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## **Food Production and the Ethical Use of Genetically Modified Organisms**

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**Abstract:** The commercialization of genetically modified organisms (GMOs) has sparked profound controversy concerning adequate approaches to risk regulation, particularly as they relate to our food. Ethical discussions are an important characteristic of the resultant public debate. The ethical concerns regarding GMOs can be divided into two groups; intrinsic and extrinsic concerns. Intrinsic concerns are the major reason that leads to consumers rejecting GMOs as a result of the process of genetic engineering that is regarded as unnatural, for example, interference with nature or playing god. Public conception that GMOs may have adverse effects on the environment and human health are regarded as extrinsic concerns. These include concerns expressed that GMO products place the farmer at a disadvantage. It is important to note that extrinsic concerns require major attention from both scientists and policy-makers as it is addressing these concerns that will contribute to greater safety assurance for the general public. It is recommended that both scientific investigation and regulatory oversight are needed, preferably on a case-by-case basis. However, a ban on all GM crops is not an appropriate way to solve the problem and can only result in denying the country use of a technology that can enhance production and provide a comparative advantage for exports. Apart from these concerns, the transparency of decision-making at all levels will lead to greater understanding, acceptance and proper use of GMOs for all stakeholders.

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## Introduction

Genetically Modified Organisms (GMOs) have the potential to dramatically change the agricultural world. Through advancements in agricultural crop production, proponents argue that GMOs have the ability to increase productivity; decrease the use of costly chemicals harmful to the environment; greater resistance to insects, disease and drought; more nutritious food; as well as lower production costs. Despite all these apparent advantages, GMOs have attracted strong criticism from certain circles. Opposition is coming from groups concerned about the safety of consuming genetically modified food, the environmental impact of growing genetically engineered plants and the ethics related to using the technology *per se*. (Kym A. and Chantal P.N., 2000). This has sown doubts in the public perception of this and other biotechnologies and led to general confusion.

## Bioethical Principles

Approaches to bioethics are varied. In describing the various approaches, it is usual to begin with principles-based ethics (D.C. Wertz, J.C. Fletcher, K. Berg, 2003).

- **Respect for the autonomy of persons:** respecting self-determination of individuals and protecting those persons with diminished autonomy.
- **Beneficence:** giving highest priority to the welfare of persons and maximizing benefits to their health.
- **Non-maleficance:** avoiding and preventing harm to persons or, at least, minimizing harm.
- **Justice:** treating persons with fairness and equity and distributing benefits and burdens of health care as fairly as possible in society.

## Ethics in the Use of GMOs

Bioethical principles are applied with GMO-related issues however, discussion of the ethical dimension of GMOs is sometimes confused by a conflation of two quite different sorts of concerns to genetic engineering: intrinsic and extrinsic. It is critical not only that we distinguish these two classes, but keep them distinct throughout the ensuing discussion of ethics.

**Intrinsic concerns allege that the process of making GMOs is objectionable in itself. This belief is defended in several ways, but almost all of the formulations are related to one central claim—the “unnaturalness concern”:** It is unnatural to genetically engineer plants, animals and food, despite science being used to improve agriculture since the day the first seeds were sown. Intrinsic ethical concerns relate to the belief that the process of producing

GMOs is itself objectionable, usually because it is regarded as interfering with nature. (Stanley J. et al., 2003) There are four examples within intrinsic concerns as follows;

To engage in biological engineering is to play God. There were also significant proportions of respondents who thought that genetic manipulation was interfering with nature, or that it was profanity to God, or said that they had a bad feeling about it. Also many saw genetic manipulation, especially of humans and animals, as unethical. Many scientists react to people with such views as being irrational, pointing out that by reducing the use of chemicals in agriculture, food processing and medicine, biotechnology may actually be able to make these areas more "natural". Also, if efficiency of agriculture is increased and genetic diversity increased, biotechnology may allow some agricultural land to revert to more random natural vegetation. The technology and the potential is there, if society demands it. However, the question remains that, if increased use of microorganisms for industrial and environmental processes may lessen the use of chemicals in these applications, would this also lessen people's concern - or raise it?

To engage in genetic engineering is to change the world through new technology and to disrupt nature, an activity that should be reserved to God alone. "Nature" has been a fluid concept. At various times in history it has been understood in different ways, such as when Charles Darwin first proposed scientific explanation for what were strongly held to be religious beliefs. As science continues to expand the possibilities of action on nature through genetic modification, humans must again reconsider their relationship with nature and how we conceptualize it. Some of the givens of nature are now seen as conceptual constructions, or a physical limitation on action that we may soon break through, such as the need to have two biological parents, or to have donated organs from the same animal. (Nicholas B., 2000).

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\* Paper presented at the Ethics of Science and Technology: 4<sup>th</sup> Session of the World Commission on the Ethics of Scientific Knowledge and Technology (COMEST) Bangkok, Thailand, International Workshop on Impacts and Biosafety of Genetically Modified Agricultural Products, 23 – 25 March 2005.

To engage in genetic engineering is to illegitimately cross species boundaries. The problems with this argument are both theological and scientific. The argument assumes that species boundaries are distinct, rigid and unchanging, whereas, in fact, species now appear to be messy, plastic, and mutable. To proscribe the crossing of species borders on the grounds that it is unnatural seems scientifically indefensible. (Comstock G., 2001).

In conclusion, intrinsic ethical concerns are likely to come from those who argue from deeply egocentric or religious ethical positions. Comstock (2001) has argued that the formulation of the unnaturalness objection considered above is unsound insofar as it leads to counter-intuitive results.

On the other hand, extrinsic concerns focus on the potential harms consequent upon the adoption of GMOs. Extrinsic concerns hold that genetic engineering should not be pursued because of its anticipated results. Such concerns arise because GMOs may have adverse effects on the environment, as well as human health. In addition, an important element in the opposition to GMOs is that it constitutes external input use into small-farm agriculture and as such raises concerns about farmers' dependence on input markets. These

fears are compounded by the advent of transgenic varieties; even when they embody public technology, private seed companies will most likely deliver them. (Tripp R., 2000).

Extrinsic concerns over GMOs are in part related to perceived risks and threats of the technology to the environment, agricultural production, food safety, human health and market access for agricultural products. Another concern is that, while the perceived threats may impact upon many, the claimed benefits appear to accrue to only a few, primarily to corporations and agri-business and particular research fields. Extrinsic concerns demand scientific and political vigilance and need regulatory oversight on a case-by-case basis. This is preferable to supporting a ban on all GM-related crops. A final area of concern of GMO opponents relates to perceptions of a lack of transparency in the decision-making and policy-formulation process. Some stakeholder groups feel that they are unrepresented in the policy discourse, and thus do not have a say within policy negotiations. As such they feel that the way is left open for multinational seed corporations to influence policy while their voice is not heard.

## **Conclusion**

In summary, there are two groups concerned with the ethical use of GMOs and they cover intrinsic and extrinsic concerns. It is not beyond one group to fall back on the arguments of the other. It should also not be forgotten that scientists involved in developing the technology are another concerned group. They have a conscience and ethical principles like anyone else. Therefore, it is recommended that scientific data combined with regulatory oversight be used on a case-by-case basis, before the merits or otherwise of a particular case are decided. Particular heed needs to be given to the transparency of decision making that will lead to the proper and sensible use of GMOs for all stakeholders. Some agricultural economies will be faced with an interim period of producing both traditional and genetically modified crops to meet different market demands.

All people should equally share both the benefits of new technology, as well as the risks involved in its development.

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