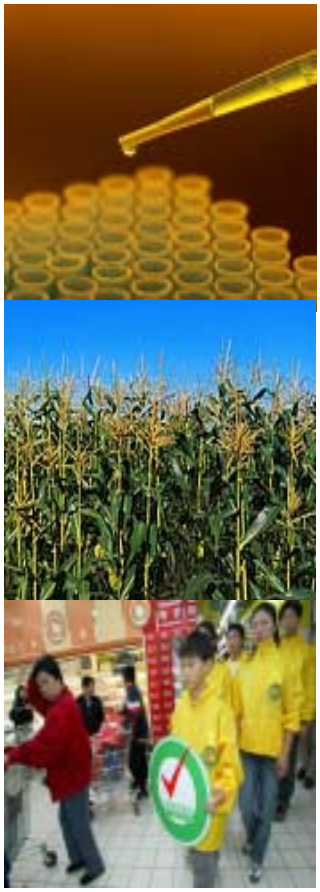
Monsanto & Genetic Engineering: Risks for Investors



Report prepared by Innovest Strategic Value Advisors

For Greenpeace

Uncovering Hidden Value Potential for Strategic Investors

April 2003

New York: (212) 421-2000 • London: +44 (0) 20 7743 6162 • Toronto: (905) 707-0876 • Paris: +33 (148) 860369

www.innovestgroup.com

Report Prepared by Innovest Strategic Value Advisors
Marc Brammer
Senior Analyst
646-237-0217
mbrammer@innovestgroup.com

Frank Dixon, MBA (Media Contacts)
Managing Director
646-237-0220
fdixon@innovestgroup.com

Beth Ambrose
Analyst
+44-207-073-0475
bambrose@innovestgroup.com

For Greenpeace
Lindsay Keenan
Genetic Engineering Campaigner
+ 49 30-3088-9916
lindsay.keenan@dialb.greenpeace.org

New York Office:

Four Times Square, 3rd Floor, New York, NY 10036 USA

(212) 421-2000 Fax (212) 421-9663

Toronto Office:

225 East Beaver Creek Road Suite 300, Richmond Hill Ontario L4B 3P4 CANADA

(905) 707-0876 Fax (905) 707-9084

London Office:

4 Royal Mint Court, London, EC3N 4HJ ENGLAND

+44 (0)20 7073 0470 Fax: +44 (0)20 7073 0473

Paris Office:

110 Boulevard de Sébastopol 75003 Paris FRANCE

+33 (0)1 44 54 04 89 Fax: +33 (0)1 44 54 02 30

Website: www.innovestgroup.com

Table of Contents

Table of Figures

This page left intentionally blank

1. EXECUTIVE SUMMARY

Innovest Strategic Value Advisors, a financial services firm based in New York, London, Paris and Toronto, analyzed investor risks related to Monsanto's genetic engineering (GE) strategy. Partly owned by State Street Global Advisors and the Dutch pension fund ABP, Innovest is a leader in analyzing the financial impacts of environmental and social issues. Investors use Innovest's best-in-class ratings, ranging from AAA to CCC, to minimize risk and maximize return potential. In nearly every industry sector, companies with above average environmental scores, taken as a group, outperformed below average firms by 300 to 3000 basis points per year in the stock market.

Monsanto received a CCC EcoValue'21™ rating from Innovest, the lowest environmental rating. This implies the firm has above average risk exposure and less sophisticated management than peers. As a result, it will likely underperform in the stock market over the mid to long-term.

Monsanto is the global leader in developing and marketing GE seeds (in 2002, 91% of GE hectares world-wide were planted with Monsanto seeds). The company also makes the world's largest selling herbicide, Roundup/Glyphosate. Its strategy includes selling GE seeds intended to be used with Roundup (71% of GE seeds planted worldwide in 2002 were designed to be herbicide resistant) and developing new seeds which produce food and pharmaceutical products.

Monsanto claims its GE products will provide economic benefits to farmers, feed hungry people around the world and improve environmental conditions. However, it appears actual benefits may be substantially less than claimed. For example, a recent study by the US Department of Agriculture questioned the economic benefits of GE soya and corn, the two largest GE crops. Also, most developing countries have strongly opposed GE crops due to concerns about environmental contamination, reduced genetic diversity and foreign firms holding patents on traditional crops.

Environmentally, Monsanto warns investors in its 10K about substantial losses that could result from unintended contamination of food crops by its GE seeds. Given the tendency of pollen and seeds to spread in nature, contamination is inevitable. As a result, the company is lobbying for regulations that allow some GE contamination of non-GE food products.

Contamination of food crops by GE seeds designed to produce pharmaceutical products (GE pharma crops) poses an even greater risk to investors. While some consumers might accept limited contamination from GE food crops, probably none would accept food contaminated with pharmaceutical properties. Yet, as with GE food crops, contamination by GE pharma crops will occur if they are cultivated. Indicating the inevitability of such contamination, GE corn designed to produce pig vaccine recently contaminated food crops in Nebraska and Iowa. Contamination of food products by Monsanto's GE pharma crops could bankrupt the firm and cause substantial investor losses.

Monsanto faces significant market and financial risks. As a result, the company's stock is probably overvalued despite recent price declines. The risks facing Monsanto investors include:

MARKET REJECTION

The inevitability of environmental contamination and concerns about human health impacts have caused GE crops and food products containing GE ingredients to be one of the most widely rejected product groups ever. Many GE products have been removed from the market or developed but not commercialized due to market rejection. Examples include GE tomatoes, flax seed, rice and sugar beets. Monsanto withdrew its GE potatoes from the market in 2001 after companies including McDonald's, Burger King, McCain's and Pringles refused to buy them.

At present, GE products provide no nutritional benefits to consumers. However, they do pose various environmental and human health risks. As a result, many consumers refuse to buy GE products once labeling makes them aware that GE ingredients are being used. Foreign markets, especially those with labeling requirements, have seen strong market rejection. In the US, where labeling is not required, outright rejection has been minimal so far.

Foreign Market Rejection

Over 35 countries have enacted or announced laws that restrict GE imports and/or require labeling of foods containing GE ingredients. Europe was one of the first regions to restrict GE imports and require labeling. More recently, major food importers such as China, Japan and Korea have enacted GE restriction/labeling requirements. GE concerns have caused US corn exports to Europe to fall from $305 million in 1996 to $2 million in 2001. Exports to Korea have fallen from $300 million to $85 million.

The Cartagena Protocol on Biosafety will probably enter into force in 2004. This will impose substantially greater documentation and risk assessment costs on GE exporters. The Protocol will also likely hold GE seed manufacturers liable for contamination and other problems caused by GE seed use. (In the wake of the $1 billion StarLink loss, it may be difficult or impossible to get insurance for GE-related losses. NFU mutual, the largest UK farm insurer, refuses to insure such losses.) These restrictions will make it more difficult for GE products to compete with non-GE varieties in the 103 countries that are signatories to the Protocol. To avoid losing market share, food exporters will likely demand non-GE crops from US farmers.

In Europe, moratoria on some GE crops may be lifted, but probably not in the near future. Opposition to GE food remains high. Most European food manufacturers and retailers have implemented policies to ensure that no GE ingredients are used in their food products. Companies pursuing such policies include Nestlé, Unilever, Heinz, ASDA (Wal-Mart), Carrefour, Tesco and many others. Beyond Europe, there has been strong opposition to GE crops in Asia, Africa and other developing regions.

Domestic Market Rejection

GE supporters claim that the widespread use of GE ingredients in US food products indicates acceptance by US consumers. In reality, the vast majority of US consumers do not realize they are eating GE foods since GE firms have aggressively and successfully lobbied to suppress labeling requirements. Since 1997, over twenty US polls have shown strong support for labeling. Examples include ABC News – 93% of Americans want GE food labeled, Rutgers University – 90%, Harris Poll – 86%, USA Today – 79%, MSNBC – 81%, Gallup Poll – 68%, Grocery Manufacturers of America – 92%, Time Magazine – 81%, and Novartis – 93%. A 2001 poll by Oxygen/Market-Pulse not only found that 85% of Americans want GE food labeled, but also that only 37% of women would feed GE food to their children.

Several of these polls also found that a significant percentage of Americans would not eat GE foods if they was labeled as such (the Time poll found 58% would not eat them). If labeling requirements were imposed in the US, it appears highly likely that a significant number of consumers, perhaps as high as 30% or more, would stop eating GE foods and demand non-GE alternatives. As in Europe, many food manufacturers would probably choose to carry only non-GE foods, rather than going to the expense of pushing two separate lines through the same distribution channels.

ENVIRONMENTAL AND HUMAN HEALTH RISKS

Inevitable Environmental Contamination

GE contamination is inevitable because it is impossible to completely prevent GE pollen and seeds from being carried by wind and other vectors to non-GE fields and natural areas. The inevitability of GE contamination is evidenced by StarLink and other GE contamination cases. In 2000, Aventis' StarLink corn, a GE product not approved for human consumption, was found in many different food products. Following recalls of over 300 corn products, Aventis spun off its CropScience division.

In another contamination case, GE corn designed by ProdiGene to produce pig vaccine recently contaminated corn and soya food crops in Iowa and Nebraska. Regulatory leniency limited ProdiGene contamination costs to $3 million and allowed the firm to stay in business. However, further contamination could occur and costs to the firm could rise since GE material from pig vaccine corn may still be in nature. In another case, GE corn contamination has been found in Mexico, where GE corn growing is not allowed. Investigations are being conducted to determine the source of the contamination. Significant costs could be imposed on the polluters.

The StarLink, ProdiGene, Mexican and many other cases reflect the essential problem of GE crops – release into nature is inevitable and once released, GE materials cannot be recalled. So far, the StarLink disaster has cost Aventis nearly $1 billion. Yet, StarLink contamination is still occurring and could occur indefinitely. As a result, it is impossible to predict the ultimate cost to Aventis. Contamination

costs could put Monsanto and other firms into bankruptcy, leaving society to deal with GE contamination problems.

Monsanto uses the term 'adventitious presence' to describe unintended GE contamination. This term is misleading to lay persons since it implies 'advantageous or beneficial presence'. As the shareholders of Aventis would readily agree, the presence of StarLink corn in food products was anything but advantageous. To enhance clarity, this paper refers to adventitious presence as contamination.

In its 10K, Monsanto notes that it is addressing the problem of contamination by, "*…continuing globally to seek regulations that recognize and accept (contamination) and provide for approval and acceptance of trace amounts of (GE contamination).*" The company is trying to convince governments, farmers, food manufacturers and consumers that they should accept GE contamination (perhaps ranging from 0.5% to 5%) of many organic and conventional non-GE food products. The contamination percentage would likely increase over time as GE crops grow and spread.

Also in the 10K, Monsanto states that, "*concerns have been expressed about the potential for (GE contamination) in food, resulting from the development and production of pharmaceutical proteins in food-crop plants. Monsanto's Protein Technologies business is one of several businesses engaged in this research.*"

Monsanto did not say GE contamination was inevitable when GE seeds for food crops were introduced. Apparently acknowledging the inevitability of contamination by GE food crops, the company is now seeking regulations that would allow it. As Monsanto develops GE pharma crops, it is not saying contamination is inevitable. But it is. Even if these crops were grown indoors, an unlikely scenario, some contamination would eventually occur. While some consumers may accept limited contamination of food products with GE food traits, probably none would accept contamination of food with pharmaceutical traits. Since contamination is inevitable, companies developing GE pharma crops are likely to face large contamination costs.

Human Health Risks

Creating GE products involves randomly inserting genetic material into an organism's DNA. It is virtually impossible to predict what interactions this will cause among the billions of components of DNA, especially over multiple generations. There are many scientific critics of the process, including the US National Academy of Science. Those concerned about GE safety point out that most research showing the safety of GE foods was conducted or funded by GE firms. Since these firms have a large financial stake in seeing GE crops commercialized, there is a risk that safety testing done by them is biased.

Other safety concerns include the fact that safety testing is usually not done over the long-term or over multiple generations. As a result, long-term impacts on human health may not be discovered until people are made ill by GE foods. Many scientists are concerned that the GE process can have unintended consequences such as creating new toxins and proteins which could cause allergic reactions and other human health problems.

An example of unintended consequences includes antibiotic resistant marker genes which are used in the production of many GE seeds. Some medical authorities have found that these genes may pass on antibiotic resistance to bacteria in the gut, thus making the bacteria resistant to clinically important antibiotics. As a result, the EU is phasing them out in 2008. The United Nations CODEX Alimentarius Committee has also recommended that they be phased out. In the US however, there appears to be no plan to phase them out.

Ethical Concerns

Numerous ethical concerns, including safety, scientific hubris and disclosure, largely explain the widespread opposition to GE foods. A nearly infinite number of interactions could occur between GE materials released into the environment and other life forms. From a statistical perspective, it is a virtual certainty that, in at least a few cases, there will be large negative impacts, such as damage to beneficial species. It is effectively impossible to test for the nearly infinite number of interactions that might occur in nature or in the human body. The effective impossibility of adequately testing the safety of GE food and pharma crops converts this to an ethical issue for many consumers. They say, if these crops cannot be safely tested, they should not be used.

Those concerned about GE believe that the creations of nature are infinitely more sophisticated than those of humanity. They argue that humanity knows virtually nothing about genetics compared to all there is to know. It is hubris on the part of the scientific community, they believe, to think that humanity can create new life forms and release them into the environment with impunity. Inserting genes into DNA in a way that could not occur in nature creates life forms that are not subject to genetic screens built up over millions of years. Once released into nature, these unnatural life forms cannot be recalled if there is a problem. Huge amounts of GE material have already been released into nature from past crops. This material cannot be recalled. There is no way to tell what impact it will have over the long-term. The idea that business continues to put the Earth's genetic wealth at risk primarily for commercial purposes arouses the most passionate opposition in many consumers.

As shown by the polls above, most consumers, whether opponents or supporters of GE foods, believe GE content should be disclosed through labeling. Given uncertainty about the environmental and human health impacts of GE foods, the vast majority of consumers believe they have the right to know if foods have GE content. In effect, not disclosing takes away their right to chose whether or not to eat GE foods. It is unethical, they believe, to take away their right to chose what food they will eat or feed their children.

STRATEGIC RISK

Monsanto's GE-focused strategy poses large risks to investors. With a 2002 loss of $1.7 billion on sales of $4.7 billion, several factors will place ongoing downward pressure on earnings. These include increasing competition for Roundup following patent expiration, growing resistance among weeds Roundup is meant to

control, difficulty in opening new markets due to concerns about GE safety, and questions about the economics of using GE products. A 2002 study by the US Department of Agriculture found that GE soya provided no net benefit to farmers in several cases. It also found that benefits from GE corn may have been due to seed companies setting low prices to gain market share.

Other threats to future earnings include new product and reputation risks. Several Monsanto products intended for human consumption have failed. The company is now facing resistance from many US and Canadian farmers to GE wheat which it plans to launch in 2004-2005. A report by Iowa University found that over 50 percent of the US export wheat market could be lost if GE wheat is introduced. Monsanto continues to face reputation problems around the world due to factors including the impression that GE foods are US products being forced on the rest of the world by the US Government and World Trade Organization, protests in developing countries against Monsanto, and the company's numerous lawsuits against farmers.

However, the largest risks facing investors are US market rejection and contamination. There is strong public support for labeling of GE foods in the US (by far the largest market for GE foods). If this occurs, it is highly likely that a significant percentage of the market for GE food would disappear. To avoid losing market share, food manufacturers would have to develop separate GE-free product lines or simply make all products GE-free.

Regarding contamination, as materials from Monsanto's GE food and pharma crops escape into the environment, which is inevitable, there is significant risk that human food crops could be contaminated. In its 10K, Monsanto states *"Some growers of organic and conventional nonbiotechnology crops have claimed that (GE contamination) will cause them commercial harm."* Contamination also *"could lead to more stringent regulation, which may include: requirements for labeling and traceability; financial protection such as surety bonds, liability or insurance; and/or restrictions or moratoria on testing, planting or use of biotechnology traits."*

The 10K also states GE contamination *"can negatively affect our business or results of operations."* And *"…can result in the withdrawal of seed lots from sale, or in governmental regulatory compliance actions such as crop destruction or product recalls."* In summary, GE contamination could cause StarLink-scale losses for Monsanto.

ANOTHER BLACK EYE FOR THE FINANCIAL COMMUNITY?

It is understandable that the US Government has essentially taken the industry position on GE safety and labeling, but much less clear why many in the financial community appear to have done so. US Government support for GE crops appears to stem from the fact that the crops are mostly US-developed and that GE companies have made substantial financial contributions to US politicians and political parties. This is not said as a criticism of politicians but rather of the campaign finance system which allows politicians to accept money from the firms they are supposed to regulate.

Money flowing from GE companies to politicians as well as the frequency with which GE company employees take jobs with US regulatory agencies (and vice versa) creates large bias potential and reduces the ability of investors to rely on safety claims made by the US Government. It also helps to clarify why the US Government has not taken a precautionary approach to GE and continues to suppress GE labeling in the face of overwhelming public support for it.

With Enron and other financial disasters, the financial community apparently bought into company stories without looking much below the surface. Since Monsanto's stock price has fallen by more than 50 percent over the past two years, it cannot be said that this is completely true in this case. However, in light of the issues and risks noted above, the firm may still be overvalued. Monsanto could be another disaster waiting to happen for investors. If the firm does not take steps to mitigate its substantial market risks, for example by diversifying its GE-focused strategy, further investor losses seem likely. Given available knowledge about company risks, financial analysts and asset managers may be hard pressed to explain their current positions on Monsanto.

This report provides an overview of the GE crop market. It then provides a detailed description of Monsanto's GE-focused strategy and the large risks it poses to consumers, the environment, food manufacturers and investors.