

Genetically Modified Crops Controversy: The Actualization of Intellectual Property Rights Regime

Cordelia Chinwe Nwogbo Egwu and Chijioko Egwu[†]

Ebonyi State University, Enugu-Abakaliki Rd, Ntezi Abba, Abakaliki, Nigeria

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Genetically modified crops have generated a lot of controversy on intellectual property rights. GM crops, also called Genetically Engineering (GE) crops contain altered genetic materials, or have genes transferred from other organisms to introduce new agronomic traits to production. The common targeted traits of GM crops include herbicide tolerance, pest, and pathogen resistance, a biotic stress tolerance, and product quality. GM technology has been applied in many major field crops, including soybean, corn, cotton, and canola by planting GM crops. Farmers may benefit from increased yields, less use of herbicide and pesticide, lower production costs, reduced cost of labour and capital equipment, and improved agricultural productivity. This paper critically appraises genetically modified crops, *vis-a-vis*, intellectual property rights, and satisfies itself that controversy really exists. It describes the benefits that genetic modified seed can provide to farmers, as well as the concerns that farmers should address before utilizing these seeds. It appraises the case for and against genetically modified crops and opines that the case for genetically modified crops is meritorious.

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Genetically Modified Crops

Genetically modified foods or genetically modified organisms is mostly used to refer to crops plants created for human or animal consumption using the latest molecular biology techniques.¹ These plants have been modified in the laboratory to enhance desired traits such as increased resistance to herbicides or improved nutritional content. The enhancement of desired traits has traditionally been undertaken through breeding, but conventional plants breeding methods can be very time consuming and are often not very accurate. Genetic engineering, on the other hand, can create plants with the exact desired trait very rapidly and with great accuracy. For example, plant geneticist can isolate a gene responsible for drought tolerance and insert that gene into a different plant, the new genetically- modified plant will gain drought tolerance as well. Not only can genes be transferred from one plant to another, but genes from non-plant organisms can also be used.

The wide application of genetic modification has been slowed down by severe limitation on the kinds traits available, complex intellectual property right regime, and regulatory issues and often negative perception about the agricultural genetic crops, not

safe for consumption, which the critics say, that it is harmful to human health.² The example that comes to mind, is the Bt (*Bacillus thuringiensis*) genes in corn and other crops, this is a naturally occurring bacterium that produces crystal proteins that are lethal to insect larvae. Bt crystal protein genes have been transferred into corn, enabling the corn to produce its own pesticides against insect such as the European corn borer.

Constituents of Intellectual Property

Intellectual property rights, may be defined as a statutory monopoly, conferred by the state for a prescribed term in relation to certain creation of the mind. But then, there is no universal definition of intellectual property rights in any national laws, or international treaty. Intellectual property is usually divided into two branches *viz*, industrial property and copyright.

The groups of intellectual property rights, that belong to industrial property, are: patents, trademarks, geographical indication, industrial designs, trade secrets, and also include, agricultural, and extensive industries, and all manufacturing or natural products, which include wines, grains, tobacco, leaf, fruits, cattle, mineral, mineral water, beer, flower, and flour. Copyright on the other hand, subsists automatically

[†]Corresponding Author: Email: decordys@gmail.com

on the creation of a work, no application is needed, nor do any formalities apply. Copyright works comprise original literary, dramatic, musical and artistic works, some recordings, films, broadcasts, and cable programmes, and the typographical layout of published editions. Copyright, confers the exclusive right to reproduce the work, issues copies to rental, or some works, perform the work in public, broadcast it or adapt it. It is infringed when one of the acts is done without permission. It is a long lasting right, lasting in the case of the original work, for the life of the author plus 70 years. Intellectual property rights are fundamental human rights would be to suggest that rights that protect the connection between a creator of information product and the information product belong in the category of human rights, because they produce the personality of the creator. A personality based approach to justification already serves to underpin the civil law system of author's right. It turns out that very few intellectual property rights makes it into the category of human rights. It does not follow that all intellectual property rights protect the personality interest of originators of intellectual property.

Intellectual property rights, are rights which are intangible. They are rights which protect innovation and creations, and rewards innovation and creative activities through various instruments. They have also been defined as rights given to people over the creations of their minds, they usually giving the creator an exclusive right over the use of his/ her creations for a certain period of time. Intellectual property rights exist for a limited period of time, or their continued existence is subject to requirements of registration. The strongest candidates for natural rights must surely be the right to life and liberty, but these rights do not have a limited tenure in the life of the right holder.

Within this context, intellectual property piracy has often been perceived as a one way street, this is because, intellectual property is developed in technological advanced countries and once released, it is copied and used in developing countries without compensation. This was the main reason developed countries insisted that the Agreement on Trade Related Aspect of Intellectual Property (TRIPS) be included in the World Trade Organization (WTO) negotiated at the Uruguay Round. In the period since TRIPS was negotiated, however, some developing countries have begun to suggest that their intellectual

property is at risk from the activities firms based in developed countries.

According to the WTO (World Trade Organization), rights are not much used unless they are enforced, pointing out that those rights which are granted to the owners of the inventions must be protected (given the force of law before they can be enforced in case of infringement.) Intellectual property rights allow the state to help producers of intellectual products to maintain some control over the products of their effort, after the products have been made public. The main characteristic of intellectual property rights are that, they are rights which preclude or prohibit another person from using such rights, when they are granted.³

The World Bank in 1999, described the term intellectual property as a broad term used to cover patents, trademarks, plant varieties and other rights (breeders rights), copyrights, trade secrets, which the law gives for the protection of those creativity, and knowledge. The relationship between intellectual property rights, and other rights, is that the inventors, who might have been granted license to be operational for some period of time, (the owner of such invention) precludes others from using that, and will have monopoly of it, so long as the time permits.

The African Charter on Human and People Rights, 1981, in Article 14, guarantees the right to property, though goes on to state that, the right may be encroached upon in the "interest of public need or in the general interest of the community". Also, the American Convention on Human Rights of 1969 in Article 21, recognizes a right of property, a right which no one is to be deprived of "except upon payment of just compensation". The European Convention of Human Rights and Fundamental Freedoms of 1950, did not include the right of individual property, because of its controversy, but enshrines rights on peaceful enjoyment of one's possessions, which was included in Article 1 of the protocol.⁴ The Article then goes on to recognise the right of a state to enforce such laws as it deems necessary to control the use of property in accordance with the general interest.

Genetically Modified Crops and its Controversy

Despite the enhanced production efficiency in agriculture, the emergence of GM crops and GM food has also triggered some health and environmental concerns. According to the World Health Organization

(WHO), the human health concerns are mainly about: GM technology may introduce new antigens and toxins, which may be toxic or may trigger human allergic reactions; possible antibiotic resistance effects, antibiotic-resistant marker genes and viral promoter genes were used as markers to indicate if a GM process was successful; the stability of the inserted genes.⁵ In 2003-04 State of Food and Agriculture (SOFA) of the Food and Agriculture Organization of the United Nations (FAO), provides a critical scientific assessment of health and environment impacts of GM crops. It concludes that there are no exceptional food safety problems with any current GM products. The scientific assessments of SOFA show that there have been no allergic or toxic effects that have resulted from consumption of GM products, the risks of antibiotic-resistant marker genes and viral promoter genes used in the GM process are very small.⁵

Some companies require that farmers and buyers of their GM seeds sign an agreement with the companies, when obtaining those seeds, may be disadvantage to farmers. Such companies have invested significant funds in the research and development of GM seeds, which they protect through their contracts with agricultural growers.⁶ These contracts aggressively protect the biotechnology company's rights to the seeds, also have a regulation within which disputes may be settled, and limit the liability of the company.

Here, the contract between a grower and a biotech company is that the grower's rights to purchase seed are significantly limited, because most times the companies might not want to sell their seeds, preventing the growers or farmers from retaining and reusing the seeds for the next planting season. This provision prohibits growers or farmers from saving seed and reusing seed from GM crops. The result of this, is that growers or farmers, are required to make an annual purchase of GM seeds.⁷ The patent infringement case stemming from the unauthorized saving of GM seed was recently seen in the Canadian courts. In this case, of *Monsanto Company v Schmeiser Enterprises Ltd.*⁸ Monsanto Company sued Percy Schmeiser, a local farmer, for saving and planting GM seeds produced from pollen that was blown into his field from a neighbouring farm. Schmeiser himself had no contract with Monsanto. He found that the pollen from GM canola had blown. The Court found further that Schmeiser had engaged

in these activities knowingly. This act violated the patent Monsanto held on the Roundup tolerant seed. Schmeiser was required to deliver to Monsanto any remaining saved seed and to pay to Monsanto the profits earned from the crops, plus interest.⁹

Moreso, when in the contract agreement between the growers or farmers, contains a clause that requires all conflicts arising from the performance of the seed, to be resolved through arbitration, this binding arbitration clause precludes farmers from filing lawsuits. Here, the farmers are constrained in terms of time frame within which they must raise a dispute. Under the contract, the grower is typically given as little as 15 days from the day that the problem is first observed to file a complaint with the seed company.¹⁰ This limited liability between the company and the farmers, is to the fact that any use or handling of a product containing in the seed company's gene technology shall be the price paid by the grower for the quantity of such product involved, or at election of the seed company, or any seller, the replacement of such quantity. In no event shall the seed company, or any seller be liable for any incident, consequential, special or punitive damages. Under such a clause, if the use of GM seed has a negative impact on another aspect of the farmer's operations, this clause precludes the farmers from recovering any damage from the company in the event the use of the product causes harm.¹⁰

Farmers may say that their use of GM seeds will create super weeds or superbugs that over time become resistant to GM seeds and crops and to other herbicides and pesticides. Gene movement from crop to weed through pollen transfer has been demonstrated for GM crops, when the crop is grown near a closely related weed species.¹¹ Noted also that insects in the past developed a resistance to pesticides, one strategy used to prevent the growth of pest resistant to GM seed is "refuge areas". These are swaths of land, planted with non-GM crops, which act as refuges for the pests. Pests migrate to and remain in these areas, where they eat and breed. Since the refuge area offers the pest adequate food, the pest has no need to become resistant to GM crops, and thus, the bulk of the crop is protected. The use of refuge areas is now mandated by the EPA.¹² The modified crops could cross with related crops or wild plants, and the consequences are unknown. Some organic food production could be contaminated by the drift of GM pollen. This can be controlled by requiring minimum distances between GM crops and organic crops.

Similarly, cross pollination of GM seeds onto non-GM crops is also a concern to farmers, particularly those farmers that certify their crops as non-GM crops or organic crops. There is evidence that such is existing. Tests performed by Successful Farming Magazine found evidence of cross-pollination in both corn and soybean crops.¹³ Traditionally, farmers have not been liable for pollen drift onto neighbouring properties, however, held liable under a theory of negligence for pesticide use, especially that of the Bt, which if encroaches on neighbouring lands causing some damages to the land.¹⁴ It remains to be seen whether pollen drift from Bt corn and other GM crops will be found by the courts to be actionable. Some observers of the GM industry have the opinion that the action should be based on the theory of trespass or negligence.¹⁵

Some farmers, who are currently planting GM crops is preserving the identity of their non-GM crops as those crops move from farm market, but remember, that bulk agricultural trading facilities are not able to separate GM crops from traditional crops.¹⁶ The importance of preserving the integrity of agricultural crops was highlighted in the recent case on Starlink corn which was found in taco shells, and distributed through a national company and in a corn product used by the brewing industry, this has not been approved for human consumption.¹⁷ Although, a recent study found no allergic reactions that could be traced to consumption of the Starlink product.¹⁸ The inability to segregate crops may lead to a situation where all products are de-valued, particularly in the international market, because, they cannot be certified GM free.

China has a strong public research sector with thousands of researchers specialized in plant biotechnology. Dozens of biotech crops are being developed and field testified, including the three major staples: rice, maize, and wheat, as well as cotton, potato, tomato, soybean, cabbage, peanut, melon, papaya, sweet pepper, chilli, rapeseed and tobacco.¹⁹ However, in some countries, the adoption of GM crops has been treated very cautiously. For example, in Japan and some European Union (EU) countries, the process of accepting and introducing GM crops is very strict and slow, although the EU has approved Monsanto's soybeans and Novartis's Bt corn.²⁰ Some of the reasons for slow approval include strong opposition to GM food from consumers, concerns of the environment and health, and

traditional protectionist pressure to keep out competing agricultural imports from exporting countries that produce GM crops. In EU countries, labelling is mandatory on products that may contain genetically modified organisms (GMOs); and the traditional food market and GM food market are segregated.²⁰

The Adverse Effect of the Controversy on Intellectual Property Rights

All human endeavour have laid complain, or concern about GM foods, and criticized agribusiness for pursuing profit without concern for potential hazard. It seems that everyone has a strong opinion about GM foods, even the Vatican and the Wales, have expressed their opinion.²¹ Most concerns about GM foods fall into three categories, *viz.*, environmental hazards, human health risks, and economic concerns.

Environmental Hazards

Harm to other organisms, the concern is centred on the impact of biotechnology as a possible harm of GM seeds and crops to other beneficial organisms. A recent laboratory study was published in Nature.²² Showing that pollen from Bt corn caused high mortality rates in monarch butterfly caterpillars consume milkweed plants, not corn, but the fear is that if pollen from Bt corn is blown by the wind onto milkweed plants in neighbouring fields, the caterpillars could eat the pollen and perish. Although, the Nature study was not conducted under natural field conditions, the result seemed to support this viewpoint. The study was performed at Cornell University, which received significant publicity. This study also revealed that a gene contained within Bt corn can be harmful to the larvae of a monarch butterfly when windblown onto milkweed leaves. But subsequent research had indicated that the actual level of Bt on milkweed plants in a real-life scenario do not reach the levels that produce a toxic result in the larvae.²³ This research suggests that the impact of Bt corn when genetically placed in the corn is far less damaging to non-target insect population than spraying pesticides.

The study has been re-examined by the USDA, the U.S. Environmental Protection Agency (EPA) and other non government research groups, and preliminary data from new studies suggests that the original study may have been flawed.²⁴ Supporters of the technology say that genetically engineered, or GE crops are necessary for meeting the nutritional

demands of a growing global population. Opponents say that the crop could pose environmental and health risks, particularly over the long term.

Currently, most of the genetically modified crops commercially available have added traits that protect plants from pests, and make them resistant to herbicides. But in the future, the technology could be used more to address crop vulnerabilities to climate change, by incorporating traits for drought resistance and for heat and cold tolerance. Climate change will no doubt affect both the yields and the quality of produce in a number of ways. In increased temperatures, will speed development and thus limit potential yields. In colder climates, increased temperatures may extend the growing season, particularly of crops with indeterminate growth such as cotton.

Genetic engineering could play a role in making crops more resilient to climate change, but more research is still needed to understand the technology's potential uses. The Country's top scientific group found there was no evidence to support claims that genetically modified organisms are dangerous for either the environment or human health.²⁵ Supporters of the mandatory laws argue that no enough research has been done on the long-time health effects of genetically modified foods, Monsanto counters that numerous studies have demonstrated that there are no health risks with GMO products.

On Human Health

As it were, some domestic markets have generally responded positively to GM products, farmers fear that the uncertain effects of the products may spook domestic consumers.²⁶ This is as a result of the lingering public perception that GM crops pose a hidden health risk to human and that these crops are not being adequately regulated at the federal level. Critics say that the effects of GM products on human health are not yet fully known. Many children in the U.S. and Europe have developed life-threatening allergies to peanuts and other foods. There is a possibility that introducing a gene into a plant may create a new allergen or cause allergic reactions in susceptible individuals. For example, a recent study found that people allergic to nut reacted to GM soybeans into which a protein from a Brazil nut had been inserted.²⁷

However, there is a growing concern that introducing foreign genes into food plants may have an unexpected and negative impact on human health.

A study carried out in *Lancet* examined the effects of GM potatoes on the digestive tract in rats.²⁸ The study showed that there were appreciable differences in the intestines of rats fed with GM potatoes and rats fed with unmodified potatoes, the gene that was introduced into the potatoes was a snowdrop flower lectin, a substance known to be toxic to mammals, which was not even intended for human or animal consumption.

Most observers of the GM industry recognize that the domestic market has consumed GM products for years and, thus far, there has neither accompanying health impacts, nor can American stop consuming these products.²⁹ At the same time, the introduction of genetically engineered crops had little influence on the rate at which agricultural productivity was increasing over time. The researchers and regulators should be sure to evaluate the safety and efficacy of specific crops, rather than focus on the potential risk posed by the process of modifying the plants.

Economic Concerns

GM crops are not generally accepted throughout the international market. The process is lengthy and costly. The European Union (EU) have banned the import of crops with inserted genes, citing concerns about human health and environment.³⁰ The EU has been forced to accept the GM crops because, it has other sources of supply rather than the United States. Brazil does not allow the use of GM crops, and remains a viable source of supply for those countries that will not import GM crops.¹⁵ Many new plant genetic engineering technologies and GM plants have been patented, and patent infringement is a big concern of agribusiness, but consumers advocate are worried that patenting these new plants varieties will raise the price of seeds so high that small farmers and third world countries will not be able to afford seeds for GM crops, thus, widening the gap between the wealthy and the poor.

Patent enforcement may also be difficult as the contention of the farmers that they involuntarily grew Monsanto-engineered strains when their crops were cross-pollinated shows, that the only way to combat this possible infringement is to introduce a "suicide gene" into the GM plants, where plants will be allowed to germinate for only one planting season, and would produce sterile seeds that will not germinate for the next planting season. Thus, farmers will be made to buy a fresh supply of seeds each year. This

will however be more difficult for farmers in the developing countries, as they might not be able to buy seed each year, and traditionally set aside a portion of their harvest to plant in the next growing season. To fight this, an open letter to the public, Monsanto has pledged to abandon all research using this suicide gene technology.³¹

Recommendations

Extensive testing of GM foods may be required to avoid the possibility of harm to consumers, with food allergies. Governments around the world should work hard to establish a regulatory process to monitor the effects of and approve new varieties of GM plants, depending on each government of different regions wants to enforce this. In Japan, for instance, the Ministry of Health and Welfare has announced that health testing of GM foods will be mandatory as of April 2001.³² This made it to be voluntary in Japan. In Japan, supermarkets are offering both GM foods and unmodified foods, and customers are beginning to show a strong preference for unmodified fruits and vegetables.

States in Brazil have banned GM crops entirely, and the Brazilian Institute for the Defence of Consumers, in collaboration with Greenpeace, has filed suit to prevent the importation of GM crops.³³ Even though the Brazilian farmers have resorted to smuggling GM soybean seeds into the country, because they fear economic harm, if they are unable to compete in the global marketplace, with other grain-exporting countries. But that position will not solve any problem, as the consumer's interests are not protected, one should be able to know what one is consuming. The proper thing to do here is that there should be a regulation, where there will be a position, where one has to make a choice, whether to eat the GM foods, or not.

In Europe, the anti-GM food protestors have been especially active. That is to say that the issue of GM foods are not welcomed. In the U.S. the regulatory process is confused because there are three different government agencies that have jurisdiction over GM foods. Here, the EPA evaluates GM plants for environmental safety, the USDA evaluates whether the plant is safe to grow, and the FDA evaluates whether the plant is safe to eat, and also regulates substances such as pesticides or toxins that may cause harm to the environment. The EPA, is actually doing a good job, and the Government inspectors are also on

their toes, visiting the farms periodically, and investigating to ensure for compliance.

One will ask at this juncture, what is happening in Nigeria, and other developing countries, regarding the issue of GM foods. The answer is not farfetched, as the regulating body (NAFDAC), and the recently passed Bill, by the immediate past administration worked exidously to see that the regulations contain the issue of GM crops being safe for human consumption before being released for commercialization. The issue here is the time, money, or resources to carry out exhaustive health and safety studies of every proposed GM food product. A lot has to be done by the government to see that GM foods get to an appreciable stage.

Even on that, Nigeria signed and ratified the Cartagena protocol on Biosafety to the convention on Biological Diversity.³⁴ This is the regulatory mechanism of genetically modified product as ratified by more than 50 countries, which came to force in September 2003. It is intended to promote human health and the environment from possible adverse effects of the products of modern biotechnology. The country needs to embrace genetically modified technology for improved livelihood. She must utilise it, and use the new discoveries to reduce food insecurity, poverty, unemployment and health hazards, like other countries of the world. Safety assessments should continue to consider potential effects of the transformation process.

The issue of labelling of GM foods comes to mind. GMO labelling is no just about the science behind the technology, but also an issue of the public, "right to know". The products and agribusiness industries believe that labelling should be voluntary, and influenced by the demands of the free market. If consumers show preference for labelled foods, over non-labelled foods, then industries will have the incentive to regulate itself or risk alienating the customer. This should be encouraged, because people have the right to know what they are eating, argue the interest groups. The food labels must be designed to clearly convey accurate information about the product in simple language that everyone can understand.

Conclusion

There is no gain saying that genetically modified foods have the potential to solve many of the world's hunger and malnutrition problems, and help to protect and preserve the environment by increasing yield and

reducing reliance upon chemical pesticides and herbicides. The technology may be more appropriate for farmers that have difficulty spraying pesticides. GM seeds may work well for farm areas that are inaccessible to tractors or close to water bodies, or in places where winds are high.

However, GM seeds maybe least appropriate for farmers who are particularly reliant on a stable market. The uncertainty surrounding consumer acceptance of GM products, particularly in foreign market, is a risk that may simply be unacceptable to some farmers. Many people feel that genetic engineering is the inevitable wave of the future and that we cannot afford to ignore a technology that has such enormous potential benefits. Here many challenges await the governments, especially in the areas of safety testing, regulation, international policy and food labelling. But then caution needs to be exercised here to avoid causing unintended harm to human health and the environment as a result of our enthusiasm for this powerful technology.

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