



POSITION PAPER

**GENETIC ENGINEERING
AND GENETICALLY MODIFIED
ORGANISMS**

*Adopted by IFOAM - Organics International World Board on
behalf of the global organic movement, November 2016*

This position paper addresses all of agriculture, its market channels, and supporting policy and infrastructure; it is not just for those parts currently focused on or aware of the organic sector.

DEFINITIONS

IFOAM - Organics International insists on precise definitions and terminology regarding genetic engineering and opposes any effort to divert the GMO debate by introducing new terminology that might cause confusion.

- **Genetic engineering (GE)** – A set of techniques from molecular biology (such as recombinant DNA and RNA) by which the genetic material of plants, animals, micro-organisms, cells and other biological units are altered in ways or with results that could not be obtained by methods of natural mating and reproduction or natural recombination. Techniques of genetic modification include, but are not limited to: recombinant DNA and/or RNA techniques, cell fusion, micro and macro injection, encapsulation, gene deletion and doubling. In addition, methods such as gene targeting and genome editing are classified as genetic engineering procedures. These depend on homologous recombination and non-homologous end joining, and employ engineered nucleases such as meganucleases, zinc finger nucleases (ZFNs), transcription activator-like effector nucleases (TALENs), and CRISPRs. Genetically engineered organisms do not include organisms resulting from techniques such as conjugation, transduction, natural hybridization, and marker assisted breeding.
- **Genetically Modified Organism (GMO)** – A plant, animal, or microorganism that is transformed by genetic engineering. A product that is the result of Genetic Engineering is called a “GMO” or a “derivative of GMOs” depending on the circumstances.
- **Synthetic Biology** – Designing and constructing biological devices, biological systems, biological machines and biological organisms using a range of methods derived from molecular biology and biotechnology, including the techniques of genetic engineering or genetic modification.

SCOPE

IFOAM - Organics International considers its position on genetic engineering to encompass the following scope, which we shall expand as new applications arise:

- Seeds and other planting stock, used for food, feed, fiber, or otherwise
- Domesticated animals (including cloned animals)
- GMOs created to produce pharmaceutical or other medicinal substances, including vaccines
- Microorganisms
- Arthropods
- Products of synthetic biology

Note: IFOAM - Organics International realizes that there are genetic varieties in wide circulation and use (even by some organic producers) that have been developed through cell fusion, or through irradiation-induced or chemically-induced mutagenesis, or through in vitro mutagenic techniques. We call for identification of all such varieties in use by organic producers and their eventual replacement by varieties developed through breeding techniques that are compatible with fundamental tenets of organic breeding, namely that the integrity of the genome and the cell are not violated through technological manipulations.



GMOS ARE EXCLUDED FROM ORGANIC SYSTEMS.

IFOAM - Organics International reaffirms its position that GMOs and their derivatives have no place in organic food and farming systems. In exceptional circumstances vaccines produced through genetic engineering are allowed in organic livestock, when no other alternatives are available or where their use is necessary to comply with legal requirements.

Organic is not a claim of absolute freedom from contamination or presence of GE materials in organic products. It is a claim that organic producers do not deliberately or knowingly use such technology, and that they take steps to avoid pollution of their systems and products by products of GE. Producers and products affected by contamination from outside their own systems should not be penalized for the trespasses of users of GMOs and their derivatives as long as they can demonstrate that they have undertaken all reasonable precautions for avoiding contamination.

The organic movements defend their freedom of choice to remain GMO-free, therefore the analysis, recommendations and policy demands in the next 3 chapters refer to agriculture and the ruling of GMOs in society in general.

GENETIC ENGINEERING HAS NOT BEEN DEVELOPED AND USED RESPONSIBLY.

The deployment of genetically modified crops so far can be understood as a further expression of the “trap” in which the dominant agro-industrial economic paradigm finds itself. It is an additional move with the aim to achieve complete control over natural obstacles beleaguering modern agriculture.

Genetically modified organisms (GMO or GMOs) and their derivatives are used across an increasingly broadening scope of applications. IFOAM - Organics International recognizes the potential impacts of GE and refers to the **Principles of Organic Agriculture** as a basis for its position on how this technology should be developed and used.

IFOAM - Organics International insists that the **Principle of Care** must be the main guide for all research, experimentation, and release of GMOs. This Principle requires that the potential for negative impacts on the environment and society be avoided with the utmost precaution, with the onus for assuring this resting on those who develop and spread the technology. Those parties must be transparent in their actions and held accountable through a transparent process.



To date, the advent and use of GMOs in agriculture has ignored this approach, with devastating negative effects. The irresponsible environmental release of GMOs has caused and continues to cause significant reduction in biodiversity, soil fertility, human and animal nutrition and health, and overall ecosystem damage. These effects directly violate the **Principle of Ecology** and the **Principle of Health**.

The presence of GMOs and the policies that allow them have resulted in reduction in farmer choice about what they have opportunity to grow and reduction in consumer choice regarding what foods they will provide to their families. There has also been increased pollution of farmers' crops and land with unwanted GMOs, causing immense cleanup and risk management costs for GM free farmers and food processors. Contamination of products in the marketplace and weak public policy disadvantage consumers from making informed choices about what they buy. These negative effects of GE directly violate the **Principle of Fairness**.

Products such as GMOs must not be introduced, unless they have been subjected to a rigorous, democratic, and transparent assessment of the technology through participatory processes that include decision-makers from every area of society and every group of people who will be impacted by the technology. Any introduction of GMOs should be limited to controllable circumstances.

DEPLOYMENT OF GENETIC ENGINEERING MUST BE BASED ON CLEAR EVIDENCE OF ITS BENEFITS.

Inherent in a responsible approach to GE is the need for a systematic, evidence-based rationale on which to base conclusions and activities. Questions in several areas that are relevant to the evaluation of genetic engineering must consider social, cultural, and economic impacts, as well as impacts that can be assessed scientifically such as impacts on the ecosystem, biodiversity, etc. and on health of humans, livestock, and native, wild flora and fauna.

The negative effects on society and the planet due to the environmental release of GMOs raise profound questions regarding whether this technology should be further deployed. These negative effects point to hasty deployment, based not on good evidence; they lack sound scientific reasoning and systematic consideration of social, cultural and economic impacts.

GE technology to date is inherently flawed due the imprecise and incompletely understood mechanisms by which it can be used to manipulate genes, and/or our inability to accurately predict the effects these changes will have on species, ecosystems, and human health. Allowing such



products into the environment and food production system without proper precautions and controls should not be legal. The evidence and justification for taking this stance are found in the widespread, clearly observed and well-documented negative impacts of GMOs. These effects are due to the problems inherent in the traits expressed by the GMOs themselves, the way in which production with GMOs occurs, and negative socio-economic effects to which GMOs contribute. In short, GMOs have not contributed to the public good. Examples of negative impacts include but are not limited to:

- Reduction in diversity on farms where GMOs are grown;
- Reduction in the diversity of available seeds and increased dependency of farmers on patented seed;
- Flooding of ecosystems, and animal and human diets with dosages of *Bacillus thuringiensis* toxins at unprecedented high levels and over long periods of time;
- The genetic pollution of non-GMO varieties by pollen drift and post-harvest mixing;
- Actual and potential for horizontal gene transfer from GMOs to other organisms with unknown harmful effects;
- Altered nutritional profiles of the GMO crop products, with questionable or known dangerous effects on human and animal health; The concern that viral promoters such as the CaMV used in GMOs can combine with viruses and bacteria to produce transgenic organisms that could be pathogenic to humans, animals, plants and other biota;
- Demise of non-target beneficial species, both above and below the soil;
- Increased use of herbicides;
- Decline of soil fertility and resilience;
- Evolution of weeds resistant to herbicides, resulting in use of additional and more toxic agrochemicals; Evolution of insect pests to become resistant to the GE crops engineered against them; Increased pesticide residues in food;
- Displacement of small farmers from their land;
- Consequent disruption of rural social structures and cultures in many countries;
- Increase in poverty;
- Decreased food security;
- Increased dependency on imported food.

IFOAM - Organics International calls for governmental recognition of the negative impacts caused by GMOs already released, with corresponding remediation. We call attention to the fact that these negative impacts are a symptom of a more systemic problem arising from the dominant agro-industrial economic paradigm that does not heed the Principles of Organic Agriculture.

ENSURE THE COMMON GOOD: REFORM PUBLIC POLICY AND LAWS REGARDING GENETIC ENGINEERING AND THE RELEASE AND MARKET PRESENCE OF GMOS.

Ensuring human health, and the sustainability of agriculture and the ecosystems on which it is based, demands that society take a different approach to GE and its outputs. We call for policy reform, with greater transparency and with meaningful and robust public participation, especially around the following themes:

A. Assure public access to genetic resources

The consolidation and/or privatization of seed supplies and other genetic material, including granting of patents on life forms or components thereof, goes against enabling communities to ensure their own food security and food sovereignty. Moreover, patenting of genetic resources poses a serious threat to innovation in breeding, because breeders have to get the patent holders' approval if they want to improve patented varieties. IFOAM - Organics International opposes patenting or other restriction from the public domain of genetic resources. We emphasize the fundamental right of farmers to save and trade seed and enhance their genetic resources, and the right of breeders to improve varieties by using traditional "open source" systems concerning genetic resources.





B. Enable and increase efforts to provide safer, healthier, more effective, and sustainable alternatives to GMOs.

IFOAM - Organics International advocates for increased research into safer, more economic, and more holistic technologies (i.e. without genetic manipulation or other techniques at the sub-cellular level) to improve the genetics used in agriculture, including seeds and other planting stock, animal breeds, and all other species cultivated by humans for food, fiber, medicines, ecosystem services, and other functions. It has been demonstrated multiple times that such holistic research not only avoids the risks associated with genetic engineering but is also less expensive and results in innovations and products which are much more attractive to consumers all over the world. Public resources dedicated to non-GE technologies are thus more reasonable investments than using public money for GE research. We call for increased public funding of research to encourage more scientists to devote their careers to these topics for the sake of the common good, thereby maximizing the chance that the benefits of such research remain in the public domain.

Specifically, more financial and human resources should be dedicated to:

- Preserving the diversity of all species' genetics and enabling their expanded use;
- Recognizing, documenting, protecting, and promoting heritage seeds and indigenous varieties;
- Research and development of selection and breeding techniques that are proven effective and without the dangers associated with GE and GMOs thus far released, for example Marker Assisted Breeding/Selection (MAB/MAS) techniques, participatory plant breeding, and population breeding.

To further enable improvement of genetics using safer selection and breeding techniques, IFOAM - Organics International calls for:

- Supporting and rewarding organic seed producers and breeders with policy and market based incentives;
- Establishment, with government support, of GMO-free zones of appropriate size to protect genomic integrity, especially in centers of origin of any given species. The possibility of coexistence of GMO and non-GMO varieties is a myth that must be dispelled.



C. Reverse the spread of bad practice and products of genetic engineering.

Undoing the damage caused by GMOs will require ongoing effort through a variety of approaches simultaneously, in the laboratory, field, and marketplace, including the following:

- Global agreement to refrain from engineering food/feed species so they produce/include drugs, toxins, substances damaging to ecosystems, industrial or other compounds that are not found in the naturally-occurring organism;
- Global prohibition of environmental release of GMOs. Deliberate continued use should be made illegal, with strict penalties for violation.
- Restoration of widespread access to non-GMO seeds. Developers and purveyors of GMO material should be responsible for financing remediation measures. Fines paid by the parties violating the GMO-ban mentioned above may also be used to re-finance these measures.
- Potential health and environmental effects of GMOs should be investigated by independent researchers. It should be ensured that they get access to relevant research material (such as sowing seeds), which are often inaccessible because they are protected by patents.
- Legislation or regulations that (i) require that GE companies pay sufficient taxes for public (and neutral) testing of GE products before their release; (ii) require that distributors and users of GMOs compensate for any GMO testing of product lots where market pressures demand they be tested for potential contamination, or where those lots may be threatened by pollution or contamination by the GMO. Testing programs should be designed by experts and administered through coordinated bodies to optimize mitigation of problems.

COORDINATE ACTIONS IN THE MARKET.

A. Proactively build well-defined non-GMO value chains.

For those parties wanting non-GMO products, mere GMO-avoidance practices are not sufficient to exclude GMOs. It is important to also proactively build, strengthen and expand supply chains that are not compromised by GMO contamination.

All actors along value chains should demand and economically support the production and multiplication of seed and other planting stock that is free from GMO contamination. All value chain actors should take appropriate precautions to avoid adventitious contamination by cross-pollination with GMOs in the field, through admixture during post-harvest handling, and by use of processing additives and ingredients that may be contaminated with or derived from GMOs.

As GE technology grows in its application, organic operators continue to encounter GMOs in new ways, such as in cleaning systems and products, in microbial cultures and products, and in other industrial uses. In some of these encounters it can be challenging to know the entire production chain for the material in question. In such cases, organic operators should guarantee that there are no viable GMOs used or released, and that GMOs and direct products of GMOs are not included in consumer products. To assist in this, manufacturers also have a duty of disclosure to inform the users of their products; this can be done in a way that does not unduly compromise "trade secrets."



Seed is the most fundamental level of the production chain and has the most concentrated impact of all links in the chain. Organic seed and other propagation materials are produced without the deliberate use and the proactive avoidance of genetic engineering. IFOAM – Organics International stresses the importance that seed or other reproductive stock be as free from detectable GMO contamination as is possible. We recognize the challenges in certain current contexts for maintaining purity and reaffirm our stance that organic producers cannot be penalized for the uncontrollable trespasses of others. We encourage seed companies (and other providers of genetic varieties) and the users of their products to voluntarily commit to using organically produced seed and other genetic materials that have no detectable GMO presence and to promote their use of same, with the objective of expanded availability of such supplies. IFOAM – Organics International calls for continued study and discussion of the challenges of protecting the integrity and availability of organic seed and other genetic resources, while also providing transparency in the market.

B. Employ testing and thresholds in a manner that serves but does not penalizes organic producers.

Organic claims in the marketplace are based on process-based standards and requirements; organic certification does not absolutely require testing for GMOs. (Some newer breeding techniques that involve genetic engineering even do not yet readily lend themselves to analytic detection.) Organic practitioners avoid the use or incursion of GMOs and their derivatives whenever and however possible, and consumers can therefore feel generally confident that organic goods are not made with GMOs. It should not be the burden of organic producers to prove that the materials they use in production (especially seed) have no detected GMOs or derivatives.

IFOAM - Organics International recognizes however that competent testing can be a useful management tool. Those responsible for release of GMOs to the market should pay the costs of testing, but we do not discourage organic producers from also conducting testing.

If testing is done, it should:

- be carried out, whenever practical, using the most sensitive technology on the market using genetic-based testing (e.g. PCR methods)
- also be available in the form of immunologically-based strip tests
- occur at critical points in the chain.

High-risk points of contamination should also be monitored to avoid adventitious contamination through pollen drift or commingling. Feed used in livestock production should be tested if it is at risk of being contaminated by GMOs and the final animal product cannot be tested.

Furthermore, while testing may be a useful tool in some cases, the advent of newer GE methods means that certain novel varieties are not possible to detect via analytical methods. It thus remains of paramount importance that a process based, policy supported approach is used as the primary approach to regulate GE and GMOs.

C. Regulate the market in a fair manner.

Governments should make labeling of GMOs mandatory in order to clearly inform consumers so that they can make informed choices about what they buy, including all food and fiber products containing GMOs or their derivatives, including animal products produced using GMO feeds.

In some countries, it may be appropriate to set an action threshold (or laws may already be in place), which if exceeded requires investigation to find the root cause of the contamination, with appropriate remediation. Action thresholds should only apply to adventitious contamination, and not rely on deliberate dilution of lots to achieve lower levels.

Penalties should be imposed against trespassers for known cases of contamination of non-GMO crops, including paying restitution to compensate for associated market losses and/or loss of organic certification.

D. Coordinate communication and information sharing.

IFOAM - Organics International advocates and animates communication among its members and other stakeholders to combat the negative impacts of genetic engineering and create alternatives. We recognize the need to:

- Gather and share new information about the effects of GMOs, including new observations from the field, laboratory, and in clinical health studies;
- Partner with allied organizations outside of the organic movement to oppose the use of and spread of that produce/include drugs, toxins, substances damaging to ecosystems, industrial or other compounds that are not found in the naturally-occurring organism;
- Craft relevant, stakeholder-specific communications to farmers, value chain actors, consumers, governments, and research institutions, among others.
- Call for description, sharing, and development of best practices.



THE DEFINITION OF ORGANIC AGRICULTURE

Organic Agriculture is a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic Agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved.

THE PRINCIPLES OF ORGANIC AGRICULTURE

Organic Agriculture is based on the principles of health, ecology, fairness and care.

THE SCOPE OF ORGANIC AGRICULTURE

IFOAM - Organics International regards any system that is based on the Principles of Organic Agriculture and uses organic methods, as 'Organic Agriculture' and any farmer practicing such a system as an 'organic farmer'. This includes various forms of certified and non-certified Organic Agriculture. Guarantee Systems may be for instance third party certification, including group certification, as well as participatory guarantee systems.

STANDARDS & REGULATIONS

The IFOAM Family of Standards draws the line between organic and not organic. It contains all standards and regulations that have passed an equivalence assessment against a normative reference approved by membership of IFOAM - Organics International. IFOAM - Organics International encourages governments and standard users to recognize other standards in the Family as equivalent.

POSITIONS

IFOAM - Organics International has developed positions on a range of topics. These include: Use of Nanotechnologies and Nanomaterials in Organic Agriculture; The use of Organic Seed and Plant Propagation in Organic; The Role of Smallholders in Organic Agriculture; The Full Diversity of Organic Agriculture; The Role of Organic Agriculture in Mitigating Climate Change; Smallholder Group Certification for Organic Production and Processing; Position on Genetic Engineering and Genetically Modified Organisms; Organic Agriculture and Food Security; Organic Agriculture and Biodiversity.

POLICY BRIEFS

IFOAM - Organics International has policy briefs on 'How Governments Can Regulate Imports of Organic Products Based on the Concepts of Harmonization and Equivalence' and 'How Governments Can Support Participatory Guarantee Systems (PGS)'.

BEST PRACTICE GUIDELINE

The Best Practice Guideline for Agriculture and Value Chains is a contribution by the organic movement to the global discussion on sustainable agriculture.