

The GMO Debates: Taking Ethics Seriously

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Introduction

Genetically modified organisms (GMOs) and genetically modified foods (GM foods) have become subjects of considerable public debate. The controversies are the result of differing views concerning the products of “the new biotechnology” — recombinant DNA (rDNA) technology to be precise. rDNA technology has allowed scientists to move genes across species’ boundaries, to create traits in plants, animals, and microorganisms that could never be accomplished using traditional crossbreeding techniques. For example, genes from cold-water fish can be inserted into tomato plants to make them more tolerant to colder weather. The reality of *transgenic* technology has caused some people to raise questions about the nature and consequences of GMOs. For example, do GM foods differ in any relevant ways from non-GM foods? Are any differences significant as to how they will they affect human health or the environment? How strictly are GMOs being tested? Who oversees the regulation and registration process? These are scientific and legal-political issues, and they are being discussed everywhere from grocery stores to the halls of Congress.

As important as these kinds of issues are in the GMOs/GM foods debates, other controversies have arisen regarding the *ethics* of GMOs/GM foods. People differ in their judgments about whether producing and using GMOs are morally correct things to do. The issue is whether GMOs/GM foods morally/ethically acceptable. If they are ethically acceptable, then there is nothing wrong about

producing/using/consuming them. If they are not acceptable, people should stop producing them, or at least those people who find them unacceptable should be able to avoid them. Clearly, some people think GMOs/GM foods are ethically acceptable, while others do not. The point of this essay is to explain why the deeper ethical-philosophical reasons underlying the GMO debates are so important. If we are to resolve *ethical* (as opposed to scientific) controversies associated with GMOs/GM foods, a key step is to acknowledge differences in basic values, and then debate the matter in terms of these deeper commitments and concerns.

Components of Acceptability

Judgements about ethical acceptability depend on answering several preliminary questions. While there are people who for philosophical or religious reasons reject transgenic technology whatever its applications, it is still important to recognize that there are differences among the products of biotechnology. The first question regarding acceptability should be, “What GMO are we talking about?”

What Product?

Different products have different ethical dimensions. For example, bovine growth hormone (bovine somatotropin or bST), an early GM product, was designed to increase the efficiency of milk production, by getting cows to produce more milk without increasing their feed intake. People who have written on the ethical acceptability of bST have called attention to its possible negative effects on cows, potential impact on human health, and economic effects on small-scale dairy operations (see, e.g., Comstock, 1989). In contrast, Roundup-Ready® crops, such as soybeans and cotton, were designed to permit a farmer to spray a herbicide on his or her field, killing weeds, but not affecting the Roundup-Ready® crops at all. Analysts have written on the potential cost-savings resulting from farmers not having

to till weeds, or use numerous herbicides to kill the different sorts of weeds that invade the field. Others have pointed out the potential human health risks, and again, economic effects on small farms (Lappé and Bailey, 1998). BT (bacillus thurengiensis) corn is yet another example. BT corn was engineered to produce a substance in the plant that is toxic to insect pests. The product was designed to reduce the need for spraying insecticides; however, people have claimed — in fact it was a major controversy in the Corn Belt — that the pollen from BT crops kills monarch butterfly larvae that consume it, a significant environmental impact (ENS, 1999). Finally (though the list of GMOs/GM foods is much longer than provided in these examples), so-called “golden rice” is a transgenic product whose beta carotene (vitamin A-producing) content is greatly enhanced, intended to provide a more nutritious food staple for people in Third World rice-consuming countries where vitamin A deficiency is a serious problem – a cause of blindness in children. Although this GM product is several years away from the market, it has been discussed in terms of both its major health benefits as well as its potentially prohibitive cost to poor people (Burkhardt, 2001).

The point concerning each of these examples is that in part, the ethical acceptability or lack of it depends on the kind of GMO/GM food we are addressing: what are its features? What are its intended consequences?

What context?

A second set of concerns that bear on ethical acceptability is the context in which the analysis or argument is set. Part of what has made the GMO/GM foods debates difficult for some people to understand is that people frequently talk past each other, as one party focuses on a set of issues in one context that are different from the issues and context that concern another party. For instance, much of

the scientific community has tended to focus on the role of the new biotechnology in contributing to food quantity, quality, and affordability, while others have focused on contexts such as human (animal) health, environmental safety, issues concerning social justice or fairness, or different implications of GM technology for the developed versus the developing world. Certainly, each of these general areas of concern is important in the ethical appraisal of GMOs/GM foods. By focusing primarily or even exclusively on one area, however, parties involved in the debates or controversies tend to ignore other relevant issues or considerations that appear in a different context. For example, when scientists limit the context of their ethical appraisal of GMOs/GM foods to the context of producing enough, affordable food (“feeding the world”) they bypass other legitimate issues such as whether peasant farmers in a developing nation may be put at a disadvantage because they are unable to afford to employ the newest bioengineered crop variety. Similarly, those who limit their vision regarding bST to effects on animals may have missed important points about the need for increased dairy productivity in poor areas of the world. Attention needs to be paid to all of the relevant contexts in which a judgement about the ethical acceptability of GMOs/GM foods can (and should) be made.

What Ethical Paradigm?

Focusing on particular products and their contexts provides the target for judging ethical acceptability. An ethical paradigm provides the criteria for making judgements. An ethical paradigm is a basic, general philosophy about what things count as right or wrong, and why. The paradigm contains basic value judgements about what is most important for people to do, or how they should be treated, or overall, how we should live. In essence, the paradigm establishes the lense through which people view the world, providing a substantive standard for unequivocally deciding whether actions, policies, or in this

case, a set of products and processes, are ethically correct. In the following the three major paradigms identified by philosophers of ethics are discussed. These are: (1) consequentialism, (2) autonomy/consent ethics, and (3) virtue/tradition ethics. Each of these implies a set of ethical judgements about food and agriculture generally, which in turn entails a judgment about the ethical acceptability of GMOs/GM foods.

In our daily lives, we seem to make ethical judgements on the basis of all three paradigms. Sometimes we decide as if we are consequentialists, sometimes as if we hold to autonomy/consent ethics, and sometimes as if we are virtue/tradition based. However, in our public acts — voting, expressing opinions in community forums, talking with friends or colleagues — we tend to fall into one of the camps. We become *more* consequentialist, *more* autonomy/consent-oriented, or *more* virtue/tradition focused. Regardless of an individual's own moral/ethical code, these ethical paradigms provide criteria for judging how we collectively ought to act, how we societally ought to judge right and wrong, and how we ought to direct public policy. In the public debates over GMOs/GM foods, the three ethical paradigms discussed below are routinely invoked as reasons why we should do something regarding GMOs. Scientists, farmers, consumer activists, environmentalists, animal welfarists, concerned citizens, and so on — the parties to the debate — express these ethical perspectives in clear and forceful ways. Just as it is worth paying attention to differences among products and contexts, it is worth attending to differences among ethical paradigms or basic ethical philosophy. It may not make the disagreements go away, but we will be clearer about where we all stand.

Three Ethical Paradigms

Consequentialist Ethics

For many people, the question, “Is X ethically right?,” where X stands for an action, policy, or in the present case, the production and use of a technology, is best answered by answering a different question: “Does (will) X produce good consequences (outcomes, effects, etc.)?” If the answer to this latter question is yes, then we have an obligation to do X or at least it is permissible (acceptable) to do X. If the answer is no, then it is ethically/morally wrong to do or allow X. The question here is, what counts as a *good* consequence?

Despite general agreement among consequentialists that we ought to promote good consequences or outcomes, there is no universal assent as to what those might be. Numerous candidates have been offered: we ought to satisfy the wants/needs of the greatest number of people; we ought to promote the greatest amount of material, spiritual, intellectual and emotional happiness as possible; we ought to maximize material benefits and minimize costs; and so forth. Some have placed an economic value on the definition of “good,” yielding what we commonly call the Benefit-Cost approach: try to achieve the greatest net financial benefit as a result of our actions or policies. Not everyone agrees with the financial interpretation of consequentialist ethics, but some version of a “satisfied wants/preferences” criterion has come to dominate the consequentialist paradigm’s calculus of right and wrong. Indeed, the longstanding slogan of consequentialist ethics, that “the greatest good of the greatest number” is what determines ethical acceptability or ethical obligations, has come to be understood as what satisfies most people’s preferences/desires. Personal health/security (and hence financial stability) are undoubtedly part of what most people want, so that consequentialist ethics also requires actions or policies that help achieve those goods. Most who subscribe to the consequentialist ethical paradigm believe that with enough foresight and care in reasoning, we can find the ethically right solution to any problem we may face (see Slote, 1985).

Ethics of Autonomy/Consent

Those who subscribe to the ethics of autonomy/consent approach the matter of right and wrong in a very different fashion. Ethical rightness or acceptability depends on whether or not an action, practice or policy respects and/or protects the individual person, as he or she acts on his or her judgements about morality. The assumption, initially, is that people are generally rational and are mature enough to make judgements about what is right and wrong. People are *entitled* to make their own judgements. This is what autonomy means — self-determination. There is a long history, within the paradigm, of discussion about what it is that makes individual human beings deserving of personal sovereignty or autonomy, and how respecting/protecting autonomy should be translated into practical ethical rules or duties. One line of thought views this as a matter of respecting people's *rights*, that is, legitimate claims people have that others do or do not act toward them in particular ways. For many contemporary autonomy/consent ethicists, the idea of individual rights is further refined: anything anyone might do that effects other people, potentially infringing on rights or limiting self-determination, requires the consent of those effected. Without prior consent, actions that effect people are ethically unacceptable, indeed, ethically wrong.

It is instructive to note here that those who subscribe to the ethics of autonomy/consent demand that actions be consented to, even if, on some consequentialist calculation, those actions would benefit people. For example, it might be shown that putting chemicals in the public water supply kills bacteria that could harm people; hence, adding the chemical achieves a public good. Even so, the autonomy/consent paradigm requires that people be given the opportunity to agree with or object to the

action, and at the extreme, be provided with an alternative water source if they disagree. For those accustomed to the consequentialist or benefit-cost approach, this demand may seem stubborn or unreasonable. Nevertheless, it is based on the principle that each individual person is entitled to decide how to live his/her life; others may not interfere without each individual's prior agreement (see Rippe, 2000).

Ethics of Virtue/Tradition

A third basic ethical paradigm defines ethical rightness in terms of whether or not an action, practice or policy promotes or is consistent with a set of virtues, usually set by a particular ethical/moral tradition. Virtues are ideal character traits or states of being that are thought to be definitive of the ethical life. For example, honesty, integrity, piety, and fairness are virtues under this definition. So are self-actualization, harmony with human nature, and life in accordance with Nature. These are in turn defined by the community within which one lives or by which s/he defines him- or herself. Honesty may mean complete openness and candor ("tell all") in one community's view; it may be simple truthfulness ("don't lie") in another's. Life in accordance with Nature may mean not killing animals in one community, and humane killing for consumption in another. The key is that the community and its tradition define what it understands to be the "excellences of character" that constitute the good life, the ethical life. It is incumbent on others not to endanger the so-defined way of life or act in ways that prevent people from virtuous actions (Crisp & Slote, 1997).

An important aspect of this is that there may be certain elements of a community's tradition that seem at odds with what the majority believe, or even what is in the majority's best interests. Indeed, there may be occasions where the greatest good for the greatest number appears to require violation of a

tradition or limitation on the practice of particular virtues. For example, the demands of an ethically justifiable war require drafting religious pacifists into military service. All this attests to is the fact that the virtue/tradition paradigm, like the autonomy/consent paradigm, can stand in decided opposition to what consequentialist ethics deems ethically acceptable or even obligatory. There may also be cases where preservation of a community's way of life seems to require violation of a person's autonomy. Literature and films are filled with examples of people torn between self-determination and the demands of their religious or cultural tradition.

The above discussion of ethical paradigms is far too brief to do justice to the complexity of these positions. I refer the interested reader to Blackburn (2001) for a more thorough discussion of the major differences among, and subtle nuances within, each of the paradigms or ethical orientations. The point is to recognize, in advance of any discussion of food and agricultural GMOs, that these are long-standing ethical perspectives which have informed ethical debate on matters from slavery to abortion. How they apply to the GMO/GM foods controversies remains an interesting and critical aspect of these disagreements.

Ethics and Agricultural Biotechnology

The ethical acceptability of agricultural GMOs, whatever paradigm the issue is approached from, in part depends on judgements about the ethical acceptability of major features of the food and agricultural system. For example, the judgement that pesticide-reducing GMOs are ethically acceptable depends on a more basic judgement about the unacceptability of pesticide use. In fact, debates about the ethics of certain agricultural practices predate current controversies about GMOs/GM foods. Each of the paradigms entails judgements about agriculture and the food system, and arguments or positions

regarding biotechnology are based on those judgements.

The Consequentialist Perspective on Agricultural Biotech

Consequentialists subscribe to the view that actions, policies, practices and technologies ought to promote people's happiness, defined as satisfied wants or preferences. The question is whether agriculture does this, and the answer is usually that it does. Historically, agricultural policy in the U.S. has been guided by a set of clearly consequentialist goals: (1) Produce enough food to feed a growing and non-rural population (sufficient *Quantity*); (2) Produce food that is safe and nutritionally adequate (good *Quality*); and (3) Ensure that food is generally affordable for consumers while also ensuring that farmers receive profits from their work sufficient to keep them in business (adequate *Price*). I refer to these goals collectively as the *QQP* formula, which in turn provides a consequentialist justification for actions or technologies needed to maintain *QQP*. Those actions and technologies help to guarantee as far as possible that the greatest good of the greatest number is achieved. People's wants/preferences for available, safe and affordable food are satisfied.

Most observers agree that the key to achieving *QQP* is *efficiency* in agricultural production. This means getting the most output from the least inputs, or in standard farming terms, productivity and yields. Growers want to keep costs down while maintaining high quality and high quantity. Historically, most successful farm technology, from hybrid seed to chemicals to high-tech machines, has been adopted with productivity and yield in mind. It is not surprising, then, that farmers and policymakers concerned with efficiency, and ultimately with *QQP*, should want technologies continually improved so as to achieve even greater productivity and yield — all the time maintaining safe, affordable food. This is where agricultural biotechnology enters the picture.

The so-called “first generation”¹ of GM technology was designed to help farmers achieve greater degrees of efficiency. Roundup-ready® crops were intended to reduce the need for costly herbicides while maintaining or improving yield. BT crops were designed to reduce the need to spray pesticides, and bST’s purpose was to increase milk yields without increased feed costs. To the extent that each of these GM products and any others intended for increased efficiency achieve their desired results, they logically must receive a judgment of approval in terms of *QQP*. Generally speaking, a consequentialist appraisal of the ethical acceptability of these GM products results in a straightforward endorsement. If GMOs/GM foods contribute to the satisfaction of people’s wants/preferences, they are ethically justifiable — perhaps even ethically required (Burkhardt, 2001).

Currently, most ethical discourse about GMOs has been couched in consequentialist terms. At issue has been questions about whether current or foreseeable GM products will satisfy the “greatest good for the greatest number” criterion. Though the answer is usually yes, occasionally there have been concerns that some things that people want other than *QQP*, for example, environmental protection, are not being provided by GMO/GM food technology, and in fact, GMOs may endanger these “other goods.” The controversy over BT corn/monarch butterflies is a case in point. People want butterflies protected at the same time they want inexpensively produced/available/safe food. Similarly, some consequentialists have raised issues about long-term consequences of GMOs: will our children’s health be placed at risk by the use of GM technology? What about future people’s wants/preferences? Are they being placed at risk?

Despite these kinds of questions, by and large the consequentialist position has been that with enough foresight and a careful calculation of benefits/costs, we can find the ethically correct solution to

any problem we may face. This implies vigilance in risk assessments, and inclusion of food and environmental safety concerns in appraisals of acceptability. Once we commit to satisfying wants/preferences, however, we have to at least implicitly endorse those technologies that help us achieve that end. For the vast majority of consequentialists, GM technology, in agriculture as in medicine, in principle and nearly always in practice is ethically acceptable.

Autonomy/Consent and Food/Agricultural Biotech

The autonomy/consent paradigm begins with the axiom that self-determination implies that people have inviolable rights, which establishes the ethical demand that people be given a choice concerning how they want to act and be treated. Foremost among these rights is the right not to be harmed or placed at risk against one's will. Certainly, an individual can choose to accept some risks: people freely choose to drive cars, fly in airplanes, engage in sports such as football, invest in the stock market — all activities with some degree of risk associated with them. As long as a person's choice to engage in one of these activities is not coerced, and does not harm others or place other people at risk, these are ethically acceptable acts. When a person drives drunk, plays sports recklessly or puts all the family savings into a stock of questionable value, acceptability starts to evaporate: the individual is risking or harming others. This is ethically wrong.

Autonomy/consent ethicists may not concern themselves with the overall goals of the agricultural/food system, as do consequentialists, but proponents of free choice and the right not to be harmed implicate occasionally agree with some consequentialists in posing this question: Is our food safe? The food system, they maintain, is far from transparent. Most consumers know nothing of farm production techniques, transportation and processing systems, even packaging and marketing activities.

Yet, most consumers want to know that when they purchase foods from the grocery store or at a restaurant, the food will not harm them. In fact, under this ethical orientation, people have a right to purchase items that will not unknowingly place them at risk. This puts the ethical burden on everyone in the chain from farm gate to food store to ensure that food is free from harmful contaminants and as safe as can reasonably be expected. And it is also part of the legal (and I would add ethical) mandate of certain agencies of the U.S. Department of Agriculture and the Environmental Protection Agency, the U.S. Food and Drug Administration, and state and local public health agencies. Autonomy/consent demands that people not be placed at risk against their wills, lack of transparency in the food system makes the obligation of government agencies to ensure safety a strong one.

For the autonomy/consent perspective, the issue of GM foods arises in part because of the lack of transparency of the food system to consumers, but also because at least in the U.S., the regulatory agencies made a decision that, in effect, exempted most GM foodstuffs from any special testing regarding safety. USDA, EPA and FDA agreed that the process of modifying soybeans, for example, was irrelevant to the safety of the soybeans themselves. That is, if a soybean is submitted for approval by EPA or FDA, it does not matter if it was modified through conventional plant breeding techniques or with the use of rDNA technology (FDA, 2000). Some consumer activist groups saw this as an attempt to smuggle GM crops into the food supply, even though, they argued, there had not been any long-term studies concerning the safety (particularly regarding allergenicity) of GM-derived crops. Even if GM foods are safe under current government guidelines, over the long term, consumers may be being placed at risk against their wills.

An even more fundamental point of the autonomy/consent proponents is this: whatever reasons

a person might have to want to avoid GMOs/GM foods, s/he has the right to be able to avoid them. Some people may have reservations about government and industry claims regarding the safety of GM foods. Some may object to the specific kinds of commodities that are being genetically engineered, e.g., corn and rice, staples in poor nations. And, some may have deeper religious objections to GMOs/GM foods — concerns about scientists “playing God.” Whatever the reason, autonomy/consent ethics demands that people have the choice to avoid these products. Hence, autonomy/consent proponents have been the strongest supporters of some form of labeling of GM foods. Mandatory labeling is now the rule in other parts of the world, notably, the European Union, and various pieces of legislation have been put forth in the U.S. Congress and in state legislatures requiring some form of labeling. How this will play out in the U.S. remains to be seen. The point is that labeling receives its strongest philosophical/ethical justification in terms of the ethics of autonomy/consent.

There is one further dimension of the autonomy/consent perspective on GMOs that deserves attention. This has to do with farmers’ choices. Even prior to the enactment of the EU labeling legislation, there were concerns among some farm groups that non-GM crop seed would become less and less available. Since farmers make their planting decisions on the basis of expected markets (among other things), and with the possibility that markets for GM grains would shrink significantly (boycotts in the EU), some farmers desired to plant non-GM varieties. The way the seed industry is structured, however — with a very small number of large corporations, all heavily invested in GM crop technology, controlling a large portion of the seed market — questions have been raised as to whether corporations will continue to supply non-GM seed.

For affected farmers, this is also a matter of autonomy/consent. Some small-farm activists

maintain that the actions of the commercial seed industry giants deliberately harm smaller operations, especially those in developing nations (RAFI, 1999). Whether or not that is true, it has primarily been larger commercial farm operations in the U.S. (and commodity associations such as the American Corn Growers Association (ACGA)) who have voiced concern about choices and alternatives. Despite costs and other practical constraints, government agencies and seed industry giants are exploring ways to “segregate” and “identity preserve” GM and non-GM seed as a way of accommodating farmers’ needs and the demands of the global market.

Many people who take a consequentialist view on these matters believe that the autonomy/consent issues that are raised are not so much a matter of biotechnology as a matter of power and control: consumers and farmers want greater control over the choices available to them in their respective arenas. Consequentialists liken the GMO controversy to the issue of organic foods: organics tended to be produced for local markets by smaller-sized producers, so that a choice for organic was really a rejection of large-scale corporate agriculture and the multinational seed/chemical inputs corporations. While there may be some truth in these claims, they do not undermine the essential claims of the autonomy/consent approach to the ethical acceptability of GMO/GM foods and GM crop seed. People have the ethical right to choose what they consume/purchase, which implies both that they be allowed to *know* what they are consuming, and to avoid or reject it if they so desire.

Ethics of Virtue/Tradition and Food/Agricultural Biotech

There are several versions of virtue/tradition ethics that have been offered in connection with the appraisal of agriculture generally and food/agricultural biotechnology in particular. These include the positions taken by Roman Catholics and some fundamentalist Protestant denominations in the US (see

Warner, 2000), and rural and farm groups in other nations, again notably the EU. While each position has its unique features, these usually negative appraisals of GMOs/GM foods tend to reflect more general traditions within virtue/tradition ethics, *Agrarian* ethical philosophy and, for lack of a better term, what I call *Nature-ism*. These are somewhat different approaches to assessing ethical acceptability in general, so they will be discussed separately.

Agrarianism is the philosophy that views agriculture as more than a business or economic sector in society: agriculture is a “way of life.” What this means is that agriculture has a unique and ethically special set of contexts, practices, and virtues that are inherent in its nature. The practice of bringing forth sustenance from the soil in the face of nature’s unpredictability requires that the farmer be patient, strong and self-reliant, and respectful of natural processes. It also requires that the farmer work in harmony with others in the community, since only through mutual respect and reciprocity that many of the tasks of farming, or living in rural community, can be accomplished. Agrarianism sees the traditional family farm as a place where real human values and virtues can be practiced, instilled in the next generation, and hence preserved. Participation in and psychological and ethical “ownership” of an *agricultural* community is among the most important virtues or values people can embrace (Berry, 1977).

Whatever challenges or threatens traditional farm virtues and rural communities is regarded as ethically suspect if not plain unacceptable. For this reason, Agrarians have long been critics of government policies, business decisions, and technology-development agendas that have tended to undermine farming as a way of life. For example, Agrarians claim that U.S. government policies have tended to favor larger, corporate, heavily “industrialized” farms that are (assumed to be) better able to deliver *QQP* to a predominantly urban/suburban population. Non-farm interests (e.g., multinational

petrochemical corporations) have increasingly purchased large blocks of farmland and have destroyed many rural communities as farming transformed from a family-based, labor-intensive, community-oriented enterprise to a mechanical/chemical production system. Researchers in both industry and in agricultural colleges and universities have limited their attention to efficiency and productivity in the development of technologies for agriculture. With the exception of farm protest groups and some academics, respect for traditional, family farms and rural communities is rarely found outside those rural communities that have managed to hang on despite the accelerating trends toward large *agribusiness*.

Given the basic ethical position of Agrarians toward modern agriculture, it should come as no surprise that most Agrarians find GM technology to be ethically unacceptable. As noted above, food/agricultural GMOs are usually designed, intended, for business-like efficient production. They are not designed to enhance the quality of life for farm families or their communities. In this regard, Agrarians echo many of the concerns voiced by proponents of autonomy/consent ethics: farmers are systematically being robbed of the ability to choose. In this case, however, it is not only that they may not be able to resist the technology, they may not be able to preserve their values and ways of life (Burkhardt, 2000).

By far the strongest expression of the Agrarian rejection of modern agriculture and GM technology has come from smaller-sized, traditional farm communities in Europe, and from peasant farm activists in developing nations in Africa, Latin America, East Asia and India. In Europe, the concern is that GM technology will favor larger farms, make traditional agriculture less competitive, and drive small farms out of business. Alternatively, GM technology may make foodstuffs cheaper, allowing foreign (read: U.S.) produced foods to replace domestic products, again, forcing traditional farmers out of business. In either case, a valued way of life is threatened.

In the developing world, the Agrarian critique of GMOs reflects a view that even if traditional family-style agriculture is not threatened initially, decreased availability of non-GM crop seed (again as a result of the concentration of ownership in the seed industry) may mean peasant farmers would be forced to use GM seed. This may be costly, and it may force farmers to get big or get out. More importantly, it threatens traditional ways of life, including the use of indigenous crops and growing practices.

In the U.S. and Canada, where most people are so far removed (physically and psychologically) from agriculture, the Agrarian position and critique of the ethical acceptability of GMOs/GM foods has not received much attention. In the late 1980's and early 1990's the Agrarian critique of bovine growth hormone (bST) did surface in Wisconsin, Minnesota, Missouri, and a few dairy farm-rich areas in New England. After that controversy faded from public awareness, Agrarianism itself faded from public view.

The second version of a virtue/tradition ethics to be considered here is what I call *Nature-ism*. This view has also been endorsed in part by members of religious denominations in their exhortations that scientists engaged in GM research and development should not be “playing God.” In its more general and secular interpretation, this view simply argues that we should not be engaging in *transgenic* technology — crossing species boundaries. *Nature*, understood as an integrated system of beings and processes, should not be treated this way: GM technology is ethically unacceptable.

Appealing to *Nature* in this way can occasionally seem fuzzy-headed or mystical, but there is actually a rational basis for this perspective. The term *Nature* is a placeholder for a complex set of relationships among species of plants and animals, what we call an ecosystem. While ecosystemic interactions are not all beneficial to every participant in the system — some things die, some things prey

on others, some things mutate into others — the process of evolution produces, at any given point in time, an “equilibrium.” This is not to say that the system becomes static, rather, that each species functions in such a way that makes the system work as it does. In effect, each species contributes to the ecosystem’s operations.

The problem with GM technology is that by transferring genetic material across species boundaries, one transfers physical traits from the donor to the recipient. These are not always (nor are they usually intended to be) traits that would appear in the recipient species through natural evolutionary processes or even through deliberate intra-species cross-breeding. According to Nature-ism, trans-species transfers of genetic material can upset the operation of ecosystems. At the very least, we do not know enough about, nor can we control enough of, complex ecosystems, to be sure that the GMO will not cause irreparable damage. Perhaps even life as we know it — including human life — may be threatened.

For Nature-ists, once we recognize the delicate balancing processes that constitute ecosystems or Nature, we must see that human beings have no right to manipulate species or processes in this way. At root, people have an ethical responsibility to try to avoid disruption of deep ecological processes. Obviously, nearly everything people do “interferes with Nature,” and much of this is necessary for people to live their lives. However, the position taken by Nature-ists is that GM technology is an arbitrary and capricious attempt to manipulate life at the deepest level.

The specific virtues and tradition implied by the Nature-ist perspective are not as well-defined as within Agrarianism and some other virtue/tradition ethical orientations. Considerable philosophical work is underway to try to articulate what Nature-ism practically implies (Callicott, 1999). One thing

Nature-ists agree on is that genetic engineering is ethically unacceptable.

In sum, then, virtue/tradition ethics defines ethical acceptability in terms of consistency with some deeply-held values and virtues, whether they relate to farming as a way of life, to life in accord with Nature, or to following God's plan and will. Not all virtue/tradition ethical perspectives will necessarily reject GMOs or biotechnology overall. However, both in the U.S. and around the world, variations on this ethical paradigm have generally rejected GMOs and GM food. The depth of convictions among adherents to virtue/tradition ethics, as well as the force of reasoned arguments stemming from these convictions, have contributed to the seriousness and intensity of public debates, and have occasionally fueled violent political action against GMOs/GM foods.

Concluding Remarks

It has not been the intention here to argue in favor of any of the ethical paradigms or approaches to evaluating the ethical acceptability of GMOs/GM foods. Rather, the point has been to illustrate the importance of each of these three ethical paradigms in the GMO debates. In many respects, both autonomy/consent and virtue/tradition ethics have been marginal to public debate, though perhaps autonomy/consent less so than virtue/tradition ethics. While somewhat marginal, these orientations should not be *marginalized*.

Indeed, public debate about GMOs/GM foods over the past decade-plus has been dominated by considerations of risk, costs, and benefits of these products of the new biotechnology. Since these products and technologies are logically and institutionally linked to an important social and economic force in the global community — agriculture — it is hardly surprising and initially justifiable that the economic dimensions be primary. Potential implications for the environment and for people's health demanded that

environmental and food safety be factored into the assessment of ethical acceptability. Still, these concerns were defined in terms of economic costs and benefits.

In the 1990s, however, consumer activists groups began to push an agenda of autonomy/consent regarding GM foods. In some cases this opened the debate to a different set of ethical concerns, indeed, a different way to think about the ethics of GMOs. So-called “civil society organizations” (CSOs) such as the Rural Advancement Foundation International (RAFI) and Farm Aid began to push agendas stressing protections for small farms and the rural way of life. Environmentalist groups encouraged considerations of intrinsic value in natural systems and places. Each perspective introduced ethical considerations that had been absent from the public arena.

Whatever one may believe about the soundness of the arguments presented by political actors opposed to GMOs, these critics have provided a valuable service to all of us concerned about agriculture and food, as well as technology. The three ethical paradigms presented here predate and are independent of any critics’ (or proponents’) use of them in public discourse and debate. Professional philosophers and ethicists wrote about issues in agriculture and agricultural biotechnology years before these issues became matters of widespread public controversy.² Nevertheless, the fact is that autonomy/consent and virtue/tradition ethics were forced into the public consciousness by activist critics. Activists have refused to limit ethical discussion to consequentialist issues — costs, benefits, risks. In so doing, they have forced policy makers and concerned citizens to recognize that we differ in what we believe is right or wrong about GMOs, but more importantly, why we differ.

As is true regarding many public issues with ethical dimensions or with deep, conflicting underlying ethical judgements, the solution to the GMO controversies may ultimately come down to political-

economic decisions. Lawmakers may decide in favor of labeling as a way of appeasing constituents. Policy-makers in USDA, EPA or FDA may decide that any additional or different kinds of tests for GMOs would be too costly and establish inefficient barriers to marketing these products. The President of the U.S. may direct the Secretary of the Department of Agriculture to press ahead with a “more biotech is better” research agenda to try to capture the world market for GMOs/GM crops/GM foods. Regardless of the reasons why laws and policies ultimately are made, ethics still matters. Recognizing — and respecting — the rationality of opposing basic ethical beliefs and a different ethical paradigm is an important step in understanding the debates. Those who disagree with us are not always uninformed or irrational: sometimes they just subscribe to a different ethical paradigm.

Notes

1. Observers have characterized the products of GM technology in terms of the general kinds of goals or properties associated with them. The so-called “first generation” has been targeted at agronomic goals — productivity and yield, reduced chemical inputs, etc. The “second generation” is supposed to provide benefits more directly to consumers, e.g., better flavor, longer shelf-life, improved nutrition content, and do forth. The “third generation,” still a long way from reality, would include novel uses of agricultural products, for example, building materials from plant fibers (not wood) and oils, alternative energy sources, and single foods (e.g., corn) with all the vitamins, minerals and proteins necessary for a wholly nutritious diet.

2. Berry (1977) alluded to the development of agricultural biotechnology and offered an Agrarian critique as early as 1977, although the agricultural biotechnology research and development effort was still in a “pre-natal” stage at the time. It was not until after the 1980 *Diamond v. Chakrabarty* U.S. Supreme

Court decision, allowing patents on “novel life forms” produced through rDNA techniques, that the agricultural biotechnology industry began in earnest. Among the earliest ethical treatments of food and agricultural biotechnology are Thompson (1984), Doyle (1985), and Burkhardt (1986). There is now a considerable ethical/philosophical literature on GMOs/GM foods; I refer the reader to the extensive bibliography in Thompson (1998).

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