

Crisis and Opportunity; Sustainability in American Agricultureⁱ

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Crisis and Opportunity; Sustainability in American Agriculture: This is the title of my book published by the University of Nebraska Press in 2008. The first chapter is a paper I presented at an agricultural conference in Brandon, Manitoba in 2000. At the time, American farmers had just experienced four years of record-low real agricultural prices. I wrote “Eventually, prices for agricultural commodities will recover, at least for a year or two. However, a year or two of profitable prices will do nothing to resolve the underlying problems of American agriculture.” I continued, “Crisis is a chronic symptom of the type of agriculture we have been promoting on this continent for at least the past fifty years – symptoms of an industrial agriculture.”

In 2003, Willard Cochrane wrote a book titled, *The Curse of American Agricultural Abundance*. Cochrane, a widely respected agricultural economist, was chief agricultural advisor John F. Kennedy. He pointed out that both the demand and supply of agricultural commodities are highly *inelastic*. This means that neither the quantities demanded or supplied change very much in response to price changes, at least not in the short run. Consumers don’t eat a lot less or more regardless of how high or low food prices go. Farmers often have large fixed investments in land, buildings, and equipment that limit their ability to reduce or increase production in response to changes in prices. So small changes in quantities supplied or demanded result in big changes in prices of agricultural products.

Over the longer run, demand for food is determined primarily by population. U.S. population has increased only about 1% per year since the “baby boom” following World War II. New agricultural technologies, particularly the post-WWII chemical and mechanical technologies, have allowed U.S. farmers periodically to expand production far faster than the gradual expansion in consumer demand. This was what I was referring to in 2000 as the era of industrialization of American agriculture. The periodic surpluses in agricultural production resulted in sharp declines in prices for agricultural prices which persisted until there was an offsetting increase in demand. Cochrane calls this persistent ability to oversupply the market “the curse of American agricultural abundance.” This is what I referred to in 2000 as the “chronic crisis in American agriculture.”

Since the early 2000s, agricultural prices have recovered and fallen a couple of times. The most recent recovery was for more than “a year or two,” due primarily to increases in exports and a government mandated diversion of about 40% of the U.S. corn crop to ethanol production. As we approach 2020, we are again confronted with a farm financial crisis due to the chronically reoccurring problem of abundant or surplus agricultural production. Chronic financial crises will continue as long as farmers feel compelled to adopt new mechanical, chemical, and biological technologies that increase agricultural production faster than increases in agricultural markets.

ⁱ Prepared for presentation at the 2019 Biosolids Conference, Michigan Water Environmental Association, Southfield, MI March 13, 2019.

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As I pointed out in my 2000 presentation, “Chronic crisis in American agriculture also has meant chronic crisis in America’s rural communities, as farms have become more specialized, larger, and fewer. It takes people, not just production, to support a community. People buy automobiles, appliances, clothes, and haircuts on the main streets of farming towns. Larger farms also tend to bypass rural communities. In addition, a rural community is far more than a rural economy. It takes people to fill the church pews and school desks, to serve on town councils, to justify investments in health care and other social services, to do the things that make a community. As farms have grown larger and fewer, rural communities have lost people... and many rural communities have withered and died.”

I pointed out that the crisis of the late 1990s was “different from others in at least one respect; it signals the final stage of industrialization. The final stage is consolidation of decision making under corporate control. The giant multinational corporations are now seizing control of all aspects of American agriculture, moving beyond specialization and standardization, beyond consolidation into larger farms, and are now consolidating agricultural decision making into the boardrooms of a handful of multinational corporations. This final stage of industrialization is turning once peaceful farms into odious factories, with all of the noxious odors, environmental degradation, and inhumane working conditions that characterized heavy industry of earlier times. This final stage of industrialization is turning remote rural communities into the dumping grounds for the rest of society – whether for prisons, landfills, toxic waste dumps, or giant confinement animal factories. This final stage of industrialization could well spell the end of the American farm, and with it, the end of the American rural community.”

Unfortunately, those with the economic or political power to bring about fundamental change have paid little attention to the “curse of a corporate, industrial agriculture.” Today, the negative consequences of this curse are far better documented than when Cochrane and I wrote our books. For example, the U.S. Environmental Protection Agency has clearly identified agriculture as the leading nonpoint source of pollution of rivers and streams and a major contributor to pollution of lakes, wetlands, estuaries, and ground water.¹ The emergence of massive “dead zones,” such as those in the Gulf of Mexico and Chesapeake Bay, are the known consequence of the industrial agricultural practices.² Agriculture has also been identified as a major contributor to global climate change. Experts disagree, but most estimates credit agriculture with about 15% of human-caused global greenhouse gas emissions—about the same as transportation.³ Large-scale, animal agriculture in particular has been labeled as a major contributor of greenhouse gasses.

Agricultural pollution has also become a major public health issue. In 2015, the World Health Organization concluded that Glyphosate, the world’s most widely used agricultural pesticide, is “probably carcinogenic to humans.”⁴ Numerous scientific studies confirm that residues of Glyphosate are ubiquitous in the air, soil, water, food, and even in our bodies.⁵ Public health risks are not limited to agricultural chemicals. Scientists around the world have confirmed that the routine use of antibiotics in large-scale confinement animal operations are significant contributors to the rise in human infections by antibiotic resistant bacteria, such as the deadly MRSA. The U.S. Center for Disease Control and Prevention,⁶ the World Health Organization,⁷ and a special United Nations Summit Meeting⁸ have all called for severe restrictions or bans on the routine use of antibiotics in livestock operations for growth promotion and disease *prevention*.

In spite of the consistent decline and decay of rural communities during the agri-industrial era, industrial agriculture is still promoted as a rural economic development strategy. Economic development statistics and studies defy the logic of this strategy. For example, a 2 ½ year meta-study funded by the Pew Charitable Trust reported in 2008: “Economically speaking, studies over the past 50 years demonstrate that the encroachment of industrialized agriculture operations upon rural communities, results in lower relative incomes for certain segments of the community and greater income inequality and poverty, a less active ‘Main Street,’ decreased retail trade, and fewer stores in the community.”⁹ A 2013 follow up to the Pew report, conducted by the Johns Hopkins School of Public health, concluded these problems had only grown worse.¹⁰

A recent Wall Street Journal article labeled rural America as the “New Inner City.” It began, “For more than a century, rural towns sustained themselves, and often thrived, through a mix of agriculture and light manufacturing. Starting in the 1980s, the nation’s basket cases were its urban areas—where a toxic stew of crime, drugs and suburban flight conspired to make large cities the slowest-growing and most troubled places. Today, however, a Wall Street Journal analysis shows that by many key measures of socioeconomic well-being, those charts have flipped. In terms of poverty, college attainment, teenage births, divorce, death rates from heart disease and cancer, reliance on federal disability insurance and male labor-force participation, rural counties now rank the worst among the four major U.S. population groupings.”¹¹ Ranking below inner cities.

Another persistent theme of its defenders is that industrial agriculture is necessary to keep U.S. food prices affordable today and to “feed the world” in the future. First, industrial agriculture is not keeping food prices affordable. In fact, retail food costs have risen faster than the overall inflation rate over the past 20 years—years when crop production was intensifying and large, industrial operations were displacing independent family farms.¹² Agri-food corporations have used agricultural commodities as cheap raw materials for high-priced manufactured food products that are filled with calories but lacking in basic nutrition.

With respect to feeding the world, today’s agriculture isn’t even providing enough good food for everyone in the United States. In 2017, the USDA classified nearly 13% of U.S. households as “food insecure,” and nearly 17% of American children lived in food insecure households.¹³ Food insecurity means uncertainty regarding whether enough food will be available to meet the nutritional needs of the household. When CBS-TV aired its classic documentary, “Hunger in America,” in 1968 only 5% of the people in the U.S. were estimated to be hungry, which was considered a national emergency. Today’s hunger is acknowledged with complacency. In addition, we have an epidemic of obesity, diabetes, heart disease, hypertension, cancer, and other diet-related diseases that threaten our nation’s physical and economic future.

Furthermore, the rest of the world doesn’t need an industrial food system. Contrary to popular belief, the food needs of 70% to 80% of the people of the world still are being met by small family farms, most of which we would call “subsistence farms.”¹⁴ Not industrial agriculture. U.S. agriculture exports are sold to those who can pay global market prices, which does not include the world’s poor and hungry. Highly credible global research has shown that with minimal public assistance, and nonindustrial technologies, the world’s small family farmers would be quite capable of doubling or tripling their production, without using industrial agriculture—not only

feeding themselves but also “feeding the world.”¹⁵ The diet/health problems we have seen in the U.S. have developed wherever the industrial model of agri-food production has been imposed on the people. Much of the rest of the world neither wants nor needs industrial agriculture.

The bottom line, today’s global corporately controlled agri-food system is rapidly becoming indefensible. The chronic crisis in American agriculture has become critical. The fundamental question now is whether to try to fix the current system or instead to replace it. The dominant players in the current system are trying to fix it, as replacing it would mean losing their position of dominance. Virtually every major agri-food corporation now includes *sustainability* in its mission statement and issues an annual sustainability report to convince its investors and customers that they are responding to growing public concerns. In the meantime, the industrial agriculture establishment is trying to restore confidence and trust in the current agri-food system through a multi-million dollar public relations campaign. This PR campaign is funded through various “front groups” by the agribusiness corporations, such as Monsanto, DuPont, and John Deere, and mainstream agricultural organizations, including the American Farm Bureau Federation and major crop and livestock producers associations.¹⁶

Admittedly, some of the large agri-food corporations are modifying their production practices, when deemed economically feasible—likely to temper growing public demands for stricter government regulations. Both Tyson and Purdue have announced they have or will stop using antibiotics in their poultry operations.¹⁷ Walmart recently joined McDonald’s on a growing list of food retailers and restaurateurs announcing intentions to source eggs from “cage-free” poultry operations.¹⁸ Large agri-food corporations have also embraced organic food production—after they found means of industrializing and dominating the organic movement.¹⁹ Industrial producers of row-crops are promising to reduce agricultural pollution of streams and aquifers, if they are given government funds to incentivize and additional time to implement voluntary programs.²⁰

Increasingly, large, commercial farming operations are utilizing “precision farming”²¹ systems. Precision farming relies extensively on digitized data gathered from soil tests and yield monitors, to control GPS-guided seeding, fertilization and pesticide application and relies on real-time monitoring of crop conditions via drones and satellite.²² This high-tech, biotech, info-tech, “climate-smart” approach to agriculture²³ is being promoted as the key to sustainable increases in food production to meet the growing global demands for food. “Big Data”²⁴ is a new buzzword for the massive data bases that are being compiled for precision farming in the U.S. and around the world. A few multinational agribusiness corporations, notably Bayer/Monsanto, assemble, own, and control a large share of the “big data.”²⁵ Some futurists envision a food system that is essentially controlled at every level, from dirt to the dinner plate, by decisions made by computers and carried out by robots.

Most attempts to defend and protect industrial agriculture have tended to focus on separating and insulating agriculture from the ecological and societal contexts in which farms must function, whether through deceptive PR or actual changes in production practices. Farming by GPS guided robots and drones would reduce future needs for farm workers and rural residents in general, reducing the associated risks to public health. Confinement livestock and poultry operations remove animals from their natural habitat and isolate them physically and visually from public exposure. Hydroponic vegetable production removes crop production from reliance on soil

fertility as well as the vagaries of climate and weather. Genetic engineers are attempting to weather-proof crops against the uncertainties of climate change. Agricultural zones also have been proposed to completely separate farming from rural residential communities.

Industrial agriculture advocates are hedging their bets by using their political influence to reshape farm and food policy. One of their favorite tools has been “Right to Farm Laws,” which became popular in the 1980s as a means of protecting farmers from nuisance suits by neighbors who are adversely affected by their operations.²⁶ All 50 states now have some type of Right to Farm legislation. A recent trend has been to expand protection to explicitly include industrial farming systems, such as concentrated animal feeding operations and genetically modified crops, as “normal farming practices”—thus protected them from nuisance suits. Another recent trend is to limit punitive or non-economic damage claims and to prohibit second suits by the same plaintiffs and even prohibit initial suits in the absence of violations of existing regulations.²⁷

These and other state and federal exemptions of industrial agriculture from regulation seem to be paving the way for a long run strategy of establishing “agricultural zones” where industrial agriculture can operate virtually free of government regulation or threat of private legal actions by neighbors. For example the *Indiana Land Resource Council* has proposed “Model Agricultural Zoning Ordinances,” based on how “counties in other states have developed their zoning ordinances to minimize conflicting uses and ensure that agriculture remains a strong component of the county's economy.”^{28,29} If the ecological “fixes” of industrial agriculture fail, many rural areas might well become sacrifice zones. “Farming” in such zones would be carried by computers, robots, and a few workers who live outside the zones and hopefully are protected from the chemical and biological hazards of industrial agriculture while working.

Clearly, American agriculture is in another time of crisis, not only another chronic financial crisis but a critical crisis that could fundamentally change the ecological, social, and economic viability not only of rural America but the future of humanity. Thankfully, as I pointed out in my presentation in 2000, in every crisis, there is also opportunity. I wrote, “A crisis is a decisive moment, a critical time, or state of affairs whose outcome will make a decisive difference for either better or worse.”³⁰ The evidence is now compelling that our responses to past crises in American agriculture have made the situation worse—most certainly not better. We can’t go back and undo what has been done, but we can use the current crisis as an opportunity to make a decisive difference for the better, not worse, not only for American agriculture but for humanity.

For the past one hundred years, but particularly the past thirty years, thousands of well-educated, insightful, thoughtful, caring people, including farmers, have been working diligently to create a new post-industrial agriculture. They are creating a sustainable agriculture that is capable of meeting the food and fiber needs of all in the present and doing it without polluting the environment, depleting the soil or water, or otherwise diminishing opportunities for those of future generations. The alternative farming systems go by names such as organic, ecological, biological, biodynamic, sustainable, resilient, regenerative, and restorative agriculture, as well as permaculture, holistic management, and nature farming. The unifying principle of all of these alternatives is their recognition and respect for the inherent interconnectedness of agriculture with its natural environment—with the air, water, soil, and energy—the things of nature and with people—rural residents, consumers, and society in general.

These alternatives share common roots in the scientific principles of agroecology, which applies the science of ecology to agriculture.³¹ Ecology is a study of the relationships of living organisms, including humans, with the other elements of their natural and social environment. In living systems, all things are interconnected—some in important ways and others less so. All elements of farms and farming—soil, plants, animals, workers, farmers—are interrelated with everything else. Farms are also integrally connected with the natural bioregions and social communities within which, and for which, they function. Agri-food economics, being creations of societies, are but one dimension of the larger agroecological environment.

I first became aware of agroecology when I moved from the University of Georgia to the University of Missouri in 1988 to assume a leadership position for sustainable agriculture research and education programs. Sustainable agriculture was a new area of work for me, as it was for most others in the U.S. at that time. In September 1988, I attended an International Sustainable Agriculture Systems conference in Columbus, Ohio. It was organized by the “Agroecology Program” at The Ohio State University. For me, this was the beginning of a 30+ year learning process that continues today.

I had spent the first half of my 30-year academic career as an agricultural economist educating and advocating for industrial agriculture. I told farmers that farming had to become a business, not a way of life. I advised farmers they should be prepared to “get big or get out” of farming because farms would have to achieve economies of scale to survive. They needed to specialize, standardize, mechanize, and grow into larger, more economically efficient operations. I believed what I had been told. I was convinced that the industrialization of agriculture would reduce costs of agricultural production, allowing food prices to fall, and making good food affordable for everyone. I believed also that opportunities for farmers to profit from industrial agricultural innovations would ensure the viability of independent family farms and allow rural communities to prosper, providing a desirable quality of rural life. I was wrong.

During the “farm financial crisis” of the 1980s, it became obvious that most farmers weren’t leaving agriculture voluntarily, they were being forced to leave—and in the process, many were losing not only their lifetime investments, but also their way of life, and some, their lives. Rural communities were not prospering, they were dying—because communities need people, not just production or profits, to thrive. Only later, I became aware of the soil degradation and the air and water pollution inherent in the industrial agriculture—as in other industrial operations. I eventually concluded that industrial agriculture wasn’t sustainable. The chronic financial crises of agriculture were growing into a crisis that threatened the future of farming and rural America.

I couldn’t continue teaching things I no longer believed, so I sought opportunities to shift my career to education and avocation for agricultural sustainability—which took me to the conference in Ohio in 1988. I didn’t become fully aware of the importance of the agroecology movement until 2014. That year, I was commissioned by the Food and Agriculture Organization of the United Nations to write the regional report on Family Farms of North America in recognition of the International Year of Family Farming.³² At the international conference in Rome, where I presented my report, advocates of the global “Food Sovereignty” movement were well represented. Agroecology was the natural model of choice for the movement, as it proclaims “The

right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems."³³ The Food Sovereignty movement has advocates in more than 80 nations around the world.³⁴ Perhaps more relevant to U.S. farmers, agroecology provides a science-based conceptual foundation for the *sustainable/local food movement*, which I believe could evolve into an American food sovereignty movement and eventually become the new agri-food system of the future.³⁵

The problems of industrial agriculture are *systemic* and thus can be solved only by changing the agricultural *system*. The defenders of industrial agriculture are focusing on specific problems rather than focusing on the *industrial system* as the source of the problems. Solving one problem invariably creates another. For example, solutions to declining soil productivity and pest pressures inherent in monocropping created new water pollution and food safety problems. Solving problems of farm economic efficiency through economies of scale created new economic survival problems for small and mid-sized family farms and rural communities. Focusing on production of cheap calories resulted in a host of diet related health issues. Any future attempt to solve the environmental and social problems of industrial agriculture can be expected to create problems elsewhere in the system—including facilitating corporate control of the global food system.

The fundamental problem with industrial agriculture is that it is organized and functions according to the mechanistic paradigm or model of industrial development. Fields and feed lots are designed and managed to function like biological assembly lines. The social and ecological context within which agriculture functions are organismic rather than mechanistic. They are living natural ecosystem and human communities which function as organisms, not mechanisms. The specific negative ecological and social consequences of specific actions taken in trying to fix the industrial food system may not be precisely predictable, but they are inevitable. The mechanistic nature of today's industrial food systems inevitably conflicts with the organismic nature of the ecological and social systems within which they function. Thus, attempts to solve specific problems to make systems less bad often create unintended consequences that instead make them worse. The crisis in American agriculture is inherent within the industrial paradigm or model of farming and food production. The only lasting solution is to choose an alternative system of farming and food production that functions in harmony with nature and society. Agroecology represents such a system.

The potential of agroecology as a credible alternative is supported now by several decades of highly credible global research. A 2016 independent study by an International Panel of Experts in Sustainability (IPES) funded by the United Nations cited more than 350 scientific sources and described evidence supporting the indictment of industrial agriculture as “overwhelming.”³⁶ The IPES members are from highly respected academic institutions and international organizations around the world. They concluded: “Today's food and farming systems have succeeded in supplying large volumes of foods to global markets, but are generating negative outcomes on multiple fronts: widespread degradation of land, water and ecosystems; high GHG emissions; biodiversity losses; persistent hunger and micro-nutrient deficiencies alongside the rapid rise of obesity and diet-related diseases; and livelihood stresses for farmers around the world.”³⁷

The report concludes: “What is required is a fundamentally different model of agriculture based on diversifying farms and farming landscapes, replacing chemical inputs, optimizing

biodiversity and stimulating interactions between different species, as part of holistic strategies to build long-term fertility, healthy agro-ecosystems and secure livelihoods. Data shows that these systems can compete with industrial agriculture in terms of total outputs, performing particularly strongly under environmental stress, and delivering production increases in the places where additional food is desperately needed. Diversified agroecological systems can also pave the way for diverse diets and improved health.”

Olivier De Schutter, leader of the independent panel observed, “It is not a lack of evidence holding back the agroecological alternative. The way food systems are currently structured allows value to accrue to a limited number of actors, reinforcing their economic and political power, and thus their ability to influence the governance of food systems.”³⁸ Farm bills and food policies can be changed. The current agricultural crisis gives us an opportunity to choose a science-based, farmer-verified alternative to the failed industrial systems of farming and food production.

Agroecology also will face many challenges. This new kind of agriculture must increase sufficiently in farm numbers, productivity, and economic efficiency to meet the food needs of a growing global population. U.S. farmers are already producing more than enough to provide domestic food security for the foreseeable future. The problem in the U.S. is not productivity, but sustainability. Agroecology need not increase but only sustain production, which research indicates is feasible.³⁹ With a global shift to agroecology, the U.S. could shift its agricultural foreign food aid programs to helping farmers in the rest of the world increase production without industrialization. A global extension program focused on agroecology could solve the problem of global food security, if we see people in other countries as people rather than export markets.

Shifting from large-scale, industrial livestock feeding operations to grass-fed, pasture-based, free-range livestock and poultry production might initially result in modest increases in costs and retail prices. However, reduced grain feeding would free up land for food-crop production. Much of the essentially abandoned marginal farmland in the U.S. could be put into management-intensive, pasture-based production—with modest economic incentives to do so. Relocalizing fruit and vegetable production to urban and peri-urban areas, many of which were settled because of fertile soils, would increase the affordability of organic and sustainable produced fresh produce. Any ultimate increases in U.S. food prices resulting from an agroecological food system would be tolerable, since the farm-level share of each retail dollar spend for food is only about 15 cents. A 50% increase in farm level costs would add only 7% to retail food prices, which is affordable.

The agroecological alternative can succeed only by transforming the entire food supply chain, from farmer to eater. Today’s corporately-coordinated, industrial system will need to be transformed into an interconnected network of community-based food systems or interdependent bioregional foodsheds. This will not be easy, but is not impossible. I personally lived through such a transformation of the American food system. When I was growing up in southwest Missouri, I suspect more than 80% of my family’s food was produced and processed on the farm or within 50 miles of our farm. We had local meat packers, flour mills, bakeries, creameries. There were no supermarkets or franchised restaurants. But change came quickly following World War II. The entire food system was transformed during last half of the 20th century, in 50 to 60 years. The sustainable/agroecological food system is further advanced today that the industrial food system of my childhood. A transformation in the food system happened then and it can happen again.

I believe the ultimate challenge of agroecology will be to restore the integrity of human relationships. Farmers must nurture healthy relationships within and among soils, crops, livestock, people, communities, and economies. Food sovereignty will require a renewed commitment among people in rural and urban communities to rebuild thoughtful and caring relationships with their neighbors, local farmers, and through farmers, with the earth. People must be willing to place a higher priority on relationships than on convenience and cost, if everyone in the community is afforded access to “enough good food.” Sustainably produced foods must be affordable and accessible to all, but they need not be cheaper than industrial foods. Agroecology will require many more thoughtful, caring farmers, more thoughtful, caring consumers, and ultimately, more supportive federal, state, and local farm and food policies.

I don't know what role any given profession or individual may play in meeting the challenges and realizing the opportunities in today's crisis in American agriculture. Perhaps the challenge of professionals working on issues related to bio-solids is to find ways to return human biological wastes to local farms,—safely, effectively, and efficiently—to help create regenerative, biological, agroecological systems of farming and food production. Regardless, I believe we each have a purpose in life—not necessarily something specific we are meant to achieve but a path we are meant to walk through life. Even though we each have unique purpose or path to walk, I believe we are all meant to contribute our unique part to some common greater good.

We are interconnected with each other as well as with the other living and nonliving things of the earth. Thus, we cannot walk our path of purpose alone. We must rely on others and others must rely on us. We must remain vigilant as to whether our individual actions are guided by good intentions. But, we must also remain aware of whether our individual actions are contributing to the greater good of society, humanity, and the earth. If we are to realize the opportunity in the current crisis in American agriculture we must each contribute whatever we can to help create a new food system that contributes to, rather than detracts from, the common greater good.

End Notes

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