



LEOPOLD CENTER
FOR SUSTAINABLE AGRICULTURE

ONLINE EXTRA: Kirschenmann: Rethinking sustainability after the drought

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The drought of 2012, on the heels of a “500-year flood” just a few years ago, may be one of a number of changes taking place that should urge us to rethink the concept of sustainability. Ever since the notion of sustainability found its way into our lexicon several decades ago, it has focused our attention on how to make agriculture a little less bad—how to reduce soil erosion, how to mitigate the effects of toxic chemicals, how to improve our water quality, etc.

While these efforts produced some important results, this perspective presumed that the way we were doing agriculture was expedient; we just needed to improve it a bit. It assumed that our system of agriculture was stable; we just had some problems we needed to address. It is a concept of sustainability that Joseph Fiksel at Ohio State University calls “steady state sustainability.”

More recently resilience thinkers have urged us to rethink the concept of sustainability.

They suggest that “steady state sustainability” is, in fact, an oxymoron. Instead of assuming that current systems are stable and simply need to be improved, we must begin recognizing that all systems—economic, social, and natural—are constructs that are constantly changing. Furthermore, when there are certain functions, like producing sufficient quantities of food, that we want to maintain, we must redesign systems so that they can absorb shocks and disturbances, without losing those functions. In other words, we need to design systems for *resilience*, instead of designing them only for maximum, efficient production for short term economic return, which is the singular goal of industrial agriculture.

In agriculture, as well as in most of our other economic enterprises, we have been able to ignore such thinking because we have experienced a rather long period of relative stability. Ever since the dawn of the industrial revolution we have had access to an abundance of natural resources (fossil fuels, fossil water, minerals, metals, etc), relatively stable climate, and adequate sinks in nature to absorb the wastes of our farming practices. Those resources enabled us to sustain an industrial economy. That period of relative stability, and resource abundance, is now rapidly coming to an end.

The drought of 2012, in other words, is probably not going to be an isolated phenomenon which has deeply affected agriculture in Iowa, it is rather likely to be part of a new world that will require us to radically rethink how we do agriculture—how we produce food.

The drought of 2012 and the “500-year flood” of a few years ago, may not just be singular, difficult moments to endure and overcome, they may be part of a more unstable climate future that we have to learn to adapt to. Beyond that, the more unstable climates will likely also be part of additional changes that will make our industrial agriculture, which has been so successful for the past century, untenable in the near future.

In addition to more unstable climates we will also likely be facing a future without cheap energy, depleting mineral resources, like rock phosphate and potassium, depleting fresh water resources, and a future in which natural sinks



Photo taken in southern Iowa in September.

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that absorbed our wastes (excess nitrates etc.) are now saturated. Consequently all of us in the business of producing food need to ask ourselves a simple set of questions.

Can we still do what we are currently doing when:

- crude oil is \$300 a barrel,
- we have twice the number of severe weather events (more droughts, more floods, more violent storms),
- no sources of rock phosphate and potassium are readily available, and
- half of our fresh water is gone?

The resilience thinkers refer to periods of such shocks and disturbances as the entrance into a period of “uncertainty, novelty and experimentation.” And the question now before us is how do we design an agriculture that can adapt to these new circumstances and still perform the necessary function of producing reliable amounts of food?

One thing is apparent; we cannot meet the challenges ahead by simply doing more of what we have been doing. The transition we have to anticipate will require some of the most creative and imaginative thinking and research we have ever done. Preparing for “uncertainty, novelty and experimentation” that can enable us to adapt to our new future means that we cannot predict the future, but we can anticipate the changes and begin planning for them, it means that doing more of what we have been doing will not likely meet the challenge, and it certainly does not mean simply “going back” to what we have done in the past.

Fortunately we do have some resources available to us that can serve us well in designing a resilient agriculture for the future. First, we are blessed with wisdom from the past. While most of us enthusiastically embraced the industrialization of agriculture, there have always been those among us who viewed food production from a different perspective and suggested an alternative approach. Sir Albert Howard, Liberty Hyde Bailey, Aldo Leopold and others warned us almost a century ago that the industrialization of our food system could not lead to a “permanent” agriculture.

Howard warned that the “N-P-K mentality” was, in fact, a “form of banditry” because it would lead to a future which ignored the need to restore and maintain the health of the soil and so would leave future generations without that essential resource to meet future challenges.

Aldo Leopold reminded us that we humans are only “plain members and citizens” of the biotic community and that we needed to learn how to live on planet earth as partners with the rest of the biotic community, not as its “conquerors.” He warned us that while the industrialization of agriculture was “inevitable” and “no doubt desirable” it would some day die of its own “too much” not because it was bad for wildlife but because it was “bad for the farmers.”

Liberty Hyde Bailey reminded us that the earth was “holy” and that we needed to adapt agriculture to the sacredness of what nature was already doing. All three embraced a philosophy that urged us to design agriculture as “nature farming,” in other words, an agriculture that mimics nature.

Our task now is to take this wisdom from the past and marry it with the science of ecology and evolutionary biology to design a new agriculture that can prepare for the “uncertainty, novelty and experimentation” that will be required of us.

Fortunately we have some resources in hand that are already providing us with some practical possibilities. We have farmers all over the world, including here in Iowa, who can serve as beacons, farmers who are shedding light on how we might adapt to the future challenges. We also have researchers, including some here in Iowa, who are moving beyond doing “more of the same” and exploring new systems. These researchers are demonstrating that interesting new models of species diversity on the farm can prove to be more resilient and productive in unstable conditions, and some are developing perennial plants which are more resilient than annuals, require less energy and external inputs, and are more drought tolerant, while restoring soil health. We also have a new generation of young “wannabe” farmers who are interested in becoming part of the “uncertainty, novelty and experimentation” of our future agriculture.

These are all gifts of social and intellectual capital that can put us on the long journey of rethinking sustainability and enable us to adapt to our new future.

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