

MINUTES OF THE SENATE AGRICULTURE COMMITTEE.

The meeting was called to order by Chairperson Derek Schmidt at 8:30 a.m. on February 20, 2001 in Room 423-S of the Capitol.

All members were present except:

Committee staff present: Raney Gilliland, Legislative Research Department
 Jill Wolters, Revisor of Statutes
 Betty Bomar, Secretary

Conferees appearing before the committee:

 Doug Wareham, Kansas Fertilizer & Chemical Association and the Kansas
 Grain & Feed Association
 Dennis Morrice, Kansas Soybean Association
 Bill Fuller, Kansas Farm Bureau
 Paul Johnson

Others attending: See attached list

SR 1804 - A resolution supporting agricultural biotechnology

Doug Wareham, Kansas Fertilizer & Chemical Association and the Kansas Grain & Feed Association, testified in support of **SR 1804**, state the "genetic engineering" of products must be closely scrutinized by federal regulatory agencies to ensure safety for food and food ingredients produced by biotechnology. This lesson has been well learned from the Starlink corn experience. Benefits of biotechnology in agriculture are significant from better quality, better tasting and more nutritious foods to more efficient methods to grow crops with less impact on the environment to new solutions to help feed the growing world population.

Mr. Wareham stated that **SR 1804** contains provisions that may be inappropriate for a Kansas resolution, for example the reference to the Western Governor's Association Resolution. The industry requests an opportunity to amend the Resolution prior to its adoption by the Committee. (Attachment 1)

Written testimony submitted by Kerri Ebert, President, Kansas Agricultural Alliance, supporting adoption of **SR 1804**, was distributed to members of the Committee. (Attachment 2)

Dennis Morrice, Executive Director, Kansas Soybean Association (KSA), testified in support of **SR 1804**, stating biotechnology is important to the state's soybean industry. Last year more than 60% of the Kansas soybean crop was planted using biotechnology-derived varieties. KSA's position is that every farmer should have the right to choose any crop protectant system that meets his or her needs, management abilities, and is cost effective. The KSA opposes any company introducing any product for open commercial sale that has not received appropriate clearance from all pertinent US government agencies, and has clearance for importation to all international markets. (Attachment 3)

Bill Fuller, Kansas Farm Bureau (KFB), testified in support of **SR 1804**, stating the KFB, at its Annual Meeting, adopted a policy on Biotechnology to support increased efforts through genetic engineering to develop consumer beneficial traits, to increase the marketability of products, to solve environmental concerns, to increase net farm income by decreasing input costs, and to improve product quality. The KFB is opposed to any law or regulation which requires registration of farmers who use or sell products approved for sale by the Food and Drug Administration, and the imposition by foreign countries of any import restrictions, labeling or segregation requirements of any genetically modified organism, once such a commodity has been certified by the scientific community as safe and not significantly different from other varieties of that commodity. The KFB supports increased efforts to educate the public worldwide regarding the safety and benefits of products developed through biotechnology. (Attachment 4)

CONTINUATION SHEET

Paul Johnson, a private citizen and small farmer, and a representative to the Midwest Sustainable Agriculture Working Group, testified on **SR 1804**, voiced his concern relating to agricultural biotechnology and raised questions as to: the number of patents pending, whether the patents are too broad, the liability issue, who is responsible for genetic drift and for keeping genetic engineered crops separate and their identity preserved.

Mr. Johnson suggested **SR 1804** be referred to an interim committee for an in-depth study and to address the labeling of genetic engineered products, the establishment of regulatory oversight, the patenting laws, liability, environmental monitoring and agricultural research priorities. Mr. Johnson testified the above questions must be answered before additional state legislation is enacted. (Attachment 5)

Written testimony from the Kansas Department of Agriculture supporting **SR 1804** was distributed to members of the Committee. (Attachment 6)

Written testimony from the Kansas Corn Growers Association/Kansas Grain Sorghum Producers supporting **SR 1804** was distributed to members of the Committee. (Attachment 7)

The hearing was concluded.

SB 59 - Update, clarify and streamline the Kansas dairy law

Senator Umbarger moved and seconded by Senator Downey, that SB 59 be amended at Page 5, Line 18 following the period (.) by inserting the following: "All rules and regulation of the department of agriculture concerning milk, cream and dairy products in existence on the effective date of this act shall continue to be effective until revised, amended, revoked or nullified pursuant to law."; and at Page 10, Line 31, insert "(d)". The voice vote was in favor of the motion.

Senator Umbarger moved, seconded by Senator Downey, that SB 59 be recommended favorably for passage as amended. The voice vote was in favor of the motion.

SB 162 - Kansas veterinary practice act; license fee increase, application for exam, definition of veterinary prescription drugs.

Senator Morris moved, seconded by Senator Huelskamp that SB 162 be recommended favorably for passage. The voice vote was in favor of the motion.

The Chairman indicated his intention to pass over **SB 61**. There was no objection, and no action was taken.

The Chairman asked whether any committee member wanted the Committee to act on **SB 223**. No committee member requested action on the bill. No action was taken.

Upon motion by Senator Huelskamp, seconded by Senator Tyson, the Minutes of the February 13th and February 14th meeting were unanimously approved.

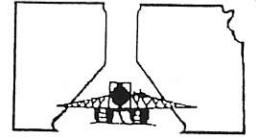
The meeting adjourned at 9:30 a.m.

The next meeting was scheduled for February 27, 2001.

SENATE AGRICULTURE COMMITTEE GUEST LIST

DATE: February 20, 2001

NAME	REPRESENTING
Mike Beem	Ks LUSTIC ASSN.
Lodd Johnson	KLA
Dennis J. Monia	Ks Soybean Assoc.
David Miller	DOB
Paul Johnson	
Herle Carlson	
DIRK HANSON DVM ED	Ks Bd VET EXAMINERS
Gary Reser	Ks. VETERINARY MED. ASSN.
George Blush	Ks. Dept. of Agriculture
Julie JIMISON	KSGRAINFEEDASSN
Dag Wareham	KGFA / KFCA
Bill Fuller	Kansas Farm Bureau
Mike Teasra	Ks Pork Assoc
Tom Bruno	Allen + ASSOC.
Leslie Kaufman	Ks Farm Bureau



STATEMENT OF THE
KANSAS GRAIN & FEED ASSOCIATION
AND THE
KANSAS FERTILIZER & CHEMICAL ASSOCIATION
PRESENTED TO
SENATE AGRICULTURE COMMITTEE
REGARDING SCR 1804
SENATOR DEREK SCHMIDT, CHAIR
FEBRUARY 20, 2001

KGFA & KFCA MEMBERS ADVOCATE PUBLIC POLICIES THAT ADVANCE A SOUND ECONOMIC CLIMATE FOR AGRIBUSINESS TO GROW AND PROSPER SO THEY MAY CONTINUE THEIR INTEGRAL ROLE IN PROVIDING KANSANS AND THE WORLD THE SAFEST, MOST ABUNDANT FOOD SUPPLY.

816 SW Tyler, Topeka KS 66612 - 785-234-0461 - Fa:

Senate Agriculture Committee

Date 2-20-01

Attachment # 1-1 thru 1-3

Chairman Schmidt and members of the committee, I am Doug Wareham appearing today on behalf of both the Kansas Fertilizer and Chemical Association (KFCA) and the Kansas Grain and Feed Association (KGFA). KFCA's over 550 members are primarily plant nutrient and crop protection retail dealers with a proven record of supporting Kansas producers by providing the latest crop protection products and services. KGFA is comprised of more than 1100 member firms including country elevators -- both independent and cooperative -- terminal elevators, grain merchandisers, feed manufacturers and associated businesses. KGFA's membership represents 99% of the over 860 million bushels of commercially licensed grain storage space in the state of Kansas.

I want to express our support for Senate Concurrent Resolution 1804, which is modeled after a resolution adopted last fall by the Council for State Government's (CSG) Agricultural Policy Task Force. Our organizations were very pleased with CSG's Ag Task Force lending support to the rapidly developing field of agricultural biotechnology. The endorsement by CSG's Ag Task Force could not have come at a more critical time for a promising technology facing some very difficult challenges both domestically and internationally.

After hearing from persons involved with the unfortunate Starlink situation last week, you now know firsthand that the process of "genetic engineering", which involves transferring genetic material between organisms to achieve a desired result, is a process that must be closely scrutinized by our federal regulatory agencies. Federal regulatory agencies that ensure food safety for food and food ingredients produced by biotechnology must learn from the Starlink corn experience to ensure new products derived from biotechnology are approved and accepted as safe by consumers in the United States and abroad.

While the agriculture biotechnology industry has certainly experienced growing pains during the past year, the benefits of this technology are much too significant to ignore. From better quality, better tasting and more nutritious foods to more efficient methods to grow crops with less impact on the environment to new solutions to help feed a growing world population,

agricultural biotechnology will play a significant role in the future of our lives. In addition, agricultural biotechnology has great potential for industrial applications, which can result in lower energy utilization, less water for processing and better use of renewable resources. Agricultural biotechnology has great promise both today and in the future for pharmaceuticals, food and industrial applications.

In addition to my written statement this morning, I have provided you with an information packet assembled by the Council for Biotechnology Information, a national organization comprised of the major biotechnology firms. I hope you will take time to review this information because it paints a very clear picture of the world population explosion we will experience during the next 50 years and describes how agricultural biotechnology can and should help meet the nutritional needs of a world population expected to reach the 9 billion mark by the year 2050.

Once again, the agricultural biotechnology industry and those of us directly involved with the production of food and fiber that stand to benefit from this science understand we have some catching up to do when it comes to consumer confidence and universal acceptance of this technology. My primary purpose here this morning is to educate. At this time, I would like to share two very short television announcements developed by the Council for Biotechnology Information designed to inform the American consumer of biotechnology benefits that are on the horizon or already benefiting humankind.

In conclusion, I would mention that some of the provisions contained in S.C.R. 1804, such as the reference to the Western Governor's Association Resolution, might be inappropriate for a Kansas resolution and we certainly welcome any positive changes that would put the Kansas signature on this message.

Mr. Chairman and members of the committee, I appreciate the opportunity to appear in support of S.C.R. 1804 and would be happy to stand for questions.

Kansas Agricultural Alliance

Kansas Agricultural Aviation Association

Kansas Association of Ag Educators

Kansas Association of Wheat Growers

Kansas Corn Growers Association

Kansas Dairy Association

Kansas Farm Bureau

Kansas Grain and Feed Association

Kansas Nursery & Landscape Association

Kansas Pork Association

Kansas Soybean Association

Western Retail Implement and Hardware Association

Kansas Agri-Women

Kansas Association of Conservation Districts

Kansas Cooperative Council

Kansas Crop Consultant Association

Kansas Ethanol Association

Kansas Fertilizer and Chemical Association

Kansas Grain Sorghum Producers Association

Kansas Livestock Association

Kansas Seed Industry Association

Kansas Veterinary Medical Association

February 8, 2001

The Honorable Derek Schmidt
Chairman of the Senate Agriculture Committee
Statehouse
Topeka, KS 66612

Dear Chairman Schmidt,

The Kansas Agricultural Alliance, representing the 21 above-named agricultural associations, supports SCR 1804, a resolution supporting biotechnology in agriculture.

Members of the Ag Alliance have voted unanimously to endorse and support this resolution.

Thank you for your consideration.

Sincerely,



Kerri Ebert
KAA President

Senate Agriculture Committee

Date 2-20-01

Attachment # 2

**Kansas Senate Agricultural Committee
Testimony Submitted
By
Dennis Morrice
Kansas Soybean Association**

Good morning. My name is Dennis Morrice and I serve as the Executive Director with the Kansas Soybean Association. I am here to speak in favor of Senate Resolution 1804. The Kansas Soybean Association applauds the Senate Agricultural Committee for its forward thinking relating to biotechnology.

Biotechnology is important to the state's soybean industry. Last year more than 60 percent of the Kansas soybean crop was planted using biotechnology-derived varieties.

The Kansas Soybean Association has the position that the organization is neither a proponent nor an opponent of biotechnology. The Kansas Soybean Association believes that every farmer should have the right to choose any crop protectant system that meets his or her needs, management abilities, and is cost effective.

The Kansas Soybean Association is strongly opposed to any company introducing any product for open commercial sale that has not received appropriate clearance from all pertinent U.S. government agencies, and has clearance for importation to all international markets.

Thank you for your time. I will be glad to answer any questions from the committee.

Senate Agriculture Committee

Date *2-20-01*

Attachment # *3*



PUBLIC POLICY STATEMENT

SENATE COMMITTEE ON AGRICULTURE

RE: SR 1804 – Supports agricultural biotechnology.

**February 14, 2001
Topeka, Kansas**

**Prepared by:
Bill R. Fuller, Associate Director
Public Policy Division
Kansas Farm Bureau**

Chairman Schmidt and members of the Senate Committee on Agriculture, Kansas Farm Bureau certainly appreciates this opportunity to express support for SR 1804 that supports agricultural biotechnology.

Kansas farmers and ranchers served as Voting Delegates to the 82nd Annual Meeting of the American Farm Bureau Federation last month in Orlando, Florida. One of the policy issues addressed was adoption of a comprehensive resolution on "Biotechnology" that includes these statements:

- *We support increased efforts through biotechnology to more rapidly develop consumer beneficial traits, to increase the marketability of our products, to solve environmental concerns, to increase net farm income by decreasing input costs and to improve product quality.*
- *We urge state and national political leaders to develop a positive national strategy for biotechnology research, development and consumer education.*

Senate Agriculture Committee

Date 2-20-01

Attachment #

4-1 thru 4-2

- ***We recommend that Congress take the appropriate actions to ensure that the USDA's Agriculture Research Service (ARS) plant-breeding programs be permitted to utilize biotechnology, genetic engineering, and other developing technologies in their breeding programs.***

- ***We are opposed to any law or regulation requiring registration of farmers who use or sell products approved for sale by the Food and Drug Administration.***

- ***We support active involvement by the United States in the development of international standards for biotechnology.***

- ***We oppose the imposition by foreign countries of any import restrictions, labeling or segregation requirements of any genetically modified organism, once such commodity has been certified by the scientific community as safe and not significantly different from other varieties of that commodity.***

- ***We support increased efforts to educate the public worldwide regarding the safety and benefits of products developed through biotechnology.***

We support the responsible use of biotechnology to enhance the quality of life of all people by improving the food we eat, the medicines we use and the environment in which we live.

We respectfully encourage the committee to approve SR 1804 and advance the measure to the full Senate.

Thank you!

SENATE AGRICULTURE COMMITTEE
FEBRUARY 20, 2001
SENATE RESOLUTION No. 1804 – AGRICULTURAL BIOTECHNOLOGY
TESTIMONY – PAUL JOHNSON

Thank you for this opportunity to testify on SR 1804. I come here as a private citizen and a small farmer. As a representative to the Midwest Sustainable Agriculture Working Group (MSAWG), I have brought the committee one copy of MSAWG's March 1, 2000 position paper on genetic engineering. The second paper I have brought to the committee is a discussion piece on agricultural biotechnology for Catholic scholars by Keith Warner who is a Franciscan Friar and an environmental studies doctoral student. I come here this morning with several concerns, questions and recommendations.

CONCERNS & QUESTIONS

Why has it taken so long to have this discussion? The more appropriate time would have been after this technology was laboratory tested but before commercial production. Now that upwards of 1/3 of the corn crop and 1/2 of the soybean crop is GMO, it seems late.

What is happening to the seed industry? Because genetic engineering (GE) is such a capital intensive research enterprise, most small firms in the industry soon become marginalized. Larger and more powerful firms receive patents on their technologies, further eliminating competition. From 1996-1999 there were \$15 billion in seed industry combinations. In 1999, Monsanto sold 88% of the GE seeds in the U.S.

Have we gone too far in the patenting of life? Current biotechnology patents are too broad. They have been determined by court rulings, not legislators. Limit the scope of patents on GMO's to the addition of the specific gene yielding the desired trait or the configuration of genes that give this trait, but exclude the rest of the organism from eligibility for patenting.

Has the liability question been answered for this industry? Who is responsible for genetic drift? Who is responsible to keep GE crops separate and identity preserved? What have we learned from the StarLink fiasco? If engineered genes are transferred via pollen to related "wild" or unrelated species, who is responsible if this super weed overwhelms a given ecosystem? Who pays if a farmer cannot grow organic canola because of GE pollen drift from a neighbor's field? If Bt lingers in the soil causing damage, who pays?

Why in 1992 did FDA rule that genetically engineered food is "substantially equivalent" to conventionally grown food thus not requiring testing or labeling? Internal reports now show that FDA's own scientists concerns about the safety of genetic engineering were ignored. The revolving door between biotech companies and U.S. regulators raise serious concerns over rapid approval process of GE foods. A **Time** survey on Jan 11, 1999 showed that 81% of U.S. consumers think GE food should be labeled. While the U.S. government opposes mandatory labeling, the Biosafety Protocol - which has the same standing as WTO - allows countries to restrict imports of GE products.

Senate Agriculture Committee

Date *2-20-01*

Attachment # *5-1 thru 5-27*

Since farmers are not paid a fair price for their crops, farms are growing larger and larger to capitalize on the economies of scale. As these farms grow so large, it becomes much more likely that these farms are locked into certain intensive use of production chemicals and agricultural biotechnology. If farmers were paid a fair price, would long-term crop rotations, stewardship practices and alternative crops become more common in Kansas?

Just because we can make such radical changes to nature, should we? What makes humans different is the ability to step back and debate what these changes will do to us today and what the long-term effects will be? The rationale is that if we do not make these radical changes, someone else will so why worry about 'unintended consequences'? If we continue to poison the well, some technological fix will always be found. I hope so. We are all together on this learning curve of farming yearly with million of pounds of toxic chemicals. What is the synergistic effect of mixing in genetically modified seeds?

RECOMMENDATIONS

Kansas' lawmakers should take the lead on this agricultural biotechnology debate. Take Senate Resolution 1804 and refer it to an interim committee where a serious debate can begin. This debate would entail certain fundamentals:

Labeling
Regulatory oversight
Patenting laws
Liability
Environmental monitoring
Agricultural research priorities

Kansas could reenter the national spotlight with such an interim debate. We could gain respect by asking the tough questions, reviewing the research of genetically modified crops and debating the market rules for this technology. Prevention is always preferable to fixing a problem. It is not too late to step back and assess the future of this technology.

The Splice of Life (Science, that is):

Implications of Genetic Engineering for Family Farmers, Consumers and the Environment

**A Position Paper of the
Midwest Sustainable Agriculture
Working Group**

March 1, 2000

About the Midwest Sustainable Agriculture Working Group (MSAWG)

The Midwest Sustainable Agriculture Working Group (MSAWG) is a network of more than 30 farm, sustainable agriculture, environmental, food, religious and rural organizations working together to develop a sustainable food and agriculture system.

The MSAWG Biotech Task Force prepared this position paper. Members include:

Dave Butcher, Minnesota Food Association

Gabriela Flora, Institute for Agriculture and Trade Policy

Mary Hendrickson, Columbia (MO) Food Circle

Renee Hunt, Illinois Stewardship Alliance

Margaret Krome, Michael Fields Agricultural Institute

Kim Leval, Center for Rural Affairs

Sean McGovern, Ohio Ecological Food and Farm Association

The following groups endorse the information and policy recommendations within this document:

MSAWG member groups:

The Center for Rural Affairs
Nebraska Wildlife Federation
The Sierra Club
The Land Stewardship Project
The Illinois Stewardship Alliance
The Kansas Rural Center
Institute for Agriculture and Trade Policy
The Minnesota Project
Ohio Ecological Food and Farm Association
National Catholic Rural Life
Michael Field Agricultural Institute
Illinois Stewardship Alliance

Other groups:

The Consortium for Sustainable Agriculture Research and Education

ABOUT THE MIDWEST SUSTAINABLE AGRICULTURE WORKING GROUP

The Midwest Sustainable Agriculture Working Group (MSAWG) is a network of more than 30 farm, sustainable agriculture, environmental, food, religious and rural organizations working together to develop a sustainable food and agriculture system.

INTRODUCTION

The recommendations contained in this paper are intended to guide public policy and to inform the debate surrounding Genetic engineering (GE). Genetic engineering originated in the 1970s following the discovery of several key techniques in molecular genetics. As genetically engineered products have become more prevalent in the food system, the topic of genetic engineering has become a controversial issue. In the Midwest, farmers face increasing pressure to decide whether or not to use genetically engineered products in both crop and livestock operations. Corporations are generating new genetically engineered products, and public universities are being tapped to participate in the research. Meanwhile, Consumers throughout the world are demanding GE-free food.

The Midwest Sustainable Agriculture Working Group, and many of its members, as well as other organizations have supported the development of this document. Our aim is to describe the issues and the state of genetic engineering as it pertains to family farmers, rural communities, religious and consumer groups, the environment and our food system. There is broad consensus among the groups endorsing this document that the eleven recommendations we propose herein should serve as a starting point for the debate on GE technologies. We hope that this document helps increase public understanding about issues and trends in genetic engineering and what this means for various constituencies that have, until now, been underrepresented in the debate on GE. Our recommendations serve to guide policy and inform the debate.

Biotechnology is a term that is currently heard in conjunction with agriculture. Biotechnology is comprised of a set of techniques that involve the manipulation of living organisms for human use. These techniques include the artificial reproduction of cells through cloning and tissue culture, agroinoculation, gene sequencing, the use of molecular markers, and genetic engineering. Agriculture input companies now have "life sciences" divisions which focus on the research and development of biotechnology.

Genetic engineering, also referred to as recombinant DNA and gene splicing, is one of the more common and controversial types of biotechnology being introduced into agriculture. Genetic engineering is a set of new technologies that artificially transfers genes in order to move particular traits from one organism to another. These techniques create organisms with new combinations of traits not possible in nature.

GENETIC ENGINEERING AND RISK

As farmers look for tools to deal with pest problems and increase their yields, genetic engineering is promoted by agribusiness as the solution to their problems. According to the National Center of Food and Agricultural Policy, 14.4 million acres of Bt corn were planted in 1998, accounting for 18 percent of the total corn acreage in the U.S. Genetically engineered soybean, cotton and corn together accounted for 20 - 44 percent of acreage planted in 1998.¹ Genetic engineering is seen as a beacon of hope for some, but the poorly understood ecological dynamics of GE pose more questions than answers for sustainable and organic farming.

Genetic engineering differs radically from traditional breeding. When referring to genetic engineering, industry tends to utilize the more benign term of biotechnology. Industry often explains that genetic engineering is simply an extension of selective breeding practices that have occurred since the dawn of agriculture 10,000 years ago. This is not the case. Traits can be manipulated across species, kingdom, and even phylum lines; thus genetic engineers create combinations of genes not possible in nature. Genes are moved from one organism to another void of their stable genomic (genetic material) context. These new combinations of genes create novel organisms and also create novel risks. These novel risks pose potential threats to ecological stability, sustainable agriculture and human health. Some of these risks are examined below.

GE IMPACTS ON THE ENVIRONMENT

While there are many examples and issues that can be brought forward, the following points outline major concerns of the use of GE in agriculture production and its impact on the environment:

1) The transfer of engineered genes (via pollen) to related "wild" species (and in some cases even unrelated species).

When engineered genes are transferred via pollen to related "wild" or unrelated species, the engineered traits are conferred on an undesirable plant or weed. This could allow the undesired plant or weed a competitive advantage via enhanced fitness or greater reproductive capacity, thereby creating "**super weeds**." In effect, they are plants that have the capacity to overwhelm a given ecosystem.²

The Union of Concerned Scientists cites the spread of rice engineered for salt tolerance into nearby estuaries as a hypothetical example. While the tolerance to salt for growing rice in a given area might be desirable, the spread of salt tolerant plants might also choke out native plants and eventually destroy the estuary.

¹ Economic Research Service, USDA. www.econ.ag.gov/whatsnew/issues/biotech

² See "Biotech Goes Wild" by Charles Mann, July/August 1999 issue of Technology Review for a current discussion of the problem.

A potential midwestern example is canola, a member of the Cruciferae (mustard) family. Canola is used for oil production. Suppose that a canola cultivar genetically engineered for herbicide resistance (Roundup Ready) out-crossed with wild mustard, thereby creating a weed resistant to Roundup. Two studies raise intriguing questions about this and similar scenarios:

- *Using a mustard species (Arabidopsis thaliana) to study the likelihood of GE crops outcrossing, researchers found that the transgenic varieties of the mustard were 20 times more likely to out-cross (breed) than their "un-engineered" cousins. According to research team member, ecologist Joy Bergelson, University of Chicago, "We're still trying to find the mechanism that drives the pattern we saw. There's a lot we don't understand, including how common [out-crossing] is."*³
- *New research by British botanists shows that pollen blown from large fields of GE oilseed rape remains fertile over greater distances than expected. Using male-sterile plants and examining a "worst-case scenario" researchers found that even at sites 400 meters away from transgenic plots, as many as 7 per cent of the seeds (from non-GM oilseed rape plants) were herbicide resistant.*⁴

2) Genetic erosion.

The National Plant Germplasm System (NPGS) in this country was built in response to the broad introduction of hybrids and the subsequent loss of genetic variability when so many crops of the same hybrid were planted. Similarly, many scientists are concerned about loss of genetic variation due to widespread plantings and uniformity of GE crops. The corn-blight epidemic of 1970 was traced to the broad distribution of a single genetic character. In response to problems like corn-blight plant breeders have had to, in the past, seek out "landraces" in order to replenish the genetic material of commercial stocks. Landraces are populations with genetic variability lending different responses to diseases, pests and environmental conditions. There is concern by some scientists and plant breeders that this natural "warehouse" of genetic material could be destroyed by the out-crossing potential or genetic pollution from GE crops. In *First the Seed*, Jack Kloppenburg warns, "Though the capacity to move genetic material between species is a means for introducing additional variation, it is also a means for engineering genetic uniformity across species."⁵

3) The spread of viral pathogens via GE plants.

Viruses are used as vectors or "gene carrying" mediums in the gene engineering process. The fear among farmers and consumers alike is that crops containing viral pathogens may exchange genes with other viral pathogens, creating more viral strains with unknown properties and attacking unknown plants, further disrupting a given ecosystem. An

³ *ibid*

⁴ "Gone with the Wind," the New Scientist, April 17, 1999. Available on the Internet at www.newscientist.com/ns/19990417/newsstory12.html

⁵ Kloppenburg, J.R. 1988. *First the Seed: The political economy of plant biotechnology, 1492-2000*. Cambridge University Press: New York. P. 244.

Sustainable and organic farmers are also concerned about the terminator seed technology, whereby crops are engineered to produce sterile seed, forcing farmers to buy seed every year. Sterile seed technology is one of a class of so-called "gene protection systems" in which important genetic traits (yield, pest resistance) are controlled or turned on only by the application of external chemical catalysts.¹³

Farmers who purchase seed with gene protection systems must also purchase and apply the external chemical catalyst in order for the crop to express a given trait. Critics argue that the technology, dubbed "traitor technology," would make farmers totally dependent on seed companies or turn them into "bioseeds." The "life-science" companies counter that the technology is necessary to control and protect their investments in genetically engineered crops.

Due to growing public pressure in the U.S. and abroad, Robert Shapiro, CEO of Monsanto, in an open letter to Gordon Conway, president of the international development aid giant, the Rockefeller Foundation, made a "public commitment not to commercialize sterile seed technologies, such as the one dubbed 'terminator.'" He did not rule out development of other types of trait-turn-off technologies, however.¹⁴

Furthermore, Monsanto's proposed acquisition of Delta and Pine Land, the company that developed terminator, has fallen through. USDA and Delta have offered no promises to abandon the so-called terminator technology they own. Monsanto is not the only research and development company working on gene protection systems. There are nearly 30 other patents pending on terminator type technologies.

CONSUMER CONCERNS ABOUT GE FOODS

While corporations work to develop and market genetically engineered (GE) products for the food sector, it is important to ask if there is consumer demand for such products, which in turn determines whether producers will have a market for their GE crops.

Consumers around the world are expressing concerns about GE foods. As a result of this concern, the European Union, New Zealand, Australia, South Korea and Japan all require the labeling of food derived through GE. Europeans have taken the lead in consumer opposition to GE foods. Consumer demands have led to retailers shifting to GE free products. For example:

- Seven of Europe's largest supermarket chains (from six different countries) announced in March of 1999 that they have formed a consortium to jointly source GE free ingredients for their products¹⁵.
- McDonalds, Burger King and Kentucky Fried Chicken operating in the United Kingdom announced in February of 1999 that they would become GE free.

¹³ Rural Advancement Foundation International. 1999. *Traitor Technology: The Terminator's Wider Implications*, Communiqué, Jan/Feb 1999. Available At RAFI Website: <http://www.rafi.ca/>

¹⁴ The letter from Shapiro to Conway is available at <http://www.monsanto.com/monsanto/gurt/default.htm>

¹⁵ Milmo, Cahal. "Sainsbury's Bans GM Food from Own Brand Range," PA NEWS, March 17, 1999.

US consumers have lagged behind European and Asian consumers in expressing concern over GE foods. Yet, in July 1999 Gerber (Novartis AG of Switzerland is the parent company) and Heinz, the two leading US baby food manufacturers, announced that they would ban GE corn and soybeans from their baby foods. The same month Iams, the US based high-end pet food producer, announced it will not use GE corn in its pet food. In January 2000 Frito Lay asked its contract farmers not to grow GE corn.¹⁶

These decisions reflect the rising concern of US consumers about genetically engineered foods. Consumer concerns arise for a number of reasons including public health consequences and ethical, religious and cultural issues (including the desire to support environmentally sound agricultural practices and technologies that do not undermine family farmers).

Health Concerns

Health concerns that arise with genetic engineering include the potential for increased allergenicity, decreased efficacy of antibiotics and increased cancer risks.

1) Increased allergens and toxins in the food system.

GE has the potential to increase allergens in the food system through the introduction of known allergens to a new food host where the allergens cannot be readily identified. The process of GE could create new toxins and increase the prevalence of allergens and toxins in the food system.

A well-known example of the transference of a known allergen is Pioneer's use of GE to insert a gene from the Brazil nut into soybeans to increase their protein level. Although the transferred Brazil nut gene is a known allergen, the soybean had passed animal tests and was considered safe for consumption.¹⁷ A study at the University of Nebraska revealed that people who were allergic to Brazil nuts also reacted to the transgenic soybeans.¹⁸

This situation revealed some glaring deficiencies in regulatory procedures. First, it was the Nebraska study that kept the product off the market, not regulatory procedures. (Pioneer voluntarily kept the soybean off the market once the Nebraska study was published). Second, genetically engineered foods are not labeled, and people with Brazil nuts allergies would not be able to identify products containing the GE soybeans. Third, although Brazil nut allergies are currently rare, adding the gene to soybeans could increase exposure and, most likely, reactivity.¹⁹

¹⁶ Bloomberg News. January 28, 2000.

¹⁷ Cummins, Ronnie. 1999. "Hazards of Genetically Engineered Foods and Crops: Why We Need A Global Moratorium." Campaign for Food Safety/Organic Consumers Association. Available at: <http://purefood.org/ge/gefacts.pdf>.

¹⁸ Nordlee, J.A., et al. 1996. "Identification of a Brazil-nut allergen in transgenic soybeans." *The New England Journal of Medicine*. No. 334:688-92.

¹⁹ Lehrer, S.B. and G. Reese. 1999. "Food allergens: implications for biotechnology," In: Thomas, J.A. (ed.), *Biotechnology and Safety Assessment*, 2nd edition. Philadelphia, PA: Taylor and Francis. pp. 127-150.

Another unintended and unpredictable consequence of genetic engineering is the creation of new allergens or toxins. Even if the transferred gene itself is not allergen producing, it may cause an imbalance in the chemistry of the new genome and create new "bioactive compounds or change the concentration of those normally present."²⁰ As Dr. Marion Nestle points out in *The New England Journal of Medicine*, "Genes encode proteins; proteins can be allergenic."²¹

2) Loss of effectiveness of antibiotics.

Many GE crops contain genes that code for resistance to antibiotics as well as the genes that code for agronomic traits. Antibiotic resistance is used during the development process as a "marker" to identify plants that have successfully incorporated the new traits. However, these antibiotic resistant genes may be inadvertently transferred to micro-organisms. This transfer could reduce the efficacy of existing antibiotics by creating resistant strains of bacteria. If more antibiotics lose their effectiveness due to resistant bacteria, consumers with antibiotic allergies have fewer safe choices and the chances of bacterial diseases becoming untreatable increases.

3) Increase in exposure to hormones and antibiotics.

Many consumers choose not to purchase products that increase their exposure to hormones and antibiotics. A case in point is the GE hormone that is used to increase milk production in cows. Studies show that cows injected with this GE hormone, known as recombinant bovine growth hormone (rBGH or Rbst), have increased susceptibility to mastitis and other health problems.²² Because of these bovine health problems associated with rBGH more antibiotics are often used to improve the health of the cows. Consumers have expressed concern over conflicting scientific evidence about the residue levels of rBGH, antibiotics, and Insulin Growth Factor -1 (a hormone known to increase risk of cancer in some humans when found in elevated levels) in dairy products from cows treated with rBGH.²³ As a result of consumer demand, some dairy manufacturers are labeling their dairy products as rBGH-free. Canada banned the use of BGH in 1999. Several studies were undertaken as part of the decision-making process on whether or not to ban rBGH in Canada. One of these studies, the "Gaps Analysis" found that insufficient evidence on oral absorption of rBGH and IGF-1

²⁰ Third World Network. "The need to regulate and control genetic engineering." *Third World Resurgence*. No 53/54, Nov/Dec 1994.

²¹ Nestle, Marion. 1996. "Allergies to Transgenic Foods - Questions of Policy." *The New England Journal of Medicine*. March 14.

²² Judge LJ, Erskine RJ, Bartlett PC. Recombinant bovine somatotropin and clinical mastitis: incidence, discarded milk following therapy, and culling. *J. Dairy Sci.* 1997; 80(12):3212-8

²³ Mephram, T.B. 1992. "Public health implications of bovine somatotropin use in dairying: discussion paper." *Journal Of The Royal Society Of Medicine*, Vol. 85, December. Chan, June M., et al. 1998. "Plasma insulin-like growth factor I and prostate cancer risk: a prospective study." *Science*. 1998. Hankinson, Susan E., et al. Vol. 279 January 23. "Circulating concentrations of insulin-like growth factor I and risk of breast cancer," *Lancet*, Vol. 351, No. 9113, May 9. Pgs. 1393-1396. Epstein, S. S. Summary public health perspectives on rBGH. National Institutes of Health, Technology Assessment Conference on Bovine Somatotropin. National Institutes of Health, December 5-7, 1990. Epstein, S. S. Unlabeled milk from cows treated with biosynthetic growth hormones: A case of regulatory abdication. *Int. J. Health Services*, 26(1):173-185, 1996.

and procedural and data gaps were found which failed to properly address the human safety requirements of rBGH.²⁴ The United States remains the only developed country permitting the use of rBGH.

Ethical, religious and cultural concerns

There are also non-health reasons consumers have concerns about GE foods. Some consumers choose not to buy GE foods because they fundamentally believe that genetic manipulation of life forms constitutes tampering with the building blocks of divinely created life and is therefore immoral or blasphemous. Most major religions have food rules or traditions. Dietary preferences (for either religious or ethical beliefs) can be undermined with GE foods when, for example, someone wishing to avoid animal products eats a tomato which has had a flounder gene genetically engineered into it. Philosophical and ethical beliefs lead people to only consume food that supports particular production methods. The potential negative impacts genetic engineering can have on the environment (described above in "GE Impacts on the Environment") and the structure of the food system (described below in "GE's link to Corporate Control and Reduced Decision-Making") are the basis for some consumers' decisions to avoid GE foods.

Distrust of the Regulatory Processes

One reason for the extreme resistance to GE food shown by consumers in the European Union is the recent history and consequences of lax food safety regulations and of insufficient scientific caution. In the mid-1990s, British consumers were assured that their health was protected even when cows that were fed food which included parts of slaughtered animals developed Bovine Spongiform Encephalopathy (BSE or "Mad Cow Disease"). Yet regulators later recanted on their assurances and acknowledged that they had been insufficiently cautious when a link was proven between BSE and New Variant Creutzfeldt – Jakob Disease, a disease that has killed over 40 people in the UK/Europe. Another example occurred in Belgium in the spring of 1999. Scientists were very slow to report the illnesses and deaths of chickens due to the presence of dioxin in reprocessed animal fats used in chicken feed.

Many critics of GE foods in the United States say they see evidence of similarly insufficient Food and Drug Administration (FDA) regulatory oversight. They cite FDA's failure to set the regulatory bar higher for the donors of organisms of unknown allergenicity. They challenge the review protocols FDA uses for approvals of new agricultural biotechnologies.

In 1992 the FDA ruled that food derived through genetic engineering is "substantially equivalent" to conventionally grown food, and thus does not require testing or labeling. Through the discovery process in a civil action lawsuit against the FDA for its blanket approval of GE foods, internal reports and memos reveal that the FDA's own scientists' concerns about the safety

²⁴ Health Protection Branch, Health Canada. April 21, 1998. Rbst (NUTRILAC) "Gaps Analysis" Report. Rbst Internal Review Team.

of genetic engineering were ignored.²⁵ Furthermore, the revolving door between biotech companies and U.S. government regulatory agencies raises serious concerns that the industry's desire for a rapid approval process of GE foods dictates U.S. regulations.²⁶

Tremendous consumer concerns in Europe and growing concerns in the U.S. have fueled a major controversy regarding labeling of foods produced using GE. An estimated 30,000 items in U.S. grocery stores have been produced using GE. U.S. consumers have only recently begun to join their European counterparts in asking for labeling to assure they know whether their food has been produced using GE. However, the U.S. government has taken a very different stance, having come out against mandatory labeling. This position seems to be moderating with the introduction of the "Genetically Engineered Food Right to Know Act" into the U.S. House of Representatives on November 16, 1999. At the state level, signatures are being gathered for a Genetically Engineered Food Labeling Ballot Initiative in California and legislation on labeling genetically engineered foods is being considered in New York, Vermont and Minnesota.

The European Union and Consumers International (a worldwide federation of 246 consumer groups) say any food produced with genetic engineering techniques should be labeled as such. As previously mentioned, there is overwhelming public support in Europe for labeling; ninety-two percent of respondents to a survey by UK Consumers' Association wanted genetically manipulated food to be labeled, regardless of the presence of a GE ingredient in the final product. In the U.S. there is also support for labeling. A survey done by *Time* magazine (Jan. 11, 1999) showed that 81 percent of U.S. consumers think GE food should be labeled.

The U.S. government opposes mandatory labeling of all GE foods. However, the recently adopted Biosafety Protocol, which has the same international standing as the World Trade Organization, allows countries to restrict imports of GE products. Shipments of GE commodities must be labeled as "may contain" GE organisms. Within two years more specific labeling requirements will be negotiated.²⁷ Most concerns that consumers have can be summarized into public policy issues when building the case for labeling. The rationale for labeling is based on consumers' right to choose their food, whether for health or other reasons. It follows several key precedents and principles of good public policy:

- **Public Right to Know.** The statutory basis for the Toxics Release Inventory (TRI) that demands industry disclose its toxic emissions, is premised on the basic recognition that citizens have a right to know about their exposures to potentially hazardous toxic substances. The agricultural biotechnology industry should also be held to this reasonable expectation.
- **Consumer Right to Choose Food.** Like salt-free, fat-free, organic or other diet choices, consumers have the right to make informed choices about food for reasons

²⁵ Center for Food Safety. 1998. *The Litigation Against Unregulated, Unlabeled Genetically Engineered Foods: Alliance for Bio-Integrity et al. vs. Shalala et al.* Docket No. 98-CV-1300 (CKK). Filed D.D.C. May 27, 1998. Plaintiffs' Briefs and Supporting Documents. The lawsuit alleges that under current law the FDA should be requiring the labeling of foods obtained through genetic engineering.

²⁶ *Nature*. 1999. "GM Foods Debate Needs a Recipe for Restoring Trust." April 22, 1999. Vol. 398. #6729.

²⁷ BBC News. 2000. "Controls Agreed on Genetically Modified Imports." January 29.

of health and, as with Kosher foods, should be able to make informed choices based on environmental, religious and ethical grounds.

- **Free Market Economics.** The U.S. government passionately promotes the merits of free markets as a natural social regulator of the supply and demand of goods through consumer choices. A crucial premise of free market economic theory is that consumers are informed about their choices. In a free market economy, full consumer information about genetically engineered foods is crucial.
- **Precautionary Principle.** This principle states that in the presence of scientific uncertainty it is important to take precautions, in other words, to look before we leap. It recognizes that we don't know all that can harm us. In the realm of GE foods, although there are questions about the validity of claims of danger, much is unknown about long-term and complex effects of such foods. Thus, we should invoke the precautionary principle.
- **Scientific Inquiry.** Those concerned about agricultural genetic engineering argue for reliable scientific studies to ascertain long-term health effects of these technologies. Many scientists argue that labeling is necessary to actually conduct meaningful epidemiological studies about the relationships between genetically modified foods and human health.

GE'S LINK TO CORPORATE CONTROL AND REDUCED DECISION-MAKING

In addition to the environmental issues and consumer concerns raised above, genetic engineering has greatly decreased farmers' latitude for on-farm decision-making. Historically, there has been a continual move from farmers making decisions about crops, livestock and inputs on the farm to putting power in the hands of corporations, in distant markets. The movement toward industrialized agriculture with its heavy dependence upon scientific expertise can be traced back to the beginning of the century. Hybrid seeds, commercial fertilizer and, soon thereafter, chemicals became common inputs on farms while farm equipment also became much larger. These technologies led to consolidation of acreage into fewer and larger farms, while reducing the number of people living on farms and in rural communities. GE is only the latest round in furthering this consolidation.

The patenting of genetic material has intensified oligopolistic control in the seed, chemical and pharmaceutical industries. Mergers and acquisitions in the agricultural sector seek to link genetic material with agricultural inputs and markets for food and agriculture products in the hands of a few firms who prioritize profit margins over other concerns. The overlapping oligopolies created by these alliances disguise the anti-competitive practices taking place and reduce the likelihood that the anti-trust provisions of corporate law will be invoked. In the last three years there have been well over \$15 billion worth of mergers and acquisitions between seed, chemical and pharmaceutical companies.²⁸

²⁸ See Heffernan, et al. 1999. Concentration in the Food and Agricultural System. Report prepared for the National Farmers Union, February. (Can be accessed at www.foodcircles.missouri.edu)

epidemic of African Cassava Mosaic Virus devastated cassava, a major food crop in East Africa. This virus is thought to be a result of natural recombination (breeding) of virus carrying plants.⁶

4) The Potential effects on soil ecology

New studies on the impacts of Bt corn on soil communities have not concluded whether Bt corn and the resulting toxins pose a risk to non-target insects and organisms.⁷ Integrated pest management consultant, Charles Benbrook, states "laboratory studies exploring direct Bt impacts on non-target organisms are an inadequate basis from which to project – and dismiss—longer-run soil ecosystem impacts of Bt - transgenic crops."⁸ Bts originating from transgenic crops are more active than conventional foliar Bt sprays which are in a more inactive form. Likewise, with densely planted transgenic Bt crops there is a much greater volume of Bt entering the soil than naturally occurring or spray forms of Bt. Thus, it is inappropriate to extrapolate from foliar Bt research to research on the long-term soil ecosystem and soil health impacts of Bt-transgenics. Further study is needed into the longer-term impacts of transgenic Bt crops on soil health and ecosystems.

5) Impacts on wildlife and ecosystems.

The experiments at Cornell University and Iowa State University (both in 1999), in which monarch butterfly larvae had a high mortality rate after ingesting genetically engineered (Bt) corn pollen from milkweed, is a potent reminder of the potential impact on biodiversity. This impact is in most cases not well understood and therefore not easily anticipated. As Dr. Neal Stewart, a biologist at the University of North Carolina puts it, "we know very little about the community ecology and virtually nothing about the ecosystem ecology of what these [engineered] genes will do."

Overall, we don't know and can't anticipate many of the effects of genetically engineered plants on ecological systems (and therefore on biodiversity). This uncertainty requires proceeding with caution with the introduction of such life forms. Moreover, these uncertainties show the need for further public dialogue, research and inquiry into the risks and benefits of biotechnology, particularly those related to genetic engineering.

GE IMPACTS ON SUSTAINABLE AND ORGANIC FARMERS

Although the first commercialized GE product for agriculture was recombinant bovine growth hormone (rBGH)—marketed to increase milk production—the next wave of commercialized GE

⁶ Mann, Charles. 1999. *ibid*.

⁷ Koskella, J., and G. Stotzky. 1997. "Microbial Utilization of Free and Clay-Bound Insecticidal Toxins from Bt and Their Retention of Insecticidal Activity after Incubation with Microbes," *Applied and Env. Microbiology*, Sept., p. 3561-3568. Tapp, H. and G. Stotzky. 1998. "Persistence of the Insecticidal Toxin from Bt subsp. *Kurstaki* in Soil," *Soil Biology and Biochemistry*, Vol. 30, No. 4, p. 471-476.

⁸ Benbrook, Charles. 1999. *Impacts on Soil Microbial Communities Needs Further Study*. From internet site Ag BioTech InfoNet www.biotech-info.net

products focused on:

- Crops engineered to express Bt (*Bacillus thuringiensis*), a naturally occurring pesticide long used by organic farmers in spray form, and:
- Crops engineered to withstand heavy applications of certain herbicides (herbicide resistant crops or hrcs), thereby allowing most plants or weeds around them to be destroyed while the crop remains unaffected.

Crops genetically engineered to express Bt are marketed by "life-science" companies as having the advantage of reduced pesticide use to control targeted insects and increase yields. In some instances, this has apparently occurred, although there is general agreement that the advantage will disappear as insects develop resistance to Bt.⁹ Entomologists and other scientists agree that it is only a matter of time before targeted insects develop resistance to Bt expressed in GE crops, despite strategies of planting refuges of non-GE crops next to fields of Bt crops in order to discourage the development of Bt resistant insects. Organic producers will be faced with the loss of a valuable pest management tool (Bt spray) once insects develop resistance to Bt.

Crops genetically engineered to express resistance to popular herbicides (herbicide resistant crops or hrcs) are marketed with the same claims as Bt crops—that chemical use will be decreased and yields increased. However, many critics charge that despite the large number of acres planted with hrcs, overall use of herbicides has not notably diminished in the U.S.¹⁰ In the case of herbicide resistant soybeans, there is a "yield drag"—a decrease in bushels per acre. Yield drag is attributed to inferior production genetics of soybeans genetically engineered for resistance to herbicides.¹¹ Farmers are faced with an increasingly uncertain economic risk vis-a-vis GE crops in that:

1. GE seeds are more expensive to purchase;
2. Herbicide use may not be reduced;
3. Yields may be less, and;
4. Prices paid for GE crops are likely to be less in the face of global consumer resistance to foods containing GE products.

Farmers who use sustainable or organic techniques and do not plant GE crops or invest in heavy chemical inputs have a decided economic advantage if they can keep their crops free of genetic pollution from genetically engineered crops.

On the national level, the American Corn Growers and the National Family Farm Coalition have developed a resolution on genetic engineering demanding that corporations be held liable for

⁹ Various articles discussing Bt crop yield and development of insect resistance to Bt crops are available at the website "pest management at the crossroads," (genetic engineering, Bt transgenic crops) at <http://www.pmac.net>.

¹⁰ Rissler, Jane. June 1999. "Review of ERS Report Genetically Engineered Crops for Pest Management." Union of Concerned Scientists. Also available at <http://www.biotech.info-net>.

¹¹ Benbrook, Charles. 1999. "World Food System Challenges and Opportunities: GMO's, Biodiversity, and Lessons from America's Heartland." Paper presented January 27, 1999 at the University of Illinois World Food Sustainable Agriculture Program. Available at <http://www.biotech-info.net>.

damage to farmers, human health and the environment resulting from the use of GE crops and livestock. The "Farmer's Declaration on GE in Agriculture." also demands suspension of all further environmental releases and government approvals of GE seeds and agricultural products. The 33 groups signing the declaration argue that American farmers have serious concerns with the economic impacts GE seeds and products will have on producers. The loss of markets has been a blow to farmers during an already hard time in the farm economy. The groups assert that the independence of farmers is threatened by corporate control of seeds and other agricultural products.

Concern expressed by consumers and scientists in Europe and elsewhere over potential health and environmental effects of GE crops and food has resulted in a loss of markets and devaluing of GE grains and beans. Producers growing non-GE crops are promised a premium but must prove (and hope) that their commodity has not been genetically polluted, either during the growing period (pollen drift) or by improper segregation of non-GE from GE commodities during the storage/transport/distribution process.

Genetic pollution has resulted in hardships for food producers as well as food distributors. For example, farmers who plant conventional seed are faced with the threat of lawsuit if GE plants somehow show up in their fields. For example, to ensure that farmers do not hold back seed for next season, corporations such as Monsanto are searching out and suing those producers who have Monsanto patented technology in their fields but haven't signed a contract and/or been authorized to use those seeds. Thus, the unfortunate farmer who finds GE seeds mixed in his/her non-GE seeds or experiences pollen drift into a field is vulnerable to lawsuits.¹²

In addition, this kind of contamination makes it difficult for food distributors to ensure that food is GE-free. Moreover, when genetic pollution is discovered, it can be costly. A Wisconsin food company specializing in organic foods had an entire shipment of corn chips to Europe destroyed when it was discovered that GE corn adulterated its organic chips. The adulteration was traced back to a Texas farmer whose organic corn had been polluted by pollen drift from a neighboring field of GE corn.

Organic producers and sustainable farmers are confronted with the prospect of not being able to plant crops which might be subject to pollution from neighboring fields of GE crops. For example, this past year, several producers in North Dakota decided not to plant organic canola for fear of drift from GE canola grown prevalently in their area. It should be noted that some crops, such as canola and corn, because they are open-pollinated crops, are more subject to pollen drift than self-pollinators like soybeans. Thus the problem of genetic pollution is more serious for some crops than for others. For growers of such crops, there is more chance for liability -- and more of a chance that an organic grower could lose certification. For sustainable as well as organic producers, the potential exists for loss of premium markets if their harvest is not GE free. The fear of planting crops that may be affected by genetic pollution via pollen drift prevents normal crop rotations, a major practice of sustainable farmers.

¹² Vancouver Sun. 1999. "Saskatchewan Farmer Battles Monsanto, Sues them back," Section B, page 1. August 14.

Investments in GE extend agribusiness control of the food industry from genetic material to production and distribution. As control of the market becomes consolidated by a few transnational corporations, the increased marketing of GE products provides a means to regain research investments in the technology.

This vertical integration, where genomics, seeds and chemicals are linked, means agriculture is becoming supply, not market, driven. The development of Roundup Ready seeds is an example of this. The patent on Monsanto's herbicide Roundup will expire in the year 2000. In order to maintain significant profits from their herbicide, Monsanto developed a soybean that is resistant to Roundup. Subsequently, they developed Roundup Ready corn, cotton, and canola.

Through extensive advertising and public relations campaigns, Monsanto has encouraged farmers to purchase the seed-herbicide package. Since the seeds are genetically linked to the herbicide and farmers must sign a contract guaranteeing that the farmer will use Roundup with Roundup Ready seeds, Monsanto can better assure themselves of profit and control even after their Roundup patent expires.

The numerous corporate "alliances" in agriculture lead to what is often called a "seamless system" from the gene to the supermarket shelf. In such a system, markets cease to exist and "price discovery" happens only at the supermarket checkout. Thus, the food and agriculture system becomes centrally organized, where inputs and outputs are usually not purchased or sold until processed into their final food product.

In these food system clusters, the food product is passed along from stage to stage, but ownership and decision-making remain with the dominant firms that make up the cluster – not the farmer or consumer. The farmer becomes a grower, providing the labor and often some of the capital, but never having clear title to the product as it moves through the food system—and never making the major decisions.

Because GE is such a capital intensive research enterprise, most small firms in the industry soon become marginalized because they cannot generate needed capital. Larger and more powerful firms receive patents on their technologies, further eliminating competition. Monsanto has acquired a number of established seed firms in the past few years. Starting with the seed to which all other inputs are linked, these mergers and acquisitions result in a handful of companies dominating the biotechnology industry. Even a firm as large as Cargill decided to sell their global seed business to Monsanto and form a joint venture with them rather than try to enter the biotechnology field on its own.

It is clear that GE is embedded in an industrialized system where the goal is profit without concern for sustainability. Corporations make the major decisions about our food production and basically control how GE will be used in the food system.

Unlike farmers, dominant food firms expect to achieve a 20 percent return on stockholder equity. Corporation's travel around the world "sourcing" their products wherever they can get

them produced the cheapest while selling them in the most profitable consumer markets. In the globalized system, both capital and technology—i.e. GE—are very mobile and can be moved anywhere in the world very rapidly.

Similarly to small and moderate size farmers in this country, developing world farmers are having to choose to either purchase expensive GE crops and livestock and their associated input packages or face not having access to technologically improved varieties. These farmers in both developing and developed countries are left with fewer choices because neither are the scales of these technological improvements appropriate to their needs nor are they affordable.

Sustainable agriculture is about ecologically sound, economically viable, and socially just food and farming systems. Genetic engineering as it is currently practiced is about privately held, industrialized inputs in a capital intensive global food system. If biotech continues the way it has started, most of its benefits will not accrue to farmers or consumers, but to firms that hold the technology and cooperate with other large firms in seamless systems. Decision-making will be further displaced away from the farmer and consumer. From that vantage point, genetic engineering as it currently stands is certainly incompatible with the philosophy of sustainable agriculture.

GE: IN THE PUBLIC INTEREST?

Public dollars are designated annually to public research institutions to seek solutions to agricultural problems that improve small and large farms alike. Private biotechnology corporations are increasingly capitalizing on the expertise, graduate student labor, building space, and equipment public universities and research institutions like the U.S. Department of Agriculture have to offer. By establishing partnerships with universities, or being treated as a "customer" by USDA, corporations can leverage public investments and receive inexpensive basic research from which they then develop products, seek proprietary rights and increase profits.

One example of such a public/private partnerships rose to the surface early in 1999, when it was revealed that more than \$200,000 in public tax dollars for agriculture research were spent to develop the terminator technology. This research partnership formed between the U.S. Department of Agriculture (USDA) and Delta and Pine Land Co. helped to fund the terminator technology, the process of genetically engineering seed so that it is sterile in the second generation. Terminator was financed with an investment of \$720,000 over four years. Individually, USDA spent \$190,000 and jointly, with Delta and Pine Land Co, spent another \$255,000 to finance this technology meant to guard the companies' investment in seed genetic engineering. Is it in the public interest when public dollars are used to protect corporate interests?

This research and resulting technology raised the ire of U.S. taxpayers. Farmers and consumers believe that the "terminator technology" will lead to fewer choices for small and moderate size family farmers around the globe. Their major concerns surround the ability to save seed, the technology's effects on biodiversity, and the fact that public research dollars

were spent on technologies to increase profit for corporations and not to benefit the public. Increasingly, farmers and other citizens in the U.S. are raising their concerns about where our agricultural research agenda and, subsequently, the future of our food system is headed.

More and more of the public are asking to have a say in how their research dollars are spent. There are avenues for public input, but are these avenues being taken seriously? As illustrated by the terminator example, when USDA and private industry, and likely representatives from large commodity boards, brokered a research deal farmers, consumers or environmental representatives were not invited to the research decision-making table.

Small and moderate size farms (those grossing under \$250,000 annually) account for 93% of farms in the U.S. and 40% of the production. Because the current push in agricultural research is toward biotechnologies applicable to large corporate farms (7% of U.S. farms; 60% of production) we see corporate farms on the rise (1998, Economic Research Service).

Instead of throwing money at GE, investing public dollars in research aimed at improving cover crops or developing crop varieties more amenable to cultural weed control would be of greater benefit to sustainable, small and mid-size farmers. These farmers are looking for improved management practices, affordable and appropriate scale technologies, ways to lower their costs and reliance on purchased inputs, and ways to capture more value for what they produce.

A case in point of the research push towards the more concentrated agricultural model is seen in the example of the "New Leaf" potato that has Bt as part of its genetic makeup. While widespread introduction of the new GE potatoes, soybeans, and corn are of benefit to large scale agriculture, organic growers are concerned about insect resistance to Bt. The impact of this technology on organic growers has not been researched by a public institution. Public research looking at how to combat Bt resistance has focused on developing refuge management plans, rather than finding alternatives to pesticides or safeguarding Bt as only one of few naturally occurring pesticides available to organic growers.

Another example of the corporate take over of our public research agenda, is the increasing private funding provided to public research institutions, many that are part of the public land grant (agricultural college) system. GE corporate giant Novartis recently gave \$50 million to the University of California-Berkeley School of Natural Resources to build a new research facility and to fund several research appointments, graduate students and equipment. Subsequently, the UC system is now saying it is a "publicly assisted" university rather than a "public" one. In an environment where funding for public agricultural research is declining, private/public partnerships of this nature are on the rise.

While it is evident that increasing private/public partnerships and GE have arrived, there are serious economic, ethical, and environmental implications associated with these types of alliances. Also in question are the types of "public goods" created: the pure (non-rival, non-exclusive, available to all users) and impure (non-divisible, partially exclusive by geography or organisms, available to selective users).

As public institutions move towards creation of more impure and commercial types of public goods, concerns are raised over definitions of public interest research and who the beneficiaries are. Public interest research aims at developing knowledge and/or technology that increases the commonwealth. Such research requires complex problem solving and will involve at least the economic, social, and environmental dimensions of people and natural resources. It will require that insights from these different ways of knowing be synthesized, and that an active citizenry be involved.

We find the following key benchmarks helpful in identifying public interest research:

- When the primary, direct beneficiaries of the research are society as a whole or specific populations or entities that are unable to carry out research on their own behalf;
- When information and technologies resulting from public interest research are made freely available (not proprietary or patented), and;
- When such information and technologies are developed with collaboration or advice from an active citizenry.

"Public" means "not private." Most research done in the private interest is done for the financial gain of a limited, circumscribed group. Research done in the public interest will seldom involve such direct financial gain to the developers and will benefit a community or the commons.

When private corporations leverage public dollars, research has the potential to become privately "owned," and academic freedom and the interest of the public good may come into question. In this arrangement, will questions be asked about the effects of new "genetic engineering" on the social, environmental, health and economic well being of the recipients? Public research institutions must remain true to their missions to serve the public good and to conduct research inquiry regardless of the potential for financial gain.

The U.S. Department of Agriculture and the agricultural colleges are moving towards greater public involvement in agriculture research decision-making. This is largely due to the long efforts by members of the environment, family farming and sustainable agriculture communities as well as the public in general. These efforts have long questioned the role of science in society, insisting that social ethics are a crucial part of scientific discovery and resulting technologies. In addition, "stakeholders" should mean more than token involvement by those people who will be beneficiaries of, and directly affected by, the research and resulting technologies. For example, the Agriculture Research Service, the research arm of USDA, is now conducting customer input workshops at which diverse stakeholders share their research needs and help to set the future research agenda.

U.S. Secretary of Agriculture Dan Glickman has named a diverse Advisory Committee on Biotechnology and in a recent speech to the National Press Club warned, "The potential is enormous, but so, too, are the questions..." "As we encourage the development of these production systems, we cannot blindly embrace their benefits." He also shared his concern

that in our rush to embrace new technologies and bring them into the marketplace we must take care to ensure that, "small and medium sized family farmers are not simply plowed under."

RECOMMENDATIONS

The Midwest Sustainable Agriculture Working Group (MSAWG) advocates for national policies that foster healthy and prosperous family farms and rural communities and a healthy environment. Given the concerns and issues raised about agricultural biotechnology—and in particular, genetic engineering—MSAWG groups, and other signatories of this document, support the following key policies and principles to foster this vision and support agriculture's sustainable development.

Many of our recommendations listed below center on the Precautionary Principle. The Precautionary Principle states that when an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause-and-effect relationships are not fully established scientifically. Core elements of the Precautionary Principle can be summarized as:

- Having as its primary goal the protection of the environment and public health;
- Using proactive measures toward this goal even in the face of scientific uncertainty;
- Shifting the responsibility to developers of potentially harmful technologies to show that technologies are reasonably safe, or that there are no safer alternatives; and
- Having open, informed, and democratic processes to make decisions about the acceptability of technology, research and policy goals as well as the processes to achieve these goals.

The Precautionary Principle is triggered in specific circumstances.

- When there is recognized potential for serious harm. "Serious" refers to long-term, broad-scale, persistent, accumulative and/or irreversible harm. In other words, the Precautionary Principle should be applied when the stakes are high.
- When —despite recognition of potentially serious harm—there remains significant uncertainty about the nature, extent and severity of the hazard so that precise measurements and effective control mechanisms are not feasible.
- When the situation entails highly complex interactions among many dynamic systems (including ecological, social and value systems) so that precise safety evaluation does not require simply more research and more regulation, but research and regulation *of a significantly different kind*.

Although large-scale release of GE crops fulfills all of these criteria, current regulations and research programs are not sufficiently precautionary.

Recommendation #1:

Encourage public dialogue around genetic engineering.

GE technologies are evolving without broad public input or discussion. Especially if

government institutions are involved, the process must be as transparent as possible. We recommend a series of 6 public dialogues to be organized by USDA in cooperation with a diversity of stakeholders, especially the supporters of this paper.

We suggest a dialogue in each of the following regions: Northeast, Southeast, Midwest, Southwest, Rocky Mountain West and the West Coast. These dialogues should be inclusive, fair, balanced, transparent, comprehensive and accountable.

Public input should not only be collected, but also considered. Summaries of all dialogues should be sent to all participants for feedback. This feedback must be considered before any final decisions are made on how to proceed with future regulation and legislation of GE technologies. Again, the Secretary of Agriculture's biotechnology advisory board would be an appropriate partner in conducting these dialogues and evaluating and considering the public input.

Recommendation #2:

A mandatory labeling system should be implemented whereby foods containing GE ingredients would be labeled as such at the expense of the GE developers.

Consumers have a right—and are demanding—to know if their food is a result of genetic engineering, so they can choose whether they want to purchase it. Consumers may have allergic or other health concerns, environmental concerns, religious, ethnic or ethical constraints, or would just rather not consume this type of product. Whatever the reason, consumers have the right to choose, which is best ensured through product labeling. The developers of GE should be responsible for the costs of segregating and mandatory labeling.

Recommendation #3:

Place the burden of labeling genetically engineered seeds with their developers.

Organic farmers buy much of their seed from smaller seed companies. Seed that is genetically engineered should be labeled to assist organic and other farmers in their ability to easily distinguish GE from non-GE seed. However, small seed companies that do not produce genetically engineered seeds, and so cannot collect the associated royalties, are presented with an undue burden if required to label their products as non-GE. The burden of labeling, therefore, should rest with the seed companies developing GE seeds and gene protections systems.

Recommendation #4

Establish a system that assigns full liability to companies developing GE technologies for economic and other loss caused by genetic drift and other environmental effects created through genetic engineering.

Certified organic and conventional farmers who want to produce for the expanding GE-free market face losing those markets due to genetic pollution from open pollinated GE crops. The companies that have introduced products into the environment that can potentially have

negative impacts must assume financial liability (in the form of a performance bond) for what goes wrong. This is particularly appropriate in that the corporation receives money for a licensing fee and thus should be held liable for the safety of their technology. Corporations should be held responsible for damages from currently released GE products.

Recommendation #5:

Invest public dollars in researching alternative production systems and guarantee the capacity for research in the public good.

We oppose the overemphasis on GE at the expense of agro-ecological research. To do so is shortsighted, and undesired by the public. Instead, more research emphasis should be aimed at developing the basic understanding of interactions between living organisms in agricultural ecosystems, in particular those interactions that are affected by management decisions and systems choices.

The large scale production bias inherent in the existing research system, needs to be redirected and refocused. Researching production methods that address pest problems, improve cover crops, develop crop varieties more amenable to cultural weed control, conserve and enhance soil, and produce a profitable economic return to small and moderate size family farmers is an imperative investment for public monies.

More public investment in research needs to focus on providing farmers with knowledge and research on production and marketing systems that enable them to reduce capital and input costs and to increase their share of the profit in the food system. The precautionary principle calls not only for examination of all possible solutions for a problem, but to find solutions that will minimize damage to people and the environment.

It is crucial that our public institutions take a leading role to develop and promote production systems that do not pollute nor generate other problems. Programs such as Sustainable Agriculture Research and Education (SARE) can fill this information void, but with funding representing less than 1% of total federal agricultural research dollars, it is clear that we are not putting enough resources in this area.

Recommendation #6:

Implement regulations on agricultural genetic engineering research using the Precautionary Principle and public interest science definition as guides.

The Precautionary Principle argues that it's the regulator's responsibility to take preventative action to avoid harm before scientific certainty has been established. Precautionary steps include identifying the impact of potential problems or threats of a new technology, pinpointing where scientific uncertainty exists, deciding when and how to proceed, and if proceeding, how impacts could be minimized. These are the types of vital considerations policy makers and regulators should operate under as they make decisions about agricultural

GE research. Further, we should ensure that research benefits the public's interest. Research in the public's interest is to develop knowledge and/or technology that increase the commonwealth.

Recommendation #7:

Involve more under-served stakeholders in research planning by strengthening the stakeholder input rules and plans of work guidelines at land-grant universities.

USDA and the Cooperative State Research, Education, and Extension Service (CSREES) should revise the Proposed Rule for Stakeholder Input Requirements so that the Final Rule issues strong standards and clear guidance to land-grant universities and colleges suggesting how they collect and utilize stakeholder input for the future. Guidelines for the State Plans of Work required by land grant and other recipients of federal formula funding should reflect these revisions.

The Agricultural Research, Extension and Education Act of 1998 requires land-grant colleges and universities to establish and implement a process for obtaining stakeholder input as a condition of receiving federal funds. The Rule should require a minimum level of standards and criteria incorporating fairness, transparency, accessibility, inclusion, accountability and comprehensiveness into how land-grant universities and colleges collect and utilize stakeholder input. Strong rules and plans of work that incorporate stakeholder input and review will meet Congress' mandate.

Research done in the name of the public's interest is best served when those directly impacted by this research are involved in the process. Their concerns, issues and perspectives can strengthen research conducted, and help to identify potential negative impacts of agricultural GE research.

Recommendation #8:

Because of a lack of caution during the rapid introduction of GE agriculture to date, there is now an urgent need to assess the impacts of already introduced GE products on the environment, human health, social and economic well-being of rural communities and small and moderate size farmers/ranchers. Developers and marketers of GE products should shoulder the costs of this impact research. Likewise, a sufficient research and regulatory system that honors the precautionary principle should be instituted before any new GE products are released.

GE technologies, like so many technologies, are assumed by the product developers to benefit farmers, the environment, rural communities, and consumers. This assumption is unacceptable and detrimental. Technologies must address the problems, not symptoms, of farming today and must consider the social and environmental costs with a full accounting of the external costs.

Following the Precautionary Principle, proponents of GE technology are responsible to prove that harm to the environment, people, or the economy does not come from the proposed technology, and must shoulder the costs of establishing this information. If a corporation is the

ultimate benefactor of this technology, it should bear the costs.

According to the Precautionary Principle, monitoring should be conducted by an independent party. Preferably this party is a public body that holds the interest of the public, rather than the company in question in order to preserve objectivity.

Recommendation #9:

Protect the right of public domain over seeds and germplasm.

We must strengthen our national seed banks, and work together with a broad range of farmers, researchers and others to preserve genetic biodiversity. Research and development conducted at our public universities must remain in the public domain. Much public concern has been expressed over the use of public funds to develop the "terminator technology."

We recommend that the biotechnology advisory board being appointed by the Secretary of Agriculture reviews the right of public domain and whether the public's right to public domain seed and germplasm materials is being infringed upon by patenting and proprietary rights laws. Genetic resources should not be patented and owned by private corporations with the aid of public tax dollars. The public should have the same rights of access to seeds and other genetic resources as the private sector.

Recommendation #10:

Return production control to farmers by enforcing anti-trust laws.

Monopolization of the food system by a few vertically integrated corporations is illegal, and is leaving farmers with little decision-making power. GE technologies further the control of farming inputs by a few corporations, thereby reducing farm level decision-making. Moreover, GE technologies have the potential to allow corporations to increase vertical integration by making market access dependent upon particular genetic material, a situation that already exists in the poultry and hog industries.

GE is an inherently consolidatory technology (see pages 11-12 above) and thus falls under anti-trust legislation. The United States Department of Agriculture and Justice Department must enforce existing anti-trust laws. Adequate funding must be provided to support enforcement efforts.

Recommendation #11:

Seek ways for farmers, consumers and communities to again be directly connected in the production and consumption of food.

Despite proponents' claims, GE will not solve our environmental, hunger, and economic problems, and in fact may significantly contribute to these problems. Much effort and thought must be put into dealing with these serious challenges. There is no magic bullet.

We must provide adequate funding for innovative programs, such as the Community Food Security Project, which ties together farming and the community to address hunger issues and establish food security. Supporting rural development and cooperative programs, such as the Rural Cooperative Development Grant Program, is key to assisting farmers with linking back to consumers.

While direct marketing, selling at farmers markets or other local markets are viable options for some, other farmers need other forms of market access. Connecting people and communities back to their food is a necessary step in a sustainable and responsible food system.

STATE OF KANSAS

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KANSAS DEPARTMENT OF AGRICULTURE

Senate Agriculture Committee

February 20, 2001

Written Testimony Regarding SR 1804

Kansas Department of Agriculture

Good afternoon Chairman Schmidt and members of the committee. Thank you for accepting the Kansas Department of Agriculture's written testimony as you consider Senate Resolution 1804.

For tens of thousands of years, humans have used selective breeding, a rather crude form of biotechnology, to encourage the development of plants and animals with specific desirable characteristics. For the past few decades, universities and seed companies have studied plant genetics to determine how biology may be used to isolate specific traits to incorporate them into agricultural plants to improve farming methods and increase yields.

So far, biotechnology has led to crop varieties that resist widely used herbicides, saving the agricultural industry about \$200 million a year, and breeds that naturally resist pests, including corn that repels the corn borer, a pest that costs more than \$1 billion annually in control measures and yield losses. Since 1996, the percentage of U.S. crops planted to biotech varieties has grown to about a fourth for corn and more than half for soybeans.

On the horizon are agricultural plants that produce greater yields, produce foods with a longer shelf life, produce foods with increased nutritional value, and plants that are amenable to a wider range of climatic conditions. All of these qualities are important to an agricultural system that must expand production to meet the needs of a growing world population.

Agricultural biotechnology is currently regulated by three federal agencies. The U.S. Department of Agriculture oversees field-tests to ensure that new crop varieties are at least as safe as those developed through traditional breeding, the Food and Drug Administration ensures the safety of all foods and ingredients developed with biotechnology, and the Environmental Protection Agency ensures the safety of crops with pest protection characteristics.

Last fall the American Medical Association established its policy regarding food-producing plants derived through biotechnology. It stated that existing science-based federal oversight and policy should continue, and it emphasized the need for government, the agriculture industry, and the scientific and medical communities to work together to educate consumers about the benefits of biotechnology.

The Kansas Department of Agriculture supports biotechnology and its role in contemporary agriculture. Therefore, we support the passage of Senate Resolution 1804.

Senate Agriculture Committee

Date 2-20-01

Attachment # 6

Kansas Corn Growers Association
Kansas Grain Sorghum Producers
P.O. Box 446
Garnett, Kansas 66032

Date: February 20, 2001

To: Senator Schmidt, Chair
Senate Agriculture Committee

From: Jere White, Executive Director
Kansas Corn Growers Association/Kansas Grain Sorghum Producers

Re: Senate Concurrent Resolution 1804; Agricultural Biotechnology

Senator Schmidt - due to a previous commitment, I am attending meetings out-of-state today and am unable to appear in person for the Senate Agriculture Committee's hearing. I would like to submit the following written testimony on behalf of the Kansas Corn Growers Association and Kansas Grain Sorghum Producers in support of SCR 1804.

SCR 1804 would promote model language developed last year by the Council of State Governments to support the continued development of agricultural biotechnology due to the many benefits we expect to be derived from this rapidly growing scientific and production sector. While we support continued government oversight of crop genetic engineering, we also see vast potential benefits resulting for all of us from this scientific research that will improve the production, uses, and benefits of many of our agricultural commodities.

Future applications of these technologies only begin with meeting the challenges of feeding a rapidly growing world population. Other potential benefits from these developments are likely to include more nutritious foods as well as industrial and even pharmaceutical applications for the future health and well being of both humans and our environment.

For these reasons, we request your approval of SCR 1804 or similar language supporting the continued development of agricultural biotechnology. Thank you for the opportunity to provide this written testimony.

Senate Agriculture Committee

Date 2-20-01

Attachment # 7