

THE GOOD NEWS
SUMMARY

THE GOOD NEWS

There is a profound spiritual awakening occurring here in America as evidenced by a growing commitment to deep ecology, peace, and wholistic health... Today, via the printed word and the miracle of the internet tens of millions of health conscious individuals have access to invaluable information regarding programs, products, information and ideas which serve to actualize genuine health... To summarize, in response to our current self-induced Environmental/Ecological /Health "Crisis", we Americans are becoming progressively aware of the importance of:

- Common Sense
- Adequate Sunlight
- Proper Nutrition and the Underconsumption of Food
- Pure Water
- Fresh Air
- Meaningful Work and Relationships
- Adequate Rest
- Healthy Mental/Emotional Attitudes
- Moderate Exercise
- Spiritual Awareness

COMPREHENSIVE HEALTH CARE REFORM

In light of a developing awareness, as documented in the preceding pages, it is self evident that now is the time to initiate comprehensive health care reforms in America... The good news is that this process of comprehensive health care reform is in motion now.

OUR FUNDAMENTAL THESIS

As we become aware that health is a function of lifestyle and as the business of America becomes the business of health for our people, we shall become a peaceful nation of strong, vital socially conscious and creative individuals... Through eco-agriculture, environmental awareness, wholistic health education, and comprehensive wholistic health insurance for all, we will manifest individually and collectively our inherent birthright..Freedom From Dis-ease...

ECONOMIC/ECOLOGIC RECOVERY PLAN

Our Lost Wealth: People + Natural Resources = Real Wealth

THE UNITED STATES WASTES MORE THAN \$2 TRILLION ANNUALLY

“Our Lost Wealth” is excerpted from Paul Hawken’s “Natural Capitalism,” the cover story of Mother Jones magazine’s April ‘97 issue. Hawken argues that business’ focus on “using more resources to make fewer people more productive” has the perverse effect of eliminating jobs when labor is plentiful while depleting our limited natural resources. The result: immense resource waste and incalculable social waste stemming from a growing population of un- and underemployed people. Look for Mother Jones on your local newsstand or call 1-800- GET-MOJO to request a trial issue. Paul Hawken is an internationally known businessman and author.

The United States prides itself on being the richest country in the world. yet we can’t balance the budget, pay for education, or take care of the aged and infirm. How is it that we can have both a growing economy and a growing underclass?

In politics, they say “follow the money.” What you find is that the waste in resources and people shows up in our overall gross domestic product (GDP). Of the \$7 trillion spent every year in the United States, we waste at least \$2 trillion. What is meant by waste? Money spent where the buyer gets no value.

GET OUT YOUR CALCULATORS

The World Resources Institute has found that roadway congestion costs \$100 billion per year in lost productivity, not counting gasoline, accident and maintenance costs. Highway accidents cost \$358 billion per year, including \$228 billion in pain and suffering and \$40 billion in property damage. We spend another \$85 billion indirectly subsidizing free parking at shopping malls and workplaces. The hidden social costs of driving - hidden because they are not paid by motorists directly - also include disease and damage to crops and forests caused by auto exhaust. these charges total \$300 billion.

We spend \$50 billion a year to guard sea-lanes and to protect oil sources we would not need if President Reagan had not gutted emission standards in 1986. We spend nearly \$200 billion a year in supplementary energy costs because we do not employ the same energy efficiency standards for our businesses and homes as do the Japanese.

We waste around \$65 billion on non-essential or fraudulent medical tests and, by some estimates, \$250 billion on inflated overhead generated by the current health insurance system. We spend \$52 billion on substance abuse, \$69 billion on obesity treatments, \$125 billion on heart disease, and, some estimate, as much as \$100 billion on health problems related to air pollution.

Legal, accounting, audit, bookkeeping and record-keeping expenditures to comply with an unnecessarily complex and unenforceable tax code cost citizens at least \$250 billion a year; what Americans fail to pay the IRS adds up to another \$150 billion.

Crime costs taxpayers \$450 billion a year; lawsuits, \$300 billion. These figures don’t include disburse-

ments for Superfund sites, monies to clean up nuclear weapons facilities (estimated to be as high as \$500 billion), the annual cost of 25 billion tons of material waste, subsidies to environmentally damaging industries, loss of fisheries, damage from overgrazing, water pollution, topsoil loss, government waste, gambling, or the social costs of unemployment. Conceivably, half the GDP is spent on waste.

If we could shift a portion of these expenditures to more productive uses, we would have the money to balance our budget, take care of those who cannot care for themselves, raise wonderfully educated and responsible children, restore degraded environments, and help developing countries. If, for example, we had simply adopted stricter energy standards in 1974 - standards in use by Japan - and had applied the savings to the national debt, we would not have a national deficit today.

(Reprint, Earth Times, May, 1997 edition)

ECOLOGICAL ECONOMICS

The International Society for Ecological Economics (ISEE) is concerned with extending and integrating the study of management of “Nature’s household” (ecology) and “humanity’s household” (economics). This integration is necessary because conceptual and professional isolation have led to economic and environmental policies that are mutually destructive rather than reinforcing in the long term.

...IN THE END, A HEALTHY ECONOMY CAN ONLY EXIST IN SYMBIOSIS WITH A HEALTHY ECOLOGICAL SYSTEM....

An increasing awareness that our global ecological life-support system is endangered is forcing us to realize that decisions made on the basis of local, narrow, short-term criteria can produce disastrous results globally and in the long run. There is also a growing acknowledgement that traditional economic and ecological models and concepts fall short in their ability to deal with global ecological problems.

Ecological Economics is a transdisciplinary field of study that addresses the relationship between ecosystems and economic systems in the broadest sense.

Ecological Economics goes beyond the normal conceptions of scientific disciplines and attempts to integrate and synthesize many different disciplinary perspectives in order to achieve an ecologically and economically sustainable world.

Innovative research aimed at articulating the mechanisms by which human populations can strike a dynamic balance between economic development and the ecological constraints they face constitutes the foundation on which the future will be built. Critically important research is needed to facilitate the transition to sustainable global production systems. To be effective, this research must be integrated into environmental and economic policy at the local, regional, and international level.

Primary topics of ecological economics research include:

Sustainability: What do we mean by - and how do we quantify - health and sustainability in ecological and economic systems? How do we maintain a sustainable life-support system? What are the relationships between ecological, economic, and cultural sustainability?

Natural Resource Valuation: What are the most sensible ways of assigning value to natural resources and natural capital? What is the role and value of biodiversity?

System Accounting: Conventional measures of economic performance do not factor resource depletion or environmental degradation into economic trends, thus presenting an incomplete and skewed picture of economic welfare. How can we create better accounting systems that integrate resource depletion and ecological impacts into national and international economic performance?

Ecological and Economic Modeling: Preserving and protecting threatened ecosystems requires an understanding of the direct and indirect effects of human activities on large geographical areas over time. How can we create an integrated, multiscale, pluralistic approach to quantitative ecological economic modeling while developing new ways to effectively deal with the inherent uncertainty involved

in modeling complex systems?

Institutions for Sustainable Governance: What regulatory and/or incentive-based instruments are most appropriate for assuring sustainability? How can governmental and other institutions be modified to better account for and respond to the environmental impacts of economic development?

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THE ECONOMY/ENVIRONMENT

All The Power That Ever Was Or Will Be, Is Here Now...

ECO-NOMICS

\$100 Billion

We support a rapid transition from a fossil fuel/fission economy into a sustainable ,global solar/hydrogen/hemp based economy through the creation of The Gaia/Solaris Consortium,a national corporation which invests in non-polluting energy technologies such as cold fusion ,fuel cells, photovoltaics, wind energy biomass, ocean thermal energy conversion and superconductors...This Corporation will be funded by the public /private sector via investment credits, donations, the Tobin Tax (**tobintax.org**) and various Green Taxes... Through Conscious Capitalism we will solve global warming, create millions of new jobs, dramatically reduce our dependence on middle-eastern oil , and initiate a Golden Age of clean unlimited energy for the Global Family...

INFINITE ENERGY = INFINITE PROSPERITY = INFINITE FREEDOM

(EarthFuture.com, phoenixproject.net)

ECO-AGRICULTURE

The Strenght Of Our Nation Is Directly Proportional To The Health of The People...The Strenght Of Our People Is Directly Proportional To The Health Of Our Soil..Healthy Soil Creates Healthy Plants...Healthy Plants Creates Healthy People....

THE HEALTH OF THE EARTH & ITS PEOPLE

The wholesale industrialized exploitation of nature for short-term gain cannot be sustained; it is a major component of what we have termed agricide. The crime of agricide is perpetrated on a variety of fronts, and its far-reaching consequences show that the health of earth and its inhabitants cannot be separated.

EROSION & DEPLETION OF RESOURCES

Agricide includes escalating soil erosion; the impoverishment and poisoning of the soil; the pollution of lakes, rivers, and oceans from the runoff of topsoil contaminated with chemicals; the destruction of groundwater sources from pollution and overuse; the use of nitrogenous fertilizers that are also implicated in the destruction of the earth's ozone layer; and the development of fast growing, high yield hybrid strains of crops and animals that are more susceptible to disease. An estimated 85% of all U.S. agricultural land is used in the production of animal foods, which in turn is linked with deforestation, destruction of wildlife habitats, extinction of species, loss of soil productivity through mineral depletion and erosion, water pollution and depletion, overgrazing, and desertification.

The USDA estimates that cropland erosion is occurring in the United States at a rate of two billion tons of soil a year. (Other analysts contend that the rate is four to six billion tons.) In 1970, the National Academy of Sciences reported that the nation had lost one-third of its topsoil. Soil erosion and land development together account for an estimated loss of some thirty-four square miles of U.S. agricultural productivity every day.

The same problem is taking place throughout the world. At the present rate of land degradation, one-third of the world's arable land will be desert by the turn of the century.

Congress has taken action to help prevent one major source of soil erosion - that by "sodbusters." The sodbuster phenomenon in western states has entailed the plowing and seeding of hundreds of thousands of highly erodible rangeland, motivated by federal farm supports and the increased resale value of such land to investors seeking tax shelters. It is quite likely that the Department of Agriculture has come up with a solution to soil erosion that is actually worse than the problem they are endeavoring to correct: more farmers are now practicing what is called conservation tillage, which entails less frequent tilling of the land; instead, repeated spraying with herbicides is done to control weeds.

One of the main problems with conservation tillage practiced according to this model is the further poisoning of groundwater and contamination of crops grown on poisoned land. As Dr. I. Garth Youngberg, executive director of the Institute for Alternative Agriculture, and Agricultural Research Services (USDA) scientists J. F. Parr and R. I. Papendick observe, "Up until four decades ago, conventional agriculture in the U.S. was, for the most part, beneficial to the support and proliferation of many wildlife species." They cite that "monoculture grain production along with intensive row cropping, clean tillage cultivation, larger machinery, and heavy applications of chemical fertilizers and pesticides (have resulted in) a concomitant decline in the (wildlife) food base, habitat areas, and in turn, the numbers and species of wildlife . . .

The need and desire to preserve and enhance fish and wildlife resources is one of the most important factors accounting for the increased interest in alternative agriculture."

UNSOUND ANIMAL HUSBANDRY

The U.S. cattle industry is beginning to turn back to raising cattle on range and forage because fattening and finishing cattle primarily on grains is becoming too costly. Thus, to cut production costs, this ecologically unsound industry is going to intensify its impact on the natural environment. Beef magazine states, "Grazeable land is America's largest natural resource. One half of the land area in the United States is covered with forage. That's more than one billion acres, enough to give every cow 200 acres to graze all by herself!" While we may find it aesthetically pleasing to see green rolling hills covered in sheep, and cattle roaming on the wide open range, we should not be tricked into thinking that these pastoral scenes are natural. They are industrialized landscapes that should be returned to nature.

Cattle and sheep-ranching industries are subsidized by the public, and private landowners enjoy tax advantages for clearing tropical rain forests and other natural ecosystems for agricultural development as has been done in Hawaii. This is not to say that natural grazing is undesirable. Professor Calvin Sehwahe observes that, of the 37.5 billion acres of the earth's land not covered by ice, only 3.75 billion acres could be cultivated, and most of this is already under plow. Some 1% of the sun's energy reaching the earth is stored in plants. The utilization of this energy for feeding man is possible only through the activities of grazing and browsing animals that harvest under their own power and convert into the highest quality human food - highly scattered or otherwise inaccessible plant life.

Some 7.5 billion acres are usable for this purpose, at a reasonable level of production, worldwide. This is about twice the amount of land that is available for cultivation. Sehwahe estimates that 60% of the world's animal protein production, about thirty million metric tons, now comes from these nonarable lands. Herbivorous animals, and particularly ruminants such as cattle, "provide the sole vehicle by which much of the earth's surface can be exploited for food production." But, as Dr. Hoperaft has known; it may be more prudent to replace cattle, sheep, and goats with indigenous wild ruminants.

PESTICIDES AND POLLUTANTS

In some areas, the land is saturated with synthetic fertilizers; rivers become polluted with the water runoff from these areas. The people of the United States are pouring into the sea, lakes, rivers and underground waters six to 12 million pounds of nitrogen, two to four million pounds of potassium and 75,000 to three million pounds of phosphorus per million of adult population annually, and this waste we esteem one of the great achievements of our civilization.

The widespread use of insecticides results in the nonselective poisoning of both "good" and "bad" insects. Worse, this practice can lead to the development of resistant strains and to the unchecked multiplication of currently harmless but naturally resistant insects, which then become pests because the other insect species and predatory birds that normally keep them in balance have been killed off.

According to Dr. H. M. Caine of the University of California, Santa Cruz, one-third of the American diet depends directly or indirectly on crops pollinated by honey bees and 6% of farm production (\$3.5 billion) is at least indirectly dependent on such pollination. But pesticides are now at work reducing the bee population by an estimated 2% per year. this loss could have serious agricultural consequences. Nevertheless, the AFBF supports the "modification of existing regulations to more easily permit restricted use of previously cancelled pesticides under emergency conditions."

The problems of dealing with the 1.24 billion tons of solid and liquid waste from animals are astronomical. this byproducts is not a natural manure that can be easily recycled onto the fields. Rather, it

has high concentrations of drugs, arsenic, and copper, and abnormally high amounts of undigested protein; it is therefore a serious freshwater pollutant. Disposing of manure in oxidation lagoons deprives the fields of nitrogenous fertilizer.

There is also the problem of topsoils that show declining levels of essential nutrients (nitrogen, phosphorus potassium, etc.), which, in turn, decreases crop production and resistance to disease, impairs the health and productivity of farm animals, and lessens the nutritive value of the crops to customers.

On the other hand, soil erosion and irrigation can lead to the accumulation of toxic levels of trace elements in lakes located in drainage areas distant from agricultural activities. And in some areas there is natural excess, and with selenium in Southern California, and with aluminum over much of the world. This is being leached from the soil by acid-rain pollution and now contaminates lakes, rivers, and drinking water. (It has been implicated in Alzheimer's disease, or premature senility). Air pollution is a serious threat to agricultural productivity. Sulfur dioxide and nitrous oxide emissions from electrical utilities and automobiles cause harmful acid rain. Nitrous oxide also breaks down into photochemical oxidants, which are toxic to plants and impair photosynthesis. It has been estimated that a reduction in ambient ozone levels of 25% would produce nearly \$2 billion in benefits, while a 25% increase would lead to an additional \$2.3 billion in crop losses.

Waterfowl are now suffering the consequences of improper land use in the San Joaquin Kesterson reservoir in California. Selenium (from distant, selenium-rich fields) has built up in plants and fish the birds eat. Forty percent of waterfowl eggs contained dead embryos in 1981, and 20% of hatched chicks had deformities: swollen heads, no eyes, legs, wings, etc.

According to Larry Ephron, and agricultural historian and analyst, the German chemist Justus van Liebig, over a century ago, analyzed the ash residue of burned plants and found that the primary components were potassium, nitrogen, and phosphorus. His findings became the basis of using these artificial chemicals as fertilizer. Had he available then modern analytical equipment, he would have been able to identify more than 90 different essential elements in plants that should be returned to the soil. Apparently realizing the hazards of using such a limited range of artificial chemical fertilizers which he had helped stimulate, he wrote that he had "sinned against the wisdom of the Creator." Applying potassium, nitrogen and phosphate certainly boosted crop yields, but this caused serious imbalances in the soil and other essential nutrients were not put back.

The deficiencies in our agricultural soil and the crops we and farm animals eat are so marked that simply putting crushed gravel screenings onto the soil and kiln dust into animal feed will dramatically increase the farmer's yields of grain and meat alike.

Many of the diseases that afflict us, our domestic animals, and our crops and forests are related in part to deficiencies in certain essential trace minerals. Immunosuppression and increased susceptibility to stress, pathogenic organisms (especially viruses), and chemical (natural and industrial) poisons, carcinogens, mutagens and teratogens, and possibly emotional instability, have been linked with trace mineral deficiencies and imbalances. How have these trace-mineral deficiencies arisen? First, from natural erosion, which has been accelerated by deforestation, strip-mining, and intensive agriculture. And especially from accelerated extraction through cropping and not returning what we take from the land.

What is returned is not blood, bones, antlers, manure, and the dead remains of animals, but artificial

fertilizers - nitrogen, phosphates, and potash. This is not enough. though they temporarily help boost yields, the crops are nutritionally deficient. These synthetic fertilizers - some of which are derived from nonrenewable fossil fuels - do not sufficiently enhance the health of the crops, so more pesticides and herbicides are needed.

Lacking organic material as well as trace minerals and carbon essential for humus formation, the soil - the 'flesh' of the earth - does not hold moisture. The rains run off it and the winds blow away the topsoil, or it becomes quickly compacted, necessitating heavy tractor power to plow it for seeding, which further compacts the earth.

The United States holds the world record for the consumptive use of water for food production with animal products accounting for 85% of the total. It has been estimated that the use of water for irrigated agriculture has tripled since 1940. Irrigation now accounts for over a fourth of the nation's crops. Groundwater supplies 25% of all water used in the United States and about 40% of all irrigation water.

The vast underground reservoir known as the Ogallala Aquifer, underlying the Great Plains grain belt, is being depleted rapidly to irrigate fields that were meant only for dryland farming. The quality of the aquifer is now seriously threatened by fertilizers, pesticides, and salination.

Residues from the insecticide toxaphene have been found in rainwater in Bermuda and in rivers and lakes in 29 states sampled nationally by the EPA. (It has also been found in fish-eating birds, including the endangered brown pelican in Louisiana.) Recently, pesticides have also been implicated in creating algal blooms in fresh water, a phenomenon that could aggravate the ecological problems of other river pollutants, particularly nitrates (from fertilizers), mercury (from fungicides, paper mills, etc.), and cadmium and lead (from sources such as automobile pollution and sewage runoff).

LIVING WITH CONSEQUENCES

The threats to public health caused by the foods we eat come primarily from two sources: chemical and bacterial contamination. A secondary problem is the unhealthiness of the standard American diet.

Hazardous chemicals used as pesticides (including herbicides) and antibiotics, growth stimulants and other drugs in animal feeds are absorbed into the meat, eggs, and dairy products we consume. There is increased reliance upon a last-spray pesticide treatment of crops to prevent spoilage; artificial ripening with gas and petroleum, wax covering of vegetables, and greater use of food preservatives (some of which may be carcinogenic).

Additional chemicals are used for their color - or flavor-enhancing and stabilizing properties. Other compounds are employed to facilitate storage, and freezing is accomplished with other ingredient-extending and "fortifying" chemicals. (Sugar, for example, is one of the most ubiquitous of these chemicals.) The EPA is considering the ban of daminozide, a possible carcinogen that is sprayed on apples to make them ripen uniformly and so permit the grower to call in only one team of pickers.

While a few of these agrichemicals undergo rapid natural degradation, many are stored in their original form within plants (for example, dieldrin accumulates in carrot tissue) and will therefore later be ingested by us or by farm animals who will further concentrate them and then pass them on to us. Arsenic, poisonous to humans, is fed to poultry to improve their looks and stimulate their appetites. As has been noted, beef cattle are fed with poultry manure, the rendered remains of animals, and such surplus agri-

cultural produce as oranges and pineapples, all of which already contain chemicals. Chemicals such as DVT enter into the food chain in these ways. (Some chemicals may even become more toxic when they are partially metabolized in the body: DDE and DDD are breakdown products of DDT that result in impaired eggshell formation and hatchability (especially in predatory birds.)

Countless chemicals (such as kepone, dieldrin, and DDT) accumulate in the bodies of freshwater and marine organisms, possibly lowering their viability, and it is through them, via the food chain, that we eventually intoxicate ourselves. While many of these chemicals are originally stored in body fat, under stress and during location they may be released into the bloodstream.

According to an extensive study conducted by the National Research Council (NRC) and released in March 1984, there are some, 3,350 pesticides in use, and most have not been adequately tested. Toxicity data were either inadequate or nonexistent for 64% of these substances. It was concluded that 50% of the cancer studies and 75% of the genetic toxicity experiments which had been done on pesticides were flawed and unreliable. In essence, because of inadequate scientific testing and data, complete toxicity and health exposure assessments are available for only about 10% of the pesticides and 5% of the food additives in commercial use in the United States. The Environmental Protection Agency is reportedly ten years behind in its safety testing program. Much of this delay has been created by private-contracting testing laboratories that falsify their reports, a fact that has necessitated the establishment of a new governmental regulatory division to ensure good laboratory practices.

It has been estimated that as much as 90% of all human cancers are caused by environmental factors ranging from pesticides to industrial chemicals, according to the National Cancer Institute (NCI).

Heptachlor, a pesticide strongly suspected of being a "complete" carcinogen (Capable of both initiating and promoting cancer), reached levels as high as 2.7 parts per million in the milk of thousands of cows in Hawaii in March 1982. The FDA's "action level," at which the contamination level exceeds 0.3 ppm and milk cannot be sold, was clearly surpassed. Cattle had been fed chopped pineapple tops that had been heavily treated with this pesticide under EPA permit.

How frequently such instances of pesticide contamination of our food chain occur is unknown. We will only know for certain generations from now, if and when the cancer epidemic in society begins to subside following drastic restrictions in the use of agrichemicals worldwide. Many however, along with industrial chemicals such as PCB, will remain in the food chain for generations, since their biodegradation is so slow. And since cancer is such a complex disease, with a long dormancy period, accurate identification of its causal agents is virtually impossible. The problem is compounded by the fact that there are so many different chemicals contaminating the environment and the tissues of our bodies.

Toxaphene is used widely to rid livestock of external parasites; it is a chlorinated hydrocarbon related to the now-outlawed compounds aldrin, dieldrin, and DDT. Some 40 - 100 million pounds of toxaphene are probably used annually by farmers. According to the NCI, this drug causes liver cancer in mice and, possibly, thyroid cancer in rats. Cattle have been killed with this drug from being sprayed by government veterinarians. This complex compound also contains both carcinogenic and mutagenic components. As has been noted, toxaphene has been discovered in water and fish-eating birds; it has also been found in market-basket food samples taken by the FDA; milk in Arizona; and catfish and other commercially sold fish in Louisiana.

The herbicide 2,4,5-T, widely used by the U.S. Forest Service, and other related herbicides contain

dioxins, which are highly toxic chemicals (they cause birth defects in laboratory animals at doses in the range of several hundred parts per trillion), and are possible the most potent carcinogens know. Any chemical that is deliberately (pesticides) or accidentally (radioactive waste, lead from air pollution) broadcast onto the crops or pasture that cattle eat may be concentrated in the meat (fat) or other internal organs, or pass into the milk (especially fat-soluble chemicals in the cream) and thus be ingested by people. Pesticides such as DDT, Aldrin, dieldrin, dioxins from the herbicide 2,4,5-T, aflatoxins from moldy feeds, PCP, and PBB are concentrated in cows milk from contaminated and moldy feed and contaminated pastures.

Other drugs (such as methoprene and permethrin to control ticks and flies) used in cattle, whether administered orally or by injection, may, like the PBB's, act as immunosuppressants. Ironically, the dairy cow and the human female are emerging as the ideal "guinea pigs" for monitoring the food-chain accumulations (or "biomagnification") of such dangerous chemicals in our species.

CORPORATE CONTROL OF FOOD, FARMING AND HEALTH

The pace of corporate concentration within the “life industry” is accelerating, according to a new report by the Rural Advancement Foundation International (RAFI). “Life industry” is a term used by the giant transnational enterprises that basically control production and sales of commercial products for agribusiness, food and pharmacy. The report warns that market dominance by these giant corporations combined with monopoly patents results in unprecedented corporate control over the biological basis for commercial food, farming and health.

The Gene Giants: Masters of the Universe? is RAFI’s third annual report on the transnational enterprises that dominate commercial sale of pesticides, seeds, pharmaceuticals, food and animal veterinary products. As traditional boundaries between the pharmaceutical, biotechnology, agribusiness, food, chemicals, cosmetics and energy sectors disappear, transnational firms are using complementary technologies such as high throughput screening, combinatorial chemistry, transgenics and genomics to become the primary players in all of these industrial sectors.

According to RAFI, a radical transformation of the global economy is well underway. Many of the world’s largest chemical corporations are shifting out of commodity petrochemicals into biology, changing from industrial chemicals to agribusiness, pharmaceuticals and food. For example, as recently as 1996, Monsanto was the fourth largest chemical company in the United States. In a dramatic shift to biotechnology, Monsanto spun off its US\$3 billion industrial chemicals business as a separate company in 1997. Since 1996, Monsanto has spent over US\$8 billion acquiring seed and agricultural biotechnology companies.

In 1998, Hoechst (Germany) spun off Celanese, its U.S. chemical subsidiary, in order to meet its goal of getting out of the industrial chemical industry by the end of 2000. In December, Hoechst and France’s Rhône Poulenc merged to form Aventis “the world’s biggest life science company.” With combined sales of US\$20 billion per year, Aventis becomes the world’s top ranking firm in sales of pharmaceuticals, agrochemicals and veterinary medicines. The combined research and development budget for Aventis will reach US\$3 billion, roughly the equivalent of 40% of all funding for agricultural research in the private sector.

Food and beverages

The food and beverage giants, however, are the “true titans” of the “life industry.” The total retail value of global food sales is estimated at US\$2,000 billion, over six times larger than pharmaceutical sales. Put another way, the 1997 revenues of the world’s largest food and beverage corporation (Nestle, US\$45.3 billion) surpassed both the entire commercial seed industry (US\$23 billion) and the entire agrochemical industry (US\$31 billion). As genetic engineering and related technolo-

gies become more widely used to alter the function and performance of plants, animal and common ingredients, the food and beverage industry is likely to enter into strategic alliances, mergers and acquisitions with seed, biotech, agrochemical and pharmaceutical firms.

Medicinal foods

With the development of so called “functional foods” and “nutraceuticals,” the lines between food and

medicine are blurring, further enticing food processors, agbiotech firms and drug companies to merge complementary interests in food, biotechnology and pharmaceuticals.

Companies such as DuPont, Kellogg, ConAgra, Mars, Astra/ Zeneca and others are rushing to genetically engineer foods that claim to enhance health and well being. According to industry analysts, the sale of foods touting healthy properties is expected to soon reach US\$29 billion a year, from virtually zero in 1990. (Note that US\$29 billion is higher than the global commercial seed market at US\$23 billion.)

Seeds

The top ten seed companies control over 30% of the US\$23 billion commercial seed market. However, corporate market share is much higher in specific seed sectors and for certain crops. For example, 40% of U.S. vegetable seeds come from a single source and just four companies control 69% of the North American seed corn market. Following DuPont's March 1999 announcement that it would acquire the rest of Pioneer Hi Bred International for US\$7.7 billion, the Wall St. journal said the deal "effectively divides most of the U.S. seed industry between DuPont and Monsanto."

The commercial market for genetically engineered seeds has expanded dramatically in scale and geographic scope. From 1986 to 1997, approximately 25,000 transgenic crop field trials were conducted in 45 countries on more than 60 crops and ten traits. Of this total, nearly half (10,000) were conducted in the last two years. According to the International Seed Trade Federation, the world market for genetically engineered seed is expected to reach US\$2 billion by the year 2000 and will triple to US\$6 billion by 2005.

CONCLUSION

RAFI states that unchecked corporate power coupled with the vanishing role of public sector research will affect all areas of global health, agriculture and nutrition. Neglect of the public good is inevitable when the research agenda is determined by the private sector in pursuit of corporate profits. Access to food, health and nutrition once considered a fundamental human right is now subject to the whims of the free market system.

Source: The Gene Giants: Master of the Universe? RAN Communique, March/April 1999,
www.rafi.org

Contact: Rural Advancement Foundation International Publications, P.O. Box 68016 RPO Osborne,
Winnipeg MB R31, 2 V9, Canada.

Credit: Pesticide Action Network (415) 981-1771

G E FOODS

Hazards of Genetically Engineered Foods and Crops: Why We Need A Global Moratorium

Ronnie Cummins

Introductory overview

The technology of genetic engineering (GE), wielded by transnational “life science” corporations such as Monsanto and Novartis, is the practice of altering or disrupting the genetic blueprints of living organisms — plants, animals, humans, microorganisms — patenting them, and then selling the resulting gene-foods, seeds, or other products for profit.

Life science corporations proclaim, with great fanfare, that their new products will make agriculture sustainable, eliminate world hunger, cure disease, and vastly improve public health. In reality, through their business practices and political lobbying, the gene engineers have made it clear that they intend to use GE to dominate and monopolize the global market for seeds, foods, fiber, and medical products.

GE is a revolutionary new technology still in its early experimental stages of development. This technology has the power to break down fundamental genetic barriers — not only between species — but between humans, animals, and plants. By randomly inserting together the genes of non-related species — utilizing viruses, antibiotic-resistant genes, and bacteria as vectors, markers, and promoter—and permanently altering their genetic codes, gene-altered organisms are created that pass these genetic changes onto their offspring through heredity.

Gene engineers all over the world are now snipping, inserting, recombining, rearranging, editing, and programming genetic material. Animal genes and even human genes are randomly inserted into the chromosomes of plants, fish, and animals, creating heretofore unimaginable transgenic life forms. For the first time in history, corporations are becoming the architects and “owners” of life. With little or no regulatory restraints, labeling requirements, or scientific protocol, bio-engineers have begun creating hundreds of new GE “Frankenfoods” and crops, oblivious to human and environmental hazards, or negative socioeconomic impacts on the world’s several billion farmers and rural villagers.

Despite an increasing number of scientists warning that current gene-splicing techniques are crude, inexact, and unpredictable — and therefore inherently dangerous —pro-biotech governments and regulatory agencies, led by the US, maintain that GE foods and crops are “substantially equivalent” to conventional foods, and therefore require neither mandatory labeling nor pre-market safety-testing.

This Brave New World of Frankenfoods is frightening. There are currently more than four dozen genetically engineered foods and crops being grown or sold in the US. These foods and crops are widely dispersed into the food chain and the environment. Over 70 million acres of GE crops are presently under cultivation in the US, while up to 500,000 dairy cows are being injected regularly with Monsanto’s recombinant Bovine Growth Hormone (rBGH).

Most supermarket processed food items now “test positive” for the presence of GE ingredients. In addi-

tion several dozen more GE crops are in the final stages of development and will soon be released into the environment and sold in the marketplace. According to the biotechnology industry almost 100% of US food and fiber will be genetically engineered within 5-10 years. The “hidden menu” of these unlabeled genetically engineered foods and food ingredients in the US now includes soybeans, soy oil, corn, potatoes, squash, canola oil, cotton seed oil, papaya, tomatoes, and dairy products. Genetic engineering of food and fiber products is inherently unpredictable and dangerous — for humans, for animals, the environment, and for the future of sustainable and organic agriculture.

As Dr. Michael Antoniou, a British molecular scientist points out, gene-splicing has already resulted in the “unexpected production of toxic substances... in genetically engineered bacteria, yeast, plants, and animals with the problem remaining undetected until a major health hazard has arisen.” The hazards of GE foods and crops fall basically into three categories: human health hazards, environmental hazards and socioeconomic hazards. A brief look at the already-proven and likely hazards of GE products provides a convincing argument for why we need a global moratorium on all GE foods and crops.

Toxins & Poisons

Genetically engineered products clearly have the potential to be toxic and a threat to human health. In 1989 a genetically engineered brand of L-tryptophan, a common dietary supplement, killed 37 Americans and permanently disabled or afflicted more than 5,000 others with a potentially fatal and painful blood disorder, eosinophilia myalgia syndrome (EMS), before it was recalled by the Food and Drug Administration.

The manufacturer, Showa Denko, Japan’s third largest chemical company, for the first time in 1988-89 used GE bacteria to produce the over-the-counter supplement. It is believed that the bacteria somehow became contaminated during the recombinant DNA process. Showa Denko has already paid out over \$2 billion in damages to EMS victims. In 1999, front-page headline stories in the British press revealed Rowett Institute scientist Dr. Arpad Pusztai’s explosive research findings that GE potatoes, spliced with DNA from the snowdrop plant and a commonly used viral promoter, the Cauliflower Mosaic Virus (CaMv), are poisonous to mammals. GE-snowdrop potatoes, found to be significantly different in chemical composition from regular potatoes, damaged the vital organs and immune systems of lab rats fed the GE potatoes.

Most alarming of all, damage to the rats’ stomach linings—apparently a severe viral infection — most likely was caused by the CaMv viral promoter, a promoter spliced into nearly all GE foods and crops. Dr. Pusztai’s pathbreaking research work unfortunately remains incomplete (government funding was cut off and he was fired after he spoke to the media). But more and more scientists around the world are warning that genetic manipulation can increase the levels of natural plant toxins in foods (or create entirely new toxins) in unexpected ways by switching on genes that produce poisons. And since regulatory agencies do not currently require the kind of thorough chemical and feeding tests that Dr. Pusztai was conducting, consumers have now become involuntary guinea pigs in a vast genetic experiment. As Dr. Pusztai warns, “Think of William Tell shooting an arrow at a target. Now put a blindfold on the man doing the shooting and that’s the reality of the genetic engineer doing a gene insertion.” Increased Cancer Risks In 1994, the FDA approved the sale of Monsanto’s controversial GE recombinant Bovine Growth Hormone (rBGH) — injected into dairy cows to force them to produce more milk - even though scientists warned that significantly higher levels (400-500% or more) of a potent chemical hormone, Insulin-Like Growth Factor (IGF-1), in the milk and dairy products of injected cows, could

pose serious hazards for human breast, prostate, and colon cancer. A number of studies have shown that humans with elevated levels of IGF-1 in their bodies are much more likely to get cancer.

In addition the US Congressional watchdog agency, the GAO, told the FDA not to approve rBGH, arguing that increased antibiotic residues in the milk of rBGH-injected cows (resulting from higher rates of udder infections requiring antibiotic treatment) posed an unacceptable risk for public health. In 1998, heretofore undisclosed Monsanto/FDA documents were released by government scientists in Canada, showing damage to laboratory rats fed dosages of rBGH. Significant infiltration of rBGH into the prostate of the rats as well as thyroid cysts indicated potential cancer hazards from the drug. Subsequently the government of Canada banned rBGH in early 1999.

The European Union has had a ban in place since 1994. Although rBGH continues to be injected into 4-5% of all US dairy cows, no other industrialized country has legalized its use. Even the GATT Codex Alimentarius, a United Nations food standards body, has refused to certify that rBGH is safe. (Also see: Monsanto and Fox TV Unite to Suppress Journalists' Free Speech on Hazards of Genetically Engineered Bovine Growth Hormone (rBGH or rBST) Food Allergies

In 1996 a major GE food disaster was narrowly averted when Nebraska researchers learned that a Brazil nut gene spliced into soybeans could induce potentially fatal allergies in people sensitive to Brazil nuts.

Animal tests of these Brazil nut-spliced soybeans had turned up negative. People with food allergies (which currently afflicts 8% of all American children), whose symptoms can range from mild unpleasantness to sudden death, may likely be harmed by exposure to foreign proteins spliced into common food products.

Since humans have never before eaten most of the foreign proteins now being gene-spliced into foods, stringent pre-market safety-testing (including long-term animal feeding and volunteer human feeding studies) is necessary in order to prevent a future public health disaster. Mandatory labeling is also necessary so that those suffering from food allergies can avoid hazardous GE foods and so that public health officials can trace allergens back to their source when GE-induced food allergies break out. Unfortunately the FDA and other global regulatory agencies do not routinely require pre-market animal and human studies to ascertain whether new allergens or toxins, or increased levels of human allergens or toxins we already know about, are present in genetically engineered foods.

As British scientist Dr. Mae-Wan Ho points out "There is no known way to predict the allergenic potential of GE foods. Allergic reactions typically occur only some time after the subject is sensitized by initial exposure to the allergen."

Damage to Food Quality & Nutrition

A 1999 study by Dr. Marc Lappe published in the Journal of Medicinal Food found that concentrations of beneficial phytoestrogen compounds thought to protect against heart disease and cancer were lower in genetically modified soybeans than in traditional strains. These and other studies, including Dr. Pusztai's, indicate that genetically engineering food will likely result in foods lower in quality and nutrition. For example the milk from cows injected with rBGH contains higher levels of pus, bacteria, and fat.

Antibiotic Resistance

When gene engineers splice a foreign gene into a plant or microbe, they often link it to another gene, called an antibiotic resistance marker gene (ARM), that helps determine if the first gene was successfully spliced into the host organism. Some researchers warn that these ARM genes might unexpectedly recombine with disease-causing bacteria or microbes in the environment or in the guts of animals or people who eat GE food, contributing to the growing public health danger of antibiotic resistance — of infections that cannot be cured with traditional antibiotics, for example new strains of salmonella, e-coli, campylobacter, and enterococci. EU (European Union) authorities are currently considering a ban on all GE foods containing antibiotic resistant marker genes.

Increased Pesticide Residues in the Soil and on Crops

Contrary to biotech industry propaganda, recent studies have found that US farmers growing GE crops are using just as many toxic pesticides and herbicides as conventional farmers, and in some cases are using more. Crops genetically engineered to be herbicide -resistant account for 70% of all GE crops planted in 1998. The so-called “benefits” of these herbicide-resistant crops are that farmers can spray as much of a particular herbicide on their crops as they want — killing the weeds without damaging their crop.

Scientists estimate that herbicide-resistant crops planted around the globe will triple the amount of toxic broad-spectrum herbicides used in agriculture. These broad-spectrum herbicides are designed to literally kill everything green. The leaders in biotechnology are the same giant chemical companies — Monsanto, DuPont, AgrEvo, Novartis, and Rhone-Poulenc — that sell toxic pesticides. These companies are genetically engineering plants to be resistant to herbicides that they manufacture so they can sell more herbicides to farmers who, in turn, can apply more poisonous herbicides to crops to kill weeds.

Genetic Pollution

“Genetic pollution” and collateral damage from GE field crops already have begun to wreak environmental havoc. Wind, rain, birds, bees, and insect pollinators have begun carrying genetically-altered pollen into adjoining fields, polluting the DNA of crops of organic and non-GE farmers. An organic farm in Texas has been contaminated with genetic drift from GE crops on a nearby farm and EU regulators are considering setting an “allowable limit” for genetic contamination of non-GE foods, because they don’t believe genetic pollution can be controlled. Because they are alive, gene-altered crops are inherently more unpredictable than chemical pollutants — they can be impossible to recall genetically engineered organisms back to the laboratory or the field. **Damage to Beneficial Insects and Soil Fertility** Earlier this year, Cornell University researchers made a startling discovery. They found that pollen from genetically engineered Bt corn was poisonous to Monarch butterflies. The study adds to a growing body of evidence that GE crops are adversely affecting a number of beneficial insects, including ladybugs and lacewings, as well as beneficial soil microorganisms, bees, and possibly birds.

Creation of GE “Superweeds” and “Superpests”

Genetically engineering crops to be herbicide-resistant or to produce their own pesticide presents dangerous problems. Pests and weeds will inevitably emerge that are pesticide or herbicide-resistant, which

means that stronger, more toxic chemicals will be needed to get rid of the pests. We are already seeing the emergence of the first “superweeds” as GE herbicide-resistant crops such as rapeseed (canola) spread their herbicide-resistance traits to related weeds such as wild mustard plants. Lab and field tests also indicate that common plant pests such as cotton boll worms, living under constant pressure from GE crops, will soon evolve into “superpests” completely immune to Bt sprays and other environmentally sustainable biopesticides. This will present a serious danger for organic and sustainable farmers whose biological pest management practices will be unable to cope with increasing numbers of superpests and superweeds.

Creation of New Viruses and Bacteria

Gene-splicing will inevitably result in unanticipated outcomes and dangerous surprises that damage plants and the environment. Researchers conducting experiments at Michigan State University several years ago found that genetically-altering plants to resist viruses can cause the viruses to mutate into new, more virulent forms. Scientists in Oregon found that a genetically engineered soil microorganism, *Klebsiella planticola*, completely killed essential soil nutrients.

Environmental Protection Agency whistle blowers issued similar warnings in 1997 protesting government approval of a GE soil bacteria called *Rhizobium melitoli*. Genetic “Bio-Invasion”
By virtue of their “superior” genes, some genetically engineered plants and animals will inevitably run amok, overpowering wild species in the same way that introduced exotic species, such as kudzu vine and Dutch elm disease, which have created problems in North America. What will happen to wild fish and marine species, for example, when scientists release into the environment carp, salmon, and trout that are twice as large, and eat twice as much food, as their wild counterparts?

Socioeconomic Hazards

The patenting of genetically engineered foods and widespread biotech food production threatens to eliminate farming as it has been practiced for 12,000 years. GE patents, such as the Terminator Technology will render seeds infertile and force hundreds of millions of farmers who now save and share their seeds to purchase evermore expensive GE seeds and chemical inputs from a handful of global biotech/seed monopolies.

If the trend is not stopped, the patenting of transgenic plants and food-producing animals will soon lead to universal “bioserfdom” in which farmers will lease their plants and animals from biotech conglomerates such as Monsanto and pay royalties on seeds and offspring. Family and indigenous farmers will be driven off the land and consumers’ food choices will be dictated by a cartel of transnational corporations. Rural communities will be devastated. Hundreds of millions of farmers and agricultural workers worldwide will lose their livelihoods.

Ethical Hazards

The genetic engineering and patenting of animals reduces living beings to the status of manufactured products and will result in much suffering. In January 1994, the USDA announced that scientists had completed genetic “road maps” for cattle and pigs, a precursor to evermore experimentation on live animals. In addition to the cruelty inherent in such experimentation (the “mistakes” are born with painful deformities, crippled, blind, and so on), these “manufactured” creatures have no greater value to their

“creators” than mechanical inventions.

Animals genetically engineered for use in laboratories, such as the infamous “Harvard mouse” which contains a human cancer-causing gene that will be passed down to all succeeding generations, were created to suffer. A purely reductionist science, biotechnology reduces all life to bits of information (genetic code) that can be arranged and rearranged at whim. Stripped of their integrity and sacred qualities, animals who are merely objects to their “inventors” will be treated as such.

Currently, hundreds of genetically engineered “freak” animals are awaiting patent approval from the federal government. One can only wonder, after the wholesale gene-altering and patenting of animals, will GE “designer babies” be next?

Also see: Interview with Dr. Vandana Shiva - “The deeper you can manipulate living structures the more you can control food and medicine.”

St. Louis, Missouri More articles on Genetic Engineering Published in Motion Magazine August 29, 1999.

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WHO'S WINNING THE FRANKENFOODS FIGHT?

News and Analysis on Genetic Engineering, Factory Farming, & Organics

Ronnie Cummins, BioDemocracy News 27 May 2000

The worst nightmares of Monsanto and the Gene Giants are becoming reality. The four year food fight by European consumers and farmers is slowly but surely driving genetically engineered (GE) foods and crops off the EU market, the largest in the world. US corn exports to the EU have fallen from \$360 million a year to near zero, while soybean exports have fallen from \$2.6 billion annually to \$1 billion—and are expected to fall even further as major food processors, supermarkets, and fast-food chains ban GE soy or soy derivatives in animal feeds.

Canada's canola exports to Europe similarly have fallen from \$500 million a year to near zero. Meanwhile Brazilian exporters are doing a brisk business selling "GE-free" soybeans to European buyers, and organic food is booming throughout the industrialized world. On May 18 the latest in a series of GE scandals rocked Europe as a major rapeseed (canola) seller, Advanta Seeds, a division of biotech giant AstraZeneca, admitted that genetic drift from gene-altered canola fields in Canada had contaminated certified "non-GE seed" export shipments to Britain, France, Germany and Sweden.

Consumer rejection of gene-foods is steadily spreading to Japan, South Korea, Australia, New Zealand, India, and a host of other nations, including the United States and Canada. Japan and South Korea—where public concern is rising—have the biotech industry extremely worried, since these two nations alone buy \$11.3 billion of US agriculture exports every year. On May 18 the Tokyo Grain Exchange soy futures market began for the first time to offer wholesale traders a choice of GE or non-GE soybeans. On the first day of trading, non-GE buyers committed to 914,000 tons, compared to only 364,000 tons for unsegregated (GE-tainted) US soybean futures.

Gene-foods and patents on living organisms have become hot button political issues in India, Thailand, Malaysia, Brazil, Mexico, and the Philippines. At recent international conventions such as the Biosafety Protocol meeting in Montreal in January and the UN Codex Alimentarius meeting in Ottawa in May, the US government has become increasingly isolated in its "no labeling, no safety-testing" position.

Since the first of the year, prospects for a Biotech Century have dimmed considerably. Among the most recent blows to the agbiotech industry have been the following:

- Storm clouds in Asia. Japan dropped a regulatory bombshell in mid-April when the Ministry of Health announced that starting next year agricultural producers must "screen" imported genetically modified foods for potential food allergies and other health hazards. In addition new mandatory labeling rules on GE food ingredients coming into force next April will have a major impact on the marketplace.

According to a report by Sharon Schmickle in the Minneapolis Star-Tribune on April 30, Japanese importers and manufacturers of many common food products—including tofu, miso, cornstarch, corn snacks, popcorn and frozen or canned corn—are almost certain to switch to non-genetically engineered ingredients once they're forced to label. James Echle, who directs the Tokyo office of the American Soybean Association, told the Star-Tribune "I don't think anybody will label containers genetically modified," he said. "It's like putting a skull and crossbones on your product."

In a related story from Asia, the government of Sri Lanka formally banned the import of GE foods and crops on April 23.

- Patent victory in India. Vandana Shiva and India and EU public interest activists registered a major victory in mid-May when the European Patent Office withdrew a controversial patent previously granted to pharmaceutical giant W.R. Grace on a chemical formulation derived from the Neem tree, which has been used as a bio-pesticide and medicinal agent for generations by indigenous villagers and farmers in India. Biotech corporations fear that the revocation of the Neem patent will set a precedent that could put billions of dollars of their “biopirated” patents on drugs and seeds at risk.
- European opposition to gene-foods is as strong as ever. A new EU-wide survey, “Eurobarometer,” recently analyzed by the European Commission, showed that consumers in the EU were “deeply wary of genetically modified food.” Professor George Gaskell of the London School of Economics, presenting the study at a news conference on April 27 flatly stated, “Genetically modified foods are getting the thumbs down. They are seen to be very risky.”
- America’s food giants begin to turn their backs on Frankenfoods. Even in the heartland of biotech, consumer aversion to GE foods is increasing. Since July, 1999 a number of major US food corporations—including baby food giants Gerber, Heinz, and Mead-Johnson (infant formula); pet food purveyor Iam’s; corn chip king Frito-Lay; and several sizable supermarket chains, Whole Foods, Wild Oats, and Genuardi’s, have announced plans to go “GE free.” On May 9 in Chicago at the convention of the Food Marketing Institute, a trade association of supermarket corporations, a number of leading supermarket chains admitted privately that mandatory labeling of GE foods is probably inevitable.
- The death of Frankenspuds. Monsanto announced in early May that they were closing down their NatureMark plant in Crystal, Maine, a transgenic laboratory and greenhouse operation that had been producing Bt potatoes since 1992. Bt potatoes are gene-spliced with the soil bacteria, *Bacillus thuringiensis*, to repel the Colorado potato beetle. Earlier this year, Monsanto laid off 20 of the 30 employees in their other Bt potato lab in Idaho. Bt potatoes thus join the growing obituary list of Monsanto’s Frankenfoods. In 1996 Monsanto/Calgene’s Flavr Savr tomatoes were taken off the market after dismal performances in the field and on grocery store shelves.

Monsanto’s retreat on Bt potatoes comes in the wake of news stories in the Wall Street Journal and Associated Press that America’s leading potato buyers—including McDonald’s, Burger King, Frito-Lay, and Procter & Gamble—are eliminating Bt potatoes from their brand-name french fries and potato chips. “We have to respect the preferences of our customers, and both the domestic and global restaurant chains which we serve have asked us to exclude these potatoes,” said Fred Zerza, a spokesman for J.R. Simplot, of Boise, Idaho, one of McDonald’s largest suppliers. In November 1999, McCain’s and Lamb-Weston, two of North America’s largest potato processors, told farmers they would no longer accept gene-altered spuds. Approximately 50,000 acres, amounting to 4% of last year’s total potato crop, were genetically engineered in North America. Next year Bt spuds may become an extinct species.

- Bt cotton gives rise to “Stink Bug” epidemic. Recent field reports posted at www.btinternet.com/~nlpwessex/Documents/btcottonnoprofit.htm indicate that Bt cotton fields

in North Carolina and Georgia are becoming infested with Stink Bugs that are eating up the cotton crop. Not only does the Bt toxin not kill the Stink Bugs, but apparently they love the mutant plants. Monsanto's recommendation, posted on their Farmsource web site, is to spray the Stink Bugs with toxic pesticides including methyl parathion, one of the deadliest chemicals used in American agriculture. So much for the notion that Bt cotton will get US farmers off the toxic treadmill.

As analysts have pointed out to BioDemocracy News, the pests that Bt-spliced cotton are designed to kill—cotton bollworms, pink bollworms, and budworms—were previously considered harmless “secondary pests” until the overuse of toxic pesticides (sold by the same companies now peddling so-called “environmentally friendly” Bt crops—Monsanto, Novartis, and Aventis) killed off their natural predators and parasites and turned them into major pests.

- More bad news for Monsanto. Recent studies carried out at the University of Nebraska indicate that gene-altered Roundup Ready soybeans produce 6-11% less yield than conventional soybeans. The two year study, reported by the Associated Press on May 18, showed Roundup Ready soybeans yield 6% less than their closest relatives and 11% less than high-yielding soybean varieties. In another damaging revelation, Dr. Charles Benbrook, a consultant for the Consumers Union, published a summary of an upcoming report revealing that genetically engineered Roundup Ready soybeans, contrary to frequent claims by Monsanto, actually use 2-5 times more pounds of herbicide per acre than conventional soybeans sprayed with other “modern low-dose pesticides.” For background information see a previous study by Benbrook on RR soybeans, see www.biotech-info.net/RR_yield_drag_98.pdf
- American farmers back-off on GE. All signs indicate that US farmers are slowly but steadily moving away from GE crops. According to the March 31 Associated Press, a recent USDA survey showed that American farmers will plant 24% less genetically engineered corn this year, 13% less cotton, and 9% less soybeans. The Winnipeg Free Press reported on April 24 that farmers in Canada are reducing the amount of acreage devoted to GE canola, perhaps by as much as 10%.
- American grain dealers starting to segregate GE crops. A May 4 report on the New York Times website www.nytimes.com/yr/mo/day/news/financial/04tsc-foods.html indicates that many of America's grain wholesalers are segregating GE and non-GE corn and soybeans for overseas export, even though they've been telling the public for years that segregation is impossible. “We are encouraging farmers to segregate crops,” said Larry Cunningham, senior vice president for corporate affairs at Archer Daniels Midland. “And we have an opportunity to also benefit from it. In Europe and Japan some people are willing to pay a premium for segregated crops.”

According to the Times, “a study conducted by Pioneer Hi-Bred, a subsidiary of DuPont, indicated that, of the 1,200 U.S. [grain] processors surveyed, 24 percent were planning to segregate corn crops this year, up from 11 percent in 1999, and 20 percent were planning to segregate soybean crops, up from 8 percent last year.”

- Opposition to GE foods increases in Canada. A nationwide campaign against Loblaw's, the nation's largest supermarket chain, has the food industry worried. On May 9 the Council of Canadians, Sierra Club, and a coalition of public interest groups filed a legal petition against the federal government for failing to protect public health and the environment in regulating geneti-

cally modified organisms. Under Canadian law, the government is required to respond to the challenge within 120 days. According to a March 31 poll conducted for the Council of Canadians, three-quarters (75%) of Canadians familiar with GE foods are worried about their safety and almost all (95%) want GE foods labeled as such. A similarly high number (95%) want consumers to be able to buy non-GE foods, and over two-thirds (71%) would even be willing to pay more to get them.

Moreover, most respondents (56%) are not confident in the federal government's ability to protect their health and safety when it comes to GE foods—although grocery retailers say they depend on consumer confidence in government testing.

- Anti-GE protests increase in the US. Four thousand people demonstrated against genetically engineered foods in Boston, Massachusetts on March 26, marching in front of the national convention of the Biotechnology Industry Organization (BIO). Over the past three months “Frankenfoods dumps” outside supermarkets in Boston, San Francisco, and at the annual shareholders meeting of the Safeway supermarket chain, organized by the Organic Consumers Association (OCA) and Friends of the Earth, have generated significant media coverage and rattled the nerves of the biotech industry. Meanwhile sabotage of biotech crops has continued in the US, with an April 8 announcement by the “Petaluma Pruners” that they had destroyed GE grape plants grown by the Vinifera corporation in Petaluma, California.
- On March 21 anti-GE protesters, led by a group called Grain RAGE (Resistance Against Genetic Engineering), wearing white biohazard suits and respirators, blocked the road to the Cargill corporation's international headquarters outside Minneapolis for several hours. Cargill, the world's largest grain dealer, is one of the most strident proponents of GE crops. In September Cargill donated \$10 million to the University of Minnesota for a plant genetics research facility. Cargill also has strong ties to Monsanto. Cargill sold its international seed business to Monsanto in 1998 and has agreed to manufacture commercial livestock and poultry feeds produced from Monsanto's proprietary germ plasm. On May 15 Reuters reported that Ernest Micek, the chairman of Cargill, told a globalization conference sponsored by the Economic Strategy Institute that “while some American consumers are raising concerns about genetically modified foods, they are ignoring the safety risks of organically grown corn, soybeans and other grains.”
- On March 21 the Center for Food Safety, the OCA, Greenpeace and 51 other groups filed a legal petition against the FDA in Washington, D.C. calling for a moratorium on all GE foods and crops unless the FDA can prove through stringent, long-term safety-testing that these products are safe for human health and the environment. For further information on the legal petition see www.foodsafetynow.org
- In Washington 52 members of the US House of Representatives are now co-sponsors of a bill introduced by Dennis Kucinich (Democrat from Ohio) calling for mandatory labeling of GE foods. Kucinich has also drafted a House bill on safety-testing. The Kucinich GE labeling bill has drawn angry criticism from the biotech industry, agribusiness, and the Grocery Manufacturers of America—who maintain that mandatory labeling would unduly alarm consumers and thereby kill the industry. Companion bills on safety testing (Patrick Moynihan, Democrat from New York) and labeling (Barbara Boxer, Democrat from California) have been introduced in the US Senate as well. For further information on the grassroots lobbying campaign to get these bills

passed in Congress see www.thecampaign.org

- More than two dozen bills related to gene-foods have been filed in US state legislatures over the past year year in at least 13 states; dealing with issues such as the “Terminator” seed technology, registration of farmers planting GE crops, and labeling gene-altered foods. Although these bills have been held up in committee or rejected in the face of concerted lobbying by powerful biotech and agribusiness special interests, their proliferation is evidence that more and more politicians are feeling the heat from constituents on GE foods. • Swiss panel slams EPA.

A prestigious panel of Swiss scientists, commissioned by Greenpeace, on April 19 issued a peer-reviewed critique of the shoddy science endorsed by the EPA to certify the environmental safety of Bt corn. The EcoStrat report reveals that tests submitted by the biotech companies Novartis and Mycogen to determine whether their GE corn could harm non-target insects were so poorly designed that there was virtually no chance that adverse effects would be observed. Despite the flawed methodology, EPA accepted the tests as scientific evidence that the gene-altered crop was harmless to non-target insects, and continued to accept the same flawed testing procedures for approval of other companies’ insect-resistant “Bt” crops. According to Dr. Doreen Stabinsky, a science advisor to Greenpeace, “We now know that EPA’s approval of insect-resistant crops was based on false assumptions, shoddy methodology, and skewed results.” For more information on the EcoStrat report see www.greenpeaceusa.org

- Investors rebel against gene-foods. Anti-GE shareholder activism in the US has increased considerably since the first of the year. According to the New York Times “Twenty-one resolutions calling for restraints on the use of genetically modified ingredients are on the annual meeting agendas at some of America’s leading food and seed manufacturers this year, up from zero a year ago... Shareholders at Coca Cola, Kellogg’s, Phillip Morris ,and PepsiCo have already voted on the resolutions, which garnered a respective 8.3 percent, 5.6 percent, 4 percent and 3.2 percent of the support of voting shares.” As activists point out, once a company faces opposition from 10-15% of its shareholders on an unpopular position such as using GE ingredients in its products, it will usually change its company policy.

Pharmageddon Strikes Back: Disinformation, TV Ads, Regulatory Reforms

Fearful that the global backlash against gene-foods is spreading to the U.S., Monsanto, Aventis, Novartis, Dow, BASF, Zeneca, DuPont, and the Biotechnology Industry Organization have launched a \$50 million a year public relations campaign to confuse and mislead the American public.

Fronting for the Gene Giants, the so-called Council for Biotechnology Information has paid for cheery “biotech is great” national television ads, launched a Web site www.whybiotech.com, opened a consumer information hotline, carried out focus groups and polls, and enlisted prominent scientists and public figures (including Andrew Young, ex-ambassador to the United Nations and former Nobel Prize winner Dr. James Watson) to serve as messengers for pro-biotech propaganda. According to the St. Louis Post-Dispatch on April 4, the Council says it may spend as much as \$250 million on the campaign over the next five years. In the CBI’s opening national TV ad, the narrator tries to equate the potential benefits of GE crops with the more widely accepted uses of biotechnology in medicine.

Flashing between scenes of farm fields and medical labs, the 60-second ad proclaims: “A patient has a

medicine she needs. A boy can survive a childhood disease. A cotton crop helps protect itself from certain pests because discoveries in biotechnology, from medicine to agriculture, are helping doctors and farmers to treat our sick and to protect our crops.”

DISINFORMATION FROM THE BIOTECH INDUSTRY:

- GE foods have been thoroughly tested by U.S. government agencies and found to be safe.
- Biotechnology increases the nutritional content of foods, makes them taste better, and can help feed the world's hungry.
- GE crops reduce the use of toxic pesticides.

In a national focus group study carried out last September 14-19 by public relations powerhouse BSMG Worldwide on behalf of the Grocery Manufacturers of America, a copy of which was obtained by BioDemocracy News, BSMG recommends broadcasting the above “positive messages” to American consumers to counteract their negative views on biotechnology. Unfortunately for the biotech industry, BSMG also learned from interviewing American consumers that there are some major obstacles to public acceptance of GE foods:

- American women, who generally do the grocery shopping, are more likely than men to have negative feelings about gene-altered foods. These negative feelings are “rooted in fear of the unknown, fear of negative consequences for human health, and resistance to tampering with nature.” African-Americans are also “notably negative” toward gene-foods, as are senior citizens.
- Both men and women overwhelmingly support mandatory labeling of GE foods, and strongly oppose industry efforts to restrict labeling or to make it voluntary.
- Only 15% of consumers are aware that the majority of supermarket foods already contain genetically engineered ingredients.
- Two-thirds of Americans say they are “concerned” about biotechnology issues. Forty-eight percent say they oppose any use of “genetic modification” in food production.

Spoiling the Party: The National Academy of Sciences Report & FDA “Reform” On April 5 the National Academy of Sciences (NAS) released their long-awaited report on genetically engineered crops. While the scientific talking heads at the NAS press conference in Washington tried to reassure the public that GE foods were safe, national TV networks broadcast a different image—outside the NAS headquarters, a crowd of protesters dressed in white lab coats, holding up signs (“The Best Science Money Can Buy”) and giant dollar bills, chanting anti-GE slogans. While the biotech industry applauded the conclusions of the study, nearly every media organization in the country reported that the NAS report was plagued by charges of conflict of interest. The majority of the dozen scientists on the NAS panel receive money from biotech corporations or labs under contract to the industry, while the original head of the panel, Michael Phillips, left the NAS to work as a PR flack for the Biotechnology Industry Organization. The media also broadcast the criticisms of consumer and public interest groups that the 261-page NAS report paid little attention to the potential health hazards of GE foods.

As Rachel's Environment & Health weekly (May 11) (www.rachel.org) points out, however, a close reading of the NAS report is actually quite damning for the biotech industry and the nation's regulatory agencies (the FDA, the EPA, and the USDA).

The NAS report admits that:

- New allergens and toxins may be introduced into foods.
- Existing toxins in foods may reach new levels, or may be moved into edible portions of plants.
- New allergens may be introduced into pollen, then spread into the environment.
- Previously unknown protein combinations now being produced in plants might have unforeseen effects when new genes are introduced into the plants;
- Nutritional content of a plant may be diminished.

Instead of a whitewash on the safety of GE foods, the NAS report has turned into yet another public relations debacle for the biotech industry.

In a similar vein, the Food and Drug Administration's long-anticipated announcement of "regulatory reforms" on GE foods and crops May 3 was met with indifference or hostility on the part of the general public. Headlines across the country emphasized that the FDA was refusing to label GE foods, while reporters noted that every consumer and environmental group in the US was denouncing the FDA maneuvers as "too little and too late."

As we predicted months ago in BioDemocracy News the FDA is calling for nothing more than

- (1) voluntary industry labeling;
- (2) non-specific industry-FDA "consultations" before new Frankenfoods and crops are put on the market, and
- (3) non-specific disclosure of research data by biotech corporations on the internet.

As Debbie Ortman, National Field Organizer, of the Organic Consumers Association put it, "The biotech industry consulting with the FDA does not constitute safety-testing, nor is so-called voluntary industry labeling of genetically engineered foods what 90% of consumers want—mandatory labeling."

Of course this is not the end of the debate. Battered by mounting public criticism and serious market share loss in Europe and Asia, now spreading to North America, we can expect Monsanto and the Gene Giants to fight back with all they have. In the next issue of BioDemocracy News we will take a critical look at the new generation of genetically engineered products being readied for market: so-called "functional foods," GE fish, Frankentrees, and other mutants. In the meantime stay tuned to our website www.purefood.org for daily updates, events listings, and action alerts.

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AGAINST THE GRAIN

Marc Lappe and Britt Bailey,

Makes it clear that genetic engineering is revolutionizing U.S. agriculture almost overnight.

In 1997, 15% of the U.S. soybean crop was grown from genetically engineered seed. By next year, if Monsanto Corporation's timetable unfolds on schedule, 100% of the U.S. soybean crop (60 million acres) will be genetically engineered.[1,pg.5] The same revolution is occurring, at the same pace, in cotton. Corn, potatoes, tomatoes and other food crops are lagging slightly behind but, compared to traditional rates of change in farming, they are being deployed into the global ecosystem at blinding speed. The mass media have largely maintained silence about the genetic engineering revolution in agriculture, and government regulators have imposed no labeling requirements, so the public has little or no knowledge that genetically altered foods are already being sold in grocery stores everywhere, and that soon few traditional forms of food may remain on the shelves.

Genetic engineering is the process whereby genes of one species are implanted in another species, to give new traits to the recipient. Traditionally the movement of genes has only been possible between closely-related species. Under the natural order established by the Creator, there was no way dog genes could get into cats. Now, however, genetic engineering allows scientists to play God, removing genes from a trout or a mosquito and implanting them in a tomato, for better or for worse. Three federal agencies regulate genetically-engineered crops and foods — the U.S. Department of Agriculture (USDA), the U.S. Food and Drug Administration (FDA), and the U.S. Environmental Protection Agency (EPA). The heads of all three agencies are on record with speeches that make them sound remarkably like cheerleaders for genetic engineering, rather than impartial judges of a novel and powerful new technology, and all three agencies have set policies that:

- No public records need be kept of which farms are using genetically- engineered seeds;
- Companies that buy from farmers and sell to food manufacturers and grocery chains do not need to keep genetically-engineered crops separate from traditional crops, so purchasers have no way to avoid purchasing genetically engineered foods;
- No one needs to label any crops, or any food products, with information about their genetically engineered origins, so consumers have no way to exercise informed choice in the grocery store. In the U.S., every food carries a label listing its important ingredients, with the remarkable exception of genetically engineered foods. These policies have two main effects:
 - (1) they have kept the public in the dark about the rapid spread of genetically engineered foods onto the family dinner table, and
 - (2) they will prevent epidemiologists from being able to trace health effects, should any appear, because no one will know who has been exposed to novel gene products and who has not.

Today Pillsbury food products are made from genetically-engineered crops. Other foods that are now genetically engineered include Crisco; Kraft salad dressings; Nestle's chocolate; Green Giant harvest burgers; Parkay margarine; Isomil and ProSobee infant formulas; and Wesson vegetable oils. Fritos, Doritos, Tostitos and Ruffles Chips – and french fried potatoes sold by McDonald's –are genetically-engineered.[1,pg.92]

By next year, if Monsanto's plans develop on schedule –and there is no reason to think they won't — 100% of the U.S soybean crop will be genetically engineered. Eighty percent of all the vegetable oils in American foods are derived from soybeans, so most foods that contain vegetable oils will contain genetically engineered components by next year or the year after.[1,pg.52]

It is safe to say that never before in the history of the world has such a rapid and large-scale revolution occurred in a nation's food supply. And not just the U.S. is targeted for change. The genetic engineering companies (all of whom used to be chemical companies) — Dow, DuPont, Novartis, and preeminently, Monsanto — are aggressively promoting their genetically engineered seeds in Europe, Brazil, Argentina, Mexico, India, China and elsewhere. Huge opposition has developed to Monsanto's technology everywhere it has been introduced outside the United States. Only in the U.S. has the "agbiotech" revolution been greeted with a dazed silence.

Monsanto — the clear leader in genetically engineered crops — argues that genetic engineering is necessary (nay, ESSENTIAL) if the world's food supply is to keep up with human population growth. Without genetic engineering, billions will starve, Monsanto says. However, neither Monsanto nor any of the other genetic engineering companies appears to be developing genetically engineered crops that might solve global food shortages. Quite the opposite.

If genetically engineered crops were aimed at feeding the hungry, then Monsanto and the others would be developing seeds with certain predictable characteristics:

- (a) ability to grow on substandard or marginal soils;
- (b) plants able to produce more high-quality protein, with increased per-acre yield, without increasing the need for expensive machinery, chemicals, fertilizers, or water;
- (c) they would aim to favor small farms over larger farms;
- (d) the seeds would be cheap and freely available without restrictive licensing; and
- (e) they would be for crops that feed people, not meat animals.

None of the genetically engineered crops now available, or in development (to the extent that these have been announced) has any of these desirable characteristics. Quite the opposite. The new genetically engineered seeds require high-quality soils, enormous investment in machinery, and increased use of chemicals. There is evidence that their per-acre yields are about 10% lower than traditional varieties (at least in the case of soybeans), [1,pg.84] and they produce crops largely intended as feed for meat animals, not to provide protein for people. The genetic engineering revolution has nothing to do with feeding the world's hungry.

The plain fact is that fully two-thirds of the genetically engineered crops now available, or in development, are designed specifically to increase the sale of pesticides produced by the companies that are selling the genetically engineered seeds.[1,pg.55] For example, Monsanto is selling a line of "Roundup Ready" products that has been genetically engineered to withstand heavy doses of Monsanto's all-time top money-making herbicide, Roundup (glyphosate). A Roundup Ready crop of soybeans can with-

stand a torrent of Roundup that kills any weeds competing with the crop. The farmer gains a \$20 per acre cost-saving (compared to older techniques that relied on lesser quantities of more expensive chemicals), but the ecosystem receives much more Roundup than formerly.

To make Roundup Ready technology legal, EPA had to accommodate Monsanto by tripling the allowable residues of Roundup that can remain on the crop.[1,pg.75] Monsanto's patent on Roundup runs out in the year 2000, but any farmer who adopts Roundup Ready seeds must agree to buy only Monsanto's brand of Roundup herbicide. Thus Monsanto's patent monopoly on Roundup is effectively extended into the foreseeable future — a shrewd business maneuver if there ever was one.

However, this should not be confused with feeding the world's hungry. It is selling more of Monsanto's chemicals and filling the corporate coffers, which is what it was intended to do. "Feeding the hungry" is a sales gimmick, not a reality. Monsanto's other major line of genetically engineered crops contains the gene from a natural pesticide called Bt. Bt is a naturally-occurring soil organism that kills many kinds of caterpillars that like to eat the leaves of crops. Bt is the pesticide of choice in low-chemical-use farming, IPM [integrated pest management] and organic farming. Farmers who try to minimize their use of synthetic chemical pesticides rely on an occasional dusting with Bt to prevent a crop from being overrun with leaf-eating caterpillars. To them, Bt is a God-send, a miracle of nature.

Monsanto has taken the Bt gene and engineered it into cotton, corn and potatoes. Every cell of every plant contains the Bt gene and thus produces the Bt toxin. It is like dusting the crop heavily with Bt, day after day after day. The result is entirely predictable, and not in dispute. When insect pests eat any part of these crops, the only insects that will survive are those that are (a) resistant to the Bt toxin, or (b) change their diet to prefer other plants to eat, thus disrupting the local ecosystem and perhaps harming a neighboring farmer's crops.

According to Dow Chemical scientists who are marketing their own line of Bt-containing crops, within 10 years Bt will have lost its usefulness because so many insects will have developed resistance to its toxin.[1,pg.70] Thus Monsanto and Dow are profiting bountifully in the short term, while destroying the usefulness of the one natural pesticide that undergirds the low-pesticide approach of IPM and organic farming. It is another brilliant — if utterly ruthless and antisocial — Monsanto business plan.

Ultimately, for sustainability and long-term maximum yield, agricultural ecosystems must become diversified once again. This is the key idea underlying organic farming. Monoculture cropping — growing acre upon acre of the same crop — is the antithesis of sustainability because monocultures are fragile and unstable, subject to insect swarms, drought, and blight. Monocultures can only be sustained by intensive, expensive inputs of water, energy, chemicals, and machinery. Slowly over the past two decades, the movement toward IPM and organic farming has begun to take hold in this country — despite opposition from the federal government, from the chemical companies, from the banks that make farm loans, and from the corporations that sell insurance.

Now comes the genetic engineering revolution, which is dragging U.S. agriculture back down the old path toward vast monocultures, heavy reliance on machinery, energy, water, and chemicals, all of which favors the huge farm over the small family operation. It is precisely the wrong direction to be taking agricultural technology in the late 20th century, if the goals are long-term maximum yield, food security, and sustainability. It is a wrong direction for another reason as well.

When 100% of the soybeans in the U.S. are grown from Roundup Ready seed — next year — then 100% of America's soybean farmers will be dependent upon a single supplier for all their seed and the chemicals needed to allow those seeds to thrive. In sum, Monsanto will have achieved a monopoly on a fundamental food crop. It is clear that Monsanto's goal is a similar monopoly on every major food crop here and abroad. If something doesn't change soon, it is safe to predict that a small number of "life science" corporations (as they like to call themselves) — the majority of them American and the remainder European — will have a monopoly on the seed needed to raise all of the world's major food crops. Then the hungry, like the well-fed, will have to pay the corporate owners of this new technology for permission to eat.

Marc Lappe and Britt Bailey, *AGAINST THE GRAIN; BIOTECHNOLOGY AND THE CORPORATE TAKEOVER OF YOUR FOOD* [ISBN 1567511503] (Monroe, Maine: Common Courage Press, 1998). Available from Common Courage Press, P.O. Box 207, Monroe, ME 04951. Tel. (207) 525-3068.

AGAINST THE GRAIN, PART 2

The corporations that are introducing genetically modified crops into the global ecosystem want you to think of genetic engineering as a well-understood science similar to laparoscopic surgery. Indeed, the phrase "genetic engineering" gives the impression that moving genes from one organism to another is as straightforward as designing a rocket or a TV set. This is not the case.

Basically, a plant's genome (all of its genes, taken together) is a black box. Genetic engineering takes a gene from one black box and forces it into a second black box (the recipient plant), hoping that the new gene will "take." Most of the time, the experiment fails.

Once in a few thousand tries, the foreign gene embeds itself in the recipient plant's genome and the newly-modified plant gains the desired trait. But that is all the technicians know. They have no idea where in the receiving plant's genome the new gene has found a home. This fundamental ignorance, combined with the speed and scale at which modified organisms are being released into the global ecosystem, raises a host of questions of safety for the future of agriculture, for the environment, and for human health.

To begin with, genes don't necessarily control a single trait. A gene may control several different traits in a plant. Without careful study, plants with undesirable characteristics may be released into the global ecosystem. And biotechnology is not like a chemical spill that can be mopped up — once you release a new gene sequence into nature, your grandchildren are going to be living with it because there's no taking it back.

How a gene affects a plant depends upon the environment. The same gene can have different effects, depending on the environment in which the new plant is growing.[2] What appears predictable and safe after a few years of observation of a small test plot may turn out to have quite different consequences when introduced into millions of acres of croplands in the U.S. and elsewhere, where conditions vary widely.

Does the new gene destabilize the entire plant genome in some unforeseen way, leading one day to problems in that crop? Only time will tell.

Genes can travel to nearby, related plants on their own. This is called gene flow. In 1996 gene flow was discovered to be much more common than previously thought.[3] According to SCIENCE magazine, many ecologists say it is only a matter of time before an engineered gene makes the leap to a weedy species, this creating a new weed or invigorating an old one. "It will probably happen in far less than 1% of the products," warns ecological geneticist Norm Ellstrand of the University of California at Riverside, "but within 10 years we will have a moderate-to-large scale ecological or economic catastrophe, because there will be so many [genetically modified] products being released,"[3] Ellstrand predicts. It is worth noting that U.S. farmers already spend \$4.3 billion purchasing 628 million pounds of herbicides (active ingredients only) to control weeds.[4,pg.32]

The Congressional Office of Technology Assessment (OTA) recommended that all genetically modified plants should be considered non-indigenous exotic species, with the power to disrupt ecosystems.[4,pg.29] Non-indigenous, introduced species have provided great benefits to humanity (most of U.S. agriculture relies on introduced species), but we also should learn from kudzu, purple loosestrife, the gypsy moth, the fire ant, and the boll weevil that exotic species can be extremely disruptive and very expensive to control (if indeed they can be controlled at all).

A public health disaster was narrowly averted in 1996 when a group of researchers tried to improve soybeans by giving them a gene from the Brazil nut.[5] The goal was to improve the nutritional value of soybeans by forcing them to produce more methionine, an essential amino acid. The gene from the Brazil nut was successfully transferred to soybeans. After this had been accomplished, but before the soybeans were sold commercially, independent researchers tested the soybeans to see if it would cause allergic reactions in people. Many people are allergic to nuts, particularly Brazil nuts. In some people, allergic reaction to Brazil nuts is swift and fatal.

A series of laboratory tests on humans confirmed that the genetically modified soybeans did provoke Brazil-nut allergy in humans. They could not feed the genetically modified soybeans to people for fear of killing them, but through scratch tests on skin, they confirmed unequivocally that people allergic to Brazil nuts were allergic to the modified soybeans. In discussing their findings in the NEW ENGLAND JOURNAL OF MEDICINE, the researchers pointed out that tests on laboratory animals will not necessarily discover allergic reactions to genetically modified organisms. Only tests on humans will suffice.

U.S. Food and Drug Administration (FDA) only requires testing for allergic reactions if a gene is being taken from a source that is already known to cause allergic reactions in humans. Many genes are being taken now from bacteria and other life-forms whose allergenicity is entirely unknown, so federal regulations require no allergy testing in these cases. This reduces regulatory costs for the corporations, but leaves the public unprotected.

Crops are being genetically modified chiefly as a way to sell more pesticides. [See REHW #637.] In some cases, the modified crops change the pesticides themselves, giving them new toxicity. The herbicide bromoxynil falls into this category.[1,pg.41] Bromoxynil is already recognized by U.S. EPA Environmental Protection Agency] as a possible carcinogen and as a teratogen (i.e., it causes birth defects). Calgene (now owned by Monsanto) developed a strain of cotton plants (called BXN Cotton) that can withstand direct spraying with bromoxynil. Unfortunately, the bromoxynil-resistant gene in cotton modifies the bromoxynil, turning it into a chemical byproduct called DBHA, which is at least as

toxic as bromoxynil itself. Although humans do not eat cotton, traditional silage for cattle contains up to 50% cotton slash, gin mill leavings, and cotton debris.

Both bromoxynil and DBHA are fat-soluble, so they can accumulate in the fat of animals. Therefore, it is likely that DBHA will make its way into the human food chain through meat. Furthermore, cotton seed oil is widely used as a direct human food and as a cooking additive. In licensing bromoxynil for use on Monsanto's genetically modified BXN Cotton, EPA conducted a risk assessment that assumed bromoxynil and DBHA had no way to enter the human food chain.

Lastly, cotton dust — the cause of brown lung disease — will now carry the added hazard of bromoxynil and DBHA, another danger that EPA has disregarded. Thus genetic engineering — which is being promoted as a technology that will reduce the perils of pesticides — will in some instances increase them. In rats and in rabbits, bromoxynil causes serious birth defects, including changes in the bones of the spine and skull, and hydrocephaly (“water on the brain”). These birth defects appear in offspring at doses of bromoxynil that are not toxic to the mother. Despite these findings, and despite a law (the Food Quality Protection Act of 1996) that explicitly gives EPA the power to reduce exposure standards to protect infants, EPA in 1997 declined to require a special safety factor to protect children from bromoxynil.

Lastly, when EPA added up the cancer-causing potential of bromoxynil, they found it to be 2.7 per million, and they promptly declared this to be “well within” the one-in-a-million regulatory limit. [1, pg. 46] Is 2.7 less than one?

By all appearances, EPA is more interested in protecting Monsanto's investment in this new technology than in protecting public health.

Because genetically-engineered soybeans will be doused with increased quantities of herbicides, such as Roundup (glyphosate), soybeans and soy products will carry increased chemical residues. Infants who must be reared on soy milk, because they cannot tolerate lactose in regular milk, will be at special hazard. • Crops that are genetically modified to resist herbicides detoxify the herbicides by producing proteases, which will be incorporated into our food with unknown results. [1, pg. 143]

When crops are genetically modified to incorporate the naturally-occurring Bt toxin into their cells (see REHW #636), those Bt toxins will be incorporated into foods made from those crops. What will be the effect of these toxins and gene products on the bacteria and other organisms (the so-called microflora) that live in the human digestive tract? Time will tell. • The “life sciences” companies have big plans for turning agricultural crops into “factories” for producing pharmaceuticals and specialty chemicals in open fields. They plan to manufacture vaccines, drugs, detergents, enzymes and other chemicals by putting the right genes into the right plants.

The net effect of all this will be to expose soil insects and microorganisms, foraging and burrowing animals, seed-eating birds, and a myriad of other non-target organisms to these chemicals and to the gene products that make them. The Union of Concerned Scientists says, “Herbivores will consume the chemicals as they feed on plants. Soil microbes, insects, and worms will be exposed as they degrade plant debris. Aquatic organisms will confront the drugs and chemicals washed into streams, lakes, and rivers from fields.” [4, pg. 6]

Most fundamentally, genetically-engineered crops substitute human wisdom for the wisdom of nature. As genetically-engineered crops are planted on tens of millions of acres, the diversity of our agricultural systems is being further diminished. Do we know enough to select the “right” combination of genes to assure the stable, long-term yield of our agricultural systems? Our recent experiences with PCBs, CFCs, DDT, Agent Orange, and global warming should give us pause. Genetic engineering is by far the most powerful technology humans have ever discovered, and it is being deployed by the same corporations that, historically, have produced one large-scale calamity after another. Is there any good reason to think things will be different this time?

[1] Marc Lappe and Britt Bailey, *AGAINST THE GRAIN; BIOTECHNOLOGY AND THE CORPORATE TAKEOVER OF YOUR FOOD* [ISBN 1567511503] (Monroe, Maine: Common Courage Press, 1998). Available from Common Courage Press, P.O. Box 207, Monroe, ME 04951. Tel. (207) 525-0900 or (800) 497-3207.

[2] Craig Holdrege, *GENETICS AND THE MANIPULATION OF LIFE: THE FORGOTTEN FACTOR OF CONTEXT* (Hudson, N.Y.: Lindisfarne Press, 1996). ISBN 0-940262-77-0. Available from Lindisfarne Press, RR4 Box 94 A-1, Hudson, NY 12534.

[3] James Kling, “Could Transgenic Supercrops One Day Breed Superweeds?” *SCIENCE* Vol. 274 (October 11, 1996), pgs. 180-181.

[4] Jane Rissler and Margaret Mellon, *THE ECOLOGICAL RISKS OF ENGINEERED CROPS* (Cambridge, Massachusetts: MIT Press, 1996).

[5] Julie A. Nordlee and others, “Identification of a Brazil-nut Allergen in Transgenic Soybeans,” *NEW ENGLAND JOURNAL OF MEDICINE* Vol. 334, No. 11 (March 14, 1996), pgs. 688-692.

CAMPAIGNING FOR FOOD SAFETY

An Interview with Ronnie Cummins

Ronnie Cummins is the director of the Campaign for Food Safety, based in Little Marais, Minnesota. Cummins is among those leading an effort to plan a global campaign against Monsanto, the biotechnology industry leader.

The United States has the most contaminated food supply in the industrialized world. There are several types of contamination. One is chemical contamination. Then there is contamination related to filthy meat and poultry slaughter houses and factory farms. And since 1994, consumers now have to worry about genetic contamination as well.

Multinational Monitor: What is the status of food safety in the United States?

Cummins: The United States has the most contaminated food supply in the industrialized world, according to official government statistics put out by the Centers for Disease Control.

There are several types of contamination. One is chemical contamination in the industrialized world, according to official government statistics put out by the Centers for Disease Control. Contamination related to filthy meat and poultry slaughter houses and factory farms are major agricultural pollutants.

Then there is contamination related to filthy meat and poultry slaughter houses and factory farms to official government statistics put out by the Centers for Disease Control. And since 1994, consumers now have to worry about genetic contamination as well, since the government has allowed the commercialization of 37 new genetically engineered foods and crops, with no special pre market safety testing required, nor labeling.

Multinational Monitor: What is rBGH and why do you think it should be banned from the market?

Cummins: Bovine growth hormone is a genetically engineered animal drug that Monsanto developed. It mimics a chemical hormone that

occurs naturally in a cow's body. When you shoot up a milk cow with Monsanto's rBGH, it forces the cow to produce excess quantities of a potent chemical messenger called IGF 1, which in turn forces it to give 15 to 25 percent more milk.

We call rBGH "crack for cows," because when you shoot up a cow with rBGH, it revs up their system in such a way that it causes major stress on the cows, major animal health problems. The government admits that there are 22 serious health problems in cows that result from shooting them up with this drug.

When you shoot up a cow with this drug, the animals suffer a much higher rate of mastitis in such a way that it causes major stress on the cows, major animal health problems. The government admits that there are 22 serious health problems in cows that result from residues in the milk, because the U.S. government does not have an adequate system for monitoring the antibiotic residues in the milk.

It is for that reason that the Government Accounting Office recommended to the FDA, both in 1992

and 1993, that it not approve this drug. They said, “We’ve already got a problem with excessive antibiotic residues in our milk supply and, if you legalize rBGH, the problem is going to get much worse.”

The first concern regarding human health hazards is increased antibiotic residues in dairy products. The second major hazard is IGF 1. There is mounting scientific evidence that humans who have high levels of IGF 1 in their blood stream are more susceptible to breast cancer, prostate cancer and colon cancer.

Multinational Monitor: If this is the case, then why did the U.S. government approve it?

Cummins: It appears that the reason the U.S. government approved the drug is because of a rampant conflict of interest in the Clinton administration with the Monsanto Corporation. The top scientists at the FDA at the time they were approving rBGH had previously worked for Monsanto as researchers. And the top decision maker at the FDA on approval and labeling, Michael Taylor, previously worked for the King & Spalding law firm, which has Monsanto and its subsidiary Searle as a major client. After Taylor left the FDA he once again went back to work for King & Spalding.

Multinational Monitor: If you go to buy a gallon of milk, what are the chances that the milk comes from an rBGH treated cow?

Cummins: The chances are pretty good because approximately 7 or 8 percent of all U.S. dairy cows are being shot up with this drug every two weeks. And since non organic milk is typically pooled and its subsidiary Searle as a major client. After Taylor left the FDA you have most people getting at least trace doses of rBGH in their milk and dairy products being shot up with this drug every two weeks. And since non organic milk is typically pooled

Multinational Monitor: But it is not just RN that disturbs you about Monsanto.

Cummins: Monsanto has a 100 year history of producing toxic chemicals, such as Agent Orange, PCBs and NutraSweet, poisoning workers, polluting communities and then avoiding liability. In Washington, D.C., it has been a prime lobbyist for so called tort reform FDAiting the damages from those poisoned by chemical corporations and other polluters. And Monsanto is the world leader in trying to force genetically engineered foods and crops down the throats of consumers around the world. rBGH is important because it is the first product of genetic engineering. It was commercialized in the United States in 1994. But since then there have been 37 other genetically engineered products approved in the United States and a couple of dozen in places like Canada, Japan and Europe.

The majority of these new genetically engineered products have been commercialized by Monsanto. These include crops such as the Round Up resistant soybeans, cotton and corn; Bt cotton and Bt corn, which have a pesticidal soil microorganism, Bt, spliced right into them; and genetically engineered tomatoes and rapeseed (canola) plants . Monsanto has been the most vocal of a handful of companies across the globe pushing this technology. Others include DuPont, Novartis, Agrovo, Dow, Eli Lilly.

Multinational Monitor: Monsanto says that splicing the pesticide Bt into the plant is a good thing, because it eliminates the risk of spraying pesticides.

Cummins: Bt is a soil microorganism. It is the most important tool for organic farmers across the world and for farmers who are trying to use fewer toxic chemicals. Say you are trying to grow potatoes

organically. If you have an infestation of potato beetle, you would spray a bit of Bt on your crops, just the minimum amount you need to repel the beetles, and just for the shortest amount of time. In a similar fashion, Bt is used by organic farmers as an emergency tool to repel corn borers in corn, or boll worms in cotton, or potato beetles in potatoes. It is the most important natural biopesticide found in nature that we have. Unfortunately, Monsanto has now stepped up and said, "Look, we are going to take that Bt and gene splice it into the genome of crops like cotton, corn and potatoes, so that every cell of these plants will permanently produce Bt. This will repel the pests so farmers won't have to spray all of those nasty toxic insecticides on the plants."

The problem with this line of reasoning, and the reason that organic farmers are up in arms about gene altered Bt crops, is that, as any farmer knows, if you overuse a biopesticide such as Bt, the pests will develop permanent resistance to it. And there is a heck of a difference between using Bt as an emergency tool organic farmers are up in arms about gene altered Bt crops, is that, as any farmer knows, if you overuse a biopesticide such as Bt, the pests will develop permanent resistance. The problem is that once Bt is rendered use less, how are organic farmers going to survive economically? The answer is they are not going to be able to. They are going to be forced to turn to toxic chemicals after a few years or else go out of business.

Multinational Monitor: Why does popular resistance to genetically engineered foods appear stronger in Europe than in the United States?

Cummins: The European resistance to genetically engineered foods has been so strong, first of all, because of the horrific historical experience of the Europeans with genetic engineering during the Nazi era. When Monsanto or Dow gene engineers pop up and say they are going to create a master race of plants, Europeans are not that impressed. Europeans also have a more heightened consciousness regarding out of control technologies because of recent nuclear plant accidents like Chernobyl and the advanced suite of environmental destruction in areas such as Eastern Europe. So, people are more skeptical about Big Science over there.

Secondly, Europe, since 1996, has gone through a food crisis triggered by the mad cow epidemic in Great Britain and other countries. Consumers have learned in Europe that industrialized food production, in this case, feeding back dead and diseased animals on an industrial scale to animals, has unleashed a deadly and incurable brain wasting disease called CJD, which is the human equivalent of mad cow disease. Even though only 30 or 40 people have died from this particular disease, scientists in the United Kingdom are still warning that it could reach hundreds of thousands or even millions before this epidemic runs its course. So, people are very concerned about what is going into their food.

Finally, the media in Europe have publicized the debate over food safety and genetic engineering much more thoroughly than in the United States. In the United States, if you ask someone on the street about genetically engineered food, probably the only "Frankenfood" they have ever heard of is the bovine growth hormone. When the U.S. media did publicize the rBGH controversy in 1994 and 1995, there was a tremendous upsurge in consumer concern about this, there were protests and milk dumps all over the country, 325 dairies pledged to not use rBGH, there were hearings in Congress, a bill was introduced in Congress and a federal court case was launched.

But, no v five years later, most consumers have no idea that there are 45 million acres of genetically engineered crops across the country, 37 genetically engineered foods and crops, and that most processed

foods in supermarkets have at least traces of genetically engineered ingredients. So, the American public is just now starting to learn that industry and government have covertly genetically engineered a lot of the food out there and that they're not allowed any choice over the matter because the government says that it does n't have to be labeled.

The government is disregarding polls which have shown over and over again in the last 10 years that 80 to 95 percent of American consumers want a choice in the marketplace. They want to know whether foods have been genetically engineered or not, so that they can exercise their right to not buy them.

Multinational Monitor: Last year, the Department of Agriculture proposed new federal regulations that would permit genetically engineered food to be labeled as organic. How did that happen?

Cummins: Because there is such a problem with food safety and genetically engineered foods, more and more consumers over the past decade have turned to organic food. Last year, \$5 billion worth of organic foods were sold in the United States. This is only about 1.5 percent of the total food dollar, but it is a market that is expanding rapidly, more and more consumers. In a poll done by Novartis Corporation in February 1997, 54 percent of the American public said that they want more of agriculture in this country. The backing at this and saying, "This is not a good thing."

The organic industry is no longer just a few hippies selling some wilted looking produce at a few tiny stores. This is now starting to be a big industry. Corporate America needs to either take over this industry or keep it marginal. So, trade associations such as the Biotechnology Industry Organization, the National Food Processors Association, Grocery Manufacturers of America and the Farm Bureau sat down with the Clinton Administration and said, "Let's draw up some federal regulations on organic foods so that you can call genetically engineered foods organic, so you can call irradiated foods organic, so you can call the products of factory farms organic, as well as foods produced with toxic sludge organic."

In addition, the food giants said, "Let's give the government a monopoly over the word organic. Let's make it illegal for any organic certifiers to have standards higher than the minimum USDA standards, which we believe should be the lowest in the world. And let's ban anything that even implies organic, like eco labels."

The government released its proposed federal regulations in December 1997, right before Christmas. But they got a big surprise. During the public comment period, 280,000 Americans wrote in irate letters, faxes and e-mails to the USDA basically saying, "Hell no, we will not accept genetic engineering, irradiation, toxic sludge, antibiotics, factory farming or these other industrial food processes under the organic label."

By May 1998, the USDA realized it had a major problem. Even companies like Monsanto told the USDA to back off on the idea of biotech being okay under the organic label because it is starting to damage the industry's entire reputation, it is starting to damage the entire biotech industry. Back off for a few years and we'll try again later, they said.

The USDA admitted that it received 20 times more comments from citizens on their proposed organic regulations than any other USDA regulation in the history of the agency. So they said, "Okay, obvi-

ously organic consumers don't want this, so we'll come back with some better proposed rules." Unfortunately, the USDA came up with a position paper on October 28, 1998 that is the beginning of the second set of proposed regulations which shows they are still up to their old tricks. They are temporarily backing off on genetic engineering, sewage sludge and irradiation, but they still want industrial agriculture practices to enter into the organic market forcefully. But it appears that these latest proposals are not going to fly with consumers either. There is going to be a continuing battle for the next several years over the government's attempt to degrade organic standards and outlaw dissent.

Multinational Monitor: Why are farmers around the world concerned that Monsanto is undermining,~ seed saPin,!r?

Cummins: Traditionally, farmers would save their seeds and exchange them. Over time, farmers improved the seed stock, through trial and error. Since the Second World War, we have had the development of a small number of seed companies developing hybrid seeds. The seed companies were never able to develop hybrid seeds for rice and wheat and a number of other crops that they really wanted to monopolize. Farmers continued to save those seeds. The chemical and genetic engineering companies are saying that it is not a good idea for farmers to be able to save seeds any longer. "We have invested a lot of money into developing these seeds," they say, "and we don't want farmers to save them."

When you buy Monsanto's genetically engineered seed, you have to sign a contract agreeing that you will not save and replant the seeds. You have to give Monsanto the right to enter your farm and inspect the premises to make sure you are not saving your seeds.

In 1998, the USDA and a company called Delta & Pine Land Company, a cotton seed producer, announced it had a joint patent for what is called the Terminator technology. Delta & Pine has since been bought out by Monsanto. The research on the Terminator gene was done with taxpayer money and now the exclusive rights to the patent are going to be held by Monsanto. The Terminator gene is the solution to the seed monopoly's problem of farmers saving seed. These seeds will not reproduce. So, if you manage to corner the market in India for wheat seeds by perhaps giving them away to farmers or giving them good credit in exchange for the seed, when the farmers go to save their seeds, as they have always done, they are not going to work. They are going to have to come back to the seed monopoly to purchase their seeds. This technology is not going over well in countries around the world. You've had Monsanto's experimental crops burned in India. You've had mass demonstrations in places like the Philippines.

Last year, there was a telling controversy in this regard. Monsanto forked over \$150,000 to the Grameen Bank in Bangladesh. The Grameen Bank is the best known micro lender in the world. It lends small amounts of money to hundreds of thousands of poor peasants in Bangladesh. It has been a successful project. Monsanto and the Grameen Bank announced they were launching a joint project to make high-tech genetically engineered inputs available to low income peasants in Asia. There was a tremendous uproar over this and the Bank was forced to give back the money to Monsanto and back out of the deal.

Multinational Monitor: Other activists around the world are engaged in civil disobedience and destroying genetically engineered test crops

Cummins: In the last several decades there have been several mass citizen movements in the United

States and in Europe crops

int project to make high-tech genetically engineered inputs available to low income peasants in Asia. There was a tremendous uproar over the genetic engineering movement that rivals in scale the European anti nuclear movement of the 1970s and 1980s. We are seeing explosions of energy at the grassroots.

This movement is saying, "We refuse to have one more fascist technology nuclear movement of the 1970s and 1980s. We are seeing explosions of energy at the grassroots.

ered inputs available to low income peasants in Asia. There was a tremendous uproar over teenpeace have blocked the pathway of ships unloading genetically engineered soybeans and corn. There have been protests at the ministerial meetings of the European Commission.

There have been actions in which Novartis and Monsanto's offices have been occupied by protesters. Farmers in France last year destroyed the entire shipment of Bt corn seeds that were sent into the country. There have been boycotts instituted that have been successful to the point where major supermarket chains in countries like Austria, Germany, UK and Switzerland are now saying they will not accept genetically engineered foods or ingredients.

In the UK, the parliament banned genetically engineered foods in its canteens and cafeterias. Thousands of school districts across Europe have banned these products. The European Commission has started to develop laws that will require mandatory labeling of genetically engineered foods and crops. Activists are trying to force U.S. companies to segregate the crops so that retailers and consumers have a choice in Europe.

Multinational Monitor: Isn't it impossible to segregate the genetically engineered crops from those that are not genetically engineered?

Cummins: No, it is not impossible. The giant grain companies like Cargill and Continental and ADM like to say that it is technically impossible, but on the other hand, they are selling "identity preserved" grains which are guaranteed not to be genetically engineered, it is not impossible. The giant grain companies like Cargill and Continent

Multinational Monitor: Let's take milk. Can you tell whether milk has rBGH in it or not?

Cummins: Approximately 10 percent of the fluid milk in the United States today is labeled that it does not have rBGH in it. But for the 90 percent of the non organic milk in the United States, consumers are left in the dark as to whether it does contain genetically engineered ingredients. To our knowledge, the only way a consumer can guarantee that processed food or produce is not genetically engineered nowadays is to buy organically certified food.

Multinational Monitor: If these foods were labeled as genetically engineered, consumers wouldn't buy them and the technology would be dead.

Cummins: Mandatory labeling, as called for in the May 27~ 1998 lawsuit of the Center for Food Safety against the FDA, would slow down the technology to the point where the public could take a long, hard look at it and decide whether it had any benefit or not. As the head of Asgrow Seed Company, now a Monsanto subsidiary, admitted, labeling genetically engineered food in the U.S. would be comparable to putting a skull and crossbones on it.

At this point, the public company, now a Monsanto subsidiary, admitted, labeling genetically engineered food in the U.S. would be comparable to putting a skull and crossbones on it. Take a long, hard look at it and decide whether it had any benefit or not. As it must be dangerous.”

Multinational Monitor: Do you believe that the technology is a danger to us ?

Cummins: I believe that it is dangerous, not only to public health but also to the environment. You have to look at each one of the 37 genetically engineered foods and crops individually, but overall genetic engineering creates new toxins, new allergens, damages the nutritional value of food, and creates “superweeds” and “superpests.”

This is a totally unnecessary and radical new agricultural technology being rushed to market because these companies want to drive up their stock prices, capture monopoly markets and make more money. Genetic engineering creates new toxins, new allergens, damages crops, and, as apologists say, like clean the toxins out of agriculture, or feed the world’s hungry.

Multinational Monitor: Now is the traditional cross breeding of plants different from what Monsanto is engaged in?

Cummins: Traditional cross breeding of plants and animals can only occur in species and varieties that are closely related. In nature, you are never going to have a pig mate with a human being and produce an offspring. And you are never going to have a flounder fish with an antifreeze gene spliced in it. You are never going to have a tomato with its ripening gene reversed. You will never find these things in nature. Only the mad scientists in lab coats can cross breed outside of nature’s laws. Genetic engineering is a radical new creation whereby scientists can take anything in nature and splice it into anything else. They can put human genes into animals and plants, they can take soil microorganisms and splice them into animals. They can literally create new human beings, new plants and new animals. And they are beginning to do this. This has nothing to do with traditional cross breeding techniques. This is totally new, radical, bizarre microorganisms.

Multinational Monitor: What is your prediction as to the future of genetically engineered foods?

Cummins: Genetically engineered foods are going to fail, just like nuclear power. The kind of opposition that has developed in Europe and that we are seeing increasing in Japan, Australia and New Zealand is going to spread in the United States. You are going to see the kind of resistance across the board that you saw in 1994 and 1995 against rBGH. We too are going to build a mass movement comparable to the anti nuclear movement of the 1970s and 1980s.

This time it is going to be a mass movement for sustainable and organic agriculture. We will make clear that chemical intensive and genetically engineered agriculture are a threat to the planet and we have to put an end to them.

MULTINATIONAL MONITOR DECEMBER 1998

THIRTEEN MYTHS OF GENETIC ENGINEERING

(from Acres USA Jan 2000)

Myth Number 1: Genetic Engineering (GE) is not new. It is just the same as speeded up selective breeding.

Fact: Genetic engineering and selective breeding are worlds apart. Breeding does not manipulate genes; it involves crossing of selected parents of the same or closely related species. In contrast GE involves extracting selected genes from one organism (e.g. animals, plants, insects, bacteria) and/or viruses, or synthesizing copies, and artificially inserting them into another completely different organism (e.g. food crops). GE usually employs virus genes and antibiotic resistance genes to act as markers. All these inserted genes are present in every cell of the plant.

Myth Number 2: Genetic engineering is precise.

Fact: The function of only a small proportion of the DNA in a higher organism is known. Modern genetics has shown that genes do not operate in isolation. Rather they interact in a complicated way, changing their behavior in response to influences from other genes. Although a gene can be cut out precisely from the DNA of an organism, its insertion to the DNA of another is entirely random. This results in the disruption of the order of the genes on the chromosome and may result in random and unexpected changes in the functioning of the cells. Richard Lewontin, Professor of genetics at Harvard University has said of GE: "we have such a miserably poor understanding of how the organism develops from its DNA that I would be surprised if we don't get one rude shock after another."

Myth Number 3: GE foods vary from non-GE foods only in the characteristic that has been modified. The random insertion of foreign genes into the genetic may cause unexpected changes in the functioning of other genes. Existing molecules may be manufactured in incorrect quantities, at the wrong times, or new molecules may be produced. GE foods and food products may therefore contain unexpected toxins or allergic molecules that could harm our health or that of our offspring.

Myth Number 4: GE food is extensively tested and the GE food at present in our supermarket shelf is perfectly safe to eat.

Fact: There are serious doubts about the adequacy of GE testing and about the validity of the conclusions drawn from the results. Independent long term testing is required before we can be sure that GE food is safe to eat. Another health concern is the possible acceleration of the development of bacterial resistance to antibiotics due to the abuse of antibiotic resistance genes in the production of GE foods.

Myth Number 5: Genetically engineered food has improved nutritional value.

Fact: No GE food produced to date has been shown to be more nutritious than non-GE food. Most GE crops are only designed to be resistant to specific herbicides, to produce their own insecticides or to have an increased shelf life.

Myth Number 6: One can always choose not to eat GE foods.

Fact: At present most foods on the supermarket shelf contain GE ingredients. These ingredients are not labeled, so there is no way of knowing whether we are eating them. GE products are likely to be found in foods containing the following ingredients: soy flower and oil, lecithin, canola oil and corn extracts.

Myth Number 7: Farmers will benefit from growing GE crop.

Fact: Seeds of GE crops are more expensive than those of conventional crops. Farmers in the UK and the US report that yields are generally no better, and the crops are less reliable and less profitable. NON-GE crops now receive a premium, and as more countries reject GE foods, the opportunities to sell GE produce are diminishing. Because of risks associated with GE crops, insurance companies in the UK and the US are reluctant to insure them. Farmers growing GE crops have to sign binding contracts with the biotechnology producers. These commit them to using only the herbicides produced by that company and prohibit them of the traditional practice of saving seed for the next season. This will hurt farmers in the third world.

Myth Number 8: GE crops will reduce the use of herbicides and pesticides. Crops engineered to be resistant to specific herbicides may encourage more liberal use of those herbicides. This has been anticipated by one manufacturer who has applied to the Australia and New Zealand Food Authority to have the allowable residue of the herbicide glyphosate in foods sold in NEW Zealand increase by 200 times. In areas of the US where crops engineered to produce their own insecticide are grown, pesticide use has not decreased.

Myth Number 9: There is no evidence that GE crops are harmful to the environment.

Fact: Insects, birds and the wind carry GE altered pollen and seeds into neighboring fields and far beyond. Cross-pollination occurs between GE and non GE crops and their wild relatives. In this way resistance to weed killer E.g. might be transmitted to weeds making them more difficult to control. There is evidence that crops engineered to produce their own insecticide can kill beneficial insects.

Myth Number 10: GE crops will save the world from famine.

Fact: A major cause of famine is the unequal global distribution of food. Mountains of food exist in much of the western world and food is regularly dumped. Poor people have limited ability to buy either GE or non GE food. There is no evidence that GE crops produce higher yields than conventional crops or that GE produce will be cheaper.

Myth Number 11: You can trust the scientists that say GE food is good for you and the world.

Fact: The money for scientific research on GE comes from either the biotechnology companies or the government. Both are committed to the promises of biotechnology. This means that even when scientists have concerns about the safety or commercial application of the technology, it is hard for them to risk their careers by being openly critical. One respected scientist in the UK who spoke up about his experimental results showing the damaging effects of feeding rats on a type of genetically engineered potato was immediately fired from his job.

Myth Number 12: You can't stop progress.

Fact: Progress implies change for the better. Change for the worse is regression. We must not commit ourselves, willingly or unwillingly to a dubious technology that cannot be reversed.

Myth Number 13: There are more important things to worry about than GE foods.

Fact: Many scientist don't think so. E.g. Joseph Rotblat, the British physicist, who won a 1995 nobel prize says: " My worry is that other advances in science may result in other means of mass destruction, maybe more readily available even than nuclear weapons. GE is quite a possible area, because of the dreadful developments that are taking place there".

(The scientists who developed this essay can be contacted at 03-489-4020 or 03-476-1345; e-mail: brentmckenzie@clear.net.nz)

GE FOODS ARE UNSAFE!

Physicians and Scientists for Responsible Application of Science and Technology (PSRAST)

1. General conclusion

Based on both scientific theory and experimental data, it can be concluded beyond any doubt that genetic engineering of plants and animals may potentially cause them to unexpectedly contain substances harmful to people who eat them. Scientists cannot however estimate the probability that harmful substances will be created in any specific case, because not enough is known about the new field of genetic engineering. Some of the harmful substances which are known to be possible in genetically engineered foods could cause allergies or toxic reactions. But, because the knowledge of DNA is incomplete, genetic engineering of food plants and animals may produce other problems which scientists have not yet anticipated.

So GE foods are inherently unsafe and we neither have enough knowledge to estimate the risk for harmful effects nor fully reliable testing methods.

2. Reasons why GE may cause the appearance of unexpected substances

Molecular biologists have shown in the laboratory that the insertion of a gene may induce unexpected metabolic changes that in the worst case may result in harmful substances for the following reasons: With presently used techniques, it is impossible to guide the insertion of a gene. Therefore, it will occur haphazardly in the midst of the ordered code sequence of DNA. This will perturb the normal close control of DNA over metabolic processes resulting in unpredictable effects on the metabolism. This is especially so as, to be successful, the inserted gene has to be inserted in a region of DNA that is active (most of DNA is inactive, and genes inserted there will not have any effect).

“The so called promoter that is always included in gene insertion packages, may cause metabolic disturbances (the most commonly used promoter comes from the Cauliflower Mosaic Virus “CaMV”). The promoter is added because it is an absolute requirement to ensure the inserted gene is “read”; i.e. copied into RNA and translated into the protein for which it codes. In addition, other regulatory sequences called enhancers are often included as they strongly stimulate gene expression. However, the so called enhancers also stimulate the activity of surrounding native genes with potentially deleterious consequences. The metabolism of the cell may become disturbed in unpredictable ways. The enhancers may also activate genes that should normally be inactive. For example a toxic protein that normally is only expressed in the leaves of a food plant, may become active in the fruit or seeds used. Moreover, normally, the activity of genes is the result of a refined regulation of their expression, so no gene is active longer than needed. The artificially inserted strongly stimulating promoter-enhancer complex without any coupling to inherent regulatory mechanisms eliminates this delicate demand/supply regulation. This may have unpredictable effects on cellular functioning.”

Genetic engineering means in most cases the insertion of a gene coding for a protein foreign to the species. There is no way of knowing what the presence of a foreign protein will have on the metabolism and functioning of an organism. It may have unexpected effects in addition to its desired effect including the possibility that it may cause the generation of a harmful substance.

The effect of a gene is context dependent. In a foreign environment, it may have unpredictable effects.

These effects may be difficult to detect but might in the worst case generate harmful substances. See “The new understanding of genes”. Most of the foreign proteins that are used in genetic engineering have never existed in food. There is no way of knowing beforehand, without extensive food safety assessment, if it is safe to eat food containing such proteins.

Regulatory genes may inadvertently be included in the inserted gene, causing unpredictable complications (however, with the kinds of genes presently used, this risk is considered unlikely). The knowledge of regulatory genes is incomplete so there is a risk that an inserted DNA sequence may possess unanticipated regulatory activities. These genes regulate the activity of other genes. This might disrupt any of the cellular processes in which DNA or RNA participate which might result in many kinds of unexpected effects including the production of harmful substances, (for more details, see The underlying mechanism involved in the “reading” of regulatory information... [AL]; (part of an article by John Fagan).) If so called fusion proteins are generated through GE, they may cause unexpected allergies that may be more allergenic than proteins produced by the original DNA sequences. Fusion proteins are created by linking pieces of DNA sequences from two or more sources. The regions where two proteins are joined can assume conformations very different from those of either of the original proteins.

Furthermore, the likelihood of generating allergenicity in fusion proteins is increased by the fact that the junctions at which two proteins are fused often assume configurations that are not common in natural proteins, and are, therefore, more likely to be allergenic. There are also other reasons why genetic engineering might cause increased problems with allergens, see Allergens generated in recombinant foods [AL]; by John Fagan.

A special class of hazards might be unexpected effects of known substances. Obvious candidates are GMOs modified to produce pesticides, substances designed to be toxic. An example of this is the demonstration of long term toxicity of a strain of GMO potato by Arpad Pusztai (Lancet 1999 Oct 16;354(9187):1353-4). Conclusion There are several known ways in which the artificial insertion of a gene may cause unexpected complications of a kind that never occurs in conventional breeding. Some unexpected effects have been experimentally verified, see Examples of unexpected effects of genetic engineering. In addition, because the knowledge about DNA is very incomplete, there may be effects that cannot be even imagined presently, see “Incomplete knowledge about DNA”

It took almost 50 years after the introduction of nuclear technology and synthetic pesticides to appreciate the health and environmental hazards they present. Because recombinant DNA technology (genetic engineering) is even more complex, and because we have almost no experience with it, it is reasonable to expect future surprises. The U.S. FDA and the European Union have been denying any hazards with GE foods. It is satisfying to find that evidence have been unearthed indicating that this has been the result of suppression of truth, see footnote.

3. Is it possible today to estimate the risk for appearance of harmful substances due to genetic engineering?

Risk is the probability that some adverse effect (hazard) will occur in the future. Of course, no one can predict the future with perfect certainty. The degree of accuracy of a risk assessment is dependent on how much relevant information is available, the quality of that information and how well that information is interpreted. Thus, some risk assessments are more reliable than others.

For example, because insurance companies have many years worth of information about automobile

accidents, they can predict rather well the characteristics of drivers (using data on age, sex, type of car, and accident history) is most likely to be involved in an accident. On the other hand, because the physics of only a few major earthquakes have been monitored with sophisticated seismic equipment, and because there are debates about what physical signals are important indicators, it is not yet possible to predict the likelihood of a major occurrence. Specifically, it is not possible to assess the risk of harm from eating GE food with a high degree of accuracy because:

Genetic control of cell function is not well understood (see footnote ·Incomplete knowledge of DNA). Not even the DNA sequence of presently marketed genetically engineered plants is fully known. In order to understand what can go wrong with a system and to evaluate its potential to go wrong, it is first necessary to understand how the system works. A cardiologist must understand anatomy, physiology, biochemistry and pharmacology to diagnose heart disease, predict outcome and prescribe appropriate remedies.

Since the genetic control of cell function is an extraordinarily complex system which is only poorly understood, our comprehension of all that can go wrong when foreign genes are added to foods, our ability to predict the outcome of eating such foods, and our ability to design safe GE foods is highly limited.

Furthermore, as anyone who uses a computer knows, the opportunity for malfunction is increased as systems become more complex and as the manipulation of complex systems becomes more random and uncontrolled. Laboratory experiments with GE have been very limited. For some (but not all) GE foods, some short-term studies have been conducted on experimental animals. But there are almost no long-term toxicological, neurological, metabolic, endocrinological, developmental or reproductive studies of these foods. Such studies are necessary to evaluate the effects of substances which are slow-acting, have cumulative or reproductive effects. For details see ·"The approval of Roundup Ready GE-Soy - based on incomplete evidence" and for a suggested procedure, see ·"Testing the safety of genetically engineered foods" by professor John Fagan.

Human experience with GE foods has been very limited. GE foods have been on the market for only about five years, so there obviously has been no experience with long-term exposure to these novel foods. Few controlled short-term human studies have been conducted on these new foods.

Moreover, since GE foods have not been labeled, there has been no way for scientists to compare the health of people who have and have not been eating them. In contrast, humans have had thousands of years of experience with naturally occurring foods, and the conditions under which they pose hazards (e.g., eating solanine in green potatoes) are well-known. The problems of risk assessment per se have been further aggravated by the way regulatory agencies have been handling the GE food issue, see footnote: Unsatisfactory handling by regulatory agencies.

Conclusion

There is no scientific knowledge at all that makes it possible to estimate how likely it is for harmful substances to be generated in GE foods. But we can definitely say today that there is no scientific basis for maintaining that harmful substances may not appear or are very unlikely.

Problems with food safety testing Safety testing of GE foods is problematic because genetic engineering may give rise to unexpected and unpredictable substances. It is illuminative to compare with a closely

related field, the testing of medical drugs, especially as there is an extensive experience of the reliability of such testing. On the basis of knowledge about the chemical properties of a medical drug, it is possible to predict, to a quite large extent, what kind of harmful effects might occur.

In the case of GE foods, there is no clue to decide if an unexpected substance may be toxic, allergenic, carcinogenic, mutagenic or otherwise harmful. In medical drug testing, it is possible to expose test objects to several times higher doses than used clinically. This helps to get an idea of the harmfulness of a drug.

For foods, such a procedure is impossible because it would give rise to nutritional imbalances. For these reasons, it is considerably easier to detect harmful effects of a medical drug than of a GE food. Still about 3 percent of drugs released on to the market have been withdrawn because of unexpected harmful effects that were not revealed until the drug had been used at a large scale. And about 10 percent have had so serious side effects that their use has been considerably restricted.

Yet the drug companies have been using the best available methods in the world. Laboratory animal and human testing has been used as well as long term clinical studies. They have been applying the tests very rigorously and carefully. This is because the development of a new drug is very expensive, so a forced withdrawal from the market means a loss of billions of dollars.

The greatest problem in toxicological testing is to reveal long term harmful effects. Against the experimental background from medical drug testing, it can be confidently predicted that even most rigorous safety testing of GE foods is likely to fail to detect long term harmful effects to a considerable extent.

The only way of minimizing the risk of not detecting unexpected harmful effects of harmful substances is to use long-term testing. As animals are not fully reliable predictors of food safety for humans, it is necessary to use Physicians and Scientists for Responsible Application of Science and Technology (PSRAST) long term human studies. Strategies for long term testing of GE foods have been suggested by professor Arpad Pusztai, see "The need for rigorous biological risk assessment" and professor John Fagan, see Testing the safety of genetically engineered foods.

As experimental long term testing is not sufficient to ensure safety, Fagan has suggested a monitored premarketing test on a population of about 2.000.000-3.000.000 people during 2-3 years with close surveillance of its health status. Even with that test included, he concludes that there will remain a "residual risk" for unexpected long term damage. These testing schemes are fundamentally different from the superficial testing that has been presently been accepted for approval of GE foods, see "Substantial equivalence versus scientific food safety assessment"

Footnotes

Incomplete knowledge about DNA Suppression of truth turning untenable Unsatisfactory handling by regulatory agencies Published in May 1999. The present version is the result of an ongoing and not yet completed revision through the contribution from new co-authors. Latest update: May 12, 2000.

All the authors of this document have, along with several other scientists, signed an Open Letter demanding that GE foods that have not been tested properly should be withdrawn from the market (in practice this means all GE foods).

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TEN REASONS WHY FARMERS SHOULD THINK TWICE BEFORE GROWING GE CROPS

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The tide appears to be turning against GE crops, but if what you read in the farm press is any indication, farmers will be the last ones to know it. The future of agricultural biotechnology is in serious jeopardy, as consumers, grain buyers, processors, and supermarket chains line up around the world refusing to buy GE products. The Deutsch Bank, largest bank in Europe, has gone public with its concerns, advising thousands of institutional investors across the world to sell GE. And so they have, affecting not just stock prices but encouraging major life science companies to consider spinning off their GE divisions - if anyone will buy them. Don't believe it?

Have a look at a revealing report entitled Ag Biotech: Thanks, But No Thanks?

(www.biotech-info.net/Deutsche.html) which was published in July 1999 by the Deutsche Bank, the largest bank in Europe. They stated that "Thirty days ago, the investment community accorded only positive attributes...to GMO corn and soybean...Today, the term GMO has become a liability. We predict that GMOs, once perceived as the driver of the bull case for this sector will now be perceived as a pariah."

This highly influential report was sent to thousands of the world's largest institutional investors. It concluded by down-rating Pioneer Hi-Bred from HOLD to SELL, coupled with a broad negative recommendation for the seed sector in general .

TO LEARN MORE ABOUT THIS VITALLY IMPORTANT SUBJECT VISIT
www.Lightparrrty.com/Health/GEFoods

ORGANIC AGRICULTURE WORLDWIDE: A Fast-Growing Reality

Bookshelves with scientific studies are filled and the evidence cannot be argued that the introduction of chemically synthesized pesticides has caused tremendous environmental and social problems. In my home country of Germany, despite all the IPM propaganda from the chemical industry and the serious attempts of scientists and farmers to really reduce pesticide spraying, we still dump 30,000 tons of pesticides per year on our fields.

A recent study in Germany has shown that the economic damage for our society caused by the use of synthetic pesticides every year is in the range of up to 300 million DM (Deutschmarks) - and this does not include the new federal states of our republic. Even in our highly educated country with careful training of our farmers in handling pesticides, the costs for deadly poisoning with pesticides alone amounts to almost 8 million DM per year. The costs for monitoring the pesticide level in drinking water is the highest cost factor at 64 million DM.

WHAT DOES SUSTAINABLE AGRICULTURE MEAN?

Since the United Nations Conference on Environment and Development (UNCED) in Brazil in 1992, the term of sustainability has become rather meaningless. The phrase has actually been hijacked by chemical companies showing nice advertisements with ladybugs and weeds flowering in the fields who claim that so-called modern agriculture with all its chemical/synthetic interference is sustainable. Politicians and organizations such as the United Nations have overused and overemphasized this phrase until it has become more or less meaningless.

The organic movement and IFOAM (International Federation of Organic Agriculture Movements) claim the parenthood of introducing the term sustainability into agriculture. Already 20 years ago, the first IFOAM International Scientific Conference in 1977 in Switzerland was titled "Towards Sustainable Agriculture." One of our earliest and most fascinating pioneers in the organic movement, Lady Eve Balfour from the United Kingdom, has given the best definition of sustainability I have ever come across: "The criteria for a sustainable agriculture can be summed up in one word, 'permanence,' which means adopting techniques that maintain soil fertility indefinitely, that utilize as far as possible only renewable resources, that do not grossly pollute the environment, and that foster life energy (or if preferred biological activity) within the soil and throughout the cycles of all the involved food chains." That is what organic farming is all about.

STANDARDS & RULES

There is no other farming method so clearly defined and regulated by standards and rules as organic agriculture. Our organic movement has four decades of experience in not only defining our way of practicing agriculture, but also in establishing inspection and certification schemes to give the consumer both a guarantee and confidence in the prime quality of our products, and especially in the environmentally sound methods by which they are produced.

The rapidly growing importance of organic agriculture may be seen in the development of organic regulations within "Codex Alimentarius," as well as in the fact that many nations such as England,

Argentina, Israel, Australia, and recently the United States are enacting legislation in this field. The draft for the U.S. regulation recently published has been heavily criticized and has already attracted thousands of comments from around the world, concluding that these agro-industry biased regulations would destroy the organic movement and our market opportunities.

There are fewer problems with the regulations in other countries by far, since they draw their inspiration from the IFOAM basic standards, which have now been translated into 18 languages from Chinese to Swahili. Comparable clarity cannot be found for integrated farming methods, much less for so-called “sustainable” agriculture. We have lots of reasons to claim that “organic agriculture is sustainability put into practice.”

A GROWING INDUSTRY

In order to get an impression about the fast growth of organic agriculture, a look at IFOAM and its membership gives some interesting indications. Founded in 1972 by six organizations (coming from three continents), the federation developed after 15 years into an umbrella federation with about 100 member organizations in 25 countries. In the last ten years, the almost explosive development of organic agriculture all over the world is reflected in the fact that IFOAM now unites 670 member organizations and institutions in over 100 countries worldwide.

To get an understanding of how fast organic agriculture is spreading out we should look first at development on the farming and production level. It is impressive to have about 8,000 organic farmers in Germany, which is home to some of the biggest and transnational chemical companies whose political and financial power creates quite some pressure on the organic movement. In the federal state of Mecklenburg-Vorpommern already 10 percent of the total land is under organic cultivation. A number of other German federal governments have committed themselves to a 10 percent organic goal. Yet, it remains a fact that nationwide, we are in the range of only 2 percent. Neighboring countries show what booming developments are possible. In Switzerland the organic share has reached the range of 7 percent, with the largest Kanton (province), Graubunden, having around 30 percent. The boom in Austria, with more than 20,000 organic farmers, indicates a 10 percent share for organic farming. But Sweden and Finland have also reached the level of Switzerland, and they are now competing with Austria for the lead. The latest statistics from Italy show 18,000 farms either organic or in conversion to organic farming.

Yet there has also been impressive development in the Southern Hemisphere and in the so-called Third World. An organic farming project for cotton-producing farmers in Uganda started with a couple of hundred farmers and within three years has shown that 7,000 farmers moved to cultivate organic cotton. In Mexico tens of thousands of campesinos (small farmers) produce organic coffee for export, as well as staple food organically for the local market. The Mexican UCIRI cooperative alone has organized some 7,000 farmers in over 30 villages converting a whole region into organic farming.

CONSUMER MARKET

Fortunately, the market development and consumer demand for organic products is matched by the rapid growth of conversion to organic farming methods. The organic market in the United States is in the range of \$3 billion and is expected to double in the next two or three years. In Germany, we can see how the whole babyhood sector is well on its way to becoming more or less exclusively organic. Also,

the fact that more than 30 percent of the daily bread in Munich is baked with certified organic ingredients is a clear indicator that organic products conquer mainstream markets.

It may be surprising that even in a country like Egypt, organic produce is becoming mainstream. The biodynamic SEKEM initiative, employing about 1,000 people, delivers its products to 6,000 pharmacies and to 1,200 shops. Egypt, being a nation of tea drinkers, has shown its preference for organic tea by the fact that the best selling herb tea is certified organic. Rapidly growing consumer demand is also reported from countries like Argentina, Japan, Poland and Australia. The boom for organic products is not a luxury of the developed world, as we have seen in the case of Egypt. It is encouraging that local markets for organic food are becoming increasingly established in so-called developing countries. The growing importance in this context will be close cooperation between organic agriculture and the fair trade movement.

The organic sector is probably the most rapidly growing food market in the world. Respected organic market analysts like Professor Ulrich Hamm have forecasted annual growth rates of 20 to 30 percent and, in some countries, even up to 50 percent per year. The largest organic trader in the United Kingdom expects today's estimated \$11 billion world organic market to go to a volume of \$100 billion in the next then years, with a major share of this growth taking place in the United States and Japan. In the context of these figures and forecasts, Denmark's target of reaching a 20 percent market share of the total food market for organic products in the next couple of years sounds quite realistic.

An indication of the organic future ahead is the fact that McDonald's (with organic milk in Sweden), Nestle, Sandoz, Lufthansa and, lately, with a lot of media attention and an ambitious commitment, Swiss Air (catering 25,000 meals per day), have entered the organic sector.

GENETIC ENGINEERING

Many people may not see that organic farming will one day be so widespread that synthetic chemical fertilizers and pesticides become "endangered species." I certainly do not want to have the farmers worldwide forced legally to stop using pesticides. But I do trust in the power of markets and consumer demands, as well as in the convincing fact that our organic and often-called "biological" way of farming is so logical.

The organic movement and the environmentalists are ready for the next struggle - genetic engineering, which is accelerating the already existing problems of pesticide use, and enters our environment with a new dimension of global risk. In the promotion of genetic engineering, we hear the same unrealistic promises as we heard when chemistry was introduced into farming. If we continue to manipulate genetic organisms, we will face problems, which we may quite likely never get under control.

Genetic engineering has to be rejected for many reasons: It is dangerous and not at all risk tolerant. It is absolutely not necessary for food production and processing, and it is not economically viable (which doesn't mean that the big multinationals cannot reap huge profits).

If one has a basic understanding of the underlying principles of organic farming and knows about the power of nature, one will agree with the firm position of the organic movement that genetic engineering has no place either on organic farms or on any other field. I will continue to support the 76 percent of German consumers that are against genetic engineering in food and will work to ensure that the

future of genetic engineering will soon become history.

During my first practical training in farming on a conventional farm which used all the chemical options available, I realized very quickly that this cannot be the future for farming. Most fascinating for me was that organic farming is not at all a “do nothing way” of farming and that it does not get its strength by being against something like pesticides or synthetic fertilizers. Organic farming has at its core an attention to healthy soils and cycle economies, and it cares about the social aspects of agricultural pursuits.

If we continue with this positive approach, the organic movement will be the starting point, not only for healthier farmers and food, but also for a change in lifestyle and consumption patterns, thus helping to develop sustainable societies with a bottom-up strategy - namely, field to field, farm to farm, shop to shop, village to village, and region to region. Look more closely at what organic farming has to offer. Have the courage to be more “radical” (in the truest sense of the word, of going to the roots) and join the organic movement.

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