THE FOOD IN OUR FUTURE: WHERE WILL WE FIND ETHICS?

EL ALIMENTO EN NUESTRO FUTURO: ¿DÓNDE ENCONTRAREMOS LA ÉTICA?

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ABSTRACT:

Food and agricultural systems are in large part driven by technology. Together with public policy, the kinds of technologies that are induced into, or chosen by actors in, food systems, dictates their structure and activities. The "Big Story" or ideology which underlies research, development and adoption of technologies provides the justification for choices we make about the future of the food system. A combination of productionism –more is better, and "feed the world"– is what governs, and seems to be what will govern Western food systems. Important ethical questions include whether more is better and whether we will feed the world with our technology and policy. But a parallel question is how will we include critical consideration of the continued legitimacy of our Big Story? This system, after all, has worked well for the past century.

Keywords:
Agricultural ethics; Technology; Productionism; "Feed the world"

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RESUMEN:

Los sistemas alimentarios y agrícolas son, en gran parte, impulsados por la tecnología. Junto con la política pública, las tipologías de tecnologías que están introducidas, o elegidas por los sujetos en los sistemas alimentarios, imponen sus estructuras y actividades. La "Gran Historia" o ideología que subyace a la investigación, al desarrollo y a la adopción de las tecnologías, proporciona la justificación de las decisiones que tomamos sobre el futuro del sistema alimentario. Una combinación de produccionismo –"more is better", y "feed the world"– es lo que gobierna, y parece ser lo que sostendrá, los sistemas alimentarios occidentales. Las preguntas éticas importantes incluyen si "más es mejor" y si vamos a "alimentar al mundo" con nuestra tecnología y política. Sin embargo, una cuestión paralela es, ¿cómo vamos a incluir la consideración crítica de la legitimidad continua de nuestra "Gran Historia"? Este sistema, después de todo, ha funcionado bien durante el siglo pasado.

Palabras clave:
Ética agrícola; Tecnología; Produccionismo; "Feed the world"

1. A vision for agricultural ethics in action

The future food and agriculture system needs food and agricultural ethics. This may sound over-reaching and self-serving, coming from someone whose career has been devoted to bringing ethics to agricultural research, education and outreach. However, given the fact that this career is nearing its (official) end, it is not self-serving in a narrow sense to say that food systems will depend on ethics. Rather, the "self" that this claim serves is that of a citizen, consumer, and in general a person who cares about agriculture and the people who make food happen. If my initial statement still sounds over-reaching, it is because we have allowed our conceptions of what ethics can do to be limited by "practical" considerations. I believe the future of our food and agricultural systems requires us to think what might appear to be impractically, but, if food and agricultural leaders (as the frequently trite saying goes), get "outside the box", nothing could be more practical. I propose that we have philosophically-educated agricultural ethicists actively employed inside colleges, institutes, departments, etc., of agricultural science and education, articulating principle-based ethical judgments about even the most ordinary decisions and actions that take place in the food and agricultural system. This may not guarantee that the future food and agricultural system will be sustainable and just, but it will go a long way toward assuring that the system is not unsustainable and unjust.

Saying that the future of agriculture depends on ethics is obviously not to suggest that there will be no food and agricultural system without food and agricultural ethics. Assuming that humans continue to populate the Earth, some agrifood activities will exist whether there is agro-ethics or not. However, the specific nature, shape or structure of a given set of agrifood activities –with whatever unique "systemic" functions or consequences that set of activities has– is not a given. It is by no means my original thought that the kind of agrifood system people have and will have depends on choices. However, in maintaining that the agrifood system's future depends on ethics, I am signaling that there is a bigger role for ethics than has been the case, and more proactive role than most agricultural leaders have envisioned. Yes, ethics wherever it originates from has provided comment, analysis, "consciousness raising" concerning the nature and consequences of our choices about the food system. Over the century, we have come to see how any "social provisioning" system, of which the food system is one , has "values" underlying and guiding it, etc. For forty years, a lot of people have been actively identifying the values and concerns and the issues they imply. What I am proposing here is that agricultural ethics now has to take us beyond the identifying-explaining "agriculture and human values" stage; "doing" agricultural ethics means that we need to decide that some things actually are morally right or wrong, and we need to make this plain to anyone who will listen. And it will best happen inside the establishments which train, educate, shape and indoctrinate future leaders in the food and agricultural system.

This paper develops these ideas according to the following script: (1) First, I discuss how the present and future agrifood system reflects decisions somebody has made about technology. As has been argued elsewhere , the agrifood system is in large part driven by technological change; indeed, the "future of agriculture" is frequently identified with the technological changes, advances, progress, that will move agriculture "forward" . So understanding the nature and contexts of decisions about technological change requires that we examine technology-related decisions. And this in turn leads us to acknowledge that technology in the agrifood system cannot be viewed as a some kind of inexorable and impersonal force doing the driving. Rather, technology adoption and diffusion (even its larger social manifestations and consequences) is just one (more) species of ethically-significant human interactions; people (for better or worse) are the drivers, so that people not technology are what "drives" the future. (2) Second, I will discuss the "stories" that have been told and lived by nearly everybody in the food system, from (some) farmers, to corporate salespeople, to scientists and science managers/administrators, to policy-makers

at numerous levels who are involved with food. People in the food system tell themselves and continue to tell anybody who will listen –especially young people, students, who are the future of the food and agricultural system– that Malthus was right, that population growth is outpacing our ability to feed ourselves, and that in order to feed ourselves we need to use more land, water and other resources, employ the latest technology, and produce as much food as we can as efficiently as possible. People have told and retold the story that we have to accept that markets (as in, capitalist production-distribution structures) are the only just and viable (or at least viable) "feed the world" alternatives, and that science and technology have to be allowed to develop unfettered. We do this, or (eventually, or 2050, whichever comes first) we will starve. Calling these stories lies is probably too strong, and may impute malevolent attitudes on the part of those who perpetrate them. A better characterization may be that the statements, claims, depictions, forecasts, etc., are all "truthy", i.e., kind of true . The account is more or less internally consistent and so is self-reinforcing: there are parts of the story which might have once been accurate although in a limited context; more important, the story "feels good", and in J. L. Austin's words, has "performative" force. (3) Indeed, I want to show how all of the issues that are raised, implied, or even just quietly sit there in producer, consumer, science and policy decisions and actions, demand principle-based ethical critique and judgment. The ethical issues may seem as mundane and scientifically "in-house" as how to enhance flavonoids in strawberries, or how to engineer hornless cows and bulls for animal welfare improvement, or how effectively capture spillover effects (as in, literally, how to contain spills and leaks of animal waste from dairy farms) in budgets agricultural economists produce for industry. Yet, these mundane, ordinary, daily life issues and problems, to which people in the agricultural system devote their time, and to which many agricultural ethicists have devoted a lot of study, are where exactly where a more proactive agricultural ethics will have its most important hands-on mission. This is the ethical place I have found myself occupying over the years, and it increasingly only reinforces my perspective. Not only do agricultural ethicists need to come to judgments about right and wrong decisions and actions in these seemingly small situations, the places where these decisions are made or at least formed need to have agricultural ethicists there providing the normative guidance we are professionally trained to deliver. Ethics from the outside has only limited value, and therefore a future food and agricultural system needs to have ethics, indeed ethicists, where the stories begin and the future is formed.

2. Agricultural technology as a choice? behind "induced innovation"

For most people, the agrifood system, like other sectors of societies, just "happens". It is not that people believe this, since belief implies consciousness which is not always (and probably usually is not) present when it comes to this dimension of our social lives. Perhaps a better characterization is that most people just go about daily activities with no thought whatsoever to agriculture or food (other than when it's time to eat). It is also true that for the most part, the technologies involved in producing and delivering our food, etc., just seem to "be there". No one imagines a countryside without tractors, a grocery store without plastic (or cardboard) milk jugs, or (the facsimiles of) tomatoes on the shelves yearround. Agriculture, its technologies and their products, just "is" (and like "God" in Christians' primer, "was and always will be"). It is heartening to some people that consciousness is rising about the "fact" of agriculture and the food system.

Indeed, the contemporary agrifood system is large and complex (see Figure 1).

It is consciously and sometimes even deliberately so in developed nations. It is also complex in different though related ways in other parts of the world, especially those well-integrated into the global food system. It is well-documented that the national and the global agrifood system is structured the way it is in part because of science and technological relations. We have

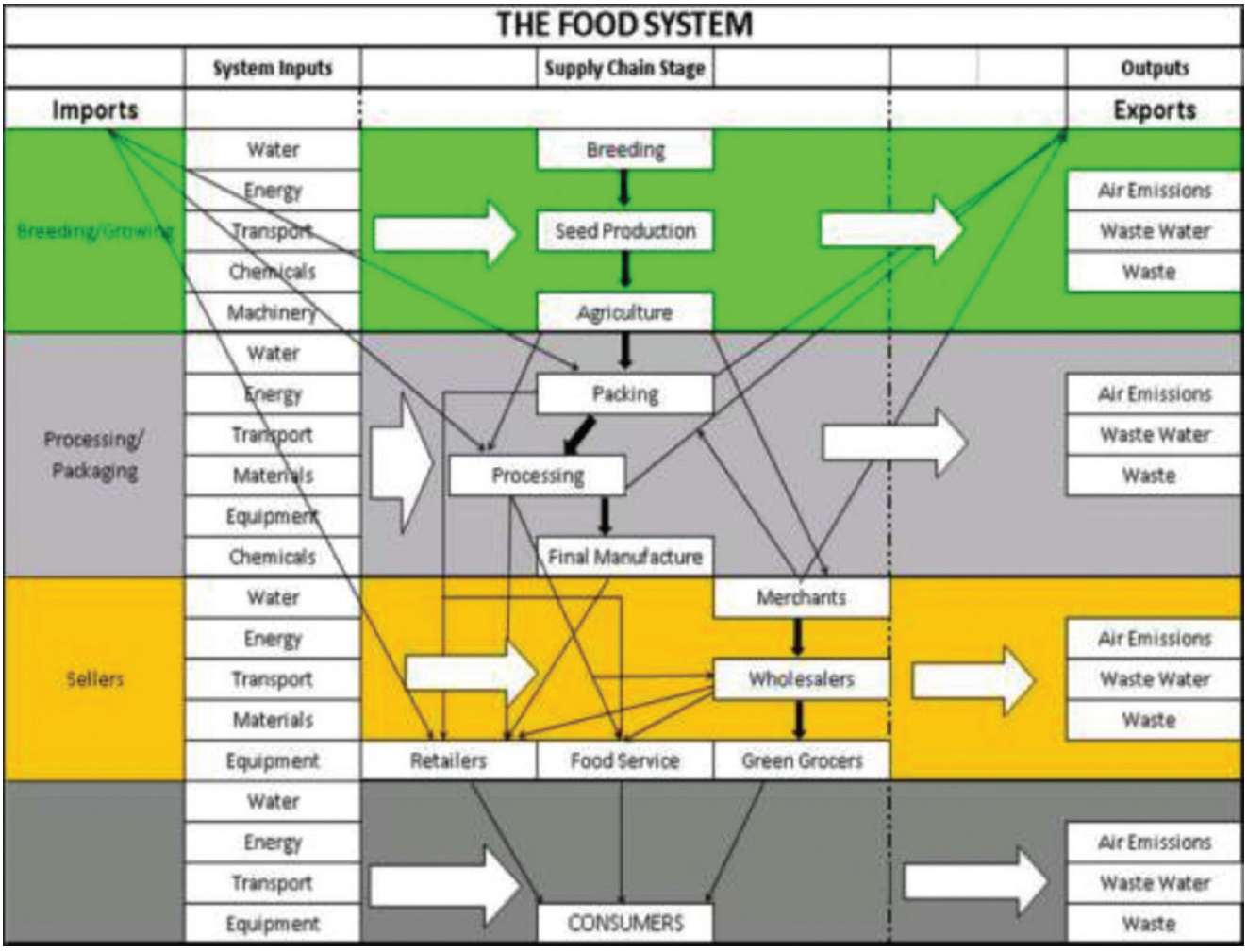

Figure 1: A Schematic of the Food System (Source: Author's design).

the inputs-farm-processor-distributor-sales-consumption food chain set up the way it is in part because the techniques and technologies inserted into this system over the approximately past two hundred years make this organizational scheme the "natural" way to do it. Perhaps "natural" is not the best word, although "efficient"– the preferred descriptor among economists and technical analysts for why things are organized as they are– is really more a goal or value than a characterization. At any rate, as farmers came to rely increasingly on external inputs (machines, biological tools, etc.), and technologies became available for long-distance transport, communication, packaging, etc., refrigeration, etc., the kinds of relationships inside the farm sector adapted accordingly. Technologies make this structure the most seemingly straightforward (again, avoiding "efficient" or "effective") in terms of resource use and time and all of the other criteria according to which we now view this system at work. Interestingly, public policy, itself shaped in part by technology, reinforces the organization of the food system along its present lines.

Agrifood systems, like any set of social practices, are based on people doing their jobs within their individual enterprises. Behind this fact, however, it is important to note that agrifood systems are born of and sustained by law and public policy. Any country with a food system, however unorganized the country (and the food system) might appear, has food (and agricultural) policy. Political authorities establish either directly, or by permissions granted to others, the structure of food systems: set-

ting who has rights to what, how those rights can be exercised and what remedies there are for violations are the most basic elements, ones which are common to all working social systems/practices. Over and above this, authoritative agencies establish the working rules for the relationships which identify the specific structure of relationships with the agrifood system: are there markets for the inputs farmers need? Are they local, uncontrolled, or subject to government agents' constant scrutiny? Can foodstuffs move from farm to any processor/distributor/marketer with whom a contractual relationship can be negotiated? Can anything farmers are able to produce and consumers have the desire for be grown? Behind even these kinds of questions, definitive of the degree to which the system is a free market or controlled production/allocation arrangement, are more time and place-specific matters: Do we permit eating raw animals or (more realistically) raw cow's milk? Are any concerns about food safety monitored or enforced and assured for consumers/citizens, and how so? Are prices allowed to fluctuate uncontrolled, or is there a range of legally sanctioned prices a middleman between farmers and consumers can charge? Add to these additional layers of public/government involvement, directing such things as availability of publically-held resources such as air and water, and the conditions of inter-region, inter-state or province, and international relations which might affect flows of resources or wastes in, though and out of the agrifood system. And, in sophisticated food systems, technology choices are predicated on there being a range of (possible) technologies already determined by governments to be permissible (and at some stages, governmentally preferred –funded, developed, marketed, and so on).

And so again, agrifood systems are basically people doing their jobs with their individual enterprises, now understood as structured and constrained by governments at various levels and with various degrees of involvement. Now, for some reason, there seems to be more attempted involvement of external agents in the decision-making of individuals at each stage in the food chain than is apparent in other sectors that come to mind, for example, heavy industry, power generation, transportation. That is, farmers and ranchers, people in the food processing and distribution subsectors, grocery store owners, restauranteurs, and even policy-makers who can affect the allocations of benefit and burdens of the system of food and agricultural regulation and oversight, are subject to interferences, what can only be called "lobbying" by people who represent a variety of economic and other interests. In the United States' agrifood system, these lobbyists includes scientists and science managers, those in pertinent government or university positions (e.g., Extension personnel), and of course representatives of the business entities (increasingly, multinational corporations) who have become increasingly involved in everything from agricultural research and technology development to farmers' technology-purchasing decisions. It might argued that anyone who provide the inputs to, transforms those inputs, or absorbs the outputs of the farm producers and natural resource managers are subject to attempts to influence as much as possible, the decisions about what the inputs are, how they are transformed, and what the features of the outputs of the food system look like from physical form to packaging to cost. Again, I know of no analogous situation in any other industry (taken as a whole, although there is a parallel at the farmer level with physicians' constant barrage of solicitation by everyone from insurance representatives to pharmaceutical salespersons). It is just true that in the food system there are people trying to affect the decisions of other people up and down the food chain, seemingly everywhere and all of the time.

This "micropolitics", if it can be called that, affects the system in ways that most analysts do not pay attention to. It is actually a joke inside agricultural science and in the Extension system especially that all important stuff takes place "where the rubber meets the road". Perhaps more appropriate, might be, where the rubber (or aluminum, or microbe) hits the soil and water, or where the university scientist hits the field. (See Figure 2 for an example). It is in this light that I maintain that the usual theories of technological change do not

Figure 2: University of Florida scientist explaining GPS crop monitoring system. See: University of Florida Institute of Food and Agricultural Sciences (UF-IFAS). "Challenge 2050 Project". **http://challenge2050.ifas.ufl.edu/about/**. [Consulted: 20/7/2016].

capture adequately, if at all, the dynamics of decision-making on the farm (or in the supermarket, or in the frozen vegetable processing facility, or in the Research Administration offices of the College of Agriculture). That is, ignoring the microdynamics of the system and the extent to which micropolitics operates tends to miss important features of how any change comes about.

"The neoclassical model of technological change utilizes only the following variables; relative prices influenced by factor endowments, consumer preferences, and production functions"[1]. The "induced innovation" theory in standard economics regards technological innovation as motivated by the bottom line: a change in the relative prices of the factors of production (land, labor, machines, etc.) is the spur to invention. Any innovation will be dictated –almost automatically– by the desire to substitute for a factor which has become relatively expensive. Why a change would even be considered is because something happening with consumer demand, that is, sales volume or prices, but in either case, profits are down.

Indeed, standard economics, despite professed interest in the microfoundations of economic phenomena, tends to assume (1) assume that all decision-situations are the same, so that exogenously dictated changes in relative factor prices makes shifts in production functions automatic (e.g., cheaper labor means use more of it relative to machines, and vice versa); (2) all decision makes are motivated solely by profit maximization; and

1 Schmid, A., Thompson, P. «Against Mechanism: Methodology for an Evolutionary Economics». *American Journal of Agricultural Economics*. 1999; 81(5): 63.

(3) decision makers decide without concern for anything other than profits and the exogenously-produced price shifts. As a result of these assumptions, standard economics is able to generalize about technology adoption decisions; however, the generalizations are almost always unrealistic in the sense that that is not what is going on in the actual decision-making context of or motivations about technological change especially[2].

The competing "institutional economics"[3] perspective highlights a different dimension of this phenomenon, although still connected to prices and profits. According to this view, agents (in our case, farmers) will not seek alternative strategies or technologies strictly because of production factors' relative price changes. Those price changes affect all farmers of a particular commodity or in a particular area pretty much the same, so it doesn't get the farmer anything in the way of a competitive advantage since everybody is making exactly the same change (or not). However, if there are incentives to change, either from consumers (usually, middlemen, e.g., a long-term supply contract might be available if a farmer, say, "goes organic"), or from the government (tax breaks to adopt, e.g., water-saving machines), change may occur. Still other considerations might still be relevant: a new machine may harvest vegetables faster than farm labor, but the machine is expensive and there happen to be a lot of unemployed prospective day laborers available this season. Or, labor may be cheap right now, but the farmer purchased a mechanical harvester last season and it can't just sit there doing nothing. The institutional view has it that technological change is still mainly bottom line focused, but it is less automatic and includes a range of other quasi-economic as well as not-economic considerations which affect adopters' decisions.

The history of agricultural technology, especially in the United States, suggests that whatever the scientific merits of the standard economics explanation, the reality on the ground is better captured by institutionalist accounts. Consider, for example, the early history of mechanical corn silage harvesters. Around 1918, a horse-drawn machine which used pulleys from the wheels to cut corn stalks was developed; when, in 1922, International Harvester introduced a gasoline-powered tractor (the "Farmall") that could transfer power from the tractor engine to the corn harvester, farmers were able to reap 100 acres in less than half the time before the introduction of this mechanized system (30-40 hours vs. 10-15 hours)[4]. Despite the efficiency, however, farmers were concerned: as one early rural sociologists observed, "the rate and magnitude of the recent mechanization of agriculture in this country are beyond the comprehension of the average man [...]. Even though unemployment brought about by the introduction of one machine may disappear in time, we would still be faced with the problems of continually changing technology, and hence continuous problems of human maladjustment"[5].

Indeed, as technologies have been developed and introduced to farmers, a wide range of things affected their willingness to adopt, or even consider, these new technologies. One particular barrier to adoption stood out early, and interestingly, has continued to play a role in adoption decisions over the past century, even if, (as economists say) ceteris paribus, adoption of many (or even most) of these technologies took hold. This barrier was farmers' suspicions that adoption of this technology would make the non-adoption of a second (and third, and fourth, etc,) impossible. In other words, even from the very beginning of the introduction of mechanical technologies into agriculture, farmers recognized the existence of what we now refer to as "the technology treadmill" without even knowing what it meant. The technology treadmill begins when a few farmers adopt a new technology early. These farmers occasionally make profits for a short while if the technology is a good one, because their production costs go down.

2 See: Schwartz, J., Hunt, E.K. *A Critique of Economic Theory*, Penguin Books, New York, 1973.

3 For primers on "Institutional Economics", see: Gruchy, A.G. *The Reconstruction of Economics: An Analysis of the Fundamentals of Institutional Economics*, Greenwood Press, New York, 1997; Hodgson, G.M. *The Evolution of Institutional Economics*. Cambridge University Press, London, 2004.

4 See: Living History Farm.Org, http://livinghistoryfarm.org/farminginthe20s/machines_01.htm. [Consulted: 24/7/2016].

5 Hamilton, C.H. «The Social Effects of Recent Trends in the Mechanization of Agriculture». *Rural Sociology*. 1939; 4(1): 13.

However, as more farmers start to adopt the technology, there is more production, but prices go down, so those profits disappear. What happens is that an even newer technology (for example, a "new and improved" model of the same machine) must be introduced to re-start the profit machine[6]. One question is whether those early twentieth-century farmers anticipated the full implications of the technology treadmill: those farmers who do not get on the treadmill (or "fall off") basically fall out of farming as more successful farmers expand over them.

Economists and farm technology developers have been working for over 100 years to try to show that the technology treadmill either does not happen, or that its mid-level macroeconomic effects are such that consumers benefit even if the late adopters fall out of farming[7]. Indeed, even if farmers go out of business, consumers benefit from lower prices. For farmers, however, this was a problem. And, it has remained a problem. A couple of personal stories will drive this concern home. My grandfather owned and farmed a 160 acre (64.75 hectares) multi-functional farm in the U.S. state of Iowa beginning about 1927. It was, for many years, a family-operated going concern with adequate revenues to support a growing family (eventually four children on farm), until the late 1930s when the long-term impacts of the Great Depression forced my grandfather to sell the farm, move to the state of Indiana, and begin life as a tenant farmer (sharecropper). With a mainly absentee landlord, my grandfather was the sole operations manager, the farm-business decision-maker. My grandfather recalled, not long after retiring from farming (around the mid-1960s, when I was also old enough to appreciate stories about his background and his farm), that his biggest irritations were not weather, animals, farm workers or even fluctuating prices. They were all the machine, chemical, and veterinary-medical salesmen who regularly hounded him to adopt their newest products; the Farm Bureau representatives who constantly dogged him about joining local cooperatives; and the Cooperative Extension agents (mainly from Purdue University) who routinely promoted the latest in pre-fabricated budgets and other management tools the university had generated. Family accounts suggest that my grandfather was a good farmer (always healthy crops and animals) as well as a good businessman (the owner was happy and they lived well on the farm). He indicated several times that had he been driven solely by profit, he might have adopted some of those innovations, but in the end, he did just fine with only those he could comfortably integrate into his (in contemporary terms) multi-functional farm operation. The micro-lobbyists tried, but only marginally succeeded in my grandfather's case to induce their innovations: He did buy a grape-press in 1958 to make wine from his extensive concord grape arbor (and to a teenager in the mid-1960s, it was pretty good wine).

Fast forward to 1986-89: As part of the research for what eventually became the book *Plants, Power and Profit*[8], I interviewed farmers, university scientists and extension people, and public-sector and corporate research managers about prospects for the success of biotechnology in agriculture. At that time, Bovine Growth Hormone (bovine Somatotropin, bST) was a hot topic in farm and policy circles, was the subject of several "anti-public" relations campaigns, and was about to be banned from use in the European Union (1990). I attended several public meetings about agricultural biotechnology and about bST, but two stand out: one in Missouri and one in Kentucky, where local Extension personnel had organized groups of dairy farmers (~45-60 per meeting) to listen to representatives of Monsanto Corporation, a developer and eventual marketer of bST (Prosilac™). During those meetings, the Monsanto rep used fancy slides, a low key ("down home") style, and constant affirmative feedback from the Extension agent, to sell the use of bST to these farmers. Much of the information presented was from reports on research; all of

6 See: Levins, R.A., Cochrane, W.W. «Treadmill Revisited». *Land Economics*. 1996; 72: 550.

7 Gould, K.A., Pellow, D.N., Schnaiberg, A. «Interrogating the treadmill of production: Everything you wanted to know about the treadmill but were afraid to ask». *Organization & Environment*. 2004: 296-316.

8 Busch, L., Lacy, W., Burkhardt, J., Lacy, L. *Plants, Power and Profit: The Social, Economic and Ethical Consequences of the New Agricultural Biotechnology*, Basil Blackwell, London, 1991.

the information was positive about the human and animal health and economic effects; and the overall message was "get on the bandwagon", since already, dairies in California and Florida (where there are significant numbers of dairy cattle) were adopting this approach. Farmers were curious, but cautious if not skeptical. Still, the Extension agent repeated and reinforced the potential profitability of bST use. I do not know about these groups of farmers, but despite some negative publicity, studies conducted in the early 1990s concluded that adoption rate of bST over the first three years of its availability was well over seventy-five percent, that is, three-quarters of dairy farmers started to use bST, with those farmers who were already better off financially being both first adopters and the largest beneficiaries of bST adoption[9].

I am not suggesting that there is a direct causal link between these sales meetings and the actual adoption of bST in dairy farming. Nor would I suggest that the keen support of Extension agents, at least in the meetings I attended, contributed to any correlation. Nevertheless, it has been shown that the rate of adoption of bST was highest in the states of California and Wisconsin; this happens also to be the regions of the U.S. where Monsanto focused most if its marketing activities, both direct marketing as described above, as well as print media ads and posters in farm supply stores[10]. Indeed, even though no causal link has been drawn, it would be surprising if Monsanto's successes were not connected to its microlobbying for the use of bST in dairy farming. Interestingly, by the early 2000s, the use of bST had dropped considerably, due to individual U.S. states' restrictions on its use, considerable negative consumer attitudes, European Union import bans on products from bST-treated cattle, and an overall rejection of Monsanto –dubbed "Monsatan" by several farm groups in the U.S. and abroad[11].

A third anecdote can drive this point further. In winter 2000, I presented a paper on "the ethics of agricultural biotechnology" to a plenary session of the annual meeting of the U.S. National Association of Conservation Districts Directors, in Colorado Springs, CO. According to their website, "The National Association of Conservation Districts (NACD) is the nonprofit organization that represents America's 3,000 conservation districts and the 17,000 men and women who serve on their governing boards"[12]. Conservation Districts are created by each individual state and function as a quasi-governmental agency; all farmers are expected to participate in CD programs and mandates; and Conservation District directors tend to be the most successful, usually larger-scale farm owner-operators from their districts. One can assume they are also technology first adopters, and probably better educated than the median. At this session, attended by ~800 people, it was abundantly clear that some of the things myself and other panel members said hit home. (Interestingly, the panel also included Dr. Roger Beechy, former (and the first) director of the USDA National Institute for Food and Agriculture, and also former director of The Danforth Institute – a leading (industry and especially Monsanto-funded) agricultural "life sciences" (read: biotechnology) research enterprise in St. Louis, MO.). During one open discussion about the National Corn Growers Association (NCGA) then-recent call for corn producers in the U.S. to reduce their planting of genetically modified (GM) corn – both Round-up Ready® and bt-functional – in part because of the upcoming EU ban on GM grains, one farmer-director stood up and stated "let's face it, folks. We're all working for Monsanto. Who here can honestly say they like it?" At this point, the crowd erupted in "Boos" and "whistles", seemingly indicating agreement with both the statement and their disapproval of the fact. Although it was not surprising, from published reports at the time on farmer attitudes toward some of the new agricultural biotechnologies, it reinforced my belief that the idea that technology adoption is an automatic, ho-

9 Fetrow, J. «Economics of recombinant bovine somatotropin on US dairy farms». *AgBioForum*. 1999; 2(2): 107.

10 Tauer, L.W. «Impact of BST on Small Versus Large Dairy Farms», in: *Bovine Somatotropin and Emerging Issues – An Assessment*, Hallberg, M.C. (ed.), Westview Press, Boulder, 1992, 208.

11 Thacker, P. «Peeling Back the Curtain On Monsanto». *The Huffington Post*, 16 May 2016. http://www.huffingtonpost.com/paul-thacker/peeling-back-the-curtain-on-monsanto_b_9867902.html. [Consulted: 15/7/2016].

12 National Association of Conservation Districts (NACD). *About NACD*. http://www.nacdnet.org/about. [Consulted: 5/7/2016].

mogeneous system-wide response to changes in relative factor prices is simply not true. These individuals had decided to adopt GM technology, probably for a variety of reasons including just being habitual first adopter, and they were clearly unhappy with their decisions on a number of levels.

Anecdotes are, of course, insufficient evidence for a hypothesis or theory. However, these stories do help explain the institutionalist's view that technology adoption decisions are not always automatically rational in the economists' sense, and that because of this decisions to adopt new technologies are sometimes the "wrong" decisions. Farmers' regrets (along with the larger set of undesirable social, economic and environmental consequences we now associate with certain technology decisions), attest to this fact. Let me reiterate, then: (1) The agrifood system is large and complex, and one of the reasons it is so are the "technical relations of production". How we produce, process, deliver and consume the products of this system is dictated in part by the political goals we have historically established for this sector of our society, but even more important are the decisions actors up and down the agrifood system have made concerning the technologies made available to them; (2) Change in the agrifood system, indeed, the drivers of the future of the agrifood system, are choices with respect to new technology. Economics (and public policy) may shape or broadly frame the structure of relationships among subsectors in the system, but the choices about technologies ultimately take place "where the rubber meets the road", that is, as farmers, processing firm production chiefs, transportation executives, supermarket managers and the like, decide here and now that X or Y machines, bioengineered plant seeds, chemicals, and even animal strains, are best for the individual farm or firm, or even multinational corporation. (3) These choices do not take place in vacuum, in agribusiness programs or especially in theoretical texts. They take place under conditions of microlobbying, business pressures, and exigencies associated with rainstorms, local enforcement of immigrant labor laws, and such seemingly remote events as Brexit votes. Not so far "in the background" if even in the background, are the scientists, extension people, salesmen and media campaigns who are doing their best to affect the outcome of those decisions in favor of the technology, product or so-called "science-based" information these external agents have a vested interest in seeing taken up by their targets. Ethics has a lot to say about this aspect of "the system".

3. Small lies(?) and the big story

In all of the cases of micro-lobbying as I have referred to it, the purveyors of the newest and greatest agrifood technologies seem to have told falsehoods of some sort: most of the time, these are the falsehoods or fabrications that are part of the so-called "ethics of business", the "rules of the game". The salesperson or promoter makes claims, purports statements of fact, about the benefits the new technology or management system or whatever will confer on the producer (store manager/owner, restauranteur, consumer). These claims may have a basis in scientific studies conducted either in-house or under contact with a university department. And, the study or studies may show that certain benefits will accrue because of the adoption of the new technology. The questionable aspects of these claims lay in the salesperson's or at least his corporate bosses' knowledge that the study was limited, controlled, isolated, not-yet-replicated, etc., Indeed, in "the case of bST"[13], Monsanto representatives touted a study from Cornell University that showed that bST would increase milk output 15-30% from only a 3-5% increase in feed intake. Subsequent research has demonstrated that the milk-to-feed ratio is more likely much smaller; and years of on-farm use of bST has proven that those numbers are even much smaller, and that the increased efficiency (positive input-output ratio) all but disappears over time[14]. Nevertheless, in standard business ethics, it is presumed that everyone

13 For a thorough examination of the social dimensions of bST, see: Comstock, G. «The Case Against BST». *Agriculture and Human Values*. 1988; 5: 36.

14 Burton, J.L., McBride, B.W. «Recombinant bovine somatotropin (rbST): Is there a limit for biotechnology in applied animal agriculture?». *Journal of Agricultural Ethics*. 1989; 2: 129.

knows that exaggeration, hype, whatever one calls it, is to be expected, so that no one is faulted. That's just how the game is played.

The critique of this model of business ethics is that information is neither neutral nor is the possession of information symmetrical. The promoters of "the new" almost always have access to information that the potential consumer do not yet, nor may ever have, access to; further, in the kinds of contexts in which bST or Roundup-ready® or whatever other technology were being promoted, it was expected that promoters were telling the truth. This is because of the presence and in some (all?) cases enthusiastic support of these technologies by university or county-based Extension personnel. Extension generally has a good reputation among farmers, and the fact of such meetings being organized by Extension, or held at Extension offices, or advertised by Extension, gives official support to these technologies even if the individual agent remained silent. Again, the research on which benefits are predicted is frequently university-based research. bST research was conducted in university labs, on university field plots or farms, by university researchers (including research assistants, some of whom may be the sons and daughters of the farmers in the room). So far from being a neutral game, the meaning and implications of the information session-cum-research reporting-cum-sales-pitch situation is loaded from the outset. Interestingly, everything that is presented may even be factual, but the question that is never raised is, is it applicable to this situation?

Farmers are not stupid, certainly, and (again, in my personal experience) many are skeptical, reluctant by nature. However, farmers are also under constant pressure to keep up, always attending to expected or possible risks vs benefits, and certainly not in a position to refute technologies which by their nature are unlike known technologies. This is key: for most people, change is good, so long as the parameters of change are reasonable. For many of the new agrifood technologies, especially biotechnologies, the parameters are themselves new and incompletely known. In these cases, anyone –farmers included– may be inclined to accept the risks associated with change if the expected benefits are so great, other farmers also seem willing, and there is wise assurance from presumably impartial scientists, that things will work out fine. This is where small lies begin to morph into the Big Story: farmers (and anybody who is considering adopting a seemingly radically new way of doing things) are willing to buy into this new set of changes, because their expected outcomes make sense in terms of a broader perspective that farmers have already been accepting. In the case of the past thirty years (at least) of agrifood technology, farmers (and we) are already poised to believe that the technical fix will solve our basic problems, including for the agrifood system, "feeding the world".

I am not sure when or where the notion arose that even small changes in a farmer's technological production function will help feed the world. However, it is certainly the case that the idea that the newest agrifood technology exist in order to feed the world is at work and in play in the promotion and justification of these technologies. In practice, the idea that workable/working technologies will help feed the world are usually associated with the more immediate goals of keeping farming profitable and making it sustainable. Actually, the conflation of feed-the-world, sustainable, and profitable probably came about when U.S. agriculture began to rely on international exports as much if not more than domestic markets for its "bread and butter". If farms are profitable, and can be expected to remain so indefinitely (sustainably), it is because there is always sufficient external effective demand to keep U.S. agriculture running at full productive capacity. Perhaps it is only a slogan found on billboards in the Midwest U.S., but U.S. farmers "feeding the world" became a fundamental justification for what U.S. farmers do. By extension, it became the rationale for developing all the new, efficiency-enhancing, productivity-enhancing technologies induced into farming for almost a century. The connection between what has been termed "productionism"[15] –the almost unqualified belief in en-

15 A telling analysis of "Productionism" in agriculture can be found in Lang, T., Heasman, M. *Food Wars: The Global Battle for Mouths, Minds and Markets*, Routledge, London and New York, 2015.

hancing productivity and output– and the unqualifiedly noble goal of eliminating global hunger globally been discussed elsewhere, so I will note only that I think that connection is a real one. What I will add is that in the areas of the U.S. where the major export crops, especially grains, are grown, the technology-productivity-profitability-sustainability-hunger elimination connections are so close that they are simply assumed.

But an interesting feature of the productionist-feed-the-word connection is that there are elements of truth about it. Increases in productivity in the 20th century did lead to surpluses. U.S. farmers were able to provide the food and fiber to support the Allies in Europe during and after the first World War[16]. Had it not been for lack of political will, U.S. farmers would have continued to feed Europe between the World Wars, which they did not, but they did resume during and after WWII. Events in Europe, Asia and Africa in the mid-to-late 20th century established that the "rest of the world" (ROW) cannot feed itself, and must rely on U.S. agriculture. So again, U.S. agriculture must sustain itself in order to sustain the world. And, whatever U.S. agriculture can do to better equip itself to feed the ROW, and export to ROW, is just expected. If that meant, in the 1970s, "planting fencerow to fencerow"[17], using all available resources to produce more food, in the 2010s it means farming with smart technologies and biotechnologies. As it turns out, a combination of growing global consumer affluence, liberal global trade policy, and the absence of too many political, social or natural disruptions (some of which actually increase global demand), has provided the US agrifood system, with its many players, and those of Canada, Mexico, the European Union, and Australia, with the greatest run of income growth for its participants ever.

Whatever feeding the world meant during, between, and after the World Wars, it now means feeding the parts of world which can afford it. It is no accident that the top 10 destinations for US agricultural exports (2015) are middle and high income nations (in order): Canada, China, Mexico, European Union-28, Japan, South Korea, Hong Kong, Taiwan, Colombia, Philippines[18]. These are nations able to absorb the kinds of agricultural products the US is especially good at producing, and are able to pay for these goods, even as other parts of the world who cannot afford it suffer continued high rates of poverty and hunger. Yet, as the slogan "feed the world" is continues to be invoked, it conjures images of those poor nations and regions of the world who need the vast quantities of food shipped from the U.S.: areas of Africa, Southern Asia, and Amazonia among them. The idea of ending hunger, especially abroad, in fact, has now become an even more dominant theme in the story behind developing agrifood technology. But there is another element in this story that needs considering.

Whether or not they can pay for our food, the fact is that there is a need, and that U.S. agriculture has the ability to (mostly) meet that need, is a powerful fact and has led policy-makers at least since the 1950s to use these facts. Europe and developed parts of Asia and most of Latin America enjoy both affluence and amiable relations with the U.S. Barring trade wars or some other disruption, they will receive what they want from U.S. agriculture. However, the policies which came to be known as "Food for Peace"[19] allowed the U.S. government to trade food for political allegiance in those parts of the world not (or not yet) able to afford out food. In the hands of U.S. policy-makers, food was visualized as a weapon to combat the aggressive tactics of Cold War enemies, especially the Soviet Union. When "feeding the world" was invoked during these times, it was to signal that the U.S. alone could help alleviate hunger (or provide the means to development), and therefore poor nations would be prudent to reject the Soviets and ally with America. There was no shortage of foreign takers, so U.S. agriculture could march on, mainting and seek-

16 See: Knutson, R.D., Penn, J.B., Flinchbaugh, B.L., Outlaw, J.L. *Agricultural and Food Policy*, Prentice Hall, Upper Saddle River, 2007, 99 ff.

17 For a discussion of the agricultural administration of USDA Secretary Earl Butz, Jr., the source of this quote, see: Solkoff, J. *The Politics of Food*, Sierra Club Books, San Francisco, 1985.

18 See: US Department of Agriculture (USDA), Economic Research Service (ERS). *Agricultural Exports 2014*. http://www.ers.usda.gov/topics/international-markets-trade/us-agricultural-trade/exports.aspx. [Consulted: 25/7/2016].

19 See: Solkoff, *op. cit.*

ing improvements in productivity, and farmers bought into the next wave of technology to make that happen.

Coincidentally or not, the political use of U.S. food co-evolved with the development of that next wave of technology. The mostly-true story about the on-farm effectiveness of new technology in maintaining profits and generating surpluses for export fit well in a newer, even bigger story. The idea that high-technology in agriculture is needed to feed the rest of world gave rise to the broader notion that the U.S. science and technology-generating enterprise should extend its focus to the rest of rest of the world, generating agricultural technology and inputs for –and this is key– and in those nations we call our friend. And so, in the 1960s, the Consultative Group for International Agricultural Research (CGIAR) leveraged resources from developed and developing nations to carry the "feed the world" story around the world. The result of this enterprise was the so-called Green Revolution of the 1960s[20]. The often-touted success of the CGIAR's international R&D effort took to a new level the argument for accelerated research and development of agrifood technologies: the ultimate effect of support for and delivery of new agrifood technologies is helping those people who needed it the most. Placement of R&D centers largely funded by CGIAR reinforced this notion. CGIAR centers were established in India, Syria, Nigeria, the Philippines, Kenya, Malaysia, Colombia, Sri Lanka, and Indonesia, for example. "Feeding the world" through improved agrifood technology now meant helping poorer nations develop their agriculture, and nations around the globe as well as international agencies such as the Rockefeller Foundation and the World Bank committed to this goal, as CGIAR states: "Linking funding to results [so donors receive] better value for money and ensures that research leads to tangible benefits for the poor"[21].

The United States was also a major player in this endeavor. And, U.S. efforts included major funding for agrifood R&D in the U.S., through the U.S. Department of Agriculture (USDA). Up to the 1980s, funding levels for agrifood R&D remained high and steady, and university agricultural sciences colleges and departments worked in earnest to provide technological solutions to the world food problem. In addition, U.S. Agricultural Colleges supplied a steady stream of graduates to CGIAR centers, and to the U.S. Agency for International Development, the U.S. Peace Corps, and to other international development institutions. However, since 1980, funding levels for agricultural R&D and education have declined from the public sector. Hardest hit initially were international programs, although all aspects of the public R&D effort were significantly reduced.

In the early 1980s, private funding started to supplement, and then to replace government support for agricultural R&D in the U.S. and around the world. As such, contracts and grants from those multinational corporations involved in everything from the seeds to machines to chemicals used by U.S. agriculture gradually came to define the research agenda for U.S. (and global, to be sure) agricultural scientific enterprise[22]. Productivity and profitability did not disappear as the objectives of agrifood research, however. But instead of (or in addition to; this is subject to debate) farm productivity and profitability, it was the productivity and profitability of the companies who supply farm technologies that became the driver for agrifood R&D. Despite official pronouncements by scientists, agriculture college and university administrators, and research policy makers in the USDA and other U.S. government agencies, farmers and others in the food system are becoming just the indirect beneficiaries of agrifood R&D. Technology development may be intended to help farmers, but only in so far as those farmers adopt the technologies funded by and owned by the agrifood inputs companies.

It may seem that this is too strong. Agricultural scientists continue to work on farmer and food-company issues: crop and animal improvement, more efficient use of natural resources, better agronomic practices, better transportation, storage, marketing, and so on. And of

20 *Ibid.*

21 Consultative Group for International Agricultural Research (CGIAR). *Our Research Centers*, http://www.cgiar.org/about-us/research-centers/. [Consulted: 30/6/2016]

22 See: Busch, L., Lacy, W.B. (eds.), *The Agricultural Scientific Enterprise: A System in Transition*, Westview Press, Boulder, 1986.

course, under policy mandates or with an eye toward consumer and citizen wants, environmental, and human and animal health are part of the overall research agenda. What is interesting, however, is that these latter considerations, which once were considered taboo or irrelevant by agrifood researchers and decision-makers, are now albeit grudgingly acknowledged in R&D policy and even the mission of the public-sector research institution. Some Colleges of Agriculture even changed their names to Colleges of Agriculture and_____, where the blank has some variation on or combination of natural Resources, Environment, Consumer Sciences (read: food safety) and the like. Animal Health and Welfare has not made it into this list. The point is that "the agricultural sciences" now officially, at least, includes these other things long ignored by, if not thought downright inimical to, the purpose and constituency of the College of Agriculture. Note here I say constituency: there was only directly one, farmers, although the rest of us as well as the rest of the world were, as I have shown, collateral beneficiaries of the R&D enterprise.

Regardless, the mission of the publically-funded agricultural research enterprise in the U.S. and globally continues on: new and improved technology for agriculture. And, whether conducted in house, or with grants and contracts to the various, relevant science departments in colleges of agriculture, R&D under private-sector, that is, multinational corporate direction, is similarly directed. What we end up with is more and new technology, ostensibly to feed the world, although in fact the primary beneficiaries are those companies providing the funding[23].

Indeed, there has been a steady progression, indeed, march, of technology induced into agriculture, from the earliest machine harvesters and the like, to combination machine-chemical-biological technologies such as the mechanically harvested, artificially ripened tomato system developed at the University of California and chronicled so well in Jim Hightower's *Hard Tomatoes, Hard Times*[24]. Since the late 1980s, the shift to genetic or microbiologic technology has been rapid. We saw earlier the rush to bST, and the inducement/adoption/diffusion of Roundup-Ready® and bt-functional plant technologies followed suit. Now, we are prepared for a new generation of technologies, which integrate nano-, cyber- and other smart dimensions into the mechanized technology and biotechnology of the late 2000s. Indeed, the July 11, 2016 issue of *The Economist*[25] features several articles which detail how these even newer technologies will again, as they put it, help "feed the world".

A couple of examples of this newest batch are worth considering in some detail. Neo-Malthusians such as people in the UN's Food and Agricultural Organization now admit that the estimated 10 billion people who will likely inhabit the Earth in 2050 will need an estimated 70% more food than was produced in 2009. Finally recognizing that there are absolute limits on land-based agriculture, that is, that there is virtually no more arable land that can be brought into production, the choice is to even further enhance yields through bio-nano or whatever other "gee-wiz" technology that is around the corner. Or, the answer is to "go down" and "go up".

Already, aquaculture is a major provider of fish protein both for human food and animal feed globally. If the authors of The Economist's special sections are to be believed, we will need to move augment land-based production of grain and fiber with some semblance of hydroponic production systems as rapidly as we can. They do not offer specifics of the technologies for doing this, acknowledging that this is more of a "big idea" than a plan. If indeed this were to become a realizable technology, many of the issues discussed here would undoubtedly arise: who will be farmers of these new hydroponic mega-fields? Where will they be located? How will products of these farms be integrated into the existing global markets. Will there be global markets? And so on.

The other technology brought up in *The Economist*'s discussion is "vertical agriculture"[26]. Already, people

23 See: *Ibid.*

24 Hightower, J. *Hard Tomatoes, Hard Times: The Failure of the Land Grant Complex*, Schenkman Publishing Company, Cambridge, 1973.

25 The Economist, *op. cit.*

26 For an account of "vertical agriculture", see: Epting, S. «Participatory Budgeting and Vertical Agriculture: A Thought Experiment in Food System Reform». *Journal of Agricultural and Environmental Ethics*. 2016; 29(4).

around the planet, mostly in urban settings, are experimenting with gardens on rooftops, orchards or at least small collections of food-providing trees planted in otherwise inhospitable areas in urban environments. The question of who farms in this kind of a subsector is an interesting one, as are questions about what will be produced, how those enterprises will fit into the global agricultural economy and so on.

I briefly nod to these new approaches to farming, as well as to the other prospects such as animal protein grown independent of living animals because they illustrate how far we have come in thinking about agriculture and food as fundamentally technological enterprises. One of the answers to Malthus –to the question of feeding the world– has always been "the technological fix"[27]. To believe the scientists, just how far technology has to go to provide that fix seems only to be a matter of time. Sooner or later, science will be able provide the food that ever-increasing human populations will need. We need not bother at this point in time to ask about what sorts of trade-offs, or absolute costs, might be associated with a given technological fix. It is only in jest that the animal-free animal meat is referred to as "the $350,000 hamburger"[28] –or is it? Or, that the only problem is that technology capable of feeding the world is not adopted? Or that the "problem" of feeding the world only exists if "smallholder and subsistence farmers of Africa and Asia [do not adopt] the best of today's agricultural practices, in such simple matters as how much fertilizer to apply and when?"[29].

4. So what about ethics? Do we need any more? Where?

I said that the system needs ethics. Optimists among scientists and technologists, research administrators in colleges of agriculture, and among those in agricultural policy-making circles, often seem to believe not. Or at least, we don't need any more or different considerations of ethics than are already built into the system, exemplified in The Story as I have called it. Indeed, the standard reply to the many criticisms of the adverse consequences of modern, industrialized agriculture –air and water pollution, food safety concerns, animal welfare considerations– is simply: modern, industrial agriculture helps feed the world. How can one dispute the ethical rightness of providing people with their most basic necessities? Isn't it enough of an overriding ethical rationale, enough, that is, to permit or even excuse the externalities associated with high-tech agriculture?[30]

Usually, however, these ideas are not presented as ethical considerations. People in the food system, especially scientists and R&D decision makes, just don't think in terms of "right" and "wrong". Feeding the world, enhancing productivity, increasing yields, and the like, are just background "givens", so much a part of the agricultural system's DNA that most do not recognize it as a story, as a paradigm, as an ideology. The few times these considerations are recognized to have moral or ethical content is when the System or some important part of it fundamentally challenged: when funding cuts are proposed, when prohibitions or limits to what scientists can do are proposed, when criticisms of either the system as a whole or of particular problems usually written off as externalities reach a certain volume in the public forum. When challenges are perceived as threatening to the system or parts perceived as integral, then and only then is the ethical justification for the system made loud and clear: Modern food production, and the technologies which make this so efficient and effective, help feed the world! What other, or greater, ethically justification could there be for what is going on now, and what we propose to continue to do. At many levels, it is hard to disagree. It is like the saying goes, "No one is against the environment" (or it's corollary: "We are all environmentalists"); no one is against "feeding the world!".

But this isn't the point. No one is (seriously) challenging the ethical legitimacy of (wanting, to, trying to)

27 For an "internal" critique of the "technological fix", see: Scott, D. «The Magic Bullet Criticism of Agricultural Biotechnology». *Journal of Agricultural and Environmental Ethics*. 2005; 18: 259-267.

28 The Economist, *op. cit.* 15.

29 *Ibid.*, 18.

30 Paul Thompson explains this well in: Thompson, P.B. *Food Biotechnology in Ethical Perspective*, Springer, Dordrecht, 1997.

feed the world. Rather, the challenge is to the unethical misuse of "The Story", the ideological use of the ideology[31]. I mentioned how corporations flaunt their technologies as solutions to the problem of world hunger, when in reality the function of the technology is mainly or even exclusively to increase profits or market share. Scientists and research administrators roll out appears to feeding the world when budgets are cut or someone questions who the actual beneficiaries of using publically-funded laboratories or field plots are. Farmers point to the billboard when an environmental or food-safety crisis emerges as a way to deflect criticism, or worse, regulatory enforcement. Ethical problems arise when the productionist, feed-the-world ideology becomes an (attempted) excuse for what unbiased observation and impartial analysis show to be ethically wrong decisions, actions, practices.

One favorite tactic that has been employed by defenders of the establishment is what I have called the "Future Benefits Argument" (FBA)[32]. FBA has been a mainstay of the corporate biotechnology enterprise, appearing not only in "argument" form, but in stylized advertising in magazines and on television at least in the U.S. FBA runs as follows:

1. Technologies intended to provide benefits in the future are ethically justifiable if they will provide benefits that outweigh risks.
2. Agricultural biotechnology will provide benefits in the future.
3. Therefore, agricultural biotechnology is ethically justifiable.

FBA appeared most egregiously in the debates surrounding the "terminator" gene. The "Terminator" is a variation one genetic use restriction technology (GURT), whereby crop seeds are engineered so that the plants grown from them will not produce either viables seed, or seeds with the same desirable traits as the parents. The immediate public reaction Terminator technology was that it was wrong, since so many farmers in poor nations save seed from a given year's harvest for planting the following season. Terminator was claimed to negatively affect farmers, since they would now have to come back yearly to purchase seed. The additional expense of buying seed was claimed to be a serious hardship for poor farmers, and merely a market control strategy by the companies (i.e., company, as in, Monsanto) which developed the technology.

Responses to criticisms of Terminator seeds made good use of FBA. Terminator may "look like" an ethically questionable technology, but in the long run the underlying GURT methodology would help farmers big and small: it would give farmers more control over the traits of their crops, allowing them to better respond to specific market demands.

My analysis of the FBA suggested that claims about future benefits justifying present actions (or in this case, technology R&D) are unfounded. Future benefits cannot justify anything in the present. However, if (a big IF) the "will provide benefits in the future" part of premise 2 were interpreted as a promise, and not just a hollow prediction, the argument might have some justificatory force. If the FBA were understood not as a logical construct subject to formal rules governing validity and soundness, but instead as a moral claim expressing a commitment on the part of whoever espouses it to bring about future benefits, we would extend its expression some moral consideration. Rather than ask if the object of a FBA is true, we would ask if the subject expressing it means it!

Two versions of the paper continuing my analysis of FBA were published, in two different professional journals, with two very different audiences. I received polite compliments from friends and professional colleagues, probably reflecting more my having published in those journals than any ideas in the papers. However, I gave presentations which included discussion of the FBA on several occasions, two in particular stand out.

In 2002, I presented a paper on GM foods and especially "next generation" GM technology to the National

31 See: Burkhardt, J. «Business Ethics: Ideology or Utopia?». *Metaphilosophy*. 1985; 16: 118-129.

32 See: Burkhardt, J. «Agricultural Biotechnology and the Future Benefits Argument». *Journal of Agricultural and Environmental Ethics*. 2001; 14: 135-145; Burkhardt, J. «Biotechnology's Future Benefits: Prediction or Promise?». *AgBioForum*. 2003; 5: 1.

Agricultural Biotechnology Consortium[33] annual meeting. NABC is a consortium of two dozen .S. and Canadian universities and government agencies involved in biotechnology R&D, and policy consultation about agricultural biotech. During and after my presentation, I was pleasantly surprised at how many deans and directors from these institutions wanted to engage the discussion about what our commitments to future benefits means, how we can get scientists to see their efforts in terms of a forward-looking ethical enterprise, and (really pleasantly surprising), would I be willing to come to their campuses to conduct workshops and give lectors on ethics in agricultural biotechnology. I have since come to know many of these agricultural research administrators personally, and I can attest that they were sincere in wanting to learn about how ethics pertains to their institutions and their endeavors.

The other occasions where I presented the FBA were departmental seminars and colloquia (probably about 20 over 4 years in the gamut of agricultural sciences), and the meetings of the European Society for Agriculture and Food Ethics (EurSAFE) in 1999. Again, I was struck by how open and amenable the many scientists and the few administrators who attended were to the ideas of conceiving of the agricultural research enterprise as morally-grounded in the commitments of the individuals and the institutions to bringing about benefits in the future (and now, too). Again, conversations were honest, open, and the scientists were in no way defensive about challenges to the ethics of their work. Certainly, more than the occasional skeptic raised questions about "value-free science" and "science and money", but in more cases than not, even those questions engendered conversation from his/her colleagues more than "an answer" from me.

If what I have said about The Story is true, that there is this productionist-feed-the-world ideology which has been the background driver of the technological drivers of the present and future food and agricultural system, then how do I account for the uptake on my ethical analysis and implicit critique by a good number of scientists, administrators, and farmers (note again NACD)? There are several reasons:

1. The Story, as I have referred to this ideology, may be there in the background, but for the most part, that is where it "lives". It gets lip-service in administrator speeches to constituents and to funding sources, and sometimes is shouted with a vengeance when people in the system feel threatened. For the most part, however, it is not something people think about. (I severely qualify this when it comes to corporate spokespeople, whether salespeople or lobbyists; they seem ready to justify their actions on the basis of feeding the word at the drop of a hat. I have several stories that I could recount on this point, but will refrain);
2. Scientists and administrators and most others in the various niches in the food and agricultural system are no different from anyone else in terms of values, interests, character, ethics. In fact, university scientists, perhaps like farmers, just want to do their work, mostly because it is interesting to them, but also because they find it important. They may, deep down, really feel like they are working to feed the world. And, as I noted, they are subject to the same pressures, limits, constraints, etc., and anyone else. They are frequently put in uncomfortable positions, and will, normally, defend themselves and their worlds and worldviews. By and large, they are decent people.
3. Most of the time, when people in the food and agricultural system encounter either criticism or dis-orienting questions, these come from "outside" their ordinary spheres of life, work, community. And, most of the time, the criticisms are such that defense mechanisms easily raise up, so that critics can be dismissed or ignored. Clearly external challenges to science, to farming, to the research and development enterprise as a whole, can be passed over as the rantings of irrational-

33 Now called "North American Agricultural Biotechnology Council" to reflect Canadian involvement and its non-financial focus.

ity. I have argued extensively[34] that most of these criticisms are not irrational, representing instead different values, different ethical commitments, or different degrees of knowledge and command of facts. But, it is again normal or natural to dismiss these voices, especially if they question or challenge one's most basic sense of one's live or work.

4. The contexts in which people are presented with ideas matters. As you walk down the street on your way to lunch, you do not expect nor would you likely take kindly to someone getting in your face calling you Frankenstein, if you happen to be a university scientist engaged in genetic engineering. However, a fellow professional at a professional conference calling attention to the possible reactions to rDNA R&D, including perceptions that it is "unnatural", would be likely to arouse less suspicion, fight/flight reactions, or hostility. (Although not always!).
5. This last point speaks directly to the willing engagement in conversation about FBA, but it includes conversations about a range of issues from animal welfare, chemical use in agriculture, GMOs and GMO labeling, private-sector funding of agricultural R&D, climate change, and the plight of family farms around the globe: people, including and perhaps especially in the agricultural establishment, are more likely to dispassionately or at least courteously engage issue with "one of their own". This connects to the final points with which I want to conclude this paper with, and speaks to a claim I made early in this paper about working inside the food and agricultural system.

In 1985, after having been involved in interdisciplinary research on the business of agricultural biotechnology for approximately three years, I was hired by the College of Agriculture and Life Sciences, Institute of Food and Agricultural Sciences, of the University of Florida in Gainesville, Florida, USA. Of course, I had begun to establish my credentials as a PhD academic, with growing numbers of refereed publications and professional presentations, a record of teaching and advising, and so on. I was "on track" to become and remain a Professor of Philosophy at probably one of three large state universities in the Southeast United States (I had offers from all three of them at the time). However, the Dean of the College of Agriculture at Florida had decided that his college was going to become one of the leaders in the not-quite-yet area of "agriculture and humanities". His institution was going to follow Texas A&M and a couple of others, and hire a *Philosopher* (of all damn things) to bring ethics, philosophy of science and technology, and public policy studies inside the agricultural college. And so I took a risk, took the job, and have for over thirty years worked as a philosopher-ethicist in the college, and in the Institute of Food and Agricultural Sciences more generally. I have found an academic home in the agricultural economics (titled Food and Resource Economics) department. I teach, research, write, advise students, and in general, do whatever a "normal" faculty member does.

However. I am "inside" the agricultural scientific enterprise. I carry a business card which reads "Professor, Ethics and Public Policy, Institute of Food and Agricultural Sciences". I am so advertised, and so introduced at conferences. When my complete C.V. is attached, and the reader notes my participation on advisory committees for USDA, the Council for Agricultural Science and Technology (CAST), FDA, the National Science Foundation, as well as the WTO, the EU, and agricultural universities around the world, it just "looks better". It looks more like something compiled by an agricultural scientists (except for the number of publications; they have way more). I bring up all this personal and professional information not for self-aggrandizement, but to make a point. For better or worse, people take to what they know. This applies as much to academic affiliation as it does to the more standard identity markers such as race, gender, religion. I will not go so far as to call the food and agricultural system a

34 See: Burkhardt, J. «Scientific Values and Moral Education in the Teaching of Science». *Perspectives on Science*. December, 1999; Burkhardt, J. «Why Can't Science Tell the Truth: Scientific Literacy in a Postmodern World», in: *Secularism & Science in the 21st Century*, Keysar, A., Kosmin, B.A. (eds.), Institute for the Study of Secularism in Society and Culture, Hartford, 2008.

closed system, clique or even cult(!). However, at least to the extent that it can be defined somewhat narrowly so as to include only *participants* as opposed to consumers of or beneficiaries of it (although we are all consumers and beneficiaries of the food and agricultural system at some level), there are internal relations which are just qualitatively different from those with "outsiders". Apart from objective, academic credentials, I have only vague ideas as to what I personally did to become a member. I hope that I am still enough of an outsider (with a Ph.D. in Philosophy, I am almost by definition an outsider) that I can maintain critical distance. But I have been able to say things, and have arguments heard, in ways I don't believe someone with no affiliation with the college of agriculture could have effectively gotten away with.

So, back to the original line. The food and agricultural system, domestically in the U.S., but equally globally, needs more ethics. People need to hear about the criticisms, and need to be exposed to the systematic way in which professional ethicists approach and address ethical issues, both big and small. I am convinced that people in the system, even those completely indoctrinated in "the story", need more knowledge and experience with ethics. If other institutions, other institutional administrators, are in any position to hire, internalize, ethicists, humanists, humanistic social scientists, and the like, I strongly encourage you to do so. There will be a benefit to your institution, the students, faculty, and clients. The benefits may not show up for a while into the future. Even so, I promise that they will appear, because I know they will appear.

For as I write this, a former student of mine is the Commissioner of Agriculture and Consumer Affairs for the State of Florida; another is Attorney General for the State of Florida; still another is a senior research director at USDA, and still another is Research Director for a major multinational agrichemical corporations. I have former students who are Ministers of Agriculture in their home countries in South American and Africa, and many who are on the faculties of universities in their home countries as well. I count as benefits of having students exposed to systematic "agricultural ethics" as a regular part of their agriculture college curriculum, and I know that they have taken more than mere exposure to my teaching style or quirky personality with them into their careers. I know because they have told me.

So, I conclude by saying that there is a place for ethics in the food and agricultural system, but it is not where one might ordinarily expect it to be. It is in the curriculum, and ultimately in the education of people who are the future of the food system. Buy saying that, I mean it is in their hearts and heads. Which is where ethics should be in any human system.

References

Austin, J.L. *How to Do Things with Words*, Cambridge University Press, Cambridge, 1962.

Brown, W. *Sacred Cows and Hot Potatoes: Agrarian Myths and Agricultural Policy*, Westview Press, New York, 1992.

Burkhardt, J. «The Ethics of Agri-Food Biotechnology: How Can an Agricultural Technology be so Important?», in: *What Can Nanotechnology Learn from Biotechnology?*, David L., Thompson, P. (eds.), Academic Press, New York, 2008.

Burkhardt, J. «Why Can't Science Tell the Truth: Scientific Literacy in a Postmodern World», in: *Secularism & Science in the 21st Century*, Keysar, A., Kosmin, B.A. (eds.), Institute for the Study of Secularism in Society and Culture, Hartford, 2008.

Burkhardt, J. «Scientific Values and Moral Education in the Teaching of Science». *Perspectives on Science*. December, 1999.

Burkhardt, J., Comstock, G., Hartel, P., Thompson, P.B., *Agricultural Ethics*, Council for Agricultural Science and Technology, Ames, 2005.

Burkhardt, J. «Biotechnology's Future Benefits: Prediction or Promise?». *AgBioForum*. 2003; 5: 1.

Burkhardt, J. «Agricultural Biotechnology and the Future Benefits Argument». *Journal of Agricultural and Environmental Ethics*. 2001; 14: 135-145.

Burkhardt, J. «Business Ethics: Ideology or Utopia?». *Metaphilosophy*. 1985; 16: 118-129.

Burkhardt, J. «The GMO/GM Food Debates: Why Ethics Matters». *Transactions*. 2001; November: 89.

Burton, J.L., McBride, B.W. «Recombinant bovine somatotropin (rbST): Is there a limit for biotechnology in applied animal agriculture?». *Journal of Agricultural Ethics*. 1989; 2: 129.

Busch, L., Lacy, W., Burkhardt, J., Lacy, L. *Plants, Power and Profit: The Social, Economic and Ethical Consequences of the New Agricultural Biotechnology*, Basil Blackwell, London, 1991.

Busch, L., Lacy, W.B. (eds.), *The Agricultural Scientific Enterprise: A System in Transition*, Westview Press, Boulder, 1986.

Comstock, G. «The Case Against BST». *Agriculture and Human Values*. 1988; 5: 36.

Consultative Group for International Agricultural Research (CGIAR). *Our Research Centers*, http://www.cgiar.org/about-us/research-centers/. [Consulted: 30/6/2016].

Epting, S. «Participatory Budgeting and Vertical Agriculture: A Thought Experiment in Food System Reform». *Journal of Agricultural and Environmental Ethics*. 2016; 29(4).

Fetrow, J. «Economics of recombinant bovine somatotropin on US dairy farms». *AgBioForum*. 1999; 2(2): 103-110.

Gould, K.A., Pellow, D.N., Schnaiberg, A. «Interrogating the treadmill of production: Everything you wanted to know about the treadmill but were afraid to ask». *Organization & Environment*. 2004: 296-316.

Gruchy, A.G. *The Reconstruction of Economics: An Analysis of the Fundamentals of Institutional Economics*, Greenwood Press, New York, 1997.

Hamilton, C.H. «The Social Effects of Recent Trends in the Mechanization of Agriculture». *Rural Sociology*. 1939; 4(1): 13.

Hightower, J. *Hard Tomatoes, Hard Times: The Failure of the Land Grant Complex*, Schenkman Publishing Company, Cambridge, 1973.

Hodgson, G.M. *The Evolution of Institutional Economics*. Cambridge University Press, London, 2004.

Knutson, R.D., Penn, J.B., Flinchbaugh, B.L., Outlaw, J.L. *Agricultural and Food Policy*, Prentice Hall, Upper Saddle River, 2007.

Lang, T., Heasman, M. *Food Wars: The Global Battle for Mouths, Minds and Markets*, Routledge, London and New York, 2015.

Levins, R.A., Cochrane, W.W. «Treadmill Revisited». *Land Economics*. 1996; 72: 550.

Living History Farm.Org, http://livinghistoryfarm.org/farminginthe20s/machines_01.htm [Consulted: 24/7/2016].

National Association of Conservation Districts (NACD). *About NACD*. http://www.nacdnet.org/about. [Consulted: 5/7/2016].

Power, M. «Social Provisioning as a Starting Point for Feminist Economics». F*eminist Economics*. 2004; 10(3).

Schmid, A., Thompson, P. «Against Mechanism: Methodology for an Evolutionary Economics». *American Journal of Agricultural Economics*. 1999; 81(5): 60-65.

Schwartz, J., Hunt, E.K. *A Critique of Economic Theory*, Penguin Books, New York, 1973.

Scott, D. «The Magic Bullet Criticism of Agricultural Biotechnology». *Journal of Agricultural and Environmental Ethics*. 2005; 18: 259-267.

Solkoff, J. *The Politics of Food*, Sierra Club Books, San Francisco, 1985.

Tauer, L.W. «Impact of BST on Small Versus Large Dairy Farms», in: *Bovine Somatotropin and Emerging Issues – An Assessment*, Hallberg, M.C. (ed.), Westview Press, Boulder, 1992, 207-217.

Thacker, P. «Peeling Back the Curtain On Monsanto». *The Huffington Post*, 16 May 2016. http://www.huffingtonpost.com/paul-thacker/peeling-back-the-curtain-on-monsanto_b_9867902.html [Consulted: 15/7/2016].

Thompson, P.B. *Food Biotechnology in Ethical Perspective*, Springer, Dordrecht, 1997.

The Economist, «The Future of Agriculture». *Technological Quarterly*. 2016; 3-16.

US Department of Agriculture (USDA). *Dairy 2007, Part I: Reference of Dairy Cattle Health and Management Practices in the United States, 2007*. http://nahms.

aphis.usda.gov/dairy/dairy07/Dairy07_dr_PartI.pdf [Consulted: 25/7/2016].

US Department of Agriculture (USDA), Economic Research Service (ERS). *Agricultural Exports 2014*. http://www.ers.usda.gov/topics/international-markets-trade/us-agricultural-trade/exports.aspx. [Consulted: 25/7/2016].

University of Florida Institute of Food and Agricultural Sciences (UF-IFAS). *Challenge 2050 Project*. http://challenge2050.ifas.ufl.edu/about/. [Consulted: 20/7/2016].

Wikipedia. *Truthiness*. https://en.wikipedia.org/wiki/Truthiness. [Consulted: 12/7/2016].