

Agriculture, Food and Society – Philosophy to Nanotechnology

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■ The Take Home Messages

- ▶ You can't understand debates about agricultural technologies such as rBST, GMOs, nanotechnologies and synthetic bio-fuels unless you see that they are occurring within a larger philosophical framework that is neither recognized nor understood by most participants.
- ▶ The dominant philosophical idea is that agriculture is now just another sector of the industrial economy. As such, it needs to play by the same rules as other sectors.
- ▶ But this dominant idea is still countered by a mix of nostalgic and poorly understood cultural ideas that see food and farming as profoundly different from other forms of manufacturing and trade.
- ▶ Specific technologies get caught between these two philosophical frameworks. On the one hand, it is fully appropriate to regulate the health, safety and environmental impact of industrial technologies; on the other hand, people expect food and farming to embody ideals that are incompatible with highly regulated industries.
- ▶ Producers are also caught in this tension. When they insist on being measured by the standard of efficiency and cost-benefit, they reinforce the idea that agriculture is just another sector of an industrial economy. When they complain that people do not understand farming, they appeal to a past world in which food and farming have a central place in the experience and values of the majority.
- ▶ A richer and more widely recognized understanding of this philosophical tension will help us achieve more creative and productive discussions of new agricultural technology.

■ Introduction

The fate of agriculture and agricultural technology will be dramatically affected by society's general expectations for agriculture. Understanding this fate requires a general framework for articulating, interpreting and discussing assumptions about the nature and purpose of agriculture. A philosophy of agriculture provides just this sort of framework. It expresses a general social vision for food and fiber production, distribution and consumption that helps us understand and anticipate how law, policy, market structures, consumer preferences and the political climate will converge to create the socio-political context in which agricultural producers will operate.

But there are many perspectives at large in society and different futures can be derived from different perspectives. I am attempting to paint a coherent picture of what others *might* say about agriculture, were they ever to take the time and energy to examine the assumptions about agriculture that are implied by their conduct and behavior. My ideas on the philosophy of agriculture are derived from thirty years of work on the way that new technologies affect agriculture and how these affects are perceived and evaluated by the broader public. I started my work in the 1980s when debates over agricultural chemicals were still fresh in the public's mind, and when the University of California was being sued by a farmworker's organization for developing a mechanical tomato harvester that put thousands of small tomato producers out of business. Very quickly the debate turned to recombinant bovine somatotropin, a technology that dairy producers will understand. Debates over the socio-economic impact of this animal drug fueled the initial anti-biotechnology social movement. By the late 1990s, this debate had become global, and the echoes of this debate continue today. I have recently undertaken research on nanotechnology and synthetic biology, two technologies that will have significant impacts in animal disease management and biofuels, respectively (Thompson 2010). I could talk at length about the details of these debates, but my take home message is that a bigger contest of ideas is at work in all these disputes.

■ Public Philosophies of Agriculture: The Industrial Model

In fact, I assume that most residents of industrialized countries rarely think about agriculture at all. Although they participate in the food system as customers of retail firms and consumers of food, they do not have well-formed ideas about the production, processing and distribution activities that compose the food system, nor do they conceptualize the constellation of individuals and firms who make up the food system as an integrated or organized whole. People certainly expect food and fiber products to be available at retail outlets, but a key component of my hypothesis is that this

expectation is framed within broader assumptions about the nature and organization of the industrial societies in which people live.

As with their expectations for housewares or electrical appliances, people believe that agricultural products available in grocery stores and restaurants are *merchantable*. This means that they meet minimum standards of quality and are safe to use. They expect that market forces will make these products available at competitive prices. I don't suggest that people are naïve or satisfied with the ability of an industrially organized society to do these things, but simply that they are conversant with the activity of shopping for the things that they need, and that this is pretty much how they relate to food and agriculture.

Although there are many assumptions about how the world works that are built into these expectations, I will, for simplicity, boil this down to two principles.

- Commercial actors in the industrial economy are expected to be competitive and efficient.
- Commercial actors are expected to operate without imposing harm on others.

The first principle is implied by the expectation that food and fiber—the primary products of agriculture—will be generally available at prices that are within the means of most ordinary citizens. Few consumers in industrialized societies today have experienced shortages of agricultural products. They expect to access these products through retail outlets such as grocery stores and restaurants. Some consumers may get some farm products through gardening, informal exchange or alternative arrangements that include farmers' markets or community supported agriculture, but these are *supplementary* forms of access. They are part of a larger context in which food is constantly available through well established retail mechanisms. Farm production, processing and wholesaling are largely invisible to the majority of the public, yet they remain at least vaguely aware that a more complex market structure supports the supply chain that ends with retail purchase. People expect this structure to function reliably (Sapp et al., 2009).

The second principle is implied by the expectation that products offered for sale in retail outlets can be consumed without significant risk, as well as by a century's worth of legal and political activity intended to regulate industries that discharge pollutants into the environment. Even in its earliest days, the emergence of capitalism was accompanied by the development of political and economic theories expressing the idea that market-oriented production and distribution is ethically acceptable only under the condition all parties to the competition play by a mutually-agreed upon set of rules—a social contract. Although secure property rights provided one key motivation for the

contract, security of one's person was equally important. No party to such a contract would agree to rules in which an advantage could be obtained by violence or the threat of violence. Thus governments have always been seen to have a role in protecting citizens from both intended and accidental harms that occur in the course of firms pursuing their economic self-interests (Nozick, 1974).

The two principles provide a framework for the conduct of agricultural production, as well as for subsequent activities by firms engaged in processing and distributing of agricultural products. But it is important to notice that they do so without making any particular reference to agriculture. These are principles that articulate norms for the organization and performance of *any* sector in a modern economy. There are differences of opinion about how these two principles are to be specified. There are especially deep differences of opinion about the role that government should play in specifying and enforcing them, on the one hand, and on whether allowing the owners of capital to determine the course of events through profit-seeking investment promotes the public good, on the other.

For example, there is an expectation that manufacturing should not introduce harmful pollutants into air or water, yet there are deep disagreements about how regulatory agencies should protect citizens from such harmful impacts. There are also disagreements about government's role in, for example, protecting workers from risks they incur during the course of their employment. Farms and ranches have been subjected to the same scrutiny that the steel or chemical industries were subjected to in the 1950s. I am not picking sides here. All I am asserting here is that the familiar debates that divide people on the left and the right presuppose assumptions about the way that firms in various sectors of the economy compete with one another, on the one hand, and have the potential to impose costs and harm on third parties, on the other hand. Agriculture is no exception.

Given this, we can identify one broadly shared set of philosophical assumptions about farming and animal production as follows:

- Agriculture is just one of many sectors in the industrial economy. Like firms in any sector, agricultural producers should be competitive and efficient, and they should not impose harms or costs on others.

The overall picture is one in which firms in different sectors supply one another, with the retail sector representing the end of the pipeline leading to consumers. Thus farmers and ranchers purchase inputs from firms in the manufacturing and chemical sectors, then sell to processors and distributors, who eventually sell to retailers who sell to the public. If each sector is organized competitively and adequately regulated so that their costs cannot be passed on to others, consumer demand provides the basis for governing

what gets produced and *how much* of it. We might call this an “end of the pipe” philosophy of agriculture, or, in virtue of the way that agriculture is judged by the general principles of an industrial economy, an *industrial philosophy of agriculture*.

Animal agriculture—and dairy is a prime example—has incorporated a slew of new technologies over the last three decades that allow producers to deliver commodities at a more competitive price. Some of them are as simple as concrete flooring and improved feed mills, while others are as exotic as robotic milking and the evolution of animal drugs. Information technology has been especially important, but little recognized by economists. Seen as an ensemble, these technologies have made concentrated animal feeding operations, or CAFOs, into an economically competitive approach in virtually every type of livestock farming. But CAFOs come with side-effects that third parties see as costs. Larger equipment and higher volumes of traffic takes a physical toll on roads while dealing with noise and traffic flow becomes a nuisance for neighbors. The potential for discharge or volatilization of manure constitutes both a real risk of pollution and a convenient target for those whose real concern lies with nuisance effects or other impacts on their quality of life. Again, I am not taking sides. My point is that debates over whether and under what conditions economic benefits outweigh third party harms may be relatively new to farmers, but they have been occurring in other sectors of the economy for decades.

It is typical for producers of any farm commodity to believe that their problems are both unique and more severe than others'. But whether you are producing strawberries or soybeans, eggs, meat or milk, all of agriculture has had to deal with the twin forces of technical change and increasing competitiveness, on the one hand, and calls for regulation or mitigation of third party impacts, on the other. If agriculture really *is* just another sector of the industrial economy, producers should expect to be engaged in political activity aimed at striking the balance between economic growth and regulation of third party effects. They should also expect to spend time negotiating with aggrieved parties.

■ **Public Philosophies of Agriculture: The Agrarian Alternative**

The fact that some producers take offense when third parties complain may simply be a sign of naïveté, but it may also reflect a deeper philosophical perspective. Industrial philosophy of agriculture has not been typical throughout most of human history. In the past, most people presumed that agriculture has a special status, and that the principles developed for governance of manufacturing, trade and commerce should *not* be applied to farming. It took more than a century for the shift to an industrial philosophy to

occur, and the accompanying changes in actual production methods lagged behind the change in philosophy for many decades. I will refer to those views of agriculture that recognize a special status as *agrarian philosophy of agriculture*. There are quite a few variations in agrarian philosophy of agriculture, and they date back to the earliest eras of recorded history.

- ▶ *Aristotle* (384 BC – 322 BC). The climate and topography of Greece supported a social organization and style of farming in which a household labor force managed diverse but highly localized systems with a mix of annual crops, olive and fruit trees, grapevines and small livestock herds. This was in contrast to other locales in the ancient world (especially Egypt) where management of massive irrigation systems demanded central management and a large unskilled workforce (e.g. slaves). While pharaohs and kings used mercenaries to force compliance, independent household farmers with a keen interest in protecting their lands were the citizen-soldiers of Greek city-states. Greek philosophers were aware of this, and attributed the special Greek virtues of courage, solidarity and loyalty to their unique approach to agriculture (Hanson, 1999).
- ▶ *James Harrington* (1611–1677). This 17th century British political theorist argued that the ability of a nation to prosper and to resist invasion depended on a thriving agriculture and large portion of the population employed therein. His arguments stressed the importance of provisioning the army and navy with a reliable source of food, which in turn required securing solidarity between farmers and government. Thus during England's period of transition away from absolute monarchy, Harrington was a key spokesman for the view that any form of stable society required a constitution that gave the farming class full rights of participation in government decision-making. Like others of his time, Harrington did not believe that those who worked for wages could be trusted to make decisions in the best interests of the nation. But farmers not only could be relied upon, they were the bulwark of a nation's strength (Montmarquet, 1989).
- ▶ *Abraham Lincoln* (1809-1865). Lincoln campaigned on the idea that access to land and to improved farming methods was critical to the future of the republic. Lincoln established the U.S. Department of Agriculture and charged it with developing knowledge and skills usable by the common people. With encouragement from journalist Horace Greeley and his Vice-President Andrew Johnson, Lincoln signed the U.S. Homestead Act in 1862. The law provided access to extensive U.S. public lands. The assured opportunity to farm implied that no one was forced to work for someone else. This provided a moral "safety valve" that allowed the industrial economy to expand (Ross, 1929).
- ▶ *Aldo Leopold* (1887-1948). This founding father of environmental ethics supported outdoor activities (such as hunting and fishing) to increase

public appreciation of nature, but he also believed that farmers were most likely to understand society's precarious dependence on a well-functioning natural environment. "There are two spiritual dangers to not owning a farm," he wrote. "One is thinking that food comes from the grocery, and the other is thinking heat comes from the furnace," (Callicott, 2000).

Religious traditions also articulate deep connections between people and land. Daily practices of cultivation and preparation of common foods are imbued with spiritual meaning. Food and farming become a key way in which the culture and religious identity of the community is established. Continuing these traditions becomes a mode of discharging humanity's duty to God as stewards of the natural world (Wirzba, 1999).

These viewpoints imply that a decline in the number or percentage of the population engaged in farming is disturbing. It could signal a weakness in the underlying integrity of society as a whole. One implication of an agrarian philosophy is that it is important to preserve land tenure arrangements and the farming population in general. In North America, this has taken shape as a movement to preserve the family farm as a social institution and as a viable economic enterprise. I will not go deeply into the historical details of history. The point is that agrarian philosophies will take a jaundiced view of changes that either decrease the number of family farms, or that lead farms to resemble firms in industrial sectors of the economy. Agrarian philosophy is, in this respect, directly opposed to an industrial philosophy of agriculture.

While industrially-oriented concerns about CAFOs, biotechnology or animal welfare will be framed in terms of risks and harms to third parties, people who take an agrarian view will be more concerned about trends in the nature and structure of agriculture. They will object to CAFOs more because of their scale or because they rely on a larger workforce of wage laborers. They will object to biotechnology because it brings a new regime of patents, technology fees and licenses. An agrarian's objection to programs such as Good Agricultural Practice (GAP) certification or traceability rules is focused on the difficulty that smaller scale, less well capitalized family farmers have in complying with them. Agrarians are thus willing to both tolerate inefficiencies and bear some costs, so long as the farm sector continues to reproduce larger social, cultural and constitutional goods (Thompson, 2010).

My general point is that although an industrial philosophy of agriculture has come to dominate our thinking today, it has not been all that long ago that agrarian philosophy was predominate. In an agrarian philosophy, more is expected from agriculture than simply producing efficiently and not harming third parties. In addition to producing its basic commodities, agriculture is expected to play a central role in producing what is sometimes called "social capital". Although this can be a murky idea, it encompasses social capabilities

for cooperation, self-regulation, cultural reproduction and solidarity. It can also include material capabilities such as ecosystem services, good nutrition and food security. In return, agriculture is regarded as “special” in comparison to other sectors of society, and as such it is given both resources and room for maneuver that would not be extended to industries focused on manufacturing, trade or the provision of services.

■ Philosophy of Agriculture and the Current Dilemma

Although agrarian thinking has become foreign to us today, it was not always so. Two centuries ago, the industrial view was barely on the horizon. One century ago, the majority probably still held agrarian views. In the Great Depression, progressives were urging that we come to see that agriculture could be organized according to industrial principles. Even fifty years ago, key elements of an agrarian philosophy were still relatively common, especially among rural populations (Wunderlich, 2000). Those of us over sixty remember a time when contraction of public agricultural research and extension would have been unthinkable, yet today it is viewed as a form of socialism by those on the right, and as a tool of agribusiness corporations by those on the left. The agrarian rationales for viewing agriculture as special have largely ceased to be persuasive in Western Europe, North America and in other European societies such as Australia. Agrarian philosophy is also conspicuously missing from the outlook of highly educated people without regard to their nationality or disciplinary background (Mariola, 2005).

There are important exceptions. The ideas of present day writers such as Wendell Berry, Joel Salatin or Victor Davis Hanson resonate with echoes from the past. As noted, religion and literature are replete with agrarian ideals. When people today read Henry David Thoreau’s *Walden* or biblical references to viticulture they are exposed to snippets of agrarian thinking. Children’s literature is especially rich in agrarian images (Thompson, 1993). So although most people lack a coherent agrarian conceptual framework, they are nonetheless exposed to elements of agrarian philosophy. Agrarian ideals also continue to echo in the mindset and speech of agricultural producers and rural communities. For example, the idea that farmers are entitled to parity is, I submit, a deeply agrarian notion, and the rationale for subsidies to farm producers continues to make an appeal to the idea that agriculture has a special status not shared by other sectors in an industrial economy (Bartenson, 2010). At a cultural level, the belief that people with farm backgrounds have an especially strong work ethic also makes an implicit reference to the way that rhythms of farming generate elements of moral character that are absent from other productive vocations (Macombe, 2009).

Current discussions about farming and the food system are thus caught between an industrial philosophy of agriculture, on the one hand, and some often inchoate and poorly conceptualized strands of agrarian philosophy, on

the other. Farmers themselves speak with two voices. This is partly because in every commodity group, there are some producers who are thoroughly reconciled to an industrial viewpoint who coexist with others who manage their production to maintain a household structure, a landscape or a home. But there are also many individuals who are torn between these perspectives within themselves. They may view their own agrarian ideals as nostalgic or impractical, but they still have them. And there is also the fact that even someone who is thoroughly committed to an industrial viewpoint can find it useful to deploy agrarian rhetoric or images when it temporarily helps them win a political argument or advertise a product. There is nothing in an industrial mentality which implies that it would be unethical to do so.

The philosophical tension has different implications for consumers. There are, on the one hand, many non-farmers who see agriculture as a rogue sector that has refused to play by the rules for far too long already. This perspective generates calls for addressing food safety, animal welfare and environmental impact through the development and enforcement of production standards. Where government refuses to implement these standards, such people will shift to the private sector, demanding that retailers take up the slack. Thus some of the most potent calls for change in production standards are now being filtered through economically powerful and publicly visible corporations such as McDonald's or Wal-Mart (Locanto and Busch, 2010). On the other hand, relatively few consumers seem to realize that such regulations drive farming ever more decisively into the industrial model. They do not understand that the costs of compliance are almost always more effectively borne by farms operating at a larger scale and with more efficiency-oriented management principles. They thus maintain a nostalgic and naïve belief that they can regulate farming back into something that looks like the agrarian landscapes in the books that they are reading to their children.

I'll illustrate my point with some examples:

- ▶ Biofuels. From an industrial perspective, the market should decide how biomass should be allocated. If liquid transportation fuels are the most lucrative market, that's where it should go, notwithstanding the impact of higher feed cost for animal producers or higher food cost for consumers who eat either the grain itself or the meat, milk and eggs derived from it. Agrarians are more likely to give the idea that meeting human food needs is a basic purpose for agriculture, and will also see the preservation of some basic farm-types as possessing social value. They will not endorse diversion of biomass to fuel production unless these more basic roles for the farm sector have been fulfilled (see Tait, 2011).
- ▶ Animal Welfare. From an industrial perspective, it makes perfect sense to think that competitive pressure will drive producers to exploit animals. Although productivity goals cannot be met without reasonably healthy animals, it may make economic sense to maximize return on capital

invested in buildings and equipment, or to use drugs that stimulate short-term productivity at the expense of animals' feelings. Animal welfare advocates see themselves as defending a powerless third party (the animal) against profit-seeking needs of the industrial farmer. However, such advocates also understand that larger scale and better capitalization provide the resources needed for a well-regulated animal industry. Agrarians are more inclined to believe that farmers' personal ethic can be relied upon to assure humane care of animals, but only when farm structure closely resembles the family-farm ideal. For them, animal welfare just becomes another reason to put CAFOs out of business, but they may be quite tolerant of less than ideal welfare when it is seen on more traditional-style farms (Thompson, 2001) .

- ▶ rBST. For the industrial philosophy, this is just another animal drug. The key question is whether it meets standard criteria for animal health. It is possible to see the difference in the way that regulators have reacted to it in terms of different perspectives on its impact on animal health. But someone holding an industrial view may also suspect that agrarian concerns about rBST's impact on the structure of the dairy industry and the viability of smaller farms have inappropriately introduced political considerations into the regulatory decision making process (Weasel, 2009).
- ▶ Nanotechnology. Key applications of nanotechnology in the food sector will be focused on monitoring the supply chain. From an industrial perspective, the question will be whether biosensors, radio-frequency I.D. and new information technologies really do reduce risks from pathogens that result in death and disease, costly recalls and outbreaks of animal disease, or whether they simply impose costs on producers to create the mere appearance of safety. Agrarians will be more concerned about the way that this ensemble of technology tips the balance of power even more firmly toward processing firms and retailers. They will be worried that small farmers will lose flexibility to manage herds, and that downstream actors in the supply chain will use these tools to manage supply and to shift their risk by intruding even more deeply into farmer decision-making by stipulating detailed production contracts (Scrinis and Lyons, 2009).

■ Conclusion: Looking Ahead

In conclusion, I am saying that the primary push to regulate agriculture derives from an industrial philosophy of agriculture that is also being promoted by many farm organizations today. It is a direct expression of the idea that farming is a business. As such, third parties should not have to bear the costs of industrial production. This philosophy is reinforced from within the farm sector by farm groups, economists and agricultural scientists who defend

the current system in terms of its efficiencies and call for even greater efficiency as a response to future needs. Although people who call for regulation and people who call for efficiency often see themselves as opposing one another, both groups are using arguments that presuppose an industrial philosophy of agriculture. There is nothing in this philosophy that implies any particular value for small or family farms, for locally organized or ecologically diverse production systems. Nothing supports the idea that farmers should have room to maneuver, much less public support in the form of subsidies or research.

It is one thing for people to be in disagreement about such matters, but something else for them to be trapped by the thrusts of contending philosophies and unable to recognize it. That is the situation in much of the Western world today. People both within and outside farming and agriculture are caught in the tensions created by two contending philosophies of agriculture. But because they do not recognize that there could even be such a thing as a philosophy of agriculture, they are unable to express their concerns in a coherent fashion. They are unable to address arguments to one another. They are not even able to think critically about the way that their own arguments are affecting the way that others think about agriculture.

If we are caught between philosophies of agriculture, what should we do about it? The first thing is simply to talk about it. Such talk is especially needed in academic and policy circles, where the industrial viewpoint is so dominant that there is a tendency to give farmers some very bad advice that ignores the influence of agrarian ideals among the general population. In the case of those who think that agriculture really is just another sector of an industrial economy, refining that perspective should include debate over the standards that should govern farm production into the future. But for those who think that agriculture has unique roles to play, and that it may need unique rules in order to play them, it will be necessary to articulate an agrarian vision that is much more complete, coherent and convincing. I believe that an updated agrarian philosophy is possible, but I have not yet seen one that I could adopt and defend.

It is entirely possible that one viewpoint *will* eventually defeat the other. If I were a betting man, my money would be on the industrial philosophy, though my rooting instincts are for the agrarians. But it is actually more likely that a conscientious effort to put such contrasting philosophies into dialog with one another would spur totally new ideas. Explicit debate will reveal opportunities for synthesis that are not obvious to us today. That is the hope that I conclude with. I do not pretend to have solved any problems in this paper, but I do think that it is time to take a few steps backwards from our practical problems and policy debates to reflect more broadly on just what it is that we hope to get from agriculture as a society. I have offered an initial hypothesis to begin this reflection, and I hope that a genuine conversation can begin.

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