



INTELLECTUAL PROPERTY AND GMOs AS A FRONTIER TECHNOLOGY: CASE FOR A DISABLING REGIME FROM BAUMAN'S PERSPECTIVE

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ABSTRACT

The frontier technology like GMOs is surrounded with benefits and risks. The former ranges from diverse applications of this technology while the latter are due to associated costs. The benefits encourage the law makers to argue for an incentivising, promoting technology or can be said an enabling regime in the form of Intellectual Property rights, and rightfully so. Howsoever, on the other hand, the uncertainty around the technology, weak regulatory frameworks and other risks associated also requires for a disabling regime. This side of the technology regulation can not be overlooked and the current paper seeks to analyse the same from the perspective of Bauman's Liquid Fear hypothesis.

I. INTRODUCTION

The Genetically Modified Organisms (hereinafter, GMO's) is, "*an organism whose genetic material has been altered using genetic engineering techniques*"¹This frontier technique involves the inducing desirable alterations in the DNA molecule of a living organism by purely technical intervention without resorting to any natural methods. It is not an absolutely modern science, however, the recent developments in the field promise applications in the field of medicine, forensics, and food industry.²The impact of genetic engineering as an applied science on life and environment and has evolved into a major economic consideration

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¹See Royal Commission on Environmental Pollution 13th Report "Report of the Select Committee of the House of Lords on EC Regulation of Genetic Modification in Agriculture", 198-99 HL Paper 11 II (London, 1999); The Release of Genetically Engineered Organisms to the Environment, Cmnd. 720 (London, 1989) *cited from* Jane Holder, "New Age: Rediscovering Natural Law", in Albert W. Musschenga, Wlm J. Van Der Steen, *et.al.* (eds.), *Reasoning in Ethics and Law: The Role of Theory, Principles and Facts*, Ashgate (1999), See also Gilbert, *International Encyclopaedia of Biotechnology*. p.31, (OUP, 2010).

²See generally Christopher Arup, *The New World Trade Organization Agreements: Globalizing Law Through Services and Intellectual Property*, 216-17 (Cambridge University Press, Ed. 1, 2000); Philip w. Grubb, *Patents for Chemicals, Pharmaceuticals and Biotechnology: Fundamentals of Global Law, Practice and Strategy*, 249-51 (OUP, 1999); Fiona Macmillan, *WTO and the Environment*, 138 (Sweet & Maxwell, London, 2011), Jayshree Watal, *Intellectual Property Rights in the WTO and Developing Countries*, 128 (Springer 2001); Yvonne Cripps, Patenting Resources: Biotechnology and the Concept of Sustainable Development, 9 *Ind. J. Global Legal Stud.* 119, 121-24 (2001); Sean D. Murphy, Biotechnology and International Law, 42 *Harv. Int'l. J.* 47, 51-56 (2001) also see Neil D. Hamilton "Feed a Hungry World" in "Legal Issues Shaping Society's Acceptance of Biotechnology and Genetically Modified Organisms", 6 *Drake J. Agric. L.* 81, (Spring 2001).

and it is expanding day-by-day.³ It is a common knowledge that the growth of bio-sciences had never been as fast relatively speaking as witnessed in the fields of physics or chemistry but it has caught up in the race very fast. The flood gates were opened with the revelation of double helix by Crick and Watson in 1953 and has become unstoppable since. With the DNA revealed and the dawn of the knowledge that one can cut and stitch the DNA as one desires revolutionized the scenario. It was the dawn of modern biotechnology. The species barrier stood broken Darwin had entered into a hyper-speed and new developments in this field start coming to the fore on a regular basis. More recently, on October 8th, 2012 scientists John Gurdon and Shinya Yamanaka were awarded Noble Prize for medicine for their work in stem cell research which did not involve taking of embryo cells, thereby, avoiding the ethical issues. Their work can be used to re-grow tissues in damaged brains, hearts or other organs- an amazing possibility.⁴

However, that is one side of the coin. Like other technologies it is also, “Janus faced”⁵, that is having both pros (the benefits) and cons (the harm/ cost). The promises of its benefits are surrounded by the security, environmental and ethical risks which are very real and at the same time difficult to be defined, calculated and quantified as the long-term consequences of this technology are a – known-unknown. The fact that generally law is reactive and not proactive also fuels the concern that law as an institution grapple with the speed of advancement in science and technology. The latter is neutral it offers us the solutions and choices; therefore, we need something to regulate it both ways, that can only be done by the institution of law. The underlying presumption of the present paper is that in the current age of manufactured risks a balance of proactive law as to reap the maximum benefits of genetic technology is required.

Apart from the international regime which seeks to provide standards for law making regimes around the globe the present national legal regime can be classified as enabling and disabling (or, regulatory), the former includes the Intellectual Property Rights (hereinafter, IPRs) and the latter is about controlling the pace and direction of the technology that will include the rules and protocols enacted under environmental law, biological diversity conservation and food labelling laws. Enabling IPR regime had some restrictions like, for example, the European approach provides for legal restrictions regarding morality and public policy,

³ The biotech industry in India is valued at US dollars 70.2 billion in 2020 at a growth rate of 12.3% and is growing at a CAGR of 16.4% is expected to be a US 150 billion dollars by 2025. Available at www.ibef.org/industry/biotechnology-india(last visited on May 10,2022).

⁴Seehttps://en.wikipedia.org/wiki/History_of_biotechnology(last visited May 9th, 2022)

⁵See M. B. Rao and Manjula Guru, *Biotechnology, IPRs and Biodiversity*, 32 (Pearson, Longman, 1st Ed. 2007).

whereas, the United States in contrast tries to avoid such restrictions and they had been traditionally liberal in granting patents. But when posed with a difficult ethically contentious issue about granting a patent upon an animal –human chimera both the patent systems struggled to find an answer to it. The question raised was what is a human? What are the limits of patentability?

As to the regulatory regime, unlike in the developed countries it suffers from a techno-centric approach that is the science not only defines the problem but also led the answer. There is also an issue of low threshold of standards. This culminates into a crisis of confidence in the society giving rise to a heightened dilemma fuelled with the irreversibility and scale of possible consequences. One recent example is the issue of Bt. Mustard and Bt. Brinjal. This paper attempts to argue that any regulatory regime must not only ensure compliance with the best practices but also include an element of garnishing public opinion so that the benefits can be reaped in a best possible manner.

Undeniably, the technology of making GMOs has benefits and also has risks. The study has relevance because the technology has not only major economic implications, access to food, and implications over human life and health, but is also surrounded by the questions of proper governance and regulation of scientific community and social, environmental, ethical and health related issues. This analysis for a disabling regime obviously would not be meaningful without discussing the enabling regime in the light of the benefits of GMOs. The next part of the article deals with them together in Part II and is followed by a Conclusion in Part III.

II. THEORETICAL FOUNDATIONS FOR COST AND BENEFITS

Overview

The theoretical foundations are important to understand and determine what needs to be measured and what relationships should be looked for. As far as the question of legal regulation of GMOs is concerned it is important to underline the need for the same on the basis of perspectives of costs and benefits. Costs has to be understood from the perspective of risks and losses and benefits has to be understood from the perspective of gains. When we talk about GMOs it is a highly contested area with its proponents at one end of the spectrum who cite its benefits and its opponents at the other who cites its threats. The truth, howsoever, lies somewhere in between these two extremes. As to its benefits, they range from its wide variety of applications in health, medicine, food, agriculture and forensics. These benefits call for providing incentives and there are strong reasons for that. Likewise, its threats, actual and

potential, to the environment, health and economics calls for its strong regulation. Both these will be taken up along with justifications for that.

The Benefits: Case for Enabling Regime

As pointed out previously GMOs offers a range of benefits to food, health and economics. It can be used to enhance production of food crops thereby offering food security, it has been used to develop path breaking medicines as well it has become a serious factor in terms of the market it has created. This part won't emphasize much on the benefits but would rather focus more upon the methods and reasons to do it. One of the ways is providing an incentive to it. That can be achieved by offering limited IPRs in the form of patents and plant variety protection. Intellectual property protection has a rationale which can be understood from two perspectives, individual and more importantly public.

Undoubtedly, society since time immemorial has developed and craved for new knowledge and products which make their lives easier. However, knowledge is intangible in nature that also applies to scientific knowledge and techniques.⁶ Being intangible they are different from tangible assets like land or a fruit. They primarily differ from each other in two aspects, excludability and rivalrous consumption. Tangible are excludable- they can be kept and in varying degrees can be kept away from others. For example, an orange is highly excludable, the owner can put that under lock and key. An intangible on the other hand is not excludable like an orange. Say if an author releases his story, he cannot put it under lock and key any more. Furthermore, intangibles are non-rivalrous in consumption as compared to tangible which has rivalrous consumption. If "A" eats his orange, "B" cannot eat the same. "A" and "B" however, can enjoy the same story and so do other "N" number of people. One person's use of intangible asset does not interfere with another's ability to use the same.

These characteristics pose challenges to the creators of knowledge. Owing to them economists would describe them as "*public goods*" and providing an adequate supply of a public good calls for a proper mechanism.⁷ As to that one might ask, why not we rely on contract, property law and tort for that. The reason being as one is aware about "*tragedy of commons*", that give rise to problem of '*overuse*' of property if treated as a public good. But the same problem would not arise for an intangible, the problem rather would be '*underproduction*' and not '*overuse*'. Consider an innovative company had made a medicine based on a GMO after decades of research and experimentation. Once he would start selling

⁶For a brief see US Council for International Business report titled "A New MTN: Priorities for Intellectual Property" Page 3 (1985)

⁷See H. Ullrich, "The Importance of Industrial Property Law and Other Legal Measures in the Promotion of Technological Innovations", *Industrial Property* 102-03 (Geneva 1989).

it the others would be free to purchase, examine and in absence of any intellectual property law would be able to copy it.⁸ This implies that they would be able to sell it at a lower price as they had incurred no sunk cost to recoup. To stay in the game the innovative company would be forced to lower the price in the end it would be below the marginal cost of producing it. It wouldn't be able to recoup its initial R&D costs. Knowing that they are unlikely to engage in creating that medicine at the first place and that would mean stagnation in innovation for the consumers, that is, underproduction. This calls for a proper mechanism in the form of robust intellectual property laws which can lend a characteristic of excludability to intangible assets through which externalities can be internalized.⁹

Justifications for Enabling Regime on the Theoretical Foundations

There are several theories which had been relied upon in order to justify the grant of intellectual property rights over intangibles. The present study would focus on two, private justifications and public justification. These two are neither mutually exclusive nor contradictory.

Private Justification

The private justification is based on natural law- a right based approach. One of the chiefs amongst them is that of Jurist and Philosopher John Locke's Labour Theory. His approach is his well-known work *Second Treatise of Government*¹⁰ begins from the supposition that individuals naturally are entitled to the fruits of their labour/toil. It assumes the existence of an uncultivated common, which is characterised by plentifulness of goods. Property rights are therefore granted to those whose labour adds certain value to the goods they take from the common, with the proviso that, as a result of their labour, the common reservoir is also increased or, as Locke put it, provided enough and as good left for others to enjoy. In case of IP the commons would be represented by the public domain. The public domain retains those which either cannot own or exploit, for example idea or discoveries or conversely those which are free to be expropriated as intellectual property, provided that necessary labour is expended on them. Meaning thereby that finished Intellectual work would leave the public domain once it meets the relevant legal criteria for protection with a right in the form of

⁸See E. Mansfield, M. Schwartz and S. Wagner, "Imitation Costs and Patents: An Empirical Study" 907, *Economic Journal*, (1981).

⁹See M. Lehmann, "The Theory of Property Rights and the Protection of Intellectual and Industrial Property" at 530 *IIC* 525 (1985) explains that an externality is an economic situation in which an individual's pursuit of his or her self-interest has positive or negative spill-over effects on the utility or welfare of others. It can be seen as a market failure and, in this context, a property right is a tool used to correct such a market failure. See R. Ekelund, and R. Tollison, *Economics*, 404-05 (Boston, M. A.: Little, Brown and Company, 1986).

¹⁰See John Locke, *Second Treatise on Government*, available at www.earlymoderntexts.com/locke1689a (last visited on September 15, 2021).

property right as IPR. As far as the question that it would breach the Lockean proviso of enough and as good it can be answered in no. Instead over course of time intellectual property rights would enrich the public domain. It would allow creators to present their work before the public which would lead to new ideas and encourage further creativity. Secondly, given the time limited nature of IPRs, these intellectual goods will eventually return to the public domain.¹¹

Public Justification

As far as public justification is concerned it can be explained on the basis of Law and Economics Theory. It is concerned with the role of law in the efficient allocation of economic resources. Because of its very nature intangible intellectual property poses what economist referred as public goods problem also discussed previously. Intellectual property is considerably costly due to investment in terms of time, money and effort. The problem with Intellectual property is that its creation is expensive but when one incorporated in a tangible form it can easily be plagiarised that too limitlessly at virtually no cost, even negative cost in some cases. And the plagiarised product would also carry an equal value as the original. In absence of excludability in the form of intellectual property rights free riding on other's investments would happen without incurring any original costs. As a result, IPRs offer an important incentive to create new knowledge and products by having a deterrent effect. This would also consequentially enhance the competition in the market. As far as it being a public justification this efficient allocation of economic resources would have a long-term positive-effects. Immediate being that society would be benefitted by new products and knowledge. This knowledge would later form the foundations for creation of further knowledge and products, thus, benefitting the public at large in this *quid pro quo*.¹²

The Costs: Case for a Disabling Regime

In the past few decades, we had been witnessing an exponential revolution in GMOs creating plethora of commercial products for deriving profits.¹³ This deliberate alteration along with its promises has come along with a panoply of new health, environmental and economic risks not previously foreseen. We are living in an age as one commentator describes as “*Darwin in*

¹¹See Hughes, “The Philosophy of Intellectual Property”, *Georgetown Law Journal*, 288 (1987).

¹²See Van Der Bergh, “The Role and Social Justification of Copyright: A “Law and Economics” Approach”, *Intellectual Property Quarterly*, 17 (1996).

¹³ Genetically modified plant crops have been planted commercially in the United States since 1994. By 2002, more than 88 million acres of genetic engineering-derived crops were being planted annually in the United States. Proposed Federal Actions to Update Field Test Requirements for Biotechnology Derived Plants, 67 Fed. Reg. 50,578, 50,578 (Aug. 2, 2002).

*Hyper-speed*¹⁴ as they were not previously foreseen the attempts of the law to regulate can be described as a reaction to the new posed challenge. Amidst this chaos haphazard steps had been taken. The situation got further worsened by politics surrounding it and inaction on the part of the bureaucracy. Though it is the inherent nature of the law that it is reactive and seldom proactive this is truer in case of science and technology. Given the associated risks involved with the GMOs the law is required to act proactively and not wait for a disaster to happen.

Risk involves dual elements of hazard and exposure. Those posed by GMOs are different both in type and degree than those presented by traditional known environmental pollutants and chemicals. The potential hazards of GMOs are well beyond imagination, and adding to the concern is that there are multiple ways of exposure to them without even knowledge of their existence, for example, through food, cross pollination etc.

One of the typical risks associated with some GMOs is toxicity. It can be toxic in itself or may produce a toxic substance which would cause prejudice to health, life or the environment.¹⁵ Another potential risk is change in behaviour pattern or reproduction ways by any future genetic changes which are unpredictable to assess and might not have been anticipated initially calling for a cautious approach. Another is for the reason that GMOs are altered to give a selective advantage to suit our needs, but that can cause a havoc upon indigenous varieties, which would not be able to compete due to lacking in that capacity. This evolutionary advantage can result in depletion. Because of the very different types of risks associated with GMOs, any regulatory system that does not take into consideration these risks is inherently skewed.¹⁶ There are economic risks as well in the form of contamination of organic crops and pesticide resistance. The cause is cross pollination of GM plants with other plants. Organic farmers who have their land near a GM farm wouldn't be able to sell their crop as organic if cross pollination occurs leading to losses in revenue. And lastly the biggest concern is the risk of uncertainty of this relatively new technology¹⁷ and the lack of experience regarding it. Another matter of greater concern is the use for R&D which may

¹⁴See Charles A. Deacon & Emilie K. Paterson, "Emerging Trends in Biotechnology Litigation", 590 20 *Rev. Litig.* 589 (2001).

¹⁵See L.G. Firbank et al., "The Implications of Spring-Sown Genetically Modified Herbicide Tolerant Crops for Farmland Biodiversity: A Commentary on the Farm Scale Evaluations of Spring Sown Crops" 1, 19-20 (2003), available at <http://www.defra.gov.uk/environment/gm/fse/results/fse-commentary.pdf> (last visited October 12, 2021)

¹⁶*Supra note* 14 at p. 590.

¹⁷See Margaret Mellon & Jane Rissler, "Union of Concerned Scientists, Environmental Effects of Genetically Modified Food Crops: Recent Experiences" (2003), <http://www.ucsusa.org> (last visited Jan. 6, 2020)

pose much more significant risks, to illustrate, any failure to contain them at that stage can pose significant risks.

The above discussion on risks is not to suggest a moratorium on GMOs neither it is suggesting that GMOs are devoid of any advantage. This is to suggest high amount of sensitivity required to deal with this emerging uncertain field of technology and hence a disabling legal regime to minimise the risks.

Justifications for Disabling Regime on the Theoretical Foundation from Bauman's perspective.

One of the theoretical justifications that can be offered is what was described as the concept of liquid fear as coined by Zygmunt Bauman, that is, living in a state of constant anxiety which presence can be felt everywhere.¹⁸ Bauman describes in his book *Liquid Fear* as living in a state of constant anxiety where the dangers may strike any time unannounced. The problem with liquid fear it is dissimilar to a specific defined danger. The latter is one which people are aware about and had knowledge of its where, how and when and in case of former it is exactly opposite. Today's society is surrounded by potential hazards and they are aware of that. But it is uncertain where and when that hazard touches us. Absence of any reliable structures guarding the society enhances that fear. Even the most robust regulatory structures appear to be powerless before this march of science and technology manifesting itself in the form of GMOs. They do not have even power to do so when two people are in a similar situation and they know that they are here together because they bring satisfaction to each other. Now if they know about that, they live in constant fear what about if the other partner first decides that it is the time to give notice and disappear? Uncertainty - impossible to predict the future, and even after you have made your decisions after long, along deliberation, very careful, very meticulous calculations. Looking retrospectively, you still are not sure whether you made the right or wrong decision.

But how is it different from past and why GMOs. Of course, dangers were with us, with our ancestors, as long as humanity is on earth but it was a different story in the middle-ages, there were wolves in the forest. So, you had to prevent our children going their keep them into home. Don't go to the forest alone, danger. Now, these are the dangers what German sociologist Ulrich Beck called society of risks¹⁹, risk means that at best, you can calculate probability of catastrophe but probability is a very foggy idea. Probability, there may be 90% probability but still we are in this one 10% or the other way around. Only 10% probability but

¹⁸See Zygmunt Bauman, *Liquid Modernity*, (Wiley, 1st Edition, 2013).

¹⁹See Ulrich Beck, *Risk Society: Towards A New Modernity*, Sage Publishing

we are struck in the 10%. To put it in one word the state of continuous “*uncertainty which makes us fear*”.

To put it briefly, there are two values without which human life is simply inconceivable one is security, that is, feeling safe. The other is freedom, that is, ability to self-assert. At this point, with regard to GMOs security can be understood to mean a robust regulatory legal regime and freedom can be taken as scientific freedom. In absence of legal regime and only scientific freedom it can potentially create a chaotic situation. Likewise, in absence of scientific freedom with only legal controls would push us back in times. We had to exchange it for security and a good deal of security has been surrendered. The people live by anxiety, by fear- they are already afraid this is the most important mark of the precariat. Precariat which comes from the French word *precarite* which loosely means walking on moving sands - not having firm ground under your feet. Somewhere in the regime of science and technology well beyond the control of our government, not to mention our own control, there are processes. These processes can do whatever they wish and may strike at any moment. We cannot turn our back we cannot turn our face when they suddenly appear next to us and we cannot omit their presence. They signify, they embody all our fears. The shock is only beginning and we are far from coming to digest the new situation, at just ourselves to this new situation possibilities are not limitless neither the human ability to endure. Realising that so we have to exercise what is called but, and that’s a big but unfortunately going to that there is no shortcut solution., no instant solution it’s a long-long process coming to an understanding takes some time. So, we have to accept this is the situation and find a solution. Biotechnology has in recent times emerged as an applied science with far reaching impact on society. GMOs is such area which has applications in a wide range of activities like food and agriculture, environment, forensic science, medicine, and industrial products.²⁰ At the same time with its enormous benefits, it also comes along with unforeseen risks which can’t be ignored. The critics often cite ethical and security concerns. One of the often-cited concern is the risk of an uncontrolled and/or unintentional release of GMOs. The same is feared to translate into an irreversible damage to the ecology and can have serious negative ramifications for the plant, animal or human life and health. Likewise, there are associated ethical dilemmas ranging from concerns raised with regard to the attempt of man playing God. Adding fuel to the concern is the underlying uncertainty in the form of long-term

²⁰ For example, the claimed invention by Chakrabarty. *see also* Elizabeth Hecht, “Beyond Animal Legal Defense Fund v. Quigg: The Controversy over Transgenic Animal Patents Continues”, 1036ff, 41 *Am. U. L. Rev.* 1023(1992).

consequences which remains to be a known-unknown. Thereby, a proper disabling regime which can regulate the direction of GMO technology and products.

III. CONCLUSION

In conclusion it can be said that there is a realization in the community and science that GMOs are potentially beneficial as well as associated with risks. This in turn informs the law to act accordingly. The proponents of GMOs are justified as well given the benefits to life, environment, health, food security and many more coupled with its contribution to economic development requires an enabling environment to promote its development. For that purpose, the IPR regime is present and the same sufficiently incentivizes it. Given that we should also not lose sight of the consequent costs and risks associated with the technology, uncertainty around it, lack of robust regulatory structures, coupled with the divergence of opinions, lack of solutions, or solutions being scientifically driven forces us to rethink about our approach towards GMOs. In conclusion it can be said that a balance in the legal approach with regard to frontier technology like GMOs would be advisable in order to be able to reap benefits to its maximum while limiting the risks to a minimum level.