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Growing Partnerships: Earning Society’s Permission to Produce and Market Genetically Enhanced Crops

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Abstract:

Earning permission from society to produce and market new products such as genetically modified crops is a dynamic and changing process, not simply an exercise of choosing the right words for presenting a persuasive argument.

A successful communications strategy must be much more than just a communications strategy – it must be a good relationship strategy. To be sure, poor communication can create problems, make them worse, or perpetuate them. And good communications are vitally important for resolving issues. But communication is not the core, it is an enabler of better or worse utility, in the endeavor to develop good relationships between people and between our institutions.

Effective relationships built from common ground and based on mutual interests, respect and trust are at the core of resolving contentions and dilemmas. Monsanto Company made a public pledge to change our behavior in ways that are responsive to what stakeholders have told us is important for developing a better relationship with customers, consumers, employees and society.

Introduction

Earning permission from society to produce and market new products such as genetically modified crops is a dynamic and changing process, not simply an exercise of choosing the right words for presenting a persuasive argument. A traditional strategy often reflecting the chemical industry perspective was built on expert decision systems with clear and defined rules - such as regulatory processes or customer-marketing models -- coupled with effective, scientific arguments to deal with challenges outside of this expert system. This strategy continues to work reasonably well for pesticides, which have measurable risks, understandable benefits and several generations of familiarity to society.

But for the newer and less familiar field of biotechnology, this strategy has been losing effectiveness. Instead, the nature of new technology, the rapid expansion of the internet and shifting societal expectations has changed the climate, realities and responsibilities of doing business in the area of biotechnology. The traditional communication model was predicated on using defined facts to influence the opinions of others; the new model is based on building relationships instead of messages -relationships built on common ground, respect and trust, from which issues can be addressed with a commitment to mutual benefit instead of winning or losing.

Recognizing the need for a new approach to earning, and keeping, society’s permission to operate, Monsanto launched a stakeholder dialogue program about three years ago. This program began with the company listening carefully to a wide range of stakeholders’ issues, concerns and recommendations. After taking to heart what it heard, it made a public pledge to change its behavior in ways that are responsive to what stakeholders have told the company is important for

developing a better relationship with customers, consumers, employees and society. This is a beginning to, not the conclusion of, developing a new relationship with the many stakeholders Monsanto impacts.

This set of commitments, described in the “New Monsanto Pledge,” was designed to be successive elements of a responsive approach to earning permission from society in the face of changing expectations. The first element of this new relationship with stakeholders is continued listening & dialogue so that it could build and maintain a common understanding of the concerns and values and aspirations of the people it serves and impacts. The second element is transparency about the performance and safety of its products so that the information is available publicly, not just to the regulatory agencies. Monsanto wants to be trustworthy but does not expect people to have to trust it without benefit of the data. The third is respect for the diversity of religious, ethical and cultural concerns of people around the world, and including the safety and stewardship of our products and operations. The fourth element is sharing its knowledge and technology to advance science and to help fulfill humanitarian needs, serve the public good and protect the environment. The final element is ensuring its products deliver broad benefit not only to its customers, but also to society and the environment.

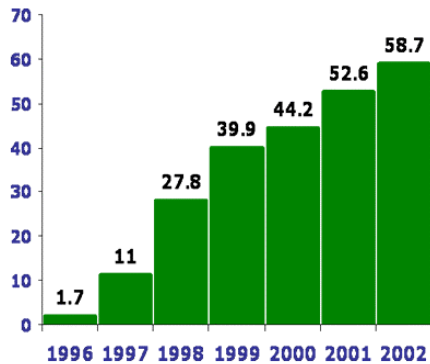
Effective relationships built from common ground and based on mutual interests, respect and trust are at the core of addressing contentious issues and dilemmas. Partnerships are a particularly useful type of relationship commonly used in business endeavors. The concept of partnership, not in a legal sense, but as a type of relationship, can help to guide a company’s behavior and relationship with customers, consumers, employees and society. A partnership, according to the dictionary, is a relationship between people or institutions where the parties are joined in a common enterprise, share with each other, and cooperate with clear responsibilities. This new and growing kind of relationship - in many ways a partnership - between companies and society will be necessary to meet the tough challenges faced by all of us in meeting the needs of all people and protecting the resources and environment on which our well-being depends.

Monsanto Pledge — commitments to stakeholders

The issues involved with the introduction to the marketplace of the products of agricultural biotechnology are complex. Monsanto, as a science-based agricultural company, was caught off guard by the public backlash that first arose in the late 1990s. The journey since then has proven educational and humbling, and resulting approaches have helped to position the company better for the future.

Monsanto’s investment in biotechnology began in the 1970s with the first plant transformations pioneered in its labs. Over the next two decades, the lab techniques were perfected, best transformation “events” selected and field trials held. By the mid-90’s, the first agricultural biotech crop had cleared regulatory requirements and was ready to launch in the U.S. with approvals in Japan and other countries underway. Growth was exponential. Farmer usage in 1996, the first year a biotech crop, Roundup Ready Soy, was grown commercially was on 1.7 million acres. In 2002, 145 million acres (58.7 million hectares) were planted in biotech crops, grown by between 5.5 and 6.0 million farmers in sixteen countries (International Service for the Acquisition of Agricultural Biotech Applications).

Global Area of Transgenic Crops, 1996 to 2002 (Million Hectares)



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However, at this time, Europe was grappling with a number of issues that eroded public confidence in their regulatory systems, among them mad cow disease, dioxin-tainted chickens, and later, hoof and mouth disease.

Concerns about agricultural biotechnology were expressed first in the UK. The tabloids picked up on the issues and fueled the concerns. The stories – and sentiment – spread across Europe. While most people knew little about biotechnology, biotech crops were seen as food that, in their view, provided no benefit to Europeans and might present some kind of risk. Although some biotech crops were already approved in the EU, a de facto moratorium was placed on biotech crop approvals in the European Union in 1998. European sentiment was also being exported to some other countries, including the US.

From Monsanto's view, biotech crops reduced the use of pesticide leading to benefits to wildlife and the environment, promoted conservation tillage practices that were good for topsoil and water quality, saved farmers time, labor and resources, and presented no health or environmental risks. The perplexing question that the company asked was, "What are we missing?"

To better understand the backlash, Monsanto went to the source – the people expressing the concern. First, Monsanto undertook a major stakeholder identification exercise initially in Europe, and then in the United States. The company identified many diverse sectors of society who had expressed an opinion about biotechnology, and whose opinion would be important to gaining a clear picture of the social conflicts at play.

Second, cross-functional teams of employees were assembled to conduct interviews with stakeholders. Members from different backgrounds were paired to gain diversity of perspectives, but also to have at least one member whose background matched that of the stakeholders they would approach.

The third step was to conduct training to help Monsanto people to become better listeners. As a company with a large concentration of Ph.D. scientists who were experts in many areas of plant biology, the company, through its people, had developed a reputation for talking and presenting and educating, but not for listening.

Finally, these teams set up appointments to talk to stakeholders. They went into the meetings with a blank pad of paper – no expectations or preconceived thoughts about what the stakeholder

might say. Questions were general: what are we missing? What issues or concerns do you have with biotechnology or Monsanto's approach? What should we be doing or stop doing?

When all of the reports were collected, the majority of the results fell into several buckets of concerns. People wanted greater transparency about product safety information. They said, "if product approvals are based on scientific studies, we want to know what was studied". People wanted to see commitments because, "without parameters, nothing seems off limits". They wanted to be sure that developing countries weren't left behind as the technology was developed. They wanted to be better educated about the technology and to know more about the benefits. And they wanted to have a voice in the process. These strong sentiments and several others led the company to draft a set of commitments to its stakeholders, which it called the Monsanto Pledge. The company had made an earlier Pledge in 1990 when it was much more focused on chemistry. As it evolved to the agricultural productivity company it is today, a new Pledge was needed that reflected the very concerns it was hearing. The new Pledge had five initial elements:

- **Dialogue** – We will listen carefully to diverse points of view and engage in thoughtful dialogue to broaden our understanding of issues in order to better address the needs and concerns of society.
- **Transparency** – We will ensure that information is available, accessible and understandable
- **Respect** – We will respect the religious, cultural and ethical concerns of people throughout the world
- **Sharing** – We will share knowledge and technology to advance scientific understanding, to improve agriculture and the environment, to improve crops, and to help farmers in developing countries.
- **Delivering Benefits** – We will deliver high quality products that are beneficial to our customers and to the environment.

In his opening letter to stakeholders in the company's most recent Pledge report (see www.monsanto.com, Our Pledge), President and CEO Hugh Grant called the Pledge "our stake in the ground". He said that it "shows what we stand for as a company. It confirms our commitment as capable stewards of the technologies we develop, addressing tough issues honestly and openly and delivering on values-based as well as science-based commitments."

The company is pursuing its Pledge commitments on several levels:

- 1) Continuing dialogue and outreach with stakeholders – to ensure we stay on track with stakeholder expectations
- 2) Culture building efforts to entwine the Pledge into the fabric of the company such that it becomes the backbone of our behaviors
- 3) Continuous progress in each of the Pledge areas
- 4) Confronting Dilemmas on issues where the path forward is not clear.

Progress:

The company has many efforts underway that attempt to demonstrate the Pledge behaviors in practice.

1) Dialogue:

To keep communication channels open with key stakeholders, and to bring outside feedback into the company to inform our decisions, the company engages in a number of activities including, continuous one-on-one outreach, engagement in industry forums, and through advisory councils.

Biotech Advisory Council -- In May, 2001, Monsanto formed a council of global experts from a range of disciplines to provide new perspectives and give feedback on the company's direction and activities – especially as it relates to corporate social responsibility and the Monsanto Pledge. The Council has now met six times over nearly two years and has reviewed and discussed new products, company policies and biotech issues of which the company is a part.

Grower Advisory Council – the Grower Advisory Council identifies and discusses areas of interest to US growers including company business policies and practices; broadened discussion of global seed purity standards; timings for introduction of new biotech products and other issues of interest to US growers. Monsanto teams in other world areas are exploring the establishments of similar councils.

EU Stakeholder Roundtable

In March 2002, Monsanto hosted a workshop with key European stakeholders to discuss potential future Monsanto products. These products were selected because they could potentially be grown in European soil, and because baseline data on the conventional crop counterparts existed to provide a basis for comparison. The discussion also explored options for biotechnology in general and possible roles for biotech crops in sustainable agricultural practices in Europe. Finally, the dialogue sought to investigate what Monsanto should be doing to address stakeholders' questions and concerns about current and future products.

European Dialogue/Conservation Agriculture

By promoting dialogue and interaction among leading academics, scientists and farmers who are interested in conservation, the European Conservation Agriculture Federation (ECAAF) seeks to “develop and spread farming practices focused on maintaining the agrarian soil and its biodiversity in the context of sustainable agriculture,” according to the group's publications. Monsanto Europe people have actively participated with ECAAF to support farmer awareness and adoption of minimum-tillage farming.

2) Transparency

In the Pledge, Monsanto committed to make scientific and safety information on its products available, accessible and understandable. Over the past two years, Monsanto scientists have drafted detailed safety summaries with tables of data and other information to meet this commitment to “get it out there”.

Biotech Studies on the Web

The company continues to develop and provide summaries on our plant biotechnology products. These detailed summaries, available for nine biotechnology crops, include information on molecular characterization, food and feed safety, composition, nutrition, and environmental safety. This information is posted on the company Web site: www.monsanto.com (click “Pledge/Transparency”). “Transparency is a process and a commitment. We want to make it easy for scientists and others with an interest in biotechnology to access and use our information,” said Roy Fuchs, head of Monsanto's biotechnology regulatory organization for North America and leader of the company's Transparency Working Team. Monsanto has posted a list of plant biotechnology publications by its scientists on this Web site. There are also lists of publications on the safety and benefits of plant biotechnology products in general. Collectively, this information provides a great overview of the scientific information available.

Brazilian Scientific Studies Become Publicly Available

Monsanto and Brazil's academic scientists working on Monsanto products made more information available in 2002. They published in Brazilian congresses and made available on the

Internet a large body of information about Monsanto plant-biotech products. All of the information was generated within Brazil. The data, which include information about biotech soybeans, corn and cotton was not only published widely, it was presented to a wide-spectrum of Brazilian scientists at conferences throughout Brazil. Thirty-three abstracts and one conference proceeding were published.

Farm Family Study

In order to address head on an issue of interest to farm families, a task force of scientists from leading agricultural companies, including Monsanto, conceived and funded a farm-family exposure study. The recent study conducted in South Carolina and Minnesota, provides the most comprehensive assessment to date of pesticide exposure for farmers and their families. It found that farm family members not directly involved in the application of three widely used pesticides showed little evidence of increases in urinary pesticide concentrations as a result of a pesticide application. The study also showed that safe handling practices are very important to minimize exposure for pesticide applicators. The three products studied were the herbicides glyphosate (the active ingredient in Monsanto's *Roundup* agricultural herbicides), 2,4-D, and the insecticide chlorpyrifos (the active ingredient in *Lorsban*). These results were broadly communicated to growers along with an emphasis on the importance of safe handling practices.

3) Respect:

The company shows respect to its employees, communities, customers and other key stakeholder and the environment in a number of important ways, including commitments to safety, environmental improvement, community involvement and diversity.

Camacari Site Focuses on Diversity

The goal of the new Monsanto Camaçari, Brazil, *Roundup* facility, was to make it the “standard of excellence” for multicultural diversity. As a new facility, it afforded the opportunity for Monsanto to build in an appreciation of diversity from the start. It was hoped that the site could be a place where diversity ideals were the foundations of a strong and vital multicultural working environment, unleashing the entire human potential that exists in an organization. It was also the goal for these efforts to facilitate cultural cross-fertilization, the integration of the work environment through task forces and networking, the seamless transferal of technology, the support of creativity, and the promotion of friendship, ownership, employee motivation and pride.

The plant has now been operating for a year; it has a three-year history from an organizational and construction perspective. It has an international work force from Argentina, Brazil, and the United States. The organizational atmosphere is comfortable. Different languages can be heard, and people come from different cultural backgrounds, but all are engaged in the single objective of being a diverse, world class manufacturing plant. In general, the site has achieved its goals. The work force is motivated, and high performance is the norm.

Community Advisory Panels Open Dialogue with Neighbors

After almost two decades of successful community interaction through Community Advisory Panels (CAPs), Monsanto and panel members have learned a lot from and about each other. “These groups have initiated, facilitated and maintained continuing dialogue with local citizens to respond to questions and concerns about safety, health, and the environment, and to discuss and address other issues of interest to the community,” explains Ron Cooley, Monsanto director of *Roundup* manufacturing.

CAPs active at Monsanto sites serve as liaisons to the general public. They convey questions, comments or concerns to the facility, and give the facility a venue in which to respond to its

neighbors. Each CAP is uniquely adapted and organized to address local needs. The Monsanto panels range from 20 to 43 members. Membership varies depending on the local situation. For example, Monsanto's Luling, Louisiana, panel has one high school student from each of the two local high schools. CAP membership frequently includes teachers, local business owners, fence-line neighbors, medical professionals, local government officials, local legal professionals, retired neighbors from other companies, and community activists. At some of the sites, groups meet monthly; at others, they meet bimonthly or quarterly. Some of the CAPs are dedicated solely to the Monsanto facility. Some include other companies that operate in the same area. A wide range of topics is discussed: plant emergency planning, biotech issues, plant-certified wildlife habitat activities, rangeland fire awareness and control, and community contributions. Overall, Monsanto believes that CAPs are extremely important to the dialogue process.

Safety a Uncompromising Commitment

In 2002, Monsanto people recorded better safety records than ever before. Monsanto's total recordable rate (TRR) in 2002 of 1.2 injuries per 200,000 hours worked shows how hard everyone is working to get there. Even more significant is safety progress made at crops seed sites. Monsanto has over 200 seeds sites. Over the several years since they became a part of Monsanto these operations have made tremendous progress in keeping people safer. To improve the safety of their operations, given the type of work they do, meant changing nearly everything from equipment to procedures and initiating extensive safety training. Just a few years ago the seeds' operations had a TRR of nearly seven and now they have the same low rate at the rest of the company.

Contractor safety is no different. Contractors are also required to take the same approach to safety as regular Monsanto employees. Monsanto takes responsibility for their safety, directly controlling their safety process. The contractor TRR was less than 1.9, Anne says, which is very close to a record year for them at Monsanto.

Improving Driving Safety

For many years, Monsanto has focused extensive efforts on employee safety in the workplace and has demonstrated great results in keeping people safe and healthy. Following several tragic automobile deaths in 2001, the company realized that employee safety is not just an on-site issue and launched a major, global driver safety program.

The new philosophy was that with good behind-the-wheel behaviors, most crashes are avoidable and that by changing thinking, these skills can be learned and adopted to prevent accidents. A World Class Vehicle Safety Team was assembled to organize, do extensive research, establish training programs and improve the overall driving performance of all Monsanto employees.

The team established a program that provides clearly defined safe-driving policies, practical behind-the-wheel training for high-frequency drivers and general training for all Monsanto employees along with tools designed to improve each driver's skills. To sustain performance, 40 local vehicle safety teams were established to address specific regional needs around the world. Some teams even took the training materials out to their communities. The results were that in 2002, there were no fatal accidents involving Monsanto people.

4) Sharing

Humsafar -- Companion on an Eternal Journey

The Udaipur District in Rajasthan southwest India is the largest corn-growing district in India but with abysmally low yields. Entire tracts of land have been abandoned to overwhelming weed growth and with an average farm size of one hectare and annual, income of less than \$190 per

hectare, the district is also one of the poorest in India. But a program called “Humsafar,” seems to be making a difference. “Humsafar,” which means “companion on an eternal journey,” was started two years ago by Monsanto Company, India with the help of two other organizations; Godrej Agrovet Ltd, the largest poultry-feed manufacturer in India; and Karmasheel Sansthan, a non-governmental organization (NGO). The program has doubled corn yields for participating farmers from 2.5 metric tons to five metric tons per hectare and raised the sale price of the corn by about \$10 per metric ton. Udaipur farmers learned about hybrid seeds, weed control, correct spacing and planting methods, optimal irrigation methods increase yield as well as other techniques for improving profitability such as vermicompost pits for farm and domestic.

NewLeaf Potato Fights Pests in Russia

Since 2000, Monsanto has been engaged in a joint research project with the Center of Bioengineering / Academy of Agricultural Sciences in Russia to apply Bt insect protection technology to Russian potato varieties. The Bt potatoes are expected to bring significant benefits to small farmers and individual growers who produce the vast majority of Russia’s potato crop, as they battle devastating losses from the Colorado Potato Beetle. Colorado Potato Beetles are a major threat to potato production. Losses can easily reach 100 percent of a crop without treatment, and even with treatment, production losses can range from 30 to 50 percent. The Bt trait has been introduced into three of the most popular Russian potato varieties by the Center, combining the achievements of plant biotechnology with Russian potato breeding expertise. The lines are currently in various stages of research, development and advanced evaluation.

Sharing Technologies For a Healthier Soybean

In addition to helping farmers in developing countries, Monsanto also contributes to improving the productivity of farmers in the developed countries. In the spring of 2002, Monsanto shared important soybean genetic information developed by researchers in cooperation with the U.S. Department of Agriculture (USDA). The donation to the United Soybean Board’s (USB) Better Bean Initiative (BBI) consisted of approximately two hundred Simple Sequence Repeat (SSR) genetic markers to accelerate the development of a soybean with improved oils, better yields and more protein. It’s anticipated that BBI researchers will be able to use these genetic markers to identify locations of important genetic traits in the soybean. This is the third donation of genetic information that Monsanto has made to the BBI in the past two years.

Gift of Six Gene Cotton Promoters to Cotton Inc.

To assist American cotton growers, in the fall of 2002, Monsanto transferred six fiber-specific gene promoters to Cotton Incorporated, the company funded by American cotton growers and importers. The purpose of the gift was to significantly advance fiber-quality research with a goal to increase profitability and demand for cotton.

5) Benefits:

Scientific Studies Support Benefits of Biotech Crops

Recent scientific studies continue to support the environmental and economic benefits from the use of biotech crops. Details of some of these reports are found below. In addition, between 1999 and 2001, more than ten independent reports were published by leading scientific or health organizations, such as the World Health Organization, the Food and Agriculture Organization, the seven National Academies of Science, the U.S. National Academy of Science, the Organization for Economic Cooperation and Development, and the European Commission which support the safety and or benefits of biotech crops. A number of medical, nutrition, scientific and development organizations have also issued supportive statements on the safety and benefits of biotechnology.

NCFAP Study Shows Reduced Pesticides, Increased Yields from Biotech Crops

In 2001, eight biotech crops approved and used in the U.S. saved growers \$1.2 billion by lowering production costs and reduced pesticide use by 46 million pounds (active ingredient), according to a study by the National Center for Food and Agricultural Policy, a private, nonprofit, non-advocacy research organization based in Washington, D.C. The eight crops were: insect-resistant corn and cotton, herbicide tolerant canola, corn, cotton and soybeans, and virus resistant papaya and squash. All 47 U.S. states analyzed in the report showed a significant economic benefit from the adoption of one or more biotech varieties.

If another 32 crop varieties under development were available, NCFAP estimated a potential increase in crop yields by 10 billion pounds per year, reduced growers' costs by \$400 million per year and reduced pesticide use by 117 million pounds per years providing a net value of \$1 billion.

Table 1. Overall Impact of Biotechnology in Pest Management: 40 Case Studies

	Pesticide Reduction
Crops Currently Grown	46 million pounds (active ingredient)
Crops Under Development	117 million pounds (active ingredient)
Total	163 million pounds (active ingredient)

Source: NCFAP

CAST Literature Review Confirms Biotech Crop Benefits

The Council for Agricultural Science and Technology (CAST), a non-profit consortium of scientists, compared the environmental impacts of biotech soy, corn and cotton crops with conventional crops using a comprehensive review of the scientific literature. "In the past, isolated studies regarding the environmental impact of biotechnology-derived crops appeared to present conflicting results," said Dr. Teresa A. Gruber, the executive vice president of CAST. "Teams of researchers assembled by CAST have reviewed and analyzed the published studies in the context of current farming practices, and the results clearly show that soil, air and water quality are enhanced through the responsible use of current biotechnology-derived soybean, corn and cotton crops." The study was based on nine criteria. Results for one of the crops, herbicide-tolerant soybeans, include the following:

- *Soil Quality* - No-till soybean acreage in the United States has increased significantly since the introduction of herbicide-tolerant soybeans. No-till farming results in less soil erosion, less dust and pesticide runoff and increased soil moisture retention.
- *Water Quality* - Less runoff means improved water quality
- *Air Quality* - Greenhouse gas emissions from some farm operations decrease by an estimated 88 percent as a result of biotech soybeans planted in a no-tillage system, which may help slow global warming.
- *Biodiversity* - The no-till practices commonly associated with biotech soybeans provide a more favorable habitat for birds and other wildlife. No-tillage systems provide food and shelter for wildlife such as pheasants and ducks.
- *Land Use Efficiency* - Biotechnology-derived soybeans may lead to increased yields through improved weed control and the adoption of narrow-row spacing.

The study found similar benefits for corn and cotton crops derived through biotechnology.

Mycotoxin Contamination Reduced in Bt Corn

Insect damage of corn opens up ports of entry for fungi that enter the plant and produce fumonisin mycotoxins. These mycotoxins can produce cancer in laboratory animals and cause brain damage in horses, pulmonary edema in swine, and liver and kidney damage in a variety of animal species. They may contribute to high rates of throat and liver cancer in farmers in Africa and China that eat large amounts of corn that is highly contaminated with fumonisins and other mycotoxins. Insect-protected crops, such as Monsanto's Bt corn, can reduce insect damage resulting in less fungal growth and lower fumonisin levels in corn grain. This allows farmers to increase grain quality and marketability and provide a safer source of animal feed. Independent field trials show an 88% reduction in fumonisin levels in Bt corn grown in Italy (1997-1999), a 97% reduction in France (1997-1999) and a 55% reduction in the United States (2000) (Hammond, 2002).

Benefits of Biotechnology for European Agriculture

Several key studies were released in the past year that identified the potential benefits that biotechnology holds for the European Union. One important report examined the environmental benefits that biotechnology would bring to the EU. The authors looked at the consequences if 50% of the maize, oil seed rape, sugar beet, and cotton grown in the EU were GM varieties. The authors estimate that "pesticide used in the EU/annum would decrease by 14.5 million kg of formulated product... In addition there would be a reduction of 7.5 million ha sprayed which would save 20.5 million litres of diesel and result in a reduction of approximately 73,000 t of carbon dioxide being released into the atmosphere." (Phipps 2002).

Earlier this year, the potential economic benefits from adoption of *Roundup Ready* sugar beets were reported in a study from Broom's Barn Research Station in the UK. Sugar beet growers in the UK stand to gain £150 per hectare/year according to the study. The majority of this saving comes from an 80 percent reduction in herbicide spending. According to the study, the savings afforded by Roundup Ready sugar beets could help the sugar industry in the EU to become more competitive (May 2003).

The economic and environmental benefits of Bt corn in Spain were quantified in a recent study. The author looked at the benefits already being realized by the current plantings (20,000 ha/yr) and the potential benefits if adoption was broadened. Yield increases were seen broadly and in the Huesca region where high insect infestation levels are commonplace, the benefit is an average 10 percent yield improvement. Significant reductions in pesticide usage could also be realized (Brookes 2002).

Dilemmas and Decisions

The preceding examples illustrate what Monsanto people are doing in fulfillment of the Pledge. But the path forward isn't always clear. Monsanto is involved in a number of issues where several different, divergent points of view are at play. The old style of behavior in the face of seemingly mutually exclusive paths was to deny the validity or legitimacy of all but the chosen path. We believe that embracing the dilemma is a better approach because it leaves open the possibility for change and for creative solutions that might be missed in a more argumentative stance. But we still must make choices and move forward – no action is itself a choice and an action, sometimes worse than the other alternatives.

Navigating these dilemmas is difficult, but we attempt to do so thoughtfully. In that regard, the Monsanto Pledge is also a “decision-making mechanism” for us. We recognize that the dilemmas we face are not simple, that answers are not black and white. But, within that context, we also know that better decisions are made with feedback from others.

That is where our Pledge instructs our decision making. In seeking feedback, we believe that we’re doing more than simply checking off the “Dialogue” element of our commitment. In earnestly seeking the counsel of others, we’re looking to build relationships. In these relationships, all of the elements of our Pledge come together – helping us share the dilemmas we face, the perspectives we bring and, then, using the experience and perspectives of those outside of our model of thought to help us consider impacts differently.

This is a process that we recognize is evolving. But, through our sincere consultation with the individuals and groups we’ve already engaged – such as our Biotechnology Advisory Council and our Grower Advisory Council – we’re already beginning to work through a number of commercial, societal and policy dilemmas.

Consider a snapshot of the spectrum of dilemmas we recognize and are working through:

- **Roundup Ready Wheat:** There has been virtually no investment in wheat as a crop in the last 50 years, so wheat farmers are desperate for innovation. Given the benefits that farmers in other major commodity crops – like corn and soybeans – have enjoyed, it is reasonable to conclude that the application of biotechnology to wheat could bring these same benefits to a neglected section of the farm community. However, given the sensitivity of the world market to biotechnology, farmers cannot make technology investment decisions solely on the basis of productivity calculations. They must consider the broader environment – including the ultimate marketability of their end products. Monsanto believes that it has a technology that portends great benefits to a innovation-starved market, but it knows it cannot bring biotechnology to wheat according to the models that guided biotechnology introduction in other crops. That presents a dilemma for the company – the technology is available and holds great promise, but *how* to take advantage of that is still a debated question.
- **“Terminator” Technologies:** In 1998 and 1999, at the height of controversy surrounding the hypothetical seed sterilization technology dubbed “terminator” technology, out of concern for the welfare of poor, small-holder farmers and being responsive to leaders like Gordon Conway and Jimmy Carter, Monsanto made the pledge that it wouldn’t commercialize sterile-seed technology in crops for food use. As a result of that controversy, and a fair amount of emotional rhetoric surrounding “terminator,” the broader technology – often referred to as “Gene Use Restriction Technology” or “GURTs” – is not being considered – even though it could hold benefits in addressing key issues related biotechnology. For applications other than food-crop use, there are other technologies beyond sterile-seed approaches that can use biological means to address areas of stewardship – like volunteer crop management and gene flow – that could be viable. Given there is such promise to this technology, we believe that it is the responsible thing to do to investigate what biological applications may be available, yet the stigma that has been attached to “terminator” unduly taints the possibility of other, future applications.
- **Plant-Made Pharmaceuticals:** The application of biotechnology for pharmaceutical production in biology-based systems, like plants, has the potential to make important, life-saving drugs more efficient and inexpensive to produce. However, because crop systems are biologically based, concerns have arisen about the ability to steward this

technology application so that there is no unintentional entrance of proteins from pharmaceutical production in plants to systems intended for food use. The technology that allows for the production of therapeutic proteins in plants was a major breakthrough, but one that brings with it new issues and new decisions about *how* to use this technology responsibly and beneficially.

- **Adventitious Presence:** It's widely understood that gene flow – the movement of genetic material between plants – is a naturally occurring and, in fact, a central biological process. Also, we recognize that the biological system that agriculture exists in is dynamic – not static. And, the practical nature of that dynamic environment means that the idea of “100 percent purity” isn't feasible. But, it also never has been. Commodity crops – outside the world of biotechnology – routinely have impurities. Yet, within this context, there are different standards being applied to products of biotechnology – with unrealistic expectations that caused a ripple effect throughout production agriculture, grain handling and international trade.
- **Labeling:** It surprises most people to learn that in the United States, there is a labeling requirement for biotechnology foods *if* they are different from foods produced through conventional agriculture. But, for biotech foods that are not different in nutritional value or composition, it is unnecessary to label them as different just based on the production system. This ignites a discussion about whether labeling should be a function of a science-based evaluation or if it should be a tool of preferential choice. For us, we have to consider the balance of the science-based system and something that still allows for consumer choice.

With all of these dilemmas, there is no easy answer; no single path Monsanto can take that seems obvious to provide for benefits without any real or perceived downside to a key stakeholder in our processes. As such, we have to approach each as an individual dilemma, requiring an individualized approach.

Consider each dilemma again, now in terms of how we believe we are applying the elements of and the lessons gained from our Pledge in developing our approach to moving forward on these issues:

- **Roundup Ready Wheat:** Building on our commitment to dialogue, we've formed an advisory group specific to our Roundup Ready wheat product, even though it will be several years before this first biotechnology derived wheat variety is ready to be commercialized. We hope the committee will facilitate an effective dialogue between Monsanto and participants in the wheat industry, including advising Monsanto on areas like feasibility, strategy and standards for market acceptance; the development and review of plans for biotech spring wheat grain handling protocols; and the stewardship of biotechnology wheat and the process for commercialization. Consistent with our commitment to work with the wheat industry on commercialization plans, we have also committed to certain conditions and milestones that must be achieved before we will commercialize Roundup Ready wheat. Those milestones are:
 - The food, feed and environmental safety of Roundup Ready wheat is demonstrated, resulting in regulatory approvals in the United States, Canada and Japan. The intent is to commercialize in the United States and Canada simultaneously. Regulatory approvals alone will not determine when Roundup Ready wheat will be commercialized. The following milestones also will be met.

- Appropriate regulatory trade approvals, thresholds or marketing agreements are in place in major export markets. This allows wheat to be traded based on buyer preferences and specifications.
- Appropriate grain handling protocols and standardized sampling and detection methods are developed and implemented. This approach will provide meaningful choice for customers who prefer conventional or biotech grain. Grain handling protocols also will facilitate variety-specific marketing opportunities – creating potential for added value for buyers.
- Comprehensive agronomic stewardship programs and best management practices are developed. This included science-based production protocols and an effective solution for managing wheat volunteers that contain the Roundup Ready trait.
- Varieties meet or exceed industry standards for grain end-use quality. Varieties will be screened for unique quality attributes prior to introduction.
- Buyers are identified who will procure and use wheat ingredients and biotech traits. Consumer acceptance for the technology is demonstrated by buyer and processor acceptance.
- **“Terminator” Technologies:** Specific to GURT technology dubbed “terminator,” we pledged in 1999 not to commercialize sterile-seed technology in food crops. Our commitment was very specific as the letter stated that Monsanto was “... making clear our commitment not to commercialize gene protection systems that render seeds sterile.” We stand by that commitment. We currently have no plans or research in the area of sterile seed for these crops intended for food use. But, there are important benefits to the whole class of gene-protection systems and applications of the technology should not be categorically ruled out. In conversations with leaders like Gordon Conway, he’s expressed his agreement that there are legitimate benefits to these technologies that should be pursued. Ruling out a whole approach to biologically based stewardship on the basis of a narrowly defined concern unfairly limits the very real benefits that can be expected. Given there is such promise to this technology, Monsanto believes that it is the responsible thing to do to investigate what biological applications may be available. To that end, the company is very actively engaged in the dialogue with experts and interested parties – including academics and the NGO community – to learn what technology applications there may be and how they may be used going forward to address biotech stewardship and still protect the needs and rights of farmers.
- **Plant-Made Pharmaceuticals:** Monsanto supports and is in the business of plant-made pharmaceuticals to make therapeutic proteins. It believe this technology will provide consumers with tremendous benefits once commercialized, including providing broader access to life-saving therapeutic drugs, thus providing more options for doctors and patients. Product stewardship is essential to establish the safety of and containment of these products during all stages of development and production. And, the bottom-line is that the plant-made pharmaceutical industry and Monsanto recognize the need for this stewardship. Monsanto is committed to making sure crops containing articles not intended to be in food are separated from the food chain. It believes that this separation can be achieved even when food crops – like corn or oilseeds – are used to grow plant-made pharmaceuticals. And, the key to ensuring that this separation is a very high level of stewardship. In fact, in 2001, MPT pledged that all field research and production on therapeutic proteins in corn (maize) would be conducted west of the Rocky Mountains - outside of the Midwest Corn Belt.
- **Adventitious Presence:** Acceptance of the adventitious presence of approved biotech traits, as a component of food and feed is needed. Uneven regulatory approval timelines across countries and the lack of a consistent recognition of adventitious presence have

disrupted the international movement of seed, grain and food. Without doubt, the issues surrounding adventitious presence of biotech-derived material are complex. Monsanto is addressing these issues in several ways, including:

- Seeking sound, science-based rules and regulations that clarify and allow for trace amounts of biotech material in seed, grain, and feed and food products.
- Providing industry leadership to establish the highest standards of purity reasonably achievable and to establish global standards for the quality of seed, grain and food products. This includes the official recognition of the presence of unintended trace levels of biotech-derived traits in conventional seed products.
- Working within the seed industry to develop strategies on various production management interventions that may reduce the likelihood of adventitious presence and address the associated costs and probabilities of success.
- Leading the development and standardization of seed quality assurance processes and quality control testing methods.
- Working with national and international trade organizations to promote policies so that farmers can freely market their grain around the world.
- **Labeling:** Monsanto's approach is focused on supporting voluntary labeling initiatives as vehicles of choice. Monsanto believes that people who want to eat food that does not contain biotech ingredients should have that option. In the United States, organic products are produced using practices that should assure that there is no intentional presence of biotechnology products. Organic foods therefore provide a ready source of foods that do not contain biotechnology-derived ingredients. Monsanto remains in active dialogue with many people and groups about this issue, and has committed to making product information available and accessible. For people who want to know more about Monsanto's biotech crops, hundreds of studies on their safety or environmental impact are available on the company's web site. Some food companies also provide more information about their food products on their own web sites. We want to do our part to provide consumers relevant information that they need to make healthy food choices, and to ensure food systems around the world operate as efficiently and effectively as possible to bring healthy food to consumers in a cost-effective way. Those priorities are built into the current system and must be weighed before any changes are made.

Final Thought

Earning continuing permission from society to engage in business and bring to market new products and technologies is an on-going process, not a simple line to be crossed. The nature of dilemmas is that there is not an easy solution that meets all people's needs or desires waiting to be found. But the process of engaging the questions with transparency, respect and a commitment to finding common ground and maximizing benefits can usually lead to workable solutions.

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