, or aquifer. The secretary of agriculture must also look at the aggregate use of our 320 million acres of cropland. Eighty percentage of that land grows annual crops. The other 20% is devoted to perennials, such as pastures or hay, although sometimes in a rotation with annuals such as corn or sorghum.

Such an overview quickly draws one's attention to the core of what might be called "the problem of agriculture": essentially all of the high-yield crops that feed humanity—including rice, wheat, corn, soybeans, and peanuts—are annuals. With cropping of annuals (alive just part of the year and weakly rooted even then), comes more loss of precious soil, nutrients, and water.

But the problem of agriculture is about more than the annual condition. It is also about growing them in the unnatural condition of vast monocultures. This makes harvest easy, but these fields of annual monocultures have only one kind of root architecture, which exacerbates the problem of wasted nutrients and water.

The problem of agriculture is not a recent development. Soil erosion brought down civilizations long before the industrial and chemical era. Why the crisis now? Simply, a surge in human population over the last 70 years, with land lost to sprawl and the remainder used far more intensely.

What is the alternative? Prudence requires one to first look to nature, the ultimate source of our food and production, no matter how independent we feel we have become. If we look to all of its land ecosystems within the ecosphere, from alpine meadows to rain forests, we see that mixtures of perennial plants rule. Annuals are opportunists that sprout, reproduce, throw seeds, and die. Perennials hold on for the long haul, protect the soil, and manage nutrients and water to fine degree. In this regard perennials are superior to annuals whether in polyculture or monoculture. We turn to perennial mixtures as nature's way.

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The Land Institute's long-standing mission has been to perennialize several major crops, such as wheat, sorghum, and sunflowers, and domesticate a few wild perennial species to produce food like their annual analogs. The goal is to grow them in mixtures as a natural ecosystem does, to bring as many processes of the wild to the farm as we can, both above and below the surface.

Because these perennial crops will not begin to be ready for the farmer on any appreciable scale for another quarter century, we must make do by perennializing the landscape in other ways. The quickest and easiest would be to increase the number of pastures and have fewer livestock in the feedlot by phasing out subsidies for production-oriented grain commodities, that industry's lifeblood. Saving the soil and allowing water to improve is more important than having more meat or corn sugar calories than are needed.

What about California and elsewhere across the mosaic where soil erosion is less serious? First, perennials are still superior for managing nutrients and water. Second, species mixtures present the insect or pathogen with a chemical diversity that requires a complex enzyme system on their part to produce an epidemic. So nature's example can be referred to no matter where the landscape. This will start what Wendell Berry calls a "conversation with nature," which begins with three questions: What was here? What will nature require of us here? And what will nature help us do here?

Wes Jackson

The Land Institute, 2440 E. Water Well Road, Salina, KS 67401, U.S.A., email jackson@landinstitute.org