

Family Farms in an Era of Global Uncertaintyⁱ

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We live in uncertain times. The future of our nation is at risk. At no time since the Great Depression has the U.S. been so vulnerable to economic chaos and collapse. U.S. federal budget deficits routinely sets new records, as we continue borrowing money to fund our military misadventure in Iraq and an unending global war on terrorism. Over time, we have become the world's largest debtor nation, and more importantly, we are no longer borrowing the money from ourselves, from Americans. In fact, we owe much of our federal debt to China, the world's leading communist nation. Our international trade deficits also have reached historic highs as we come to rely on cheap imports from low-wage countries such as Mexico, India, and China. Many Americans no longer make enough money to buy things "made in America." The value of the U.S. dollar has declined precipitously in relation to other world currencies, as the Federal Reserve periodically reduces interest rates in attempts to stave off domestic recessions. American consumers are also suffering under the burden of too much debt; yet the government's response to the current economic crisis is to encourage more borrowing and spending.

The disparity of incomes between the rich and the poor in the United States has reached unprecedented levels, as American corporations have moved their manufacturing operations to cheap-labor countries. The poorest *one-half* of Americans currently now lives on only one-eighth of total U.S. income while the top *one percent* takes in more than one-fifth. In the words of Alan Greenspan, former Federal Reserve Chairman, "The income gap between the rich and the rest of the U.S. population has become so wide, and is growing so fast, that it might eventually threaten the stability of democratic capitalism itself."¹ In addition, costs of health care are exploding at a time when the poorest segments of our population is suffering from an epidemic of obesity and diabetes and the nation as a whole is growing older and less healthy. It should come as no surprise that the U.S. is a world leader in mental depression and suicide, particularly among adolescents and young adults.

The uncertainties are not limited to the United States. The future of humanity is also at risk. At no time in human history have we faced environmental risks comparable to those of global climate change and "peak oil." Even the major oil companies now grudgingly admit that the world is running out of cheap fossil energy. The persistently high oil prices of the last few years likely signal the end of a 200-year era of industrial economic development. Retreating glaciers and polar ice caps now provide undeniable evidence of global warming, with potentially catastrophic impacts on the future of human life on earth. Yet many Americans remain in denial. We continue to roll back environmental regulations that protect our air and water and refuse to sign treaties to protect the global environment, in a futile attempt to squeeze a bit more economic

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value from our badly depleted natural resources. Americans eventually must accept the “inconvenient truth” that we are at serious risk of making the earth uninhabitable by humans.

To cope with these uncertainties, we must confront the “uncomfortable reality” that our growing economic, societal, and ecological problems are all symptoms of our unrealistic expectations. We have developed expectations of personal wealth and economic growth that our economy is fundamentally incapable of fulfilling. Our economy, in turn, is placing demands on nature and society that neither the earth nor humanity can long endure. We simply cannot continue doing what we have been doing. Change is not simply an option; it is a necessity. We must change our economic expectations, meaning we must change our ways of thinking, which means we must eventually change virtually every aspect of our lives. As Albert Einstein once pointed out, “We cannot solve our problems with the same thinking we used when we created them.” We ultimately must come to a new understanding of how the world works and our place within it. Our current way of life quite simply is not sustainable.

This is not a matter of personal opinion; it is rooted in the most fundamental laws of science. Sustainability ultimately is a matter of energy. Everything that is of use to humanity – our houses, clothes, food – requires energy to make, energy to use. In fact, all material objects are concentrated forms of energy. All useful human activities – working, managing, thinking – also require energy. And equally important, the usefulness of human energy is a product of society. We are not born as productive individuals but as helpless babies. We have to be nurtured, socialized, and educated by society before we are capable of being useful to society, which requires energy. It takes “social energy” to maintain human productivity.

According to the laws of thermodynamics, energy inevitably changes form whenever it is used to do anything useful, which physicists call *work*. Specifically, anytime energy is used to do work, it always changes from more concentrated to less concentrated forms, as when gasoline, a highly concentrated form of energy, is ignited in the engine of a car. Energy is never destroyed by use, but each time it is used and reused, it becomes less concentrated and thus less useful. So each time energy is used to do something useful, some of its *usefulness* is lost. This is the essence of the law of entropy. Conserving, reusing, and recycling can improve the efficiency of energy use, but cannot offset the inevitably loss of energy to entropy.

The only source of energy available to offset entropy is solar energy. Unfortunately, there are powerful economic incentives to use and reuse energy but there are no economic incentives to collect and store solar energy to offset the energy lost to entropy. Even the solar energy captured through agriculture and forestry is put in the marketplace for consumption rather than used to regenerate and renew energy resources for the benefit of those of the future. This basic problem arises from the fact that economic value is inherently individualistic; it accrues to individuals, and thus, must be expected to accrue during the lifetime of the individual decision maker. It makes no economic sense to invest anything for the sole benefit of someone else, certainly not an unknown someone of some future generation. An economy driven by economic self-interest, as is increasingly the case in all modern capitalist economies, is not *physically* sustainable.

Less appreciated but no less important, capitalist economies also dissipate *social* energy because they weaken human relationships. Economic efficiency requires that people relate to

each other *impartially*, which means *impersonally*. People must compete rather than cooperate, if markets are to work efficiently, and competition degrades personal relationships. Economic efficiency encourages people to devote the maximum time possible to work, to being economically productive, which leaves little time and energy to spend on sustaining families, communities, and societies. Under modern capitalism, human relationships are turned into economic transactions and social equity, justice, and civility are sacrificed for economic efficiency. An economy driven by economic self-interests is not *socially* sustainable.

All economic value comes either from nature or from society. An economy creates nothing; it is simply a means of facilitating relationships among people and between people and the earth. When an economy has extracted all of the energy or usefulness for its natural and human resources, the economy will have nothing left from which to extract additional economic value. Today's capitalist economies are degrading the productivity of nature and society and quite simply are not sustainable.

Nowhere are the uncertainties, risks, and lack of sustainability more evident or more important than in our systems of food production. Our large-scale, specialized, mechanized farming operations are "energy-using," industrial operations, driven primarily, if not solely, by the economic bottom line. They use land, fertilizer, fuel, machinery, and people but they do nothing to renew or regenerate the usefulness of these resources to offset the inevitable loss of energy to entropy. Industrial farmers don't use the solar energy captured by plants to restore the productive capacities of their farms; instead, they transform solar energy into crops and livestock that are sold off the farm to be used elsewhere. It makes no economic sense to maintain the natural productive capacity of the land if the benefits will accrue someone else of some future generation. On average, American farms require approximately three kcals of fossil energy for every kcal of food energy they produce. An industrial agriculture is not physically sustainable.

The industrialization of agriculture also has depleted the social energy of rural America. Persistent consolidation of farmland into larger and fewer farms has resulted in ever-fewer family farms and farm families. It takes people, not just production, to support rural communities – to buy feed, fuel, clothes, and haircuts on Main Street, to support local schools, churches, and local public services. Some farming communities have become so desperate they grasp at any economic opportunity for survival. Unfortunately, outside investors see rural areas, with their open spaces and sparse population, as ideal places to locate things other communities don't want, such as prisons, landfills, toxic waste incinerators, or giant confinement animal feeding operations. Ethanol factories are but the latest "economic opportunities" to join this list. Such enterprises create economic benefits for a few but at the expense of the many, particularly those who live downstream or downwind. Such violations of civility rip the social fabric of rural communities apart. There are no purely economic incentives to protect rural culture or to mend the torn fabric of rural society. Industrial agriculture is not socially sustainable.

There is no way to "fix" industrial agriculture or to "tinker with" industrial economic development to make it sustainable. Sustainability requires a fundamentally different way of thinking, working, and living. Industrialization is based on a mechanistic worldview; the world is a big, complex mechanism and humans are but cogs in the big machine. Sustainable requires an

ecological worldview; the world is a living organism within which the well-being of humanity is critically interconnected with the well-being of the other elements of the whole.

This organismic worldview is necessary because only living things have the capacity for self-renewal and -regeneration. Living plants have the capacity to capture and store solar energy to offset the usefulness of energy lost to entropy. Living things can be useful, and at the same time, can devote a significant portion of their energy to renewal and regeneration. Even we humans are capable of capturing and storing solar energy; we just do it with windmills, dams, and photovoltaic cells. Humans also have an inherent tendency to produce and reproduce, even when we have no economic incentive to do so. Otherwise, few of us would ever choose to raise children. Obviously, an individual life is not sustainable because every living thing eventually dies. But communities of living individuals clearly have the capacity to be productive while devoting a significant part of their life's energy to conceiving and nurturing the next generation. Sustainability requires that we respect our basic human tendencies to meet our individual economic and material needs, while devoting a significant part of our life's energy to meeting the needs of others, including those of future generations.

To do so, we ultimately must adjust our economic expectations to reflect the realities of the world of which we are a part. We may be able to capture enough solar energy to meet our "basic human needs," by various means, but there is essentially no possibility of maintaining current expectations of continuing economic growth. The fossil energy that fueled the industrial era was captured and stored by living organisms over millions of years. We have depleted about half of the earth's total petroleum reserves in less than a century and are rapidly depleting its reserves of natural gas and its *usable* coal as well. Most energy experts agree that within fifty years humanity will have to make do with only a small fraction of our current fossil energy use. Even if fossil energy reserves were adequate to sustain economic growth for another century, the earth's atmosphere and natural ecosystems simply cannot accommodate the continuing release of carbon, heavy metals, and other wastes associated with current levels of extraction and use.

Renewable energy from biological sources might seem to be the answer, since green plants are capable of sequestering carbon and other greenhouse gases as they capture and store energy from the sun. However, bio-energy is incapable of sustaining more than a small fraction of our levels of current energy use. David Pimentel of Cornell University, who has been exploring the potential of bioenergy since the energy crisis of the 1970s, estimates that if *all* of the solar energy collected by *all* of the green plants in the United States could be *magically* converted into fossil energy, it would replace only about *one-half* of the fossil energy currently consumed annually in the United States.² Agriculture accounts for only about one-third of all green plants, meaning that the solar energy captured by the whole of agriculture amounts to only about *one-sixth* of U.S. fossil energy use. His estimates are confirmed by other energy experts, as in a recent Academy of Science report which indicated that converting the total U.S. corn crop to ethanol would replace only about *one-eighth* of current gasoline use.³

In addition, it takes fossil energy to produce agricultural crops and to transform those crops into biofuels. Here the experts differ, at least somewhat. Some experts, including Pimentel, estimate that corn ethanol production results in a *net energy deficit*, while others estimate that it only requires about two kcals of "old fossil energy" to produce three kcal "new bioenergy."

Regardless, if the whole of agriculture were devoted to energy production, the “net” energy addition would amount to something less than ten percent of our current fossil energy use.

Even more important, we cannot afford to divert even a significant part of agriculture from producing food to replacing fossil energy. We humans are biological beings; we can’t eat sunshine or wind or the electricity generated by windmills or photovoltaic cells. We are inherently dependent on the energy captured by green plants to fuel our bodies and eating is more important than driving. Unfortunately, the current euphoria over biofuels could turn out to be a very costly distraction from the more important task of agriculture, which is producing food for people. Our current industrial food system as a whole uses about 17 percent of the total fossil energy used in the United States and requires about ten kcals of fossil energy for each kcal of food energy it produces. The highest priority for American agriculture in the future should be to find ways to produce even more food with far less fossil energy.

When we confront the realities of sustainability, we begin to understand that the security of any nation is ultimately rooted in the willingness and ability of farmers to meet the essential food and fiber needs of its people and to pass the land to the next generations as healthy and productive as when it was passed to them. In other words, to ensure food security farmers must use the land but use it *well*. And as Wendell Berry, Kentucky farmer, writer, and philosopher puts it, “If the land is to be used well, the people who use it must know it well, must be highly motivated to use it well, must know how to use it well, must have time to use it well, and must be able to afford to use it well.”⁴ He goes on to write, “farmers must tend farms they know and love, farms small enough to know and love, using tools and methods that they know and love, in the company of neighbors that they know and love” – and one might add, producing food for people they know and love. A nation’s food security depends on farmers who know and love their land, their neighbors, their customers, and their country.

The agribusiness corporations that increasingly control American agriculture have no commitment to stewardship of the land or to being good neighbors or good citizens; their priorities are profits and growth. Industrial farmers have no love for any particular piece of land; most don’t even own most of the land they farm. They can’t really *know* the land because they are trying to farm too much of it to *know* any of it very well. Many don’t know how to take care of the land; they depend on prescribed regimens of pesticides, fertilizers, and other fossil energy inputs to achieve productivity. Industrial farmers can’t afford to love their neighbor because sooner or later they will need their neighbor’s land to grow. The corporations for whom they produce have no commitment to any particular nation; they operate globally and have stockholders scattered all around the world. Industrial farmers can’t afford to love anything more than the economic “bottom line” if they expect to stay competitive in the global economy.

Thankfully, a new breed of farmer is emerging in America. They are given a lot of different labels, such as organic, biodynamic, holistic, bio-intensive, biological, ecological, permaculture, innovative, practical, or just family farmers. These farmers all share a common commitment to creating an agriculture that is capable of maintaining its productivity and value to society and humanity indefinitely. They understand that farms must be ecologically sound and socially responsible if they are to be economically viable over the long run. They know they must meet the needs of the present without compromising the opportunities of the future. They are creating a new

sustainable American agriculture. They also understand, intuitively if not explicitly, that sustainable systems of farming and food production ultimately must rely on renewable solar energy and renewable human energy for long run economic viability.

These farmers use crop rotations, cover crops, intercropping, managed grazing, and integrated crop and livestock systems to manage pests and to maintain the natural fertility of their soil. They capture solar energy to renew and maintain soil organic matter and the natural productivity of the soil. As they build soil organic matter, they are not only storing solar energy for future use but are also sequestering atmospheric carbon in the soil. Many have grass-based and free-range livestock and poultry operations, which rely more heavily on solar energy and avoid the negative ecological impacts of confinement animal feeding operations.

Many of the new farmers produce raw or minimally processed foods for local customers, saving much of the fossil energy typically consumed in processing, packaging, storage, and transportation and reducing the corresponding emissions of greenhouse gasses. As they develop local markets, they are also developing personal relationships with their customers and their neighbors and helping to restore a sense of community. They aren't trying to drive other farmers out of business and don't exploit their neighbors or customers to increase their profits. They are regenerating and renewing both physical and social energy by leaving their land and their communities as least as healthy and productive as when they found them.⁵

With few exceptions, these new American farms are independently owned and operated, family farms. The mention of family farming invariably raises questions of definition. A family farm is commonly defined as a farm owned by a family, where the family makes the important management decisions and provides most of the labor. While these characteristics may fit most family farms, a lot of industrial farms and contract farming operations also fit this technical definition of a family farm. However, a true family farm may be more accurately defined as a farm where the farm and the family are inseparable parts of the same whole.

Such family farms can be full-time or part-time, they can be family owned, leased, or rented. Non-family members can do much of the work on the farm, as long as the farm workers eventually become a part of the "farm's family." Family farms can even be operated by single individuals or unrelated "family members" as long as the people who farm share an enduring commitment to each other and to the land.

On a true family farm, the family would be fundamentally different if they did not live and work on "their" farm and the farm would be fundamentally different if it were not farmed by "its" family. The family and farm are essential aspects of the same inseparable whole. On a true family farm, the farming operation changes as the family changes, with family members taking on different roles as they mature and age. A family farm also evolves to accommodate each new generation of the family. The family considers the needs of the land, the animals, the farm, as well as the needs of the family, in making all decisions. The farm is a reflection of the family and the family is a reflection of the farm, in the local community and in society as a whole. A farm that simply makes money for family members to spend is not a family farm.

True family farmers farm for reasons quite different from industrial farmers. Ask them why they farm and virtually all family farmers will mention that a farm is a good to live and to raise a family. A family farm is a place that nurtures life – plants, animals, and people. Farm families grow stronger because they share a common commitment to each other and to the land. Farm parents have greater influence on their children, because farm families spend more quality time together – work and family life happens at the same place. Most children on family farms grow up knowing they are valued, productive participants in the work of the family – with a better opportunity for a healthy sense of self-worth. Obviously, farm families do not always succeed, but the opportunities to build strong families arise as a natural part of day-to-day life on a good family farm.

Ask family farmers why they farm, and most will mention that they like the open spaces, fresh air, scenic landscapes, and the opportunity to live in natural settings. Family farmers feel a strong sense of connectedness with nature and many are committed to the Leopold ethic, to “preserve the integrity, stability, and beauty of the biotic community.”⁶ Ask family farmers why they farm, and most will mention that they like being part of a farming community. Farming communities may not be as close as they were when most farmers shared work and rural social life was pretty much limited to community activities. However, many family farmers still feel a strong sense of connectedness with their communities and many are committed to protecting them from economic exploitation and degradation. On a good family farm, taking care of the land and caring about people are just natural, normal aspects of farming and farm life.

Yes, we live in uncertain times. The future of our nation is at risk. In times of economic and political chaos, which would you rather depend on to provide food for the nation? Industrial farms or family farms? Which would you rather rely on for your own food? Global corporations or local family farms? When Americans run out of credit, and the economy collapses, which would you rather rely on to help build a new sustainable economy? Industrial farms or family farms? Which would you rather rely on to support your local economy? Global corporations or local family farms? If the disparity in income grows so wide that the poor are no longer afford enough food to survive, which would you rather count on feed the hungry? Global corporations or family farms? If health care costs climb beyond the reach of even the middleclass, which do you think would show more concern for public health? Industrial farms or family farms? Which would you rather rely on for healthy foods? Global corporations or family farms?

When Americans finally accept the “inconvenient truth” that we are making the earth uninhabitable by humans, who would you trust to be good stewards of nature and caretakers of society? Global corporations or family farms? In a world growing hotter, who would you rather rely on to reduce greenhouse gas emissions and sequester atmospheric carbon? Industrial farms or family farms? In world with far more people and far less fossil energy, who would you rather count on to ensure the future of humanity? Global corporations or family farms?

Finally, in an era of global uncertainty, who should we support with our food dollars, our votes, and our life’s energy? Global corporations or family farms? Family farms obviously are not the answer to every challenge confronting global society today. But in times of uncertainty, family farms are the clear and compelling public choice over industrial farms and global corporations. In an era of global uncertainty, we simply cannot afford to lose our family farmers.

End Notes

¹ Alan Greenspan, as quoted in Christian Science Monitor, “Gap Between Rich and Poor Gaining Attention,” <http://www.csmonitor.com/2005/0614/p01s03-usec.html> , June 15, 2005.

² From a presentation by David Pimentel, Cornell University, at *Local Solutions to Energy Dilemma*, New York City, April 28-29, 2006. Revised to account for increased energy use from earlier estimate of solar energy collected as two-thirds of fossil energy use, published in David and Marcia Pimentel, *Food, Energy, and Society* (Niwot, CO: University Press of Colorado), 1996.

³ As reported by Alexei Barrionjevo, “It’s Corn vs. Soybeans In A Biofuels Debate,” *New York Times*, July 12, 2006.

⁴ Wendell Berry, “Nature as measure,” in *What are people for?* (New York: North Point Press, 1990): 206—207.

⁵ Sustainable Agriculture Network, *The New American Farmer*, Ed. Valerie Berton, (Beltsville, MD: United States Department of Agriculture, 2001); also available at <http://www.sare.org> (accessed January 2007).

⁶ Aldo Leopold, *A Sand County Almanac* (1949, New York: Balentine Books, 1966) “The Land Ethic,” 262.