UNDERSTANDING THE PUBLIC RECEPTION OF GM CROPS IN THE U.S.

Frederick H. Buttel [1/]

Many observers have found the public reception to GM crops to be difficult to fathom because it departs substantially from our experiences in technological innovation in American agriculture. While there have been conflicts over new technology in agriculture in American history—for example, over cotton mechanization in the South during the 1930s and 1940s which led to the massive migration of ex- sharecroppers, over animal growth hormones, and over confinement animal practices and technologies—for the most part new technologies have been developed and commercialized with little overt politicization. The BST conflict in the late 1980s and early 1990s was something of an exception to this rule, but by the same token it is useful to note that since 1998 or so there has been little overt conflict over BST technology. The GM crop experience, in which there has been protracted conflict that shows little sign of being abated, appears to represent a departure from previous trends of American technology adoption.

The GM crop experience also contrasts with the two major ways that American farmers, researchers, policymakers, and food system actors have traditionally thought about the diffusion of new technologies. The first model is the scientific expert model—typified by the FDA process in which product-approval and other regulatory decisions are based on scientific consensus, are backed by regulatory police power that legally clears away obstacles to technological diffusion, and are not challenged until there is evidence of massive product failure, human mortality, and so on. The second is the marketing model, in which repeated information flow and advertising, combined with the absence of product defects, lead to product to achieve consumer acceptance and to expansion of market share.

Neither model, however, fits the circumstances of the adoption and acceptance of GM crops today. In my view, a more realistic perspective needs to be based on three key observations. First, and arguably most important, the GM crop/food conflict is a product of trade liberalization agreements, especially the World Trade Organization. Prior to WTO there was considerable anti-GM crop mobilization in Europe (Biotechnology and the European Public Concerted Action, 1977). American and other Cairns Group country interests, however, were able to get pro-GM crop language included in the Uruguay Round Agreement on Agriculture (URAA)—specifically, into the Sanitary and Phytosanitary (SPS) part of the URAA—and they felt that this victory would ensure that Europe would be compelled to approve GM crop products and to import GM foods and feedstuffs. The leverage that WTO afforded to American biotechnology firms and actors

---

[1/] Dept. of Rural Sociology, Program on Agric. Technology Studies Univ. of Wisconsin-Madison.

in the seed and grain trade, however, served to aggressively mobilize anti-GM crop sentiment in Europe. Were it not for WTO, which led to the politicization of the GM issue in Europe, and thus to the European Union's de facto moratorium on GM product approvals and to EU restrictions on imported corn and soy (Borch et al., 2003), there almost certainly would not have been a GM controversy in the U.S. Indeed, by the 1999 growing season, roughly 50% of U.S. soybeans were GM and nearly 30% of U.S. corn was Bt, and perhaps 50% of processed food in the U.S. had at least trace GM content. In fact, virtually no one among the consuming public had the slightest idea that there were so many foods with GM content as of 1999. And there was no significant public protest in the U.S. against GM crops. U.S. groups opposed to GM groups made little attempt to contest these products because they recognized that there was so little awareness of these technologies among the public and no widespread ambivalence about the technology.

All hell broke loose in 1999, however, because of a variety of factors, the chief ones being mobilization of environmental groups in Europe over GM crops and the EU moratorium on new GM product approvals that resulted. Were it not for WTO, and the threat seen by the European public and its activists that the U.S. would use WTO to force them to use GM crops against their will, there would not have been the uprising against GM crops that occurred in Europe, Japan, Korea, Australia, and other countries after 1999. This resistance to GM crops spread to the U.S. and galvanized the opposition that currently exists. American anti-GM activism is moderate by European standards, but it is still considerable. There are a dozen or so significant national-level groups that devote considerable effort to contesting GM crops and foods. Most are environmental groups, consumer groups, anti-trade liberalization groups, and organic farming/food groups (Schurman and Kelso, 2003).

The second component of a framework for understanding the GM controversy is to recognize that the U.S. is a very unusual nation by world standards in a variety of ways that bear on GM crop acceptance and adoption. The U.S., for example, has a chain-restaurant, fast-food, processed-food, convenience-food, mega-grocery-store, and supersized-oriented food system, which departs substantially from those of most other countries around the world. "Style" in food—its regionality, its naturalness, its genuineness and traditions, and so on—tends to matter a great deal in most European countries but not in the U.S. GM foods are *not* generally seen by most Europeans as being particularly "dangerous" or "risky." Instead, they are seen as being simply undesirable—a kind of a contaminant or a low-quality raw material. GM foods are so unpopular in the United Kingdom that, for all practical purposes, most biotechnology corporations have pulled their operations out of the U.K., GM crop R&D for application

there has largely ceased, and public GM R&D has been heavily pared. Much the same situation prevails in Germany[2].

Third, U.S. civil society is simultaneously highly partisan and deeply divided politically at the same time that there is, to be frank, mass ignorance about politics and public affairs. As an example, in the 4 January 2003 *New York Times*, there was an op-ed piece by a Republican Party activist who reported data from a recent national poll showing that over half of the American electorate does not know the name of the person who represents them in Congress, and only one-third know who their state's governor is. While this activist's concern is that the largely ignorant American public is difficult to appeal to on "the issues," and nearly compels the use of distorting, negative political advertising, the lack of American public interest in and awareness about public issues plays an important role in the GM crop controversy as well. Thus, when controversial public issues come to the fore, there is an upwelling of highly polarized views, especially from those who are paid to polarize (corporate and trade lobbyists, NGOs, and other interest groups); there also tend to be strongly held views among the small minority of the electorate that is reasonably well informed about public affairs, and these views are typically as polarized as those of the professional politicizers and spin-doctors. At the same time, most citizens have only the most flimsy awareness of or interest in what is going on.

Each of these three factors that shapes public views about GM crops leads to one or more further conclusions or observations. First, I believe the polarization around GM crops and foods will last for a considerable time. This will be especially the case in Europe, Japan, and Korea, but probably also in Oceania. Overseas activism will sustain U.S. anti-GM activism for the foreseeable period.

Second, while GM crops appear safe for human health, do not have major environmental liabilities, and some have some environmental advantages, they have just enough minor liabilities—the likelihood of Roundup Resistant weeds, evidence of gene flow and genetic contamination, modest negative effects on biodiversity and wildlife populations, insect resistance—so that there will be continuing grounds for mobilization against them. Most importantly, there are no significant consumer benefits to GM crops so that there is essentially no major cost to European countries and European citizens of wanting to curtail their use. FAO-Codex rules now permit import restrictions if there is reasonable scientific evidence of even minor risks (as was the reasoning behind Codex's upholding of the EU moratorium on BST in the late 1990s). Neither the WTO, diplomatic pressure, nor American power will be able to override these circumstances.

[2] There is now a huge literature on public biotechnology attitudes in European Union countries. Biotechnology and the European Public Concerted Action, in a 1997 article in Nature, reported relatively negative attitudes toward GM crops and foods in most of Europe as of the early 1990s even though there was broad support for biotechnology in the biomedical field. G. Gaskell, one of the co-authors of the 1997 piece, has published several important updates to their original paper, the most significant of which is Gaskell et al., 2000. Other important pieces of research include Bonny (2003) and the "Eurobarometer" studies, the last of which was Gaskell et al. (2003).

American exceptionalism may play a role in the future of GM crops in several respects. Five to ten years hence the U.S. will probably be the only world nation with a large share of its agricultural land surface devoted to GM crops. (The main exceptions to this will be the three countries in the world with large acreages of oil seeds that lend themselves to highly mechanized herbicide resistance technology.) Over 50% of world soy acreage is already GM, so there is not much opportunity for growth in this sector. Global GM penetration of corn, cotton, and canola has essentially held constant in recent years. It could be that ten years hence GM crop adoption will come to have essentially the same global pattern that BST now has: considerable adoption in the U.S., some adoption in a small handful of other countries, and very little adoption in the bulk of world nations. [3]

Second, it is not out of the question that consumers' and countries' views about GM crops will reflect what they think about the United States, which is widely seen as being something less than in-step with the rest of the world. The U.S. has been quite aggressive in recent years in projecting its strength militarily, and in general this has been very unpopular across the world. Anti-Americanism is strong enough in Europe that some would like to see the European Union orient itself much more to countering U.S. power. This is not likely to occur, but it gives a feel for much of world opinion about the U.S.' exercise of its power. GM crops and foods could well become caught up in the complicated politics of transatlantic jockeying for power. But it could be that there are so many differences between the U.S. and Western Europe that GM issues become viewed as trivial and fall to the bottom of the stack.

Third, I see little reason why there will be much, if any, change in public views about GM crops and foods in the U.S. It is not an exaggeration to say that for the bulk of the American population, they have essentially no opinion about GM crops because they are essentially unaware and indifferent. Public opinion polls that ask respondents what "biotechnology" or "genetic modification" is without prompting then (that is, without clues that essentially give respondents the answer) show that about 10 percent have a pretty good idea what these are and the rest do not. Their and our futures are being decided by lobbyists, WTO tribunals, and strained transatlantic diplomacy. I've always been something of an advocate of the notion that people deserve what they want. In the case of GM crops, however, most Americans are so devoid of information that they do not even have opinions on this topic, ill-formed or not.

What to do? As I survey this landscape, my concerns do not lie with whether GM crops achieve broad success or not. My two main concerns are: (1) to ensure that there is a future for public agricultural research and higher education, and (2) to make progress in creating a more informed and engaged public—to help remake them into a citizenry again.

[3] These global data on GM adoption are summaries of more extensive documentation in Buttel and Hirata (2003).

These are some of things I would like to see happen, or not happen. I am deeply concerned that our colleges of agriculture find themselves in an unsatisfactory position because of the GM controversy. Colleges of agriculture, for some understandable and mostly justifiable reasons, have dramatically shifted their research programs in the direction of molecular biology. For this reason, they are perceived as being pro-GM and pro-biotechnology industry, and indeed there are a number of very energized pro-GM crops voices in colleges of agriculture such as at UW-Madison (as well as a good many who are opposed or ambivalent). Yet colleges of agriculture and experiment stations receive very little industry money, and they actually do very little GM research (defined as the development of cultivars involving novel single-gene-input traits developed through transgenes consisting of "foreign" genetic material [either synthetic material or material from phylogenetically distant species]).[4] I am continually amazed by how many anti-CALS people I run into who think that every CALS scientist believes that the holy grail in research today is to insert salmon or some other exotic transgene into crop plants and then hand this material over to private industry.

One of the reasons that there is so much misinformation and ignorance is that we in agricultural higher education have not made it a priority to engage a wide range of the public on the details of what we do and why. CALS people, for example, normally deal with people like you. They do not go out of their way to talk with people outside of mainstream agriculture and agribusiness such as environmental groups, civic groups, church groups, and so on.

Everyone knows that the single biggest issue in agricultural research today is transgenic technologies and their implications, yet we have not done much to inform the public about what transgenic technologies are in practice. Most people with some amount of information on GM crops believe that transgenes *must* come or *always* come from another species. For example, in a very widely circulated article in the October 2003 *Atlantic Monthly*, Jonathan Rauch tells that that "'Biotech' can refer to a number of things, but the relevant application here is genetic modification: the selective transfer of genes from one organism to another." This misunderstanding is widespread, despite strong evidence (Strauss, 2003) that there are major differences between conventional GM crops (involving transgenes from phylogenetically distant species that code for single-gene input traits) and those transgenic crops in which the genetic material comes from the same species or very closely related species. We in the public agricultural colleges have let this continued disinformation pass unchallenged. This is a particular significant shortcoming when one realizes that the majority of transgenic crop work in land-grant colleges of agriculture does not involve "exotic" genetic material. Indeed, many crop plant geneticists believe that the allelic variability that exists in the landraces

[4] Our colleges of agriculture now depend primarily on the National Institutes of Health and the National Science Foundation for their funding.

and traditional varieties of crop species—when identified and evaluated through methods such as comparative functional genomics, bioinformatics, marker-assisted selection, and so on—is more attractive than that available through use of exotic transgenes.

My take-home message is that we ought to aim to kill two birds with one stone. Land-grant colleges of agriculture need to be concerned about their future given the cutbacks in public funding and the fact that the land-grant colleges are typically linked in the minds of activists with a kind of technology that provokes concern if not opposition. I believe that land-grant colleges of agriculture should be active in promoting the strengths and advantages of molecular biology methods, the bulk of which are not directly related to GM crop technology. I also feel that they owe it to the public to try to prevent people like Jonathan Rauch from confusing our citizens into thinking that the choice we face is between conventional sexually based breeding methods on one hand, and use of exotic transgenes on the other. This is a false choice that deceives the public about the potentials of molecular biology. And it also plays into the hands of the paid propagandists and spin-doctors who want citizens to believe that this is actually the choice that needs to be made.

I admit that the process of actively engaging various groups in the public about agricultural research will not be easy to do and will not generate instant results. We work for a public that has relatively little interest in public affairs, little interest in what we do, little interest in agriculture, and little knowledge about biology. It will be a multiple-decade project to bring a much broader swath of the Wisconsin public up to speed on molecular biology, GM crops, and so on. But I think we have no choice. I fear for the future of land-grant public research and am only slightly more optimistic about the future of public higher education. I'd rather take my chances with a relatively informed public than one whose knowledge of politics is based on the last negative campaign ad or talk show he or she happened to hear.

References

Biotechnology and the European Public Concerted Action. 1997. "Europe ambivalent on biotechnology." Nature 387:845-847.

Borch, K., J. Lasen, and R.B. Jorgensen. 2003. "EU reflects European public opinion." Nature Biotechnology 21, 9:976.

Bonny, S. 2003. "Why are most Europeans opposed to GMOs? Factors explaining rejection in France and Europe." Electronic Journal of Biotechnology Vol 6 http://www.ejbiotechnology.info/content/vol6/issue1/full/4/bip/6:

Buttel, F.H., and I. Hirata. 2003. "The 'gene revolution' in global perspective: a reconsideration of the global adoption and diffusion of GM crop varieties, 1999-2002." PATS Staff Paper No. 9. Madison: Program on Agricultural Technology Studies, University of Wisconsin, September.

Gaskell, G. et al. 2000. Biotechnology and the European public. Nature Biotechnology 18:935-938.

Gaskell, G. et al. 2003. Europeans and Biotechnology in 2002. Report to the EC Directorate for Research, Brussels, March.

Rauch, J. 2003. "Will frankenfood save the planet?" Atlantic Monthly 292 (October).

Strauss, S.H. 2003. "Genomics, genetic engineering, and domestication of crops." Science 300 (4 April):61-62.

Schurman, R.D., and D.D.T. Kelso (ed.). 2003. Engineering Trouble. Berkeley: University of California Press.