

THE CURRENT STATE OF AGRICULTURE

Does It Have a Future?

Frederick Kirschenmann

If the [current] pattern holds, farming as a way of life will mainly disappear within the next 50 years, large swaths of the country will be virtually depopulated.

-Jedidiah Purdy

When in the mid-1970s Wendell Berry was writing his singular work *The Unsettling of America*, the industrialization of agriculture was already well underway. The transformation of agriculture into an industry was enthusiastically endorsed by many agricultural pundits and "experts." In fact, as Berry tells us in the preface to the first edition of *Unsettling*, he was "incited" to begin taking the first notes for his book in 1967 when Pres. Lyndon Johnson's special commission on federal food and fiber policies made its report. In the view of the commission, a major problem with U.S. agriculture was that we still had too many farmers on the land. The "technological advances" had so reduced the need for farm "manpower" that national farm income simply could no longer support as many farmers.

The industrialization of agriculture, particularly after the Second World War, precipitated a free fall decline in farming populations. Indeed, as a study by Calvin Beale has indicated, the decline in farm populations was a trauma not tied to market and price fluctuations, but rather was endemic to the industrialization process itself.¹ The result: "the total number of farms has declined from 6.5 million in 1935 to 2.05 million in 1997, and most of this huge decline took place among family-type farms."² The decline in farm population can no longer be seen as an aberration, or a correction to an otherwise healthy system. It is also instructive to recognize that while farmers have been reluctant to adopt industrialization, in the end they have almost always complied. Frederick Buttel points out that farmers have been aware of the spending treadmill that industrialization inevitably puts them on, but economic forces ultimately force them into compliance.³

For the most part the situation has continued to deteriorate since the publication of *The Unsettling of America*. Not only have farm numbers continued to decline (with the exception of the very small farms), but we are now faced with major structural changes that threaten to dramatically alter the landscape of rural America. Here is what we are seeing.

We are moving rapidly into a bifurcated food and farming system. At one end of the scale are a decreasing number of increasingly large farms that produce a single, undifferentiated bulk commodity, for a consolidated firm, most often under a contract written to accommodate the business interests of the firm. According to the most recent (1997) USDA statistics, 61 percent of our total national agricultural product is now being produced by just 163,000 farms, and 63 percent of that production is tied to a market or input firm by means of a contractual relationship.

Direct-market farms occupy the other end of the spectrum. These farmers sell their products directly to food customers through various marketing arrangements—farmers' markets, community supported agriculture arrangements (CSAs), direct sales off the farm, home deliveries, and various Internet networks that directly link producers and consumers. This is a rapidly growing sector of the food industry, but it remains a tiny portion of the food and agriculture system. No reliable statistics exist to establish what portion of total agriculture production is served by direct marketing. But since 1.3 million of American farmers, those classified as part-time or retirement or residential farms, account for only 9 percent of the total national agricultural product⁴, we can imagine that the direct-market farmers capture only a tiny percent of that meager margin.

Yet these direct-market farms have increased significantly. CSAs have grown dramatically all across the country and farmers' markets have grown substantially. In California alone, farmers' markets are now reportedly a \$100 million business. The number of these farms is likely to continue to grow, especially on the urban fringe and in regions unsuitable for industrial farms. Yet, they will likely always comprise only a tiny segment of production agriculture.

In between these two farm sectors we have approximately 575,000 farms, classified as small to midsize family farms, that produce 30 percent of our total national production. Twenty-seven percent of these farms are tied to a marketing or input firm by means of a contract that determines at least some of the management decisions on the farm.⁵ So, while we still have nearly 2 million farmers in America—slightly less than the total number of prisoners housed in our nation's prisons—the majority of our production comes from a handful of very large farms.

These statistics might not be so troubling were it not for their implications for the future. As these trends play themselves out, we are likely to see some dramatic changes on America's landscape that I suspect will be equally disturbing to urban and rural citizens.

CHANGES ON THE LANDSCAPE

First, the food and agriculture system now emerging from this industrialization process will dictate how farm management decisions are made. Farmers will no longer be able to make management decisions to serve the interests of their farm or the community in which the farm exists. They must make choices that serve the business interests of the consolidated firms with whom they contract. Rapid consolidation, initially in the seed and manufacturing sectors, but now in the food

retailing sector, means that about six multinational retail firms will determine not only the size of America's farms, but also the type of management decisions made on those farms.⁶

Independent farmers, selling their production into the free market, have always made on-farm decisions based on a variety of intended outcomes. In addition to managing the farm for profitability, most farmers also made decisions that assured the survival of the farm in its particular community so that it could be passed on to future generations in good health. This is *not* to suggest that small, independent farms have always been managed to prevent soil erosion, protect water quality, or maintain vibrant communities. There is a long history of degradation and loss that belies such a romantic picture of the yeoman farmer of the past.⁷ But it *is* fair to say that many independent farmers have included these nobler considerations in their management decisions as a way of insuring the health of the farm for future generations. As farmers now are increasingly forced into contractual arrangements with highly consolidated firms-"forced" because no other markets will remain open to them-on-farm decisions will, of necessity, be made based on the business interests of the firm issuing the contracts. The nobler considerations of the past will be ignored.

The business interests that drive these large consolidated firms are based on three primary objectives: the development of supply or value chains, biological manufacturing, and the reduction of transaction costs.⁸ Each of these business objectives will have a profound effect on how local farms are managed.

The *development of supply chains* means that on-farm decisions will no longer be made to benefit the long-term economic viability of the farm, or the quality of life in the community, or the health of the natural resources that sustain the farm. Decisions throughout the supply chain will be made solely to compete effectively with other supply chains and to gain a larger share of the consumer's food dollars.

The introduction of the concept of *biological manufacturing* means that farmers can no longer manage their farms to encourage the normal functions of the animals on the farm, or to enhance the diversity of the landscape, or to promote the general health of the farm. Rather, farm management will necessarily focus on technologies designed to produce uniform products that meet the desired processing and retail objectives of the firm.

And the *reduction of transaction costs* means that consolidated firms will do business only with the largest farmers. It is simply less costly to contract with one farmer who raises ten thousand hogs than to issue contracts to ten farmers who each raise one thousand hogs. All but the very largest farms will become "residual suppliers."

SOCIAL AND ECONOMIC TRANSFORMATIONS

Given that farms will be pushed to these new levels of specialization, concentration, and uniformity, profound changes will take place on the landscape. First, farms will be replaced by industrial centers. In Iowa, for example, it is now being suggested that farms of the future will consist of 225,000 acre industrial

complexes. Some argue that it will be necessary to consolidate farms into such industrial behemoths to gain access to markets and to negotiate effective prices with input suppliers. This transformation would reduce the number of "farms" in Iowa to 140. Surely such "farms" will not buy equipment from local dealers or fertilizer from local suppliers, nor will they deliver grain to local elevators. As with other industrial complexes, labor will consist largely of minimum-wage earners.

For the most part, commodities produced on these megafarms will be owned by the consolidated firms that issue the contracts. Just as Tyson retains the ownership of chickens placed on "farms" to be raised for them, using *their* feed, managed in accordance with *their* management plan, so other livestock species and patented seed crops will increasingly be owned by the firm, raised for the firm, in accordance with the firm's management plans, using the firm's technology and inputs. In 1992 *Time* magazine had already begun to refer to the "farmers" raising Tyson's chickens for them as "serfs on their own land."⁹

This is a future, in other words, where all local business transactions will be made with distant supply chains, with the benefits accruing to shareholders who most likely live in distant places. And the "farmers" who provide the labor for these operations will be allowed only minimal independent judgment and creativity. Like any other franchised business, such franchise farms will be given the "freedom" to operate in accordance with the firm's directions and to accept most of the liability. In effect, this further transformation from agrarian to industrial agriculture will amount to emptying the landscape of all of its local agriculture related economies and talent.

BIOPHYSICAL TRANSFORMATIONS

In addition to such social and economic transformations there will be commensurate biophysical transformations on the landscape. We know from past experience that large industrial complexes, owned by absentee landlords, and managed by a highly centralized managerial class, do not exhibit a commitment to the care of the environment in which they exist. Witness Love Canal, Louisiana's "cancer alley," the burning Cuyahoga River, the PCBs in the Hudson River, the dried-up Rio Grande River, and the hazardous waste inserted into farm fertilizer in Quincy, Washington. There is no good reason to believe that industrial farm complexes will operate with any higher degree of environmental care than any other industrial complex-indeed factory-farm poultry and hog complexes already serve as harbingers of a clouded future.

Since each of these agricultural industrial complexes will specialize in the production of only one or two commodities, they will foster additional biophysical degradation. We now know that imposing specialization on any ecosystem causes a host of ecological problems. These problems include the elimination of the biodiversity that is essential to the resilience and productivity of any ecosystem.¹⁰ Furthermore, the uniformity and specialization demanded by this new level of industrialization invites genetic uniformity that in turn leads to additional vulnerability. Again the poultry industry presages the future. William

Heffernan reports, for example, that "90 percent of all commercially produced turkeys in the world come from three breeding flocks."¹¹ Such genetic uniformity, initiated to obtain a uniform product, results in birds with such compromised immune systems that their health cannot be maintained without extensive use of antibiotics.

Farms, of course, are ultimately micro-ecosystems that exist within macro-ecosystems. As such, agriculture is an inevitable part of the larger dance of life-part of that complex, interdependent web of life that has evolved (and continues to evolve) over *four* billion years. We ignore that evolving complexity only at our peril.

The standard industrial answer to this cautionary tale is, of course, that we will always have the technological capability to restore any damage we may do to the ecosystem through our industrialized agriculture especially with the newly discovered technological capacity of genetic engineering. We now seem to have convinced ourselves that we can redesign life to live better in a new biological order of our own making.

In *The Future of Life* E. O. Wilson gives the proper response to such misplaced optimism.

Such is the extrapolation endpoint of techno-mania applied to the natural world.

The compelling response, in my opinion, is that to travel even partway there would be a dangerous gamble, a single throw of the dice with the future of life on the table. To revive or synthesize the thousands of species needed-probably millions when the still largely unknown microorganisms have been cataloged-and put them together in functioning ecosystems is beyond even the theoretical imagination of existing science. Each species is adapted to particular physical and chemical environments within the habitat. Each species has evolved to fit together with certain other species in ways biologists are only beginning to understand.¹²

Wilson, of course, is speaking here of whole ecosystems not farms. But, again, farms are simply biotic communities that are integral to the ecosystem in which they exist. Consequently, anywhere agriculture is practiced, it must become part and parcel of the task of restoring the species diversity that is as essential to a healthy farm as it is to a healthy ecosystem.¹³

Industrial agriculture with its specialization, centralization, and uniformity is simply another example of what Wilson calls "mistaken capital investment." We must now redesign agriculture so that it becomes an integral part of restoring the landscape's biodiversity.

And the reason the human resource factor on farms is important to that task is that such restoration is not likely to be accomplished without caring people on the land. As Berry has reminded us, ". . . there is a limit beyond which machines and chemicals cannot replace people; there is a limit beyond which mechanical or

economic efficiency cannot replace care." ¹⁴

TECHNOLOGICAL TRANSFORMATIONS

A third effect likely to result from this new level of industrialization is a further reinforcement of authoritarian technologies. Lewis Mumford, arguably one of America's most important social critics, reminds us that from Neolithic times to the present two technologies have "recurrently existed side by side"-one authoritarian, the other democratic. The former, while powerful is "inherently unstable," the latter, while relatively weak is "resourceful and durable,"

Mumford reminds us that democratic technologies usually consist of "the small scale method of production, resting mainly on human skill . . . remaining under the active direction of the craftsman or farmer, each group developing its own gifts, through appropriate arts and social ceremonies, as well as making discreet use of wide diffusion and its modest demands. . . [and has] great powers of adaptation and recuperation." Authoritarian technologies, on the other hand, tend to be large in scale and concentrate power in the hands of the few. They rest mainly on technocratic inventions and scientific discoveries. They are generally under the direction of centralized management, usually exploiting the gifts of nature to suit the purposes of management. Because of its centralization and insatiable demands, authoritarian technology has little power of adaptation or recuperation. ¹⁵

THE NEXT TWENTY-FIVE YEARS

The overall effect of forcing farms to become industrial complexes that utilize authoritarian technologies will be to change fundamentally the social and biophysical character of both rural and urban communities.

Given these factors, it is not hard to imagine what the landscape of the future may look like in another twenty-five years.

The most extreme outcome might be the one proposed by Steven Blank, a University of California agriculture economist. In his thought provoking book, *The End of Agriculture in the American Portfolio*, Blank argues that since U.S. farmers cannot compete in the production of bulk commodities with farmers in other parts of the world having significantly lower land and labor costs, we should just get out of the farming business altogether and concentrate our labor on "higher value-producing activities."¹⁶ While others have pointed out the many flaws in Blank's thesis,¹⁷ the market logic of his argument remains persuasive, given the consolidation of the industrial food system and our naive contention that all we need from farmers is the production of cheap raw materials. Fortunately, every urban consumer with whom I have discussed Blank's vision has been horrified, and clearly expressed the view that his vision is simply not an acceptable future. But even if we stop short of Blank's bleak vision, current trends can take us in just ten or fifteen years to a future that may be equally unacceptable to most citizens.

Here is the future I see emerging if present trends continue. A few large

industrial farm complexes, managed in accordance with the business interests of five or six consolidated retail firms-perhaps only one of them an American firm (Wal-Mart)¹⁸-will mass produce a few crop and livestock commodities. These commodities will be produced in intense concentrations, using powerful technologies to achieve specific biological traits, introduced to accomplish the goal of providing the firm with an ample supply of cheap, uniform, raw materials from which to manufacture a variety of food products. These firms will do whatever it takes-to the food and to the body politic¹⁹-to gain the largest possible share of the consumer's food dollar. Green and purple catsup, chocolate-covered french fries, and inane nutrition advice filtered through the powerful lobbies of the food industry might be only the beginning.

Whatever environmental standards citizens may impose will be adhered to only by means of expensive, draconian regulations. Rural communities will essentially disappear. Trailer parks to house cheap labor will dot the countryside. Riparian buffer strips, grassed waterways, shelterbelts, and terraces will be demolished to make way for equipment that is even larger than the new eighty-foot-wide planters introduced last year. Recreational areas, habitat for wildlife, and wildlife corridors will give way to miles and miles of the continuous expanse of a single crop.

Urban residents will likely have to drive long distances to find suitable recreational or sporting areas. The environmental and human health consequences of imposing high concentrations of single species of crops and animals on the landscape will require an increasing array of powerful technologies to maintain the health of humans and other species. Unpleasant odors-always nature's way of issuing a warning of possible danger-will make it increasingly unpleasant for humans to coexist with agriculture.

And a few parts of rural America, especially places that abound in remote scenic beauty, will become playgrounds for the idle rich.

Meanwhile, global absentee "farmers" will continue to acquire land in developing countries where land and labor costs are cheap in order to produce cheap commodities for export to global consolidated food firms, depriving local populations of the opportunity to access land to feed themselves. This will add another dimension of vulnerability to the industrialized global food system. The social unrest that always accompanies such disparities will continue to destabilize human communities.

The lessons we have learned from evolutionary biology, ecological economics, and the history of social movements suggest that the new industrialized food system described here must, of necessity, be very short-lived on any evolutionary timescale. Evolutionary biology reminds us that population explosions of any species inevitably transform it into a "plague species" that crashes in order to bring it back into ecological balance with the community of species on which it ultimately depends. Very large industrial farms, devoted to producing large quantities of a single species, fit the definition of a plague species exactly.

Ecological economics teaches us that human economies are ultimately subsystems of the natural economy. Natural ecosystems provide the natural

resources that fuel human economies, and natural sinks recycle the waste generated by human economies. As these natural systems become degraded or overloaded, human economies begin to fail.

And the history of social movements teaches us that without a modicum of egalitarian rule, societies become destabilized. Such unreliable social environments are almost always costly to the entire biotic community. In today's political and social climate this could be an urgent matter. David Orr reminds us, for example, of some of the vulnerabilities and costs our industrial agriculture system may incur given our current social unrest. Orr suggests that, among other things, a centralized agriculture is not easily protected from terrorist attack.

A society fed by a few megafarms is far more vulnerable to many kinds of disruption than one with many smaller and widely dispersed farms. One that relies on long-distance transport of essential materials must guard every supply line, but the military capability to do so becomes yet another source of vulnerability and ecological cost. In short, no society that relies on distant sources of food, energy, and materials or heroic feats of technology can be secured indefinitely. . . . An ecological view of security would lead us to rebuild family farms, local enterprises, community prosperity, and regional economies, and to invest in regeneration of natural capital.²⁰

Finally, another discomfiting analysis of our industrialized systems has been proposed by Charles Perrow in his enlightening book *Normal Accidents*. Perrow argues that as any system becomes increasingly complex and more tightly coupled, normal accidents, which inevitably take place in *any* system, become catastrophes.²¹ If Perrow is correct then we should expect an increase in food-related catastrophes in our highly complex, tightly coupled, industrial food system.

ANOTHER VISION

But the future I have just described is not inevitable. There are, in fact, encouraging transformations already taking place that suggest that an alternative future may not only be feasible, but highly likely. Aside from the vulnerabilities of the industrial model just described, there are ecological and economic opportunities on the horizon that will clearly give a comparative advantage to a food and farming system that will look very different from the bifurcated system currently emerging. What are some of those opportunities and how might they shape the food and farming system over the next twenty-five years?

New Market Climate

First, a new market climate is emerging that may change how we produce our food. The new market climate, especially where food is concerned, consists of

three distinct elements: (1) a "conversational" marketplace; (2) trustworthy and authentic producers and products; (3) a "close to home" connection.

The concept of markets as conversations is imaginatively described in a recent book written by a team of four authors, including two who are on the management team of Sun Microsystems. The book is titled *The Cluetrain Manifesto*.²² Markets, these authors contend, are undergoing a major change as we enter the twenty-first century. During most of the twentieth century markets consisted of "broadcast" information. To market a product, one published a Sears Roebuck catalog, bought advertising in newspapers or magazines, purchased a spot on the radio, or bought airtime for an advertisement on prime-time television. Marketing meant one-way communication.

The authors of *Cluetrain* argue that the broadcast era is over, that twenty-first-century customers grew up on the Internet and consequently are no longer receptive to having information broadcast to them. They are used to having a conversation about everything--including the products they buy and the food they eat. Therefore, anyone who does not provide an opportunity for customers to have a conversation about what they are selling will simply not be in the market for very long. As *Cluetrain* reminds us, customers are not "seats or eyeballs or end users or consumers," they are human beings whose reach exceeds *your* grasp.

What this analysis of the market of the twenty-first century tells us is that people increasingly will want to have relationships as part of their purchasing experience. Consequently, food marketers of the future who do not provide an opportunity for food customers to experience the story behind the food they buy are not likely to be in that market for very long. When food customers go to the farmers' market or buy from their local CSA, they are buying a relationship as much as a food product--this is the special magic behind today's direct market success. The late Ken Taylor, my good friend and the founder of the Minnesota Food Association, used to express relationship marketing in graphic terms. "People who live in urban communities for the most part don't like to get their hands dirty," he said, "but they surely want to shake the hand of someone that does."

What are the implications of this transformation in the marketplace for the future of agrarian agriculture? In the first place, this new development clearly gives the comparative advantage to precisely those farmers who are most threatened in the emerging bifurcated food system. Imagine with me a large number of small and midsize family farmers producing food products using sound conservation practices, providing their animals with the opportunity to live as nature intended, preserving the identity of such food products by processing them in locally owned processing facilities, and making them available in the marketplace with opportunities for consumers to access the entire story of the product's life cycle.

There are numerous successful examples of such marketing relationships already in place. Let me cite just one such example. A company in Great Britain (home of mad cow disease and the recent hoof and mouth disease outbreak that caused beef sales to plummet) created a new line of products called "Greenstuff." The Greenstuff label carries an identification number that allows food customers

to use the Internet to access the story behind each product. According to a story in a British newspaper, this marketing system allows eaters to "see their weekend joint when it still had horns and hooves, contentedly grazing on the farm where it was bred. Shoppers who buy Greenstuff products—a branded range of organic Irish beef, lamb and sausages—can log onto an Internet site for a full CV on the animal they are about to eat."²³

Here is how it works. Farmers who raise their beef in accordance with the Greenstuff standards take video pictures of their operations farmers standing in the midst of their herds, cows grazing contentedly in their pastures. Each animal is identified; its medical history, the age at which it was butchered, and other vital statistics are published on the website. In the comfort of their homes, food customers can place their order on the Internet for a five-pound beefsteak from a specific animal, raised by a specific farmer. If they wish, they can contact the farmer by phone. Once the order is placed, the beefsteak from the specific animal with its own unique story is delivered to the door by courier.

How does Wal-Mart compete with such marketing relationships? It becomes extremely difficult for large consolidated firms, whose marketing advantage is based on being the lowest cost supplier of an undifferentiated, mass-produced commodity to provide such marketing relationships.

As Michael Porter reminds us, there are two ways to be competitive in a global economy. One is to supply an undifferentiated product at the lowest cost, and the other is "to provide unique and superior value to the buyer in terms of product quality, special features, or after-sales service."²⁴ And Porter goes on to say that while it is not impossible for the same firm to do both, it proves to be extremely difficult. The comparative advantage consequently goes to the agrarian farmers of the future.

The second change in today's emerging market climate—the desire for trust and authenticity—also offers a comparative advantage to independent, small and midsize producers. Marketing surveys conducted by the Hartmann Group consistently show that one of the attributes that today's discriminating food customers look for in the marketplace is a trusting relationship and the assurance that claims made for a product are authentic. Smaller supply chains that have food provided for them by identifiable farmers whose products can be easily traced to specific farms and, as we have seen, even to specific animals—can more readily establish trusting relationships and provide information that can be authenticated than can the consolidated supply chains with mass-produced products. Add to that the opportunity to engage in conversations with the farmers concerning the product and the comparative advantage becomes a no-brainer.

The third change in today's emerging market climate—the increasing desire to purchase "close to home"—also gives a comparative advantage to independent family farms. In a March 4, 2002, interview on the National Public Radio program *Morning Edition* Fred Crawford, an internationally recognized retail food consultant, remarked that supermarkets, part of a global economy, won't be in business very long if they fail to realize that their markets are local. Once again, it is agrarian farmers in local communities whose products can be traced directly to the farm even when those products are sold at some distance—and can

be more readily identified as "produced close to home" than mass-produced commodities whose traceability is near impossible.

All of these changes in the market climate suggest new opportunities for relationship marketing that can help convert the most vulnerable farmers in the industrial food system into thriving entrepreneurs in the evolving markets of the next several decades. This bodes well for a new kind of agrarianism.

New Production Paradigm

In addition to the changing market climate, new production strategies that fundamentally redesign farming systems also may present a comparative advantage to the agrarian farmers of the future. These new production strategies evolve out of an ecological-in contrast with a technological-paradigm. Instead of using one-dimensional, single-tactic approaches to solving production problems—an approach that always calls for the invention of yet another technology that farmers must buy—this approach seeks to employ natural systems that are more self-regulatory and synergistic. Using nature as the model, mentor, and measure,²⁵ these new systems seek to achieve production goals by making use of nature's own free ecosystem services. This natural systems approach to agriculture is, of course, the new design being developed at the Land Institute in Salina, Kansas.

One example of how such systems may change the fundamental parameters of agriculture in the future is the integrated duck/rice system, developed by Takao Furuno, a farmer in southern Japan.²⁶ Instead of producing rice in a monoculture, dependent on fertilizers and pesticides to achieve acceptable yields, Mr. Furuno developed an elegant, complex, species-interdependent system that has increased his rice yields while producing a full range of other food products, without relying on any outside crop inputs.

Here is how it works. Right after Mr. Furuno sets his rice seedlings out into his flooded rice paddies, he puts a gaggle of young ducklings into the paddies. The ducklings immediately start to feed on insects that normally attack young rice plants. Mr. Furuno then introduces loaches, a variety of fish that is easily cultivated and produces a delicious meat product. He also introduces azolla, normally considered a "paddy weed." The azolla fixes nitrogen but also serves as food for the fish and the ducks. In this way Mr. Furuno has developed a highly synergistic farming system. The ducks feed on the insects and, later, the golden snails that also attack rice plants. Since the ducks and fish feed on the azolla, its growth is kept sufficiently under control so it does not compete with the growing rice, but serves as a source of nitrogen. The nitrogen from the azolla, plus the droppings from the ducks and fish, provides all of the nutrients needed for the rice.

Mr. Furuno also grows figs on the periphery of his rice paddies, supplying him with fruit. He then rotates his integrated rice/duck crop with a crop of vegetables and wheat. He also harvests duck eggs that he markets along with the rice, fish and duck meat, vegetables, wheat, and figs. Mr. Furuno's productivity is also enhanced by the fact that his rice yields in this system exceed the rice yields of industrial rice systems by 20 to 50 percent. This natural systems design makes

Mr. Furuno's six acre farm in Japan one of the most productive in the world. According to conversations he has had with modern monocrop rice growers in Texas, the gross income from Mr. Furuno's six acre farm in Japan slightly exceeds the gross income of a typical six hundred acre rice farm in Texas.²⁷

The concept behind Mr. Furuno's design is simple, yet profound. The concept, he writes, "is to produce a variety of products within a limited space to achieve maximum overall productivity. But this does not consist of merely assembling all of the components; it consists of allowing all components to influence each other positively in a relationship of symbiotic production." Farmers, largely without the help of experts, have been developing such elegant synergistic systems throughout the world in recent decades.²⁸

These highly productive, redesigned systems, are, once again, most compatible with smaller-scale, independently owned farms. Such complex systems do not lend themselves well to large-scale, highly centralized operations where farmers are seldom intimately involved with the ecology of their farms. It is therefore difficult to imagine them managing such interdependent systems.

New Public Policies

In addition to new market relationships and redesigned production systems, the new agrarianism of the twenty-first century could be further advanced with new public policies. Current agricultural policies are geared to propping up a failed agricultural system. One can reasonably argue that the only reason the consolidated industrial food system has survived as long as it has is because of the immense political power the industry enlists to protect its interests,²⁹ which include enormous public subsidies that distort free market signals that might otherwise give the competitive advantage to more agrarian production systems. One simple shift in public policy could make an enormous difference. Directing public support *away* from subsidizing a few bulk commodities-a policy that benefits no one except the consolidated firms that acquire those commodities well below the cost of production-and *toward* the support of public goods that benefit communities could help transform much of agriculture.

We all recognize that farmers produce more than food and fiber. They also provide a wide range of public services. For example, properly managed soils help filter water to improve water quality. Properly managed landscapes provide habitat for wildlife, helping to restore biodiversity and provide recreational space for hunting and fishing. One can reasonably argue that the public ought to pay for such services, provided the farmer conserves and nurtures these resources. Given adequate information and incentives, farmers could provide additional public services that could benefit the entire citizenry-economically, socially, and ecologically. Provided with adequate support, farmers could be in the forefront of providing all of society with clean water, clean air, quality soil, vibrant communities, and a host of other services.

So we do have a choice. We can continue on our current path, insisting that we have too many farmers and that economic efficiency is the sole driver of our

future food and farming system, ultimately leaving us with industrial complexes on the American landscape whose sole objective is to produce raw materials for food and fiber as cheaply as possible regardless of the cost to the environment or human communities. Or we can invest in new marketing systems that enable farmers to produce more value and retain more of that value on the farm; empower the research community to develop more productive, diverse, biologically rich production systems that mimic nature and are more profitable for farmers and less harmful to the environment; and develop new public policies that begin the transition to a new food and farming future.

But, once again, this will require a particular kind of farmer with a particular kind of farm. Of all the millions of words that have been written about agriculture since the publication of *Unsettling*, none have described what we need more eloquently than the particulars outlined by Wendell Berry in another of his poignant works written over a decade after *Unsettling* I find myself, again and again, going back to this simple description of what we need: ". . . if agriculture is to remain productive, it must preserve the land, and the fertility and ecological health of the land; the land, that is, must be used well. A further requirement, therefore, is that if the land is to be used well, the people who use it must know it well, must have time to use it well, and must be able to afford to use it well. Nothing that has happened in the agricultural revolution of the last fifty years has disproved or invalidated these requirements, though everything that has happened has ignored or defied them."³⁰

NOTES

1. Calvin Beale, "Salient Features of the Demography of American Agriculture," in *The Demography of Rural Life* (publication 64), ed. David Brown, et al. (University Park, Pa.: Northeast Regional Center for Rural Development, 1993).

2. Willard W Cochrane, "A Food and Agriculture Policy for the Twenty-First Century," June 21, 1999 (unpublished paper available from the author).

3. Frederick H. Buttel, "Ideology and Agricultural Technology in the Late Twentieth Century: Biotechnology as Symbol and Substance," *Agriculture and Human Values* 10, no. 2 (spring 1993).

4. Cochrane, "A Food and Agriculture Policy."

5. Ibid. These are the farms that are the most vulnerable since they are too small to access markets with consolidated firms and have little opportunity to do direct marketing.

6. See the work of William Heffernan, who has tracked the consolidation in the agriculture and food industry for the past twenty-five years. His most recent work (coauthored with Mary Hendrickson and others), "Consolidation in Food Retailing and Dairy: Implications for Farmers and Consumers in a Global Food System," January 8, 2001, is available from the National Farmers Union.

7. W.C. Lowdermilk, "Conquest of the Land through Seven Thousand Years," USDA, Soil Conservation Service, Agriculture Information Bulletin no. 99, 1953.

8. Michael Boehlje, "Structural Changes in the Agricultural Industries: How Do We Measure, Analyze and Understand Them?" *American Journal of Agricultural Economics* 81, no. 5 (December 1999).
9. *Time*, "Arkansas Pecking Order," October 26, 1992.
10. See, for example, David Tilman's work: "The Greening of the Green Revolution," *Nature* 396 (November 19, 1998); "Biodiversity and Ecosystem Functioning: Current Knowledge and Future Challenges," *Science* 294 (October 26, 2001).
11. Quoted in William Greider, "The Last Farm Crisis," *The Nation*, November 20, 2000.
12. Edward O. Wilson, *The Future of Life* (New York: Knopf, 2002).
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