The Great Agricultural Biotechnology Debates: Outcomes from the Workshops

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In order to thoroughly examine the conflicting issues and arguments that fuel controversies about agricultural biotechnology in the food system, the workshop sessions were constructed in a modified "debate" format. The overriding intent was to ensure that the workshops were not just cerebral exercises, but would result in strong connections among participants, and thought-provoking, useful take-home outcomes. The debates were engineered in order to:

- engage conference participants as *active players* in a deliberately fast-paced process of discovery, and
- compel conference participants to *critically and thoroughly evaluate rival viewpoints*.

Accordingly, upon entering the workshop-breakout rooms, participants were assigned to a particular framework position, and were called upon to rapidly absorb, adopt, and rigorously defend a stance perhaps contrary to their own deeply ingrained beliefs.

The topic resolution for the debates was: ***Be it resolved: that GM technology is a sound and safe innovation, and should be permitted in the food chain without restrictions.*** Up until this point in the conference, attendees had heard a variety of viewpoints on the issues. Now, they were required to actively advocate and defend a particular position in multi-dimensional arguments that closely paralleled those currently ongoing internationally in the media, and even on the streets in front of the conference venue.

Because so many of the opposing *pro* and *con* arguments about GM food crops are at cross-purposes, debate participants found that irrefutable

arguments and decisive winners were not easy to identify. Although relatively well versed in the issues, frequently they scrambled to counter opinions voiced by the opposing team, and realized that some lines of reasoning, especially those with emotional undertones, were difficult to refute. Therefore, it is not surprising that the general public has a difficult time sorting out the facts surrounding GM issues.

The Great Debate workshop format promoted productive, concentrated interaction, and facilitated appreciation for diverse perspectives. The scenario presented here may be adapted for use in classrooms or other assemblies to foster intensive exchange of viewpoints.

The Set-Up

The debate-format workshops were prefaced by presentation of a mock debate (Appendix I, page 229), which introduced the conferees to the extremes of viewpoints both from the pro-GM and from the anti-GM camps. The moderator introduced the resolution, and the mock debate followed with arguments from a land grant university professor, an advocate of GM technology, that were countered by a European prince/gentleman organic farmer strongly opposed to genetic engineering, followed by arguments from a pro-biotechnology industry representative countered by an anti-biotechnology radical protestor from a consumer advocacy group.

Although deliberately exaggerated in tone and content, the mock debate introduced the rules of engagement for the workshops to come, and provided a preview of the typical point/counterpoint order of argumentation in traditional debates.

Next, the conferees were divided into four workshop-breakout sessions (twenty-five to thirty participants per group). At least two trained debate coaches staffed each breakout session.

Once participants entered a breakout room, they were asked to count, in turn, one through six. All who had called out number one were asked to form a group in one corner of the room, all those who called number two assembled in another part of the room, *etc*. Via this procedure, the attendees were arbitrarily divided into teams, the composition of each likely represented a broad spectrum of viewpoints. This process occurred simultaneously in each of the four breakout session rooms, with four to six teams assembled in each room.

Debate coaches then assigned each team one of the following identities:

- pro-GM university scientists
- anti-GM militant environmental “green” group (anti-multinational companies)
- pro-GM large corporate US/multinational biotechnology company representatives
- anti-GM consumer advocate group in the European Community

- pro-GM farmers in the developing world
- anti-GM organic farmers in the US
- pro-GM US regulatory agency
- anti-GM government regulatory agency (non-US)
- pro-GM politician (you pick the country)
- anti-GM politician (you pick the country)

Individual group members did not have the opportunity to select a preferred position on the GM issue.

Each team selected a captain, who usually served also as recorder. During the remainder of this session, each team identified a 'top-ten' list of arguments in favor (or opposed, depending on their assigned identity) to the stated debate resolution, *Be it resolved: that GM technology is a sound and safe innovation, and should be permitted in the food chain without restrictions.*

Because participants were randomly assigned to possibly unfamiliar positions, the debate organizers had collected a broad selection of written position papers and other statements that were displayed in each breakout session room. A table was laid out with an eclectic selection of actual current literature materials including Website position statements from consumer activist groups, white-paper statements from pro-GM authorities, industry public relations statements, newspaper stories on GM issues, political statements, *etc*. Team members were encouraged to peruse this array of *pro* and *con* arguments surrounding the GM controversy as they assembled arguments to support their positions. Teams were allotted only 15 minutes to compile their top ten lists, and the debate coaches offered assistance and encouragement to any teams that were floundering for ideas. With only a brief period of time to formulate arguments, intensive, cooperative effort was necessary, thus building camaraderie.

Each team captain listed the top-ten arguments (in abbreviated outline form) on large buff sheets posted on the walls. The captains explained the items to the broader audience; discussion ensued and suggestions of potentially stronger arguments were entertained.

For the remaining 10 to 15 minutes of this first session, each pro-GM team exchanged their top-ten list with their counterpart anti-GM team, and *vice versa*. The teams reconvened to develop counterpoint arguments to refute their opponents' arguments. The coaches collected all of the *pro* and *con* and rebuttal arguments, and held them until the afternoon workshop sessions.

THE DEBATES

The second workshop-breakout session was initiated by having the coaches quiz the participants about which positions had seemed most difficult to defend or rebut during the morning session. This brief discussion session helped to prepare the teams for the debate scenario.

Each team designated two spokespersons, and abbreviated debates were staged between the *pro* and *con* teams. Teams were introduced to the following 'Rules of Debate,' which were posted on large buff paper sheets to facilitate order during the debate exercise:

1. First pro-GM constructive speech: affirm the resolution, explain the position, and provide a plan for adopting and embracing GM in the food system. (3 min)
2. Cross-examination by the first anti-GM spokesperson (Q&A): attempt to refute the arguments of the first speaker, and show the audience that you are a truth seeker. (2 min)
3. First anti-GM constructive speech and rebuttal: turn the tide in favor of your position by explaining why the plan of the *pro* side would be disastrous, and/or offer an alternative plan. (3 min)
4. Cross-examination by the first pro-GM spokesperson. (2 min)
5. Second pro-GM constructive speech and rebuttal. (3 min)
6. Cross-examination by the second anti-GM spokesperson. (2 min)
7. Second anti-GM constructive speech and rebuttal. (3 min)
8. Cross-examination by the second pro-GM spokesperson. (2 min)

At least two debates (four teams) were conducted in each session, at the finish of which the audience voted on which side "won," and arguments that were perceived as "turning points" were discussed. Pitfalls that inhibited serious resolution of opposing viewpoints were documented. Cases where the arguments did not seem to address the same points also were noted.

The Outcomes

By general consensus, the debates were thought-provoking and productive, because the debate teams put concerted effort into preparing and delivering strong and persuasive arguments. Team spokespersons, even those assigned to positions contrary to their own opinions, provided well constructed, impassioned short speeches. Rebuttals were made with little hesitation, again even when the participants were playing roles diametrically opposed to personal convictions. Clearly, the participants were well informed about biotech issues.

Since the workshops were strictly timed, the participants were thrust into the task of actively defending their assigned positions and quickly formulating the strongest possible arguments. In most scenarios, within a team of five or six participants, only one or two were elected to provide the formal speeches and rebuttals during the debates. In other cases, all team members were free to ask questions during cross-examination, which amplified the scrutiny of, and the challenge for, the representative speaker in opposition.

As the debates progressed, the intensity of the arguments escalated. When a designated team spokesperson had the chance to refute an argument voiced by

the opposition, (s)he frequently did so with passion. This competitive spirit often engendered the development of stronger counter-arguments. Nuances and hidden perspectives behind each position were brought to light. Participants reported that they came away with new appreciation for the wealth of information and complexity behind opposition viewpoints, which, in some cases, they had previously viewed as one-dimensional.

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A synopsis of primary arguments and position statements from the *pro* and *con* camps is provided below.

The coaches agreed that the presentations staged in their breakout sessions provided mixes of opinions on GM products in the marketplace that spanned the range from rational to irrational. One coach commented, “Our role diminished the moment the groups understood the task in hand. They jumped right into it, and came up with good arguments for their positions; every individual on each team threw in ideas and perspectives, so we had an excellent mix of people who were not afraid to participate.”

What were the hardest points to refute? Participants found it difficult to defend their stance against ‘the moral high ground’ of a zealous opponent. Interestingly, this particular strategy was used on both sides of the issue. While it was frequently argued that GM technology is “immoral, unethical, and against nature to cross species barriers,” others contended that it is “immoral and unethical” to deny the benefits of GM crop improvements to impoverished farmers or undernourished children in a global context, or to fail to embrace the opportunity for reduced pesticide exposure, or decreased environmental impact.

Another coach commented that some of the participants were “sobered” by the fact that they were most swayed by the *con* arguments. In fact, most of the coaches acknowledged that many of the arguments, *pro* and *con*, were most difficult to refute when based on fears and emotional issues: “It is relatively easy to create a fear and more difficult to allay one, because of the complexity of the subject matter.” One coach noted that he was not sure there were any clear winners in his breakout session, which illustrated that “gray is the color of choice for biotechnology and food.”

Coaches observed that a few debaters "did not always play it straight." There were cases where "fallacious arguments, including begging the question, creating a straw man, *argumentum ad hominem*, and emotional appeals" were substituted for substantive factual materials. In a couple of instances, debate teams spent more time on form (disruptive behavior) than on content. For example, a spokesmen for an 'environmental advocacy group' noted that his opposing spokesman had ridiculed his position and failed to take him seriously—an observation with which the other participants concurred.

In summary, some of the most difficult issues to resolve concerned the approval/regulatory process, labeling, and, as noted previously, moral and ethical issues.

Approval/regulatory process Based on available data, teams were unable to verify to what extent GMOs are required to undergo regulatory approval in the United States. Pro-biotech literature emphasizes that GM is perhaps the most highly scrutinized technology in recent history. The European press argues that the approval process in the United States is shrouded in mystery, and the interconnections among the three major regulatory agencies (the Environmental Protection Agency, Food and Drug Administration, and United States Department of Agriculture) are unclear and without transparency. Further, there was a perception that safety data on which approvals are based may have been compiled by industry and held by private companies.

Labeling Neither side of the issue was able to address to what extent labeling policy is consistent with United States law, practice, or longstanding guidelines. Opponents argued that labeling policy in the United States is out of synchrony with those of the rest of the world, *e.g.*, the EU views labeling as the first step as a matter of policy. The apparent contradiction was noted with regard to "substantial equivalence " of a GM product on one hand and the ability to patent it on the other.

Moral and ethical issues Religious and moral beliefs were among the most strongly held, but proponents and detractors were repeatedly chastised when they "tried to impose their views on everyone else." Opponents should not be forced to consume GM products, whereas advocates should not attempt to force the world to accept the technology without choice. When an opposition team debater claimed, "I'm scared! I want to know my risks!", the fears could not be alleviated with data, statistics, or probabilities.

Pro-GM scientists were faced with the challenge of credibility: "Why should we trust you? Originally you told us that DDT was safe." Anti-GM teams found it difficult to counter accusations of being "against progress" and "against free enterprise." These arguments implied that the precautionary position is shortsighted, especially when challenged with illustrations of past fears over

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pasteurization, microwave ovens, and vaccination. An agreeable compromise between caution and progress was not easy to reach.

Interestingly, the participants saw clear parallels between their GM debates, and emotion-charged disputes over unrelated issues such as *Creationism vs. Evolution*. It was especially clear that science-based opinions were frequently insufficient against ideological arguments or moral/emotional concerns. One spokesperson, an industry representative from the private sector, had endured the "pesticide wars" in the seventies; he felt that those years were worse in terms of being in an uncomfortable position and representing an industry that was constantly attacked.

Take-Home Message

What was the take-home message of the Great Debate workshop sessions? In order to be effective advocates for what we believe in, in order to readily defend our position, it is essential that we thoroughly appreciate all the nuances and complexities of the contrary view. The participants came away with a broader understanding of opposition viewpoints and a broadened appreciation of subtle, perceived flaws inherent in their own stated positions.

A compilation of *pro* and *con* arguments voiced in the role-playing debates in response to the resolution is presented below. Similar or linked arguments are grouped under subject categories.

Many of these points were made in the heat of open discussion and are not necessarily factual. Their inclusion here should not be interpreted as an endorsement by the NABC.

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Arguments in Favor of the Resolution (pro-GM)	Arguments Opposed to the Resolution (anti-GM)
Environmental Concerns	
• GM products are embraced by farmers because of benefits, *i.e.*, increased efficiency, increased yields, decreased pesticide costs, improved quality of commodities. • Biotechnology can be used to produce food on marginal land, *i.e.*, dry areas, saline and acid soils; this is particularly important for developing countries.	• What aspect of quality has been improved for the consumer? It seems that only farmers and producers are benefiting. • So far, there have been no consumer benefits despite a lot of talk; all benefits are to US producers • Excess food is already produced in the US and EU. Land that is marginal should not be used.
• Growing GM crops means environmentally friendly reduction in pesticide usage on the farm. • Less impact on the environment, *e.g.*, less tillage required, less contamination of groundwater, less erosion of soil. • Reduced off-target drift = better relations with neighbors. • Extensive evaluation of Bt corn does not support initial findings of adverse impact on monarch butterflies. • Less exposure to pesticides, – benefits medical system, – better water quality. • Lessens negative impact on beneficial insects.	• GM crops may induce pesticide resistance in insects, which means we will need all the pesticides anyway. • Monarch butterflies illustrate a definite negative environmental impact.
• GM crops increase genetic diversity/ biodiversity.	• GM crops may decrease biodiversity. • Stronger drive towards monoculture.

Arguments in Favor of the Resolution (pro-GM)	Arguments Opposed to the Resolution (anti-GM)
Environmental Concerns (continued)	
• The GM process is precise—known genes and proteins. • Pollen-flow issue is being addressed to ensure pollen will not be able to reproduce. Organic growers may need to develop their own seed sources and testing procedures. • Data show reductions in use of environmental toxins. • Reduced energy (petrochemical) use.	• GM crops contaminate organic agriculture. • Organic farmers lose certification because of pollen drift. • No data are available showing environmental impacts. • Environmental pollution—superweeds, salmon, toxins.
• Genes used are already present in the environment. • New GM crops are being developed to prevent pollen drift / gene flow.	• Ecological concerns—gene transfer damage to wild species. • Gene drifting.
• Agribusiness is best equipped to scale-up research and development. • No other agricultural processes (e.g. the method of slaughtering animals) are labeled and neither should this process.	• Consumer choice must be preserved (GM ingredients should be labeled, traceable). • There is a danger of induced resistance in pests (threat to organic farming). • GM crops will lead to fundamental restructuring of global agriculture.
• GM crops can produce food on marginal lands (dry regions, saline and acid soils).	• Marginal lands should not be exploited.

Arguments in Favor of the Resolution (pro-GM)	Arguments Opposed to the Resolution (anti-GM)
US Regulations/Trust in Government	
• The process is as safe or safer than conventional crop improvement. • GM foods are scrutinized more rigorously than conventional foods. • GM technology has earned third-party endorsements (AMA, NAS, FDA, USDA, etc.).	• Has there been enough testing? Where is the scientific literature? Where is the third-party testing? • A neutral third party should do the testing.
• If a product is substantially equivalent, labeling has no point. To give total information on a label would be both confusing and counterproductive.	• Labeling should be mandatory. What is being hidden by companies who are reluctant to label? • The concept of substantial equivalence is inappropriate since GMOs by definition are not equivalent.
• Farmers are adversely affected by any requirement to segregate a crop—such would be an ill-advised regulation. • Legal liability is of great concern. • Safeguards are already in place to protect the environment and the consumer through the legal system. • GM is proven by 13+ years of testing. • US consumers do not want further regulations and restrictions. • There has been equivalent or greater testing than for non-GM food.	• Government has misinformed us in the past: mad cow and hoof and mouth diseases in Europe. Pre-market review has been voluntary only, not mandatory. • Segregate GM from other crops. • Poor public health history. • If the current approval system is supposedly effective, what happened with StarLink™? • Testing of all commodities should be required (and defined by law).
• There have been no public-health issues to date. • Extensive testing and regulation is done, even more than for most non-GM food products. • Vertical integration is an on-going economic process regardless of the science. • USDA requirements are adhered to.	• Trace-back-to-origin systems should be set in place. • Post-market surveillance should be required.

Arguments in Favor of the Resolution (pro-GM)	Arguments Opposed to the Resolution (anti-GM)
Health and Safety	
• Human health will be improved due to lower incidence and levels of toxins (including aflatoxins), carcinogens, and allergens	• Bt proteins are toxic to insects; how do we know that there will be no long-term effects on humans? • How do we know that there will be no changes that will elevate production of toxins?
• Dr. Pusztai's interpretations of data were found to be faulty by a review panel. • GM is far more precise than conventional breeding and selection. • Pharmaceuticals produced by GM methods are well accepted—why not food? • Higher quality, "cleaner," more uniform products; nutritional benefits. • Known allergens are not used. • Antibiotic markers are no longer used in GMO development. • GM with breeding will increase nutritional quality of food. • The Brazil-nut/soybean episode shows that industry takes the responsible self-regulating course when required.	• Arpad Pusztai's potato-feeding experiment shows how dangerous GM is. • Mark Lappe's soybean analysis paper shows GMOs have lower isoflavone content. • We have co-evolved with our food supply and GMOs introduce unnatural new proteins. • Antibiotic resistance markers may transform our cells or those of gut bacteria. • StarLink™ proves we cannot regulate these things. • We have no way of telling what will be an allergen. • The Brazil-nut protein in soybeans proves how dangerous the technology can be. • We cannot anticipate new health hazards that could arise from these unknown crops. • Safety is uncertain, especially long term.
• GM benefits the American consumer. Without it we could not get out-of-season produce. Free-trade channels are desirable. • Producers/farmers have an improved quality of life/efficiency.	• Threatens the way of life of small-farm communities. • Poor public health history (mad cow, hoof and mouth diseases in Europe).

Arguments in Favor of the Resolution (pro-GM)	Arguments Opposed to the Resolution (anti-GM)
Research Issues	
• Biotech offers more control of the product and its consequences. • There is an exact characterization of inserted genes. • Safety has been tested and proven. • Pleiotropic effects are tested in the laboratory and in field trials over 5–7 years.	• This is a new technology and we are dealing with living organisms. There may be unforeseen consequences. Science has not always been right, e.g. mad cow disease. • Not enough research has been conducted. • There have been no long-term studies.
• Delaying science will result in reduced capacity to meet future challenges.	• Pesticide resistance may build up over time. • No fixed protocols have been established. • There have been no studies in humans.
• GM is the quickest way to add value. • Academia was doing this research long before the large corporations had a profit stake. Corporate funding is necessary to finance university research.	• Corporate research information has not been available to the public. • Corporate profit trumps public health. • Biotech companies exert undue influence in setting public research agenda. • Data favoring biotech products have been produced by industry, not by unbiased scientists. • Data are not published in peer-reviewed journals; data are limited or lack substance; peer-review is biased; scientists are untrustworthy (especially in industry).

Arguments in Favor of the Resolution (pro-GM)	Arguments Opposed to the Resolution (anti-GM)
Moral and Ethical Issues	
• In the long term, more food can be produced from a relatively constant area of arable land to feed an increasing population. • The potential exists for a major contribution to alleviating world hunger. We cannot take the risk of not developing this technology. The impact has been small so far; products to decrease world hunger are still being developed. • Food choice is plentiful in the US and Europe, but not in many other parts of world, and biotech can help. • Most critics of GM are well fed, as are their children; they may feel differently if hungry, as are many in developing nations.	• GM is not needed to "feed the world." Why not control population? There is no clear-cut evidence of increased yields with GM crops. • Currently there is a global excess of food—the issue is one of distribution—golden rice is not an answer to world health / hunger.
• Hybrids and past and current farming practices have for years been based on manipulating Mother Nature.	• GM is against God and nature; a perversion of Mother Nature. • GM is immoral.
• Given the benefits of biotechnology it would be criminal not to progress and bring its advantages to our world.	• A moratorium should be established. • The precautionary principle should be followed; do not approve until certain.
• Religious and moral convictions should not be imposed.	• Religious and moral issues must be addressed.

Arguments in Favor of the Resolution (pro-GM)	Arguments Opposed to the Resolution (anti-GM)
General Considerations	
• Intellectual property rights and protection provides more incentive to enable products to be brought to market.	• Corporate power is driving the technology. • Terminator + Developing World damage from multinationals. • Domination / control by multinationals. • Profit-driven research funding. • Industry is buying credibility. • Focus is share holders, profits. • Industry donates only unprofitable technologies. • Public pressure is forcing transparency. • Industry is selectively transparent—GM-producing companies do not want us to know they make pesticides. • Biotech a conspiracy—ecompassing large companies and government agencies
• GM will benefit small-farm communities.	• Ordinary farmers do not see advantage; benefits accrue only to corporations. • Potential liability for farmers. • Threatens small-farm communities. • Hurts small family farms; local production is important—eat locally, shop daily.
• GM contributes to medical, industrial and environmental advances.	• Unforeseeable risk: plant it, cannot sell it. • Intellectual property issues—patenting life is wrong. • Decreased cultural / local identity. • GMOs are not needed. • Farmers will become serfs to large corporations.