National Sustainable Agriculture Coalition

Policy on Genetically Engineered Crops and Livestock

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INTRODUCTION

Agriculture faces many sustainability challenges, which will increase with growing population, climate change, limited fresh water, and rising energy costs. Sustainable agriculture takes an agro-ecological approach to farming with a goal of creating an adaptive and resilient system that can best address these challenges. In the face of a massive campaign to promote genetic engineering (GE) as the solution to sustainability issues, we are increasingly asked for our position. This short policy brief lays out the basic contours of that position.

Our view is perhaps best described as skeptical. Since the introduction of GE technology in the mid-1990s, no widely commercialized GE crop variety to date has contributed significantly to the broad array of sustainability issues. A great deal of the hype around GE crops and sustainability, nutrition, and productivity remains hypothetical. The regulatory system for GE is weak, and legal restrictions regarding GE varieties are a major impediment to the free flow of scientific ideas and resources critical to the future of the food system. Genetic engineering has also threatened the viability of important value-added and identity-preserved markets in agriculture, including organic agriculture.

Genetic engineering vs. breeding

Genetic engineering is a technology that retrieves genes from virtually any organism, manipulates them in a laboratory, and inserts this manipulated genetic material into the original source organism or different organism. In most cases, the engineered gene becomes part of the genetic material of the engineered organism and is passed on to future generations. The first widely grown genetically engineered crops contain genes from bacteria and plant viruses that make them resistant to several insect pests and herbicides. Thus, genes that cannot normally be transferred to crops or livestock can become part of, and alter, their genetics and characteristics.

Genetic engineering entails laboratory manipulations and the potential to transfer genes from unrelated organisms like bacteria, and thereby differs significantly from all other breeding methods. The latter rely on the transfer of genes from closely related species through mating, and include newer forms of breeding such as marker assisted selection, which uses molecular markers to track traits during the breeding process. Genetic engineering can be performed on all life forms, from bacteria, to insects, plants, animals, fungi, etc.

Genetically engineered (GE) crops, livestock, and microorganisms are also known as GMOs (genetically modified organisms); the two terms are essentially synonymous.

FINDINGS

Benefits vs. risks

Many scientific bodies—including the US National Academy of Sciences—have recognized that genetically engineered (GE) organisms have the potential to provide benefits but also to harm both people and the environment. The extent and possibility of harm and benefit from genetic engineering is a controversial topic, and the implications of adding new genes to the food supply and environment in new combinations raises many questions that have not been fully answered.

In evaluating new technologies such as GE, US regulators examine only the risks, not claims about benefits. Thus, in making decisions, regulators do not consider the question of whether the risks outweigh the benefits, and whether desired benefits can be obtained with less cost and risk through other means (i.e. through conventional breeding or ecological production methods).

Genetic engineering has important environmental, economic, and social implications beyond narrowly defined risks and benefits. For example, current GE herbicide tolerant crops encourage the use of conservation tillage, which reduces soil erosion. But these crops have also encouraged overuse of a single herbicide, which has resulted in the widespread occurrence of herbicide resistant weeds, greater total herbicide use, and recourse to older often more toxic herbicides—practices not consistent with sustainable agriculture methods.

The patenting of genes and seeds, along with contract arrangements between seed companies and customers, has drastically altered the seed industry and farming. These contract agreements prevent farmers from saving and exchanging GE seeds, require scientists to obtain permission from companies to conduct research on GE seeds and organisms, restrict the ability of seed retailers to stock and sell non-GE seeds to farmers, and dramatically increase economic concentration of the seed industry in the hands of a small number of companies. This concentration has severely limited farmer choice in the purchasing and planting of seed.

In addition, farmers who have *accidentally and unknowingly* acquired patented GE crop germplasm through seed commingling or pollen drift beyond their control, and subsequently saved and replanted the seed, have been sued or otherwise harassed by patent holders. This has further deterred farmers from the time-honored practice of saving seed and selecting locally adapted crop strains. Seed saving and exchange among farmers has been an important source of crop genetic diversity and farming system sustainability for millennia.

Overall, GE crops have not yet contributed to any substantial shift to more sustainable agricultural practices, and have not fundamentally addressed major agricultural challenges such as increasing nitrogen use efficiency or drought tolerance. At the same time, the use of GE crops has significantly altered the availability of seed and the structure of the seed industry, to the detriment of farmers and consumers.

Public-sector research

Classical breeding, along with agronomic improvements, was responsible for all of the many successes in US agriculture over the past century through the mid-1990s. Classical and new genomic breeding methods continue to produce desirable traits that contribute to sustainability, such as improved nitrogen use efficiency, increased yields, drought tolerance, pest resistance, and improved quality.

Because of the high cost of producing engineered traits, especially compared to classical breeding methods, breeding is likely to continue to have advantages over genetic engineering in improving small-market crops—such as most fruits and vegetables—and small-market traits of large acreage crops, such as minor diseases. Classical breeding also has advantages in providing much needed public cultivars and animal breeds that are regionally adapted to address climate change, that respond well to organic and other agroecological farming methods, that offer improved flavor and nutritional quality, and that respond to changing consumer demands.

Although GE seed companies make extensive use of classical breeding technology, these companies also insert engineered genes into crop varieties improved through conventional breeding, making these varieties unavailable to organic and other non-GE farmers. Seed companies focused on GE also do not breed to meet the needs of sustainable, organic and other non-GE farmers and gardeners, and consumers. Similarly, the agribusiness industry does not develop agroecological farming systems because they are largely based on knowledge rather than marketable inputs. This makes public-sector research on breeding and agroecology-based methods critically important.

In addition to an investment in classical breeding techniques, there is a great need for public agencies, universities, and other institutions to develop farmer-ready public crop varieties and livestock breeds. Breeding is a multi-step process, and the crop varieties and animal breeds that are produced in the initial stages of breeding are not ready for farmers or gardeners to use because they have some undesirable properties. Breeding efforts must include not only the initial research into varietal and breed improvement but must include the final stages of breeding to develop varieties and breeds that farmers can use.

Liability

Value-added markets—such as organic and identity preserved—important to an increasing number of farmers and ranchers serve consumers who demand non-GE products. US organic farming regulations prohibit the use of genetically engineered seeds or feed. However, due to the movement of pollen and seed, incidents of contamination inevitably occur in crops for which a GE variety exists.

Currently, organic and other non-GE farmers bear the cost of both preventing contamination and of paying for contamination if it occurs. The patent-holder and the technology-user are not required to implement practices to control genetic drift and contamination of seed, despite being the parties who most profit and benefit from the technology's use.

Many domestic and international markets, including organic and important non-organic export markets, do not accept GE crops or non-GE crops contaminated with GE material. Continued contamination by GE organisms will lead to loss of income to non-GE farmers, loss of crucial export markets at the national level, and sourcing of non-GE products abroad rather than from US farmers.

RECOMMENDATIONS

In the light of these findings, the National Sustainable Agriculture Coalition –

- Supports policies that eliminate or minimize GE contamination of non-GE crops, and compensate non-GE farmers for contamination that results in loss of present and/or future income. This includes a full recognition that farmers have a basic right to not have their crops contaminated by GE material, and that GE patent-holders should be held liable.

- Encourages publicly funded research to prioritize the development and improvement of sustainable, organic, and other agroecological technologies and practices. These are crucial to improve sustainability, and their advancement is greatly aided by public research.

- Supports robust public funding of classical breeding programs and production of farmer-ready seed and other planting material for non-GE public crop varieties, and non-GE livestock breeds. These programs should include development of public crop varieties and livestock breeds that are regionally adapted and well suited to sustainable and organic production systems, and should be prioritized over GE for public research funding.

- Recommends establishment of a genetic commons for each major food crop and livestock and poultry species that guarantees public access to a wide diversity of varieties/breeds, accessions, and germplasm that cannot be patented by private interests.

- Supports widespread availability of non-GE seed and other agricultural inputs to farmers and gardeners from distributors unencumbered by restrictive contracts or other agreements that limit or discourage the sale of numerous varieties of non-GE seed and other agricultural inputs.

- Supports open and unfettered access by public-sector scientists to GE seeds and other agricultural inputs for non-commercial research purposes, including evaluation of potential environmental, agronomic, and human health impacts of the use of GE varieties and other agricultural inputs.

- Opposes the granting of utility patents for seeds or crop varieties, whether derived through genetic engineering or other breeding methods. Recognizes the Plant Variety Protection Act as the appropriate means to protect the legitimate interests of crop breeders.

- Supports a mandatory federal regulatory approval process to ensure that any genetically engineered organisms pose no appreciable threats to human health and the environment before they are released for commercial production or use, and to ensure that potential benefits exceed risk. The US Food and Drug Administration should conduct a mandatory approval process to assess the safety of GE foods, rather than rely on the current voluntary review process for foods from GE crops.

- Supports consumers' right to know what is in their foods and recognizes the need for a mandatory federal GE food-labeling regime.

- Supports the authority of regulating agencies to impose restrictions on the experimental or commercial cultivation of GE crops and production of other agricultural inputs to prevent harm to the general public, non-GE farmers, and the environment.

- Supports a regulatory process that is transparent and informed by independent science. The regulatory review process should be required to consider independent, scientific peer-reviewed literature (i.e. not only industry-generated literature), empirical evidence of social, health, and environmental impacts, and assessment of viable alternatives of GE technologies. All data on the safety and efficacy of GE organisms should be available to the public at all critical decision-making stages, and the public should have meaningful input into regulatory decisions.