

# SCRUTINIZING THE IMPACT OF GMOs THROUGH THE PRISM OF HUMAN RIGHTS

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**Abstract:** Necessity is the mother of invention. The booming population triggered the need to carve out efficient ways to feed the growing millions. Biotechnology answered this need with the creation of Genetically Modified Organisms (GMOs). They are organisms whose genetic make up has been altered using genetic engineering techniques. Such alterations enabled to create agricultural products (both plants and animals) that were resistant to diseases, harsh seasonal changes and had better nutritional qualities. Thus, it improved food both in quantitative and qualitative terms. But under the garb of these numerous benefits, one should not ignore the potential risks, which these organisms pose to the human health and the environment at large. GMOs provide a risk to human health as it can cause allergic reactions. It also causes significant loss to biodiversity and dismantle the sensitive balance of a food chain.

Human Rights, the inalienable rights bestowed to mankind, preserving its dignity and sanctity faces dilemma in the midst of the benefits and risks of GMOs. The human right to 'food' and the human right to 'health' are quite relevant in this context. For instance, the benefit of condensing better nutritional qualities in food through the creation of GMOs apparently seems to protect the right to food. But, taking note of the possible threats of allergic reactions (the nature and gravity of which, is not known) and loss to biodiversity, may pose a long-term hidden challenge to the human right to health. Furthermore, human beings are an entity of the ever-changing and mysterious nature. The health and strength of our lives are connected to that of the earth. Thus, a loss of biodiversity and disruption of the sensitive food chain will also have repercussions on our right to food as well. The triggering of genetic mutation will also have effects upon other living organisms, which challenges the greater cohesion inherent in nature. This paper makes a humble attempt to study and analyze subtle but pertinent observations.

The Cartagena Protocol is the first and main international legal instrument regarding biosafety. It broadly covers protection of biodiversity and to regulate the manufacture, import and export of GMO based food products. It emphasis upon the concept of precautionary principle and introduces 'labeling' of food containing GMOs. The paper attempts to search solutions and evaluate the efficacy of solutions in existence in the International Legal Framework. The paper will also briefly evaluate the efficacy and efficiency of domestic legislations of India with regard to biosafety. It will try to analyze and evaluate the scales of justice in the light of earth jurisprudence.

**Keywords:** Earth Jurisprudence; Food; Genetically Modified Organisms; Health; Human Rights.

## INTRODUCTION

Invention and innovation is in man's blood. The application of technology on living systems and organisms to derive appreciable benefits has been one such example [1]. The benefits so derived are multifarious from products bearing defined features or other specific uses. This technology is called biotechnology [2]. The growing use of biotechnology has created a stir in numerous fields owing to the benefits and negative impacts it has. The concern and debates have also seeped into the field of human rights, rights bestowed upon mankind that are inalienable and are needed for preserving and sustaining the dignity of mankind. The human right to food and the human right to health are two of the aspects that are highly relevant under the vast umbrella of human rights. They are directly related to the controversies surrounding GMOs as gene technology is applied to crop plants to enhance food in terms of quality and quantity. Thus, beginning to form an inherent part of the kind of food we consume and consequently the health we maintain.

### Locating the spirit of Right to Food as a Human Right

Food is the basic necessity of life. Survival of every being demands input of some kind of fuel to keep the metabolism running – food is that fuel. The right to food is universal, acknowledged at the national, regional and

international level, and applies to every person and group of persons [3]. Formally, in legal terms, the Right to Food has been enunciated in the Universal Declaration of Human Rights (UDHR), the International Covenant on Economic, Social and Cultural Rights (ICESCR), the Convention on the Rights of the Child (CRC), and several other international instruments [4].

The right to food was recognized for the first time at the international level in the 1948 UDHR [5] [6]. Article 25 reads-“Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including *food*, clothing, housing and medical care and necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control.” The importance of the UDHR lies in its being accepted today by *all countries*.

ICESCR deals with the Right to Food more comprehensively than any other treaty [8]. “Article 11 of the ICESCR envisages two notions of the Right to Food: “adequate food” (para.1) and “freedom from hunger” (para.2). While the former is a broader concept, the latter is narrow in scope and could be achieved by adopting policies to provide a minimal daily nutritional intake.” [9]. “The Special Rapporteur uses the following comprehensive definition in his report which is derived from Article 11 of the ICESCR and GC 12: “the Right to Food is the right to have regular, permanent and free access, either directly or by means of financial purchases, to *quantitatively and qualitatively adequate and sufficient food* corresponding to the cultural traditions of the people to which the consumer belongs, and *which ensures a physical and mental*, individual and collective, fulfilling and dignified life free of fear.”” [10].

### **The Right To Health as a Human Right**

Since time immemorial, health has been a concern for mankind. It has been defined in numerous ways, from mere absence of disease to adaptation and sustenance in a changing environment. There are varying perspectives of health [11]. An ecologist does not appreciate health in the same light as a medical specialist. For the former, a sound environment is a home to a sound health but for the latter, health means absence of infectious diseases. Such wide range of perspectives is a challenge in defining health. Herein, the concept and idea of health has been derived from a holistic model. It enshrines the essence of all kinds of perspectives – social, political, economic and environmental [12]. This is because, in the nature every being shares a symbiotic relation and an appreciation in the light of earth jurisprudence facilitates the need of appreciating this interdependence that every being have on each other in all aspects of their existence.

The shaping of right to health as a human right has come a long way from the public health movements of the 19<sup>th</sup> century in US and Europe to the numerous declarations and treaties such as UDHR, ICESCR, Declaration of Alma Ata and World Health Declaration [13]. “The first expression of this right in the international legal instrument came in the Constitution of World Health Organization (WHO) in 1946” [14]. It was in the Article 25 of the UDHR, where for the first time right to health was acknowledged as a *human right*. Subsequently, the ICESCR and International Covenant on Civil and Political Rights (ICCPR) elaborated upon it [15]. Article 25 of UDHR (1948) states – “(1) Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing and medical care and necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control. (2) Motherhood and childhood are entitled to special care and assistance. All children, whether born in or out of wedlock, shall enjoy the same social protection.” This is the root of right to health as a human right. This is now seen as a pre-condition to enjoy and cherish all other human rights. The spirit reflected in this article has a wide ambit and a holistic approach. It circumscribes everyone.

Article 12 of ICESCR has the most authoritative interpretation of the human right to health and lays down the crux of making the governments responsible of safeguarding the human right to health of people (Avanish Kumar, 2007). Article 12 of ICESCR states – “1. *The States Parties* to the present Covenant recognize the right of everyone to the enjoyment of the highest attainable standard of physical and mental health. 2. The steps to be taken by *the States Parties* to the present Covenant to achieve the full realization of this right shall include those necessary for: (a) The provision for the reduction of the stillbirth-rate and of infant mortality and for the healthy development of the child; (b) The improvement of all aspects of environmental and industrial hygiene; (c) The prevention, treatment and control of epidemic, endemic, occupational and other diseases; (d) The creation of conditions which would assure to all medical service and medical attention in the event of sickness.”

In the later years, the essence and spirit of these landmark documents have been boosted by other international initiatives and documents such as the Declaration of Alma Ata (which critically dealt with the inequities of health services) and the WHO (which has rigorously worked for materialization of health awareness programmes and various other policy documents, notably, Health for All in the 21<sup>st</sup> Century) [16]. “Thus, tracing the roots of health as a human right in its historical perspective, we find that the global health jurisprudence has taken a long process of development from 1946 to 1998 and is still strengthening the link of health and human rights and the WHO is continuing to take a lead role in ensuring the place of health at the center of all human rights” [17].

### Take of Human Rights On GMOs – The Hidden Incongruity

Genetically Modified Organisms (GMOs) are a product of biotechnology. They are organisms in which the genetic content has been altered/ modified artificially i.e., through lab methods and not through natural methods. “Genetic modification allows selected individual genes (that are units of heredity) discovered in one organism to be inserted directly into another. The inserted gene sequence (known as transgene) may come from another unrelated organism or from completely different specie. The technology is also sometimes called gene technology, recombinant DNA technology or genetic engineering.” [18]. “The integration of the transgene into the organism is carried out by different methods: (a) Transduction with the use of bacteriophages (b) Transgene injection using pronuclear microinjection; (c) Transfer using modified viruses and plasmids (d) Electroporation method by which higher permeability of cell membrane is achieved” [19]. By altering their genetic content, one can enhance as well as introduce the desired traits in a particular organism and control or do away with traits that are undesirable. For example, consider the fruit *Magnifera indica* (mangoes). There are different varieties of mangoes. There is one variety that strong sweetened flavor but less pulp and there is another variety that has sourness but has good quantity pulp. Gene technology allows to create a *new* variety that can have the desired quality of both these varieties – the sweetness and the pulp, by combing the respective genes responsible for these traits. This new variety so created would be a GMO. GMO can be a plant as well as an animal, but mostly refer to crop plants created for human or animal consumption. The most popular and best example of a GMO is the BT Cotton. It was developed by a multinational company, Monsanto [20]. They introduced a gene coded as Bt found in the bacterium *Bacillus thuringensis*, into the genetic framework of the cotton plant. This gene was responsible for production of a crystal protein, which was toxic to insects. The new variety of cotton so developed was thus resistant to insect pests as it produced the lethal toxin in all parts of the plant [21].

*These GMOs has scores of positive and negative impacts that carry a strong potential to create a stir within the human rights regime.* They strongly pose a threat to the ethical aspects of human rights. Human right to health and human right to food are strongly connected in this aspect and thus, have been focused and elucidated in this paper. With malnutrition as a serious social problem, GMOs brought a sigh of relief with enhanced food production and improved quality. *Thus, GMOs brought quality and quantity laden food for all, securing the human right to food.* For instance, the Swiss Federal Institute of Technology Institute for Plant Sciences have created a rice which contains high levels of vitamin A – the golden rice and are making strong efforts to develop a new variety that will have high iron content as well [22]. These benefits seem to be short term with the discoveries being made on the long term impacts of the GMOs on human health. The quality of food nutrition in GMOs seems volatile and doubtful to the scores of hazards that are posed to human health in return. There are studies that reveal that GMOs have considerable effect on the environment and human health. Risks of GMOs to human health are related mainly to toxicity, allergenicity and antibiotic resistance of the new organism [23]. For instance, in Europe and US, children have developed live threatening diseases to peanuts and other food items consisting these GMOs [24]. There are other health risks also associated with it such as infertility, accelerated aging, immune problems, changes in major organs and gastrointestinal system [25]. Experiments done on rats have revealed that GMOs triggered liver lesions, altered enzyme production, slower brain growth and other kinds of toxicity [26]. But, there are contradictory information which negate such harms posed by GMOs. Studies trying to convince that GMOs are safe put forward that, the genetic makeup of these organisms are a construct of the 4 basic nucleotides (the difference that lies is within sequencing of these nucleotides) and thus, degradation of it should not pose any threat to health [27]. They also assert that any harm is a rare event and is influenced by other modification too.

Human right to health is multifaceted. There are multiple factors that influence human right to health. Environment and scientific and technological advances are two of the crucial determinants that are highly relevant [28]. To enjoy good health and relish the spirit of Article 25 UDHR and Article 12 ICESCR, good environment and safety of the new technology advances (inclusive of the gene technology) is a pre-requisite. Thus, one cannot do away with the other impacts of GMOs on the environment that has impact upon right to health and food. This is because all aspects are interrelated and cannot be judged in isolation. Accidental cross breeding between GMOs and the indigenous species can contaminate the traditional varieties and thus, cause substantial loss to biodiversity [29]. GM crops have found their way into the conventional crops, which are exclusively grown using organic farming practices [30]. Such, unexpected genetic flow is a matter of concern to the food chain for they disrupt the inherent equilibrium of nature. This is because it is introduction of an alien substance. This can be condensed as a form of pollution – genetic pollution. It also threatens the human right to food like a boomerang. This is because disruption of the food chain and loss of biodiversity will in course hamper *the quality of food*, we consume. Furthermore, there is harm to other organism, which is against natural justice principle. For instance, a study performed at Cornell University has revealed that, the toxic protein of gene contained within Bt corn can be harmful to the larva of a monarch butterfly [31]. It will also affect the quantity of food produced. Cross-pollination between GMOs and weeds will create super-weeds that will be herbicide and pesticide tolerant [32] [33] [34]. This will affect the

agricultural produce in the near future, thus affecting the quantity of food so produced. There will be increased possibility of food security.

From the above, the irony of dilemmas persistent within human rights with regard to GMOs can be easily sketched. On one hand, it seems to protect the right to food but the other side of the picture has a different story to narrate. It threatens the enjoyment of right to health as well as right to food long term.

### **The Cartagena Protocol and an Overview of the Biosafety Regulations in India**

To-date, one of the main responses given by states to the need for legal frameworks that address concerns arising from the development of genetic engineering has been the development of the Cartagena Protocol on Biosafety to the Convention on Biological Diversity (Cartagena Protocol) [35]. It was adopted on 29 January 2000 and entered into force on 11 September 2003 [36] [37]. The Cartagena Protocol is an important environmental law treaty not only because it is a protocol penned under the Biodiversity Convention whose basic principles revolve around the idea of biodiversity conservation and sustainable usage but also because it is the first international regulatory framework on biosafety [38] [39]. The treaty covers the aspects of usage, handling and transfers of GMOs from one place to another. One of the main contributions of the protocol to the development of environmental law is the central place given to the precautionary principle in the regulation of genetically modified organisms [40]. The main elements of the protocol reflect that it is a sound starting point wherein it tries to connect address the all possible concerns connected to genetic engineering with environmental problems and other socio-economic concerns and thus, makes a significant contribution to environmental law. The protocol acknowledges that environmental and health impacts of genetically modified organisms cannot be looked at in isolation from broader socio-economic issues [41]. Yet, there are suitable spots of concern attached to this document.

The Advanced Informed Agreement Procedure (AIA) is the backbone of the protocol or the main operative part [42] [43]. In essence, the AIA procedure gives the importing state the right to refuse entry to genetically modified organisms covered by the procedure on the basis of a risk assessment carried out according to the provisions of the Protocol, so as to minimise possible adverse effects and ensure sustainable use of genetically modified organisms [44]. The protocol does not cover five types of GMOs [45]. *The most relevant in terms of right to health and right to food is the, Living Modified Organism intended for Direct use as Food or Feed, or for Processing (LMO-FFP)*. The LMO-FFP being commodities made directly out of GMOs. Thus, being commodities of consumption they bear a great link to the food quality people would consume and the health they would relish. These exclusions (particularly the exclusion of LMO- FFPs) mean that the AIA covers only a small percentage of traded LMOs—basically, only those destined for direct introduction to the environment of the importer, such as seeds and microorganisms. They are covered separately under Article 11, which is less restrictive in nature [46]. As they are not covered under AIA procedure, the procedure for LMO- FFPs lays first responsibility on potential importers to develop and announce regulations proactively. The result is less onerous for the exporters, who will not have to wait for the Parties of import to respond to their notifications. As well, exporters of LMO- FFPs do not face the burden of proof established for exporters of other LMOs, who may have to conduct and finance risk assessments in support of their notifications. Such, narrow scope raises doubt over the credibility over the intent of the document [47].

“India has a well-defined regulatory mechanism for development and evaluation of GMOs and the products thereof. The Department of Biotechnology (DBT) and the Ministry of Environment & Forests (MoEF) are the two apex regulatory bodies. Rules have been notified by MoEF in 1989 under Environmental Protection Act, 1986 (EPA), as the production and preservation of the environment is vested upon the government. These rules cover procedures for the manufacture, import, use, research and release of GMOs as well as products made by the use of such organisms. The objective of the rule is to ensure that the use of such products or life forms is safe to the environment and beneficial to the human beings. The competent authorities and their composition for dealing with all aspects of GMOs and products thereof has also been defined.” [48]

The Department of Biotechnology (DBT) had issued the safety guidelines in 1990. It covered research in biotechnology, field trials and commercial applications. They also have separate guidelines for research in transgenic plants and clinical products [49]. Activities involving GMOs are also covered under other policies such as the Drugs and Cosmetics Act (8<sup>th</sup> Amendment), 1988, the Drug Policy, 2002, and the National Seed Policy, 2002 [50]. There are six competent authorities for implementation of regulations and guidelines in the country. They are - Recombinant DNA Advisory Committee (RDAC), Review Committee of Genetic Manipulation (RCGM), Genetic Engineering Approval Committee (GEAC), Institutional Biosafety Committees (IBSC), State Biosafety Coordination Committees (SBCC) and District Level Committees (DLC) [50].

“IBSC is constituted by organizations involved in research with GMOs with the approval of DBT. The IBSC is the nodal point for interaction within the institution for implementation of the guidelines. Every research project using GMOs has to have an identified investigator who is required to get the research project approved from safety angle and inform the IBSC about the status and results of the experiments being conducted. The major of

IBSC includes review and clearance of project proposals. The role of IBSCs assumes major importance since it is the only Statutory Committee, which operates from the premises of institution and hence is in a position to conduct onsite evaluation, assessment and monitoring of adherence to the biosafety guidelines. The decisions taken by the next higher committee i.e. Review Committee on Genetic Manipulation (RCGM), which operates from DBT are based on the applications submitted by the investigators with the approval of IBSC on the status of the project and its conformity with the regulatory guidelines.” [51]

## MATERIALS AND METHODS

For the purpose of analyzing the subject, the current study is focused on – analyze and interpretation of the data collected from various sources and the sources of the study is divided into primary and secondary. In the process of analysis and interpretation, primary sources such as Acts, commission reports; national and international government and organization will be consulted. Further, we will consult the secondary sources, which has been written and produced by eminent academicians.

## RESULTS AND DISCUSSION

In order to appreciate the conflict and dilemma within the human rights better, it is highly essential that their inter-relation and interdependence is acknowledged. The notion of interdependence and indivisibility of all human rights has been considered a fundamental principle from the beginning of the UN and has been iterated in the Vienna Declaration and Programme of Action (adopted during the Second World Conference on Human Rights in 1993) as well that “all human rights are universal, indivisible and interdependent and interrelated [52]. Thus, human right to health and human right to food, are interrelated and interdependent on one another. *An illusionary benefit of quantitative and qualitative food production cannot mask the long term effects of GMOs on right to food and right to health of mankind.* Apparently, it seems that with the GM crops an aspect of problems like world hunger and malnutrition has been effectively tackled. But, a question lingers: how long? With the effects and the threats discussed above, it is quite expected that an Armageddon would happen in the distant future when the world would have lost all its indigenous varieties and there be deaths due to GMOs as if it were an epidemic.

With a scope that is limited and sides away a class of GMOs (LMO-FFPs) that covers the world consumers, thus having its effects upon all, the efficiency of the Cartagena Protocol remains doubtful (even if it has covered important aspects of import, usage, transfer and handling of GMOs). It seems even more hideous to include them for a mere satisfaction of people, when in reality they have been given relief from the most operative part of the protocol i.e., AIA. The ethical conflicts have molded a new concept of the right to informed choice. People should know what they are consuming and should make their own choice in the *kind of food* they want to consume [53]. Here lies the inherent irony that mocks on the spirit of human rights that our generation and the coming generation wishes to enjoy. For people to make an informed choice, it is essential that people have access to information and knowledge about GMOs. This is not the scenario in the developing nations [54]. The very poor (both women and men) may lack the most basic information to make decisions that may affect their health and capacity to sustain themselves [55]. Knowledge about GMOs remains a distant dream.

All the sources read to shape the idea and pen down the paper have reflected an approach that is largely materialistic in nature. Any inclusion or exclusion in a legal (international and national) document have been justified under the reflection of market and economy. Such a narrow outlook from one of the most intelligent specie of earth is not appreciated. It is time that we humans realise that, there are things bigger than us. The earth is the larger being and we are an organism in its larger web of life. We should abide by the laws of the earth for a smooth functioning because no specie is superior than other. We should shape our laws according to the wild laws. “The idea is that the universe itself is the primary reference and source of law because it is the great environment in which all activity takes place. In nature there is an intimate connection between every being and the universe, which determines time scales, life spans, seasons and temperature ranges and provides all of the elements on which all creatures, animate and inanimate, depend and from which they are formed. This being so, human laws, to have any real validity, should be designed to correspond with universal laws so as to produce a “mutually-enhancing” relationship.” [56].

## CONCLUSION

The earth is sensitive. Our survival depends on her. It’s high time that we should realize this. If we hail to be one of the most intelligent specie, it is our responsibility to act smartly and be bound by the wild laws of nature. Our understanding and priorities should surround the eternal laws of nature for happier sustenance. The creation of GMOs shows the potential that we carry to alter some of the forces of nature. But, that does not make us powerful than the nature. Such technology should be restricted to laboratories and not applied. It may seem an extreme step. But, if man takes earth and it’s health as his priority, it can be easily justified. With power comes responsibility. Earth has been merciful and giving to us and we should respect it, even if it asks for extreme compromises. Compromises that should not be mere words hailed and clapped in conferences, seminars, gatherings and books but

that take action to make the world a better place, not just for us but for every being. *If the mother can sacrifice for its child, why cant the child make the same for ones own mother?*

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