

**FOOD SECURITY AND PATENT RIGHTS - AN ANALYSIS**

*Dissertation submitted to the National University of Advanced Legal Studies, Kochi  
in partial fulfilment of the requirements for the award of the degree of*

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## **DECLARATION**

I declare that this dissertation titled," **FOOD SECURITY AND PATENT RIGHTS - AN ANALYSIS**", researched and submitted by me to the National University for Advanced Legal Studies, Kochi in partial fulfilment of the requirement for the award of Degree of Master of Laws in International Trade Law, under the guidance and supervision of **DR. ASIF.E**, Assistant Professor, NUALS is an original, bona-fide and legitimate work and it has been pursued for an academic interest. This work or any type thereof has not been submitted by me or anyone else for the award of another degree of either this University or any other University.

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## **PREFACE**

*“Food security is an authentically human requirement. Guaranteeing it for present and future generations also means safeguarding ourselves against the uncontrolled exploitation of natural resources”.*

- Pope Benedict XIV

Food security is a concern which needs to be addressed for the sake of the present and future generations, by conserving the natural resources, protecting the environment, maximizing food production and ensuring accessibility of food to the needy. In this context, it is pertinent to examine the legal implications on food security. How far the laws aid in enhancing the food production without exploiting the natural resources and protecting the ecosystem is to be looked into. The exponential growth of the population in certain parts of the globe calls for efficient utilization of the natural resources addressing the requirement of food, enable the maximum food production within the existing limitations. What are the legislations which play a role in enhancing the food production and ensuring food security needs to be examined. The innovations in agriculture methods, seed technology and genetically modified crops expose a new avenue in this regard and how the existing legal system enables the utilization of these technological innovations in realising the goal of food security is examined.

Exploring this area, the focus is shifted to intellectual property legislations especially patents and the role it plays in facilitating the farming community in using the latest inventions in this area. The inventions in this field of biotechnology and genetic engineering have resulted in a variety of genetically modified crops which can significantly enhance the food production with minimal efforts and infrastructure. Proper implementation of research developments in the field of agriculture and horticulture can be employed productively to achieve maximum food production. Hence the relevant laws like the Patents Act 1970, the Protection of Plant Varieties and Farmers’ Rights Act 2001 etc have been examined in this study.

The first chapter deals with a general introduction on food security and patent rights. The second chapter discusses the food security concerns in patenting. Third chapter focuses on the international regulations concerning food security. Fourth

chapter deals with the implications of patenting on food security. Fifth chapter discusses the intellectual property protection and food security. Sixth chapter concludes the observations of the research and offers a possible solution to harmoniously balance patent rights to achieve food security.

## ABBREVIATIONS

- AIR : All India Reporter
- APPL : Appeal
- Bd. App : Board of Appeals
- Bt : Bacillus Thuringensis
- C.M : Civil Miscellaneous
- CABI : Centre for Agriculture and Bioscience International
- Cal : Calcutta.
- CAV : *Curia advisari vult*
- CBD : Convention on Biological Diversity
- CGIAR : Consultative Group for International Agricultural Research
- COMM : Commercial
- Comm'r. pat : Commissioner of Patents
- CRISPR : Clustered Regularly Interspaced Short Repeats
- CSA : Climate Smart Agriculture
- Dec : December.
- Del : Delhi.
- DUS : Distinct, Uniform and Stable
- EC : European Council
- ECJ : European Court of Justice
- Ed./Edn : Edition.
- Eng. : England.
- EU : European Union
- FAO : Food and Agriculture Organization
- FAO (OS) : First Appeal Order from Original Suit.
- GATT : General Agreement on Tariff and Trade 1944.
- GFAR : Global Forum on Agricultural Research and Innovation
- GI : Geographical Indication

• GM	:	Genetically Modified
• GMO	:	Genetically Modified Organisms
• I.P.L.R	:	Intellectual Property Law Review.
• ICESCR	:	International Covenant on Economic, Social and Cultural Rights 1966.
• IFAD	:	International Fund for Agricultural Development
• IP	:	Intellectual Property
• IPAB	:	Intellectual Property Appellate Board
• J.L & TECH	:	The Journal of Law and Technology
• L.Ed	:	Lawyer's Edition
• LMO	:	Living Modified Organisms
• O.J.E.P.O	:	Official Journal of the European Patent Office.
• OAU	:	Organisation of African Unity
• Ors.	:	Others
• P	:	page
• PDS	:	Public Distribution System
• PGFRA	:	Plant Genetic Resources for Food and Agriculture
• PGFRA Treaty	:	International Treaty on the Plant Genetic Resources for Food and Agriculture
• PPV& FR Act	:	Protection of Plant Varieties and Farmers' Rights Act 2001.
• S.ct	:	Supreme Court Reporter
• SC	:	Supreme Court
• SCC	:	Supreme Court Cases
• TRIPS Agreement	:	Agreement on Trade Related Aspects of Intellectual Property Rights
• U.S.P.Q	:	United States Patents Quarterly
• u/A	:	under Article
• u/s	:	under section
• UDHR	:	Universal Declaration of Human Rights 1948.
• UK	:	United Kingdom
• UN	:	United Nations



- UPOV : International Union for the Protection of New Varieties of Plants
- US : United States
- USPTO : United States Patent and Trademark Office.
- v. : versus
- WIPO : World Intellectual Property Organization
- WTO : World Trade Organization

## TABLE OF CASES

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# Chapter I

## INTRODUCTION

The world is plagued by the scarcity of food on account of the food insecurity faced by major countries. A nation suffers from food insecurity when its people do not have accessibility and availability to good quality food at reasonable prices. It becomes necessary to understand the actual meaning of the term food security as defined by the Food and Agriculture Organization (FAO). It defines food security as “a situation that exists when people lack secure access to sufficient amounts of safe and nutritious food for normal growth and development and an active and healthy life.”<sup>1</sup> Food security refers to not just availability of food, it also includes the accessibility of safe and nutritious food sufficient to meet the nutritional and dietary needs of the people so as to enable them to grow and develop in a healthy manner, thereby aiding them to lead an active and healthy way of living. The world population is increasing at a rapid rate, at the same time, the land available for agriculture and food cultivation is small, the problem of food insecurity arises as it is very difficult to feed the huge population. With the increasing role of intellectual property in all walks of life including food and agriculture, it becomes necessary to explore the correlation between intellectual property and food security.

Patents are a kind of intellectual property which is crucial in the context of food security. Letters Patents evolved in England as a form of open letter which the King of England would confer on a person or a public company, so as to authorise and permit them the right to perform certain acts or enjoy privileges which they would not be able to perform otherwise.<sup>2</sup> Letters Patent granted under the seal of the King of England would authorise its holder to certain rights and privileges. Granting of a patent refers to the conferring of a privilege to an individual or individuals by the government authority or sovereign by means of an instrument. The instrument by means of which the

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<sup>1</sup> Food and Agriculture Organization of the United Nations 2010. *The State of Food Insecurity in the World 2010: Addressing Food Insecurity in Protracted Crises*. <http://www.fao.org/docrep/013/i11683e.pdf> accessed on October 12, 2019.

<sup>2</sup> Mathew Thomas, *Understanding Intellectual Property*, 211, 1<sup>st</sup> Edn. (2016), Eastern Book Company.

privilege is granted is known as the patent. In India, the Patents Act 1970 is the statute governing patents in India. According to section 2(m) of the impugned Act, the term patent refers to a patent which is granted under the Patents Act 1970.<sup>3</sup>

Patents are granted for an invention to the inventor in order to acknowledge his intellectual labour and efforts behind the creation of the invention. Patents are granted for either a product or process which is novel, has utility, involves an inventive step and has industrial applicability. Patents give the creator of the invention an absolute monopoly power on his creation to the exclusion of all others. In India, patents are conferred for a duration of twenty years.<sup>4</sup> The rationale for the granting of patents was recognised in the case *Raj Prakash v. Mangat Ram Chowdhry*<sup>5</sup> wherein it was held that patents are conferred on *quid pro quo* basis. The knowledge revealed to the public through the grant of a patent is the *quid* whereas the exclusive monopoly power which a patent grants to the creator for the duration of the patent becomes the *quo*.

The famous decision in *Bishwanath Prasad Radhey Shyam v. Hindustan Metal Industries*<sup>6</sup> highlights that the fundamental principle behind the law of patents is to grant patents for inventions which are novel and possess utility. Moreover, the inventor's own creation and not just a verification of something which was already known.

The path breaking decision in the US case *Diamond v. Chakrabarty*<sup>7</sup> is significant wherein it was held that genetically modified organisms such as bacteria were patentable. The bacterium *Pseudomonas Putida* which eats up crude oil was held to be patentable subject matter. According to 35 USC § 101, a patent can be granted to a person who invents or discovers any process, manufacture or composition of matter or machine. Since the instant case involved a new and useful manufacture, it was patentable. In the light of this path breaking decision, it is crucial to look into the relationship between intellectual property and food security, with due regard to the patenting implications in the agriculture and food sector.

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<sup>3</sup> Section 2(m), Patents Act 1970.

<sup>4</sup> Section 53, Patents Act 1970.

<sup>5</sup> AIR 1978 Del 1.

<sup>6</sup> (1979) 2 SCC 511.

<sup>7</sup> 447 US 303 (1980).



## 1.1 Intellectual Property and Food Security

There is a school of thought, the proponents of which suggest that when intellectual property is linked to food security, it leads to a technology trap. According to them, the technology trap refers to a scenario wherein intellectual property suggests that food security be regarded as a technology. The people favouring the protection of intellectual property opine that there exist a direct association between intellectual property and technological development.<sup>8</sup> The supporters favouring the use of intellectual property such as patents and plant variety rights in the field of production of food and agricultural research are of the view that intellectual property acts as a catalyst for investment in research, thereby aiding in the development of novel and modified technologies, which help in furthering the objective of achieving food security. Article 7 of the TRIPS Agreement states that the contribution and promotion of technological innovation and technology transfer in order to mutually benefit the creators as well as users of technological knowledge in a manner which leads to social and economic welfare is one way in which protection and enforcement of intellectual property becomes pertinent. Intellectual property can be used as a means to incentivise research and innovation in the field of agricultural research and food production, thereby leading to the creation of new and improved techniques which ensure more fruitful results.

However, the connection between technology, intellectual property and food security is based on various assumptions. One major assumption is that food insecurity may be the result of factors such as the non-availability of climate resistant and pest resistant crops or the absence of high yielding varieties of crops. According to Lappe and Collins, world hunger is the result of colonialism as well as the exploitation done by the multinational companies, rather than non-availability of food or technology.<sup>9</sup> Amartya Sen, on analysing numerous instances of famines such as the Bengal famine, the Ethiopian Famine, Bangladesh Famine etc, has found that famines are caused not by food scarcity but rather on account of loss of entitlement or

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<sup>8</sup> Jay Sanderson, *Chapter 8. Can Intellectual Property Help Feed the World? Intellectual Property, the PLUMPYFIELD® Network and a Sociological Imagination*, Charles Lawson & Jay Sanderson, *The Intellectual Property and Food Project: From Rewarding Innovation and Creation to Feeding the World*, 146, (1<sup>st</sup> Ed., Ashgate Publishing Ltd), 2013.

<sup>9</sup> Lappe F & Collins, J. with Fowler, *Food First: Beyond the Myth of Scarcity*, 1<sup>st</sup> Ed.(1977), Houghton Mifflin Company.

capability.<sup>10</sup> According to him, food and other commodities are not freely disseminated to the people. Therefore, people's consumption is determined by their entitlements. 'Entitlements' in this context refers to the bundle of goods on which the people are able to show their ownership by way of trade, manufacture or other means. This is called the Capabilities Approach of Amartya Sen. According to him, famines were caused due to deprivation of entitlements or capabilities of certain occupation groups which led to a loss of their opportunity to control and consume food.

The food crisis which occurred during the period 2007-08 reflects the fact that food insecurity is caused by non-accessibility of foods as well as a lack of adequate food production.<sup>11</sup> Countries such as Mexico, Haiti, Egypt, Jordan, Italy, Argentina, Morocco and Philippines were detrimentally affected by this food crisis. The prices of food crops soared high. Crops like corn were used predominantly as bio fuel rather than for food production and consumption in order to reduce greenhouse gas emissions by promoting renewable fuels. As a consequence, countries like Mexico were forced to import Corn from the United Nations for food production and consumption. The prices of tortillas, which was the staple food in Mexico soared high. In such a scenario, the non-availability of crops such as corn for food production negatively impacted the food security as it lead to high prices, thereby resulting in these crops being non-accessible at reasonable prices, thereby leading to food insecurity.

Another major assumption behind the rationale of using intellectual property in the ambit of food production as well as agricultural research is that intellectual property results in the enhancement of crops, thereby aiding the achievement of food security. However, it is not always possible to ascertain the incentive based benefits accrued on account of using intellectual property in the production of food and agricultural research based on empirical evidence. The Green Revolution had a major impact on agriculture, paving way for more efficient crop yields. It is pertinent to note that although the Green Revolution of the 1940s to 1970s has resulted in crop improvement, high-yielding varieties, pesticides, irrigation facilities, fertilisers etc, the Green Revolution's contribution to the food production and agriculture did not last very long. The situation of food insecurity is still a major issue in today's world. Green Revolution cannot be

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<sup>10</sup> Amartya Sen, *Poverty and Famines: An Essay on Entitlement and Deprivation*, 1<sup>st</sup> Ed.(1982), Oxford University Press, New York.

<sup>11</sup> *Supra* n.8.

viewed as a one-size-problem as underdeveloped countries like Africa which has structural and political problems, economic instability etc. have not been significantly benefitted by it in the long run.

Intellectual property aids in granting incentives for the production of food and improvement of crops. Other technological innovations such as pesticides, transgenic crops and fertilisers also enhance agricultural productivity. It is crucial to note that concentrating solely on the link between intellectual property and technological advancement results in a technology trap.<sup>12</sup> Technology trap is a scenario wherein intellectual property categorises food security as technology at the cost of the ways of food production, as well as in connection with access to food and its distribution. It is imperative to avoid the technology trap as in spite of technological development and food production, many people still suffer from hunger as they do not possess sufficient means to produce or buy the food required to sustain a healthy and active life. Giving food insecurity a mere technology- based justification may not be very fruitful as food insecurity poses a crucial issue with regard to its myriad aspects- such as social, economic, political and physical aspects. Food security ultimately depends on the food relations including the way in which it is produced, accessed, distributed etc.

The French company, Nutriset which produces healthy and nutritional products employs intellectual property to gain local support and participation, thereby ensuring a presence in the local community so as to mobilise the community to work together to ensure food security. The Nutriset's PlumpyField Network works to provide access to information about its products and other features such as quality control. The PlumpyField Network involves intellectual property in garnering local participation in the product's production and distribution by bringing together producers, farmers and consumers in the process. The Nutriset's patents and trademarks help it control the manner through which its logos, products, processes are utilised.

Intellectual property and food security have a very complex dynamics which needs to be analysed through this paper, especially when it comes to patenting. The

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<sup>12</sup> Jay Sanderson, *Chapter 8. Can Intellectual Property Help Feed the World? Intellectual Property, the PLUMPYFIELD® Network and a Sociological Imagination*, Charles Lawson & Jay Sanderson, *The Intellectual Property and Food Project: From Rewarding Innovation and Creation to Feeding the World*, 146, (1<sup>st</sup> Ed., Ashgate Publishing Ltd), 2013.

inherent complexities of this relationship and the implications of patenting on food security is sought to be examined in detail through this work.

## **1.2 Statement of the Problem**

Food security is one of the most basic and fundamental need of all persons to ensure their continued survival and sustenance. The state has a duty to ensure food security to its people. However, with the advent of the predominance of the intellectual property rights such as patents, there is a growing concern that such predominance has made the attainment of food security in jeopardy. The interrelation between patent rights and food security is being examined through this study.

## **1.3 Scope of Study**

Food security is a matter of great pertinence in any economy. The right to food as recognised under the International Covenant of Economic, Social and Cultural Rights 1966 provides for the right to adequate food and the right to be free from hunger. The state has to provide measures to ensure the same. The right to food is realised when all the people in a nation have physical and economic access at all times to adequate food or means of procuring food. Freedom from hunger and right to food requires effective steps to improve the methods of production, conservation and distribution of food. States have to take a significant, pro-active role to strengthen people's access to resources and to ensure food security. States have to ensure that the people have freedom and ability to cultivate and produce the food they require. The farmers, being one of the poorest communities, they get adversely affected by natural calamities and are dragged further into poverty. With the advancement of technological inventions like genetic engineering, the farmers can produce high yielding varieties of crops which are pest and herbicide resistant. The interrelation between patent rights and food security is being examined to eradicate food insecurity to a great extent.

## **1.4 Research Questions**

The research questions involved in the study are-

- R 1- Whether the intellectual property rights such as patents adversely affects the food security of a country?
- R 2- Whether reconciliation of patent rights and food security is a possibility?

## 1.5 Research Objectives

The study focuses on the following objectives:

1. To examine the international regulations pertaining to food security.
2. To evaluate the implications of patenting of GM products on food security.

## 1.6 Hypothesis

H1. Patents granted to food-related products and processes adversely affect food security.

## 1.7 Research Methodology

This study is undertaken through the method of doctrinal research by analysing the legislative instruments pertaining to patenting and food security. A combination of descriptive and analytic approach is adopted.

## 1.8 Literature Review

1. Dr Philippe Cullet, *Food Security and Intellectual Property Rights in Developing Countries*, 1<sup>st</sup> Edition (2003), Geneva International Academic Network.
2. John Barton, *International Intellectual Property and Genetic Resource Issues Affecting Biotechnology*, (1998) Wallingford, CABI.
3. Michael Blakeney, *Intellectual Property Rights and Food Security*, 2009 Edn, CABI.
4. Christine Friscon, *Redesigning the Global Seed Commons: Law and Policy for Agrobiodiversity and Food Security*, 1<sup>st</sup>Edn (2018), Routledge.
5. Charles Lawson and Jay Sanderson, *The Intellectual Property and Food Project: From Rewarding Innovation and Creation to Feeding the World*, 152, 1<sup>st</sup> Edition (2013), Ashgate Publishing Ltd.
6. Patents Act 1970.
7. TRIPS Agreement 1994.
8. Protection of Plant Varieties and Protection of Farmer's Rights Act 2001.

## **1. 9 Chapterization**

### **Chapter 1: INTRODUCTION**

First chapter deals with general introduction to the study which includes scope of the study, research objectives, research problems, hypothesis and the research methodology.

### **Chapter 2: FOOD SECURITY CONCERNS IN PATENTING**

This chapter focuses on what is food security and tends to understand the policy considerations in intellectual property in relation to food security. It seeks to analyse the interrelation between intellectual property and food security.

### **Chapter 3: FOOD SECURITY AND INTERNATIONAL REGULATIONS**

This chapter focuses on the-

- a. legal framework in relation to agriculture,
- b. The legal and institutional framework with regard to intellectual property and
- c. The legal and institutional framework in relation to environment.

### **Chapter 4: PATENTING IMPLICATIONS ON FOOD SECURITY**

This chapter examines on the various trends in law and policy and the recent developments in India that have an impact on food security and intellectual property rights.

### **Chapter 5: INTELLECTUAL PROPERTY RIGHTS AND FOOD SECURITY**

This chapter focuses on the various kinds of intellectual property that has a bearing on food security in India.

### **Chapter 6: CONCLUSION**

This chapter consists of the crux of the study and concludes the ways in which food security can be attained with use of patented products and processes in a harmonious manner.

## Chapter II

# FOOD SECURITY CONCERNS IN PATENTING

### 2.1 Introduction

Food is an integral necessary element of every person's life and sustenance. Access to food is thus a basic necessity of life. Food security aims to secure that the basic need of access to good and quality food is ensured to all at affordable prices. The World Food Summit of 1996 defines that food security exists "when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life".<sup>13</sup> It provides that everyone must have access to affordable and quality food that meets their dietary and nutritional requirements to lead an active life full of health. Ensuring food security is imperative because it guarantees that people's right to food is adequately safeguarded. Realising the significance of food security, the United Declaration on Human Rights 1948 u/A 25 and the International Covenant on Economic, Social and Cultural Rights 1966 u/A 11 recognises it as a right of all people that needs to be adequately enforced and safeguarded. Article 25<sup>14</sup> embodies the universal principle that all people are entitled to the right to a living standard which has adequate facilities for health, wellbeing and is not restricted to mere provisions for food, housing, clothing etc. Article 11<sup>15</sup> recognises that everyone has a right to adequate and improved standard of living but not limited to merely food, shelter, housing facilities and clothing. It is interesting to note that intellectual property rights and food security are interconnected as there are various innovations and inventions in agriculture and food sector that aid in ensuring that food is affordable and accessible to people which needs to be explored.

The digital era has seen a rise in prominence of intellectual property rights as an indicator of development of a nation. The evolution of intellectual property rights has led to enhanced protection of the creative and intellectual efforts of intellectual

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<sup>13</sup> Report of the World Food Summit, Food and Agriculture Organization of the United Nations, Rome 1996 available at <http://www.fao.org/3/w3548e/w3548e00.html> accessed on November 12, 2019.

<sup>14</sup> Article 25, Universal Declaration of Human Rights 1948.

<sup>15</sup> Article 11, International Covenant on Economic, Social and Cultural Rights 1966.

property holders. Intellectual property rights are the exclusive monopoly rights granted to the owner or creator of an intellectual property as a reward for his intellectual labour by the government for a limited period of time. Although it is seen as a new form of right, it is interesting to note that intellectual property protection has existed for a long time.

## **2.2 Food Security, Intellectual Property and the Indian Constitution**

It is crucial to note that the Indian Constitution implicitly provides for the protection of intellectual property rights under Article 300A which affords protection of the property of a person as a legal right, if not a fundamental right<sup>16</sup>. The right to property envisaged u/A 300 A is not confined to physical, tangible property alone but also extends to intangible property like intellectual property. Article 21 which envisages protection of the right to life and personal liberty encompasses a wider connotation to 'life' not limited to mere animal existence<sup>17</sup> but a life with adequate facilities for recreation and intellectual stimulation as upheld in the case *Francis Coralie v. Union Territory of Delhi*.<sup>18</sup> The intellectual property aims to reward and promote intellectual stimulation by providing incentives for innovation and growth of the economy. In the landmark *Right to Food*<sup>19</sup> case, the Supreme Court of India had ruled that right to life includes right to food and the government is required to undertake affirmative action to ensure it is made available to all.<sup>20</sup>

Moreover the right to freedom of speech and expression enshrined u/A 19(1)(a) of the Constitution promotes the creation of intellectual property such as copyrights which confer exclusive rights over the expression of literary, artistic, dramatic works, cinematograph films and sound recordings to the first and true owner of such works.

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<sup>16</sup> Article 19(f) of the Indian Constitution which provided for the protection of right to property as a fundamental right was deleted *vide* Constitutional Amendment Act 1978

<sup>17</sup> H.M Seervai, *Constitutional Law of India*, 4th Edition (1996), Volume 3, Universal Law Publishing Company.

<sup>18</sup> AIR 1981 SC 746.

<sup>19</sup> *People's Union for Civil Liberties (PDS Matters) v. Union of India*, (2013) 2 SCC 688.

<sup>20</sup> Prof. Dr. Bimal N. Patel, *Food Security Law: Interdisciplinary Perspectives*, 26, 1<sup>st</sup> Edition (2014), Eastern Book Company.



This is significant because copyright is conferred on the originality of expression of ideas<sup>21</sup> and not ideas *per se*<sup>22</sup>.

Article 51 A (h) of the Constitution is significant as it prescribes the fundamental duty of every Indian citizen to develop the scientific temper, humanism and the spirit of inquiry and reform. This in turn promotes intellectual property development as the creation of intellectual property stimulates the scientific temper and intellect thereby promoting scientific and technical advancement.

Moreover, Article 253 of the Indian Constitution provides for the recognition of international treaties, thereby recognising the treaties pertaining to intellectual property such as the Paris Convention for the Protection of Industrial Property 1883, the Berne Convention for the Protection of Literary and Artistic Works 1886 etc. With the advent of the WTO TRIPS Agreement<sup>23</sup> and India being a signatory to the World Trade Organisation (WTO), India had to comply with minimum standard of protection enshrined in the impugned agreement, thereby leading to consequent enactment and amendments of the Indian legislations to incorporate enhanced intellectual property regime. These treaty obligations make it imperative for the recognition of intellectual property rights as an incentive for innovation and a reward for the intellectual property holders for the exercise of their knowledge, skill and efforts in the creation of intellectual property.

### **2.3 Evolution of Intellectual Property: A Jurisprudential Analysis**

From the jurisprudential point of view, it is interesting to look into the evolution of the concept of intellectual property. According to Salmond, the substantive civil law is categorised into three categories which are the law of status, the law of property and the law of obligations.<sup>24</sup> Property is described as bundle of powers<sup>25</sup> which comprises of powers in relation to title, ownership, sale, mortgage etc. The term property has been attributed with many meanings. In its widest connotation, the term 'property' comprises

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<sup>21</sup> *R.G Anand v. Delux Films* (AIR 1978 SC 1613).

<sup>22</sup> N. S Gopalakrishnan & T.G Agitha, *Principles of Intellectual Property*, 57, 1<sup>st</sup> Edition (2009), Eastern Book Company.

<sup>23</sup> Agreement on Trade Related Aspects of Intellectual Property Rights (1995).

<sup>24</sup> P.J Fitzgerald, *Salmond on Jurisprudence*, 411, 12<sup>th</sup> Edition (1970), Indian Economy Reprint (2007), Universal Law Publishing Company Pvt. Ltd.

<sup>25</sup> W. Friedmann, *Law and Social Change*, p 11, 1<sup>ST</sup> Indian Reprint (2010), Universal Law Publishing Company.

of all the legal rights that are attached to a person, irrespective of its description.<sup>26</sup> The learned jurist Austin puts forth the view that property signifies the greatest right of enjoyment as recognised by law apart from servitudes.<sup>27</sup> Erie J was of the view that old notion that property is something which is capable of being earmarked and is recoverable through detinue, it is true only where the property and its infringement were in the simplest form and it does not hold true in today's complex society.<sup>28</sup>

Property is generally divided into two broad categories based on the physical presence or corpus of property which comprise of corporeal property and incorporeal property. Corporeal property refers to the property that has a physical or material existence or corpus and is capable of being possessed in material or physical form<sup>29</sup>. Chattel, land, building etc come under the category of corporeal property as it can be physically possessed. Incorporeal property on the other hand refers to property that does not exist in material or physical form. Incorporeal property is further categorised in two types- property in encumbrances (rights *in re aliena*) and property over immaterial things (rights *in re propria*) arising out of intellectual labour.<sup>30</sup> Examples of the former category include mortgages and leases whereas the latter category includes intellectual property such as copyrights, patents, etc. The various forms of intellectual property recognised in India are copyrights, patents, trademarks, geographical indications, semiconductors and integrated circuits- layout designs, designs etc.

## 2.4 Patents as Intellectual Property

Patents are one form of intellectual property that that are inextricably linked to innovation and development. Patents are exclusive monopoly rights conferred on the inventor of an invention which involves a product or a process that offers a new method of doing something or provides a technical solution to an issue at hand<sup>31</sup>. This grants the inventor an exclusive right to sell, use, import, commercialise and make the patented invention for any purpose. Applying the Jeremy Bentham's utilitarian theory, the

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<sup>26</sup> V. D Mahajan, *Jurisprudence & Legal Theory*, 399, 5<sup>th</sup> Edition (Reprint 2014), Eastern Book Company.

<sup>27</sup> *Id.*, 400.

<sup>28</sup> *Id.*

<sup>29</sup> Roscoe Pound, *An Introduction to the Philosophy of Law*, p 110, 4<sup>th</sup> Indian Reprint (2006), Universal Law Publishing Company Pvt. Ltd.

<sup>30</sup> *Supra* n.12.

<sup>31</sup> Sreenivasulu N.S & Preethi Venkataramu, *Patent Law in India: A perspective*, 4 The Journal of World Intellectual Property Rights, 80, (Jan-Dec 2008), Serials Publications, New Delhi.

granting of patents are justified on the ground that the exclusive monopoly rights are granted to the inventor or patentee as a reward to the patentee in return for the pains that he undertook for developing an invention that promotes public welfare and scientific development.<sup>32</sup> Patents are granted for inventions that fulfil the patentability criteria of being novel, non-obvious, involve an inventive step and capable of industrial application.

John Stuart Mill asserted that patents were justified on the ground that inventors are to be rewarded for their efforts and hence a limited period of exclusive monopoly rights over their inventions is permissible.<sup>33</sup> Patent protection is vital as it promotes scientific progress and technical advancement. Although opposers to patent protection regard it as contrary to public interest as it provides exclusive monopoly rights to the inventor of a new product or process, it is pertinent to note that such novel patented inventions can be afforded to the general public by way of flexibilities such as the compulsory licensing. Section 84 of the Patents Act 1970 provides for compulsory licensing. It provides that compulsory licensing is a measure granted by the Controller General of Patents, Designs and Trademarks on an application by a third party by which a patented invention can be made available to the general public on the expiry of three years since the grant of patent if it is found that the reasonable requirements of the public in relation to the patented invention has not been met or if it is not accessible to the general public at reasonably affordable prices or if it is found to be not worked in India. Compulsory licensing is granted compulsorily by the Controller General without the permission of the patent holder if these conditions are fulfilled. Even though patents are viewed as detrimental to the public interest, it can cater to public interest if used appropriately. Hence, it is found that the need for a robust intellectual property system including patent protection is widely acknowledged by prominent jurists as a measure to promote public welfare and scientific development as it acts as both a reward for the creator as well as an incentive for further innovations.

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<sup>32</sup> Auora Plomer, '*Patents, Human Rights and Access to Science*', 1<sup>st</sup> Edition (2015), Edward Elgar Publishing Limited.

<sup>33</sup> Elizabeth Varkey, '*Intellectual Property*', p.9, 1<sup>st</sup> Edition (2015), Eastern Book Company.

## **2.5 Agriculture, Biotechnology and Food Security**

Agriculture and food security are closely interconnected as the achievement of food security is directly dependent on the effective and efficient agricultural production yielding good quality food products. An increase in agricultural produce so as to meet the needs of nutritional and dietary requirements of people is an integral element of food security. The green revolution of the 1960s pioneered by Dr M.S Swaminathan was a path breaking innovation which helped in solving the food scarcity crisis that plagued India during that period. Biotechnology has an essential role to play in this sphere as the use of biotechnological methods in agricultural production helps in achieving better results. Biotechnology refers to the practical use of living organisms in diverse fields. The introduction of biotechnology can bring a lot of benefits to agricultural produce in terms of disease resistance, traits, the improvement of levels of micronutrients, ousting allergens etc.<sup>34</sup> The rDNA (recombinant DNA constructs) technology is used in the development of genetically modified organisms (GMO) including genetically modified plants, whereby the DNA fragments of one organism which carries a genetic material of the desired stretch is transferred to the genome of another organism.

### **2.5.1 Biotechnology and GM Crops and Controversies: A Critique**

Whilst there are people favouring biotechnology, the critics of this movement are wary of the potential risks it may cause to sustainable development, agriculture, environmental diversity and public health, particularly with reference to gene technology. Such plants obtained as a result of the application of biotechnology are called genetically modified crops. Genetically modified crops, also known as transgenic crops are essentially plants that possess new and unique composition of genetic material by way of utilising biotechnology. It is pertinent to note that research with respect to genetically modified crops is regarding the enhancement of transport durability, shelf life, food processing qualities and appearance. The link between patenting and genetic engineering is criticised as it is seen as a way to control the traditional knowledge and

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<sup>34</sup> Eva Willnegger, *A Retrospective with Special Emphasis on the TRIPS Agreement, Innovation in Today's Food Sector, Patents in the Food Sector*, (2008), Nomos Verlagsgesellschaft mbH.

biological treasure of developing countries which has a diverse gene pool.<sup>35</sup> This is deliberated with the help of various case laws such as the *Monsanto Technology LLC v. Controller General of Patents*<sup>36</sup> and *Nuziveedu Seeds Limited & Ors. v. Monsanto Technology LLC & Ors*<sup>37</sup>.

In the case of *Monsanto Technology LLC v. Controller General of Patents*<sup>38</sup>, the patent applicant, being aggrieved by the Controller General's refusal of patent for "a method of producing a transgenic plant with increased heat tolerance, salt tolerance or drug tolerance" filed an appeal before the Intellectual Property Appellate Board (IPAB). The Controller General of Patents had rejected the patent application on the grounds of –

- Lack of inventive step
- Claims do not provide for any invention u/s 2(1)(ja) of the Patents Act 1970 as the structure and function of cold shock protein was already known as prior art and it is obvious to a person skilled in plants to make transgenic plant.
- It is mere application of already known cold shock protein in producing cold stress tolerant plant and tolerant to heat, salt and drought conditions, and therefore it falls within the purview of section 3(d) of the Patents Act 1970.
- It is not patentable u/s 3(j) of the Patents Act 1970 as the claims also include essential biological process of regeneration and selection, which includes growing plants in specific stress condition.

On appeal, the Intellectual Property Appellate Board (IPAB) set aside the Controller General's order of refusal to grant patent u/s 3(j) of the Patents Act. The IPAB ruled in favour of the applicant (Monsanto) by holding that the transgenic variety involved substantial human intervention, and hence it did not come under the non-patentability dealt u/s 3(j) of the Patents Act 1970. However, the Intellectual Property

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<sup>35</sup> D. Sharma, Conquests by Patents, Pakistan Observer, 22 August 1999, quoted in G. Downes, *Implications of TRIPS For Food Security in the Majority World*, Dublin, Comhlanh Action Network, October 2003, 23.

<sup>36</sup> IPAB Order No. 146 of 2013 dated 5 July 2013.

<sup>37</sup> FAO (OS) (COMM) 86/2017, C.M. APPL. 14331, 14335, 15669, 17064/2017; *Monsanto Technology LLC & Ors. v. Nuziveedu Seeds Limited & Ors.* FAO (OS) (COMM) 76/2017, CAV. 328/2017, C.M. APPL. 133348-13352/2017.

<sup>38</sup> *Supra* n .23.

Appellate Board refused the grant of patent due to the lack of inventive step and non-patentability owing to it being a mere use of an already known substance as provided u/s 3(d) of the Patents Act 1970.

In *Monsanto Technology LLC and Ors v. Nuziveedu Seeds Ltd and Ors*.<sup>39</sup>, the Division Bench of the Delhi Court overruled the decision in *Nuziveedu Seeds Limited & Ors. v. Monsanto Technology LLC & Ors*<sup>40</sup>, rendered by the Single Bench of the Delhi High Court. The Single Bench had rejected the patent application for a claim for the “methods for transforming plants to express *Bacillus thuringiensis* deltaendotoxins” on the ground of that it was an essentially biological process. However, the Division Bench overruled it by holding that the infusion of Bt gene into the cotton genome was a process involving substantial human intervention and was therefore not an essentially biological process and hence it is not hit by the patent exclusion u/s 3(j) of the Patents Act 1970.

The innovative changes in the pattern of manufacture of agricultural products or materials involve both plant-based products as well as animal-based products. Biotechnology has impacted the manufacture of such substances to a great extent.

## **2.6 Changes in the manufacture of agricultural materials with the aid of biotechnology**

The changes in the manufacture of agricultural materials through the use of biotechnology are particularly with regard to agronomical traits, traits related to the health and with regard to manufacture of processed food. Most of the modifications made in the genetically modified crops are particularly with regard to agronomical traits like the control of pests and growth in yields.<sup>41</sup> With respect to genetically modified crops with pest control characteristics, the major focus is on building certain specific traits. This includes the spotting of a bacterial gene from ‘*Bacillus thuringiensis*’ that encodes a protein resisting corn borer which is incorporated in the species of plants such as corn which makes the Bt Corn immune to the corn borer. Therefore, this does away with the requirement of any further application of insecticides as it is already

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<sup>39</sup> FAO (OS) (COMM) 76/2017, CAV. 328/2017, C.M. APPL. 133348-13352/2017.

<sup>40</sup> FAO (OS) (COMM) 86/2017, C.M. APPL. 14331, 14335, 15669, 17064/2017.

<sup>41</sup> Bollgard *Bacillus thuringiensis* cotton for controlling Lepidopteran insects by Monsanto is an example.

resistant to the corn borer. Also, there is an incorporation of genes encoding for proteins which shuts off the herbicides, thus resulting in them becoming immune to herbicides such as Glyphosate. Glyphosate possesses properties of being effective when used in low concentrations and is generally regarded to be non-hazardous to mammals including humans and is easily worn out by soil microorganisms. The Glyphosate resistant trait is incorporated in maize, sugar beet, soy etc.

The transgenic crops have the advantage of providing economic gains directly to the farmers through the reduction of the cost of manufacturing food especially pertaining to financial and environmental cost. Such reduction of prices in a way benefits the consumers as they would no longer need to resort to expensive agricultural raw materials when cheaper alternatives are available. The use of biotechnology in food production also helps in increasing the agronomical traits that in turn aid in sustainable production of food. One such method aiding sustainability is the use of water in a sustainable manner. Moreover, the plants which are resistant and immune to herbicides in a way help in lowering the pollution of water.

Plants produced by way of plant breeding have the capability to tolerate salt and drought. Another significant factor is the fact that plants which are resistant to insects does not require the utilisation of the respective herbicides more than once. Hence, biotechnology plays a role in improving the sustainable way of producing food.<sup>42</sup> The traits pertinent to making processed food generally involve genes for economically significant starches, oils and proteins.

The first genetically modified food crop to be commercialised was Calgene's tomato, known as Flavr-Savr™ in 1994 which possessed the delayed ripening trait. This trait of delayed ripening eventually leads to delayed rotting and hence these food crops last long as edible produce. This led to the increased commercialisation of genetically modified crops during the mid 90s to the mid 2010's thereby leading to a surge in transgenic plants. The first generation genetically modified crops possessing the attributes of herbicide tolerance and resistance to insects has tremendously contributed towards the reduction of food production costs. Polygalacturonase aids in disintegrating

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<sup>42</sup> Eva Willnegger, *A Retrospective with Special Emphasis on the TRIPS Agreement, Innovation in Today's Food Sector, Patents in the Food Sector*, (2008), Nomos Verlagsgesellschaft mbH. See also Bennett, *The Foundation of Food Security*, 2003(2), Syngenta Lectures 4.

the pectin which keeps the cell walls together into smaller parts, thus resulting in the fruits becoming softer. The polygalacturonase antisense gene was incorporated into the tomato, thus neutralising the gene that encodes polygalacturonase. Such genetic modification of the fruit led to it being longer lasting with enhanced flavour, when compared to wildy grown crops.

The second generation of genetically modified crops possessed traits of higher nutritional and industrial value which proved to generate benefits directly to the ultimate consumers. Some of the second generation genetically modified crops that has been commercialised are the apples with non-browning traits, potatoes with low acrylamide and non-bruising traits, maize varieties possessing higher essential amino acids and low phytic acid etc.

The process of imbining genetically modified crops having enhanced traits for feed is an example of the application of biotechnology in plants, particularly with respect to the food sector. This results in an increase in the quantity of feed additives such as necessary fatty acids and amino acids. Plants have the capacity to undergo complex synthesis. In the case of salmon breeding, carotinide astaxanthin which gives salmon its reddish colour is widely used as a feed additive and is considered as a staple food in salmon farms. It is pertinent to note that it takes around 13 steps to chemically synthesise this feed additive called astaxanthin. However, if the genetically modified plants which have superior degree of astaxanthin are used as a feed to salmon, then salmon breeders can do away with additional application of astaxanthin.<sup>43</sup> Enhancement of nutritional quality is one of the ways of incorporating plant biotechnology in the production of food. There was an instance wherein a rice strain was genetically modified to develop the GoldenRice® which contains higher levels of Vitamin A. The development of GoldenRice® having Vitamin A is hailed as a sign of progress in the sphere of global nutrition as it helps to cure deficiency of Vitamin A which is directly linked to trigger blindness. When traits related to health are incorporated in genetically modified plants, it eventually leads to higher yield as well as enhanced value of pharmaceuticals or nutraceuticals<sup>44</sup> that are acquired from the

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<sup>43</sup> Eva Willnegger, *A Retrospective with Special Emphasis on the TRIPS Agreement, Innovation in Today's Food Sector, Patents in the Food Sector*, (2008), Nomos Verlagsgesellschaft mbH.

<sup>44</sup> Nutraceuticals refers to food or fortified products of food that contributes to supplementing the diet as well as aiding in the preventing and curing diseases. These generally fall in the 'unregulated category' especially in US.



products of plants. Genetically modified plants are a potentially viable source of biological factories for the creation of complex therapeutic molecules at a low cost of capital for such manufacture. Hence, it is feasible option in comparison to pharmaceuticals as a manufacturing hub.

Bt cotton is the first commercialised genetically modified plant crop which was not a food crop. The creation of Bt cotton plant process involves the introduction of *Cry* genes (*CryIAc* and *Cry2Ab*) which produces endotoxin, commonly found in *Bacillus thuringiensis* bacteria, is introduced in the plant genome of the cotton plant through the use of recombinant DNA technology constructs.<sup>45</sup> Bollgard® technology which is aimed at *CryIAc* gene was approved by India, followed by the approval of the Bollgard II® (BgII) technology aimed at *CryIAc* and *Cry2Ab* genes. Such insertion of *Cry* genes in the plant genome through the use of synthetic recombinant DNA helps the plants to yield pest resistant produce. This in turn results in these crops being resistant to pests like bollworm. This minimised the requirement of using foliar insecticides and also mitigated the outburst of any secondary pests. This eventually leads to enhanced quality and agricultural produce thereby contributing to the crop's growing economic significance. The introduction of the Bollgard and Bollgard technology has transformed India to one of the forerunners in terms of cotton production. This changed the earlier position of India from being a mere importer of cotton to being the fourth largest exporter of cotton.

## 2.7 Genetically Modified Crops and India

India has refrained from approving the commercialisation of any genetically modified food crop. The Genetic Engineering Approval Committee (GEAC) which is the regulatory authority in India with respect to genetically modified technology had approved Bt brinjal as a biosafe product. However, the Ministry of Environment, Forestry and Climate Change did not approve the commercialisation of Bt brinjal based on the precautionary principle. Bangladesh has approved varieties of Bt brinjal which was developed on the basis of backbone technology evolved in India. Using this technology, the brinjal plant is modified through the use of synthetic gene which

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<sup>45</sup> Malathi Lakshmikumaran, *GM Plants: IP and Regulatory Concerns in India*, Kung-Chung Liu, Uday S Racheria, *Innovation, Economic Development, and Intellectual Property in India and China: Comparing Six Economic Sectors*, 368, 369, 1<sup>st</sup> Edition (2019), SpringOpen.

encodes hazardous *CryIAc* protein, thereby making it pest resistant<sup>46</sup>. This in turn minimises India's dependency towards the usage of pesticides. Brinjal being a highly consumed food crop in India, hence the non-approval of the commercialisation of genetically modified brinjal has major repercussions in the food sector.

The GEAC in India had approved the commercialisation of DMH11(Dhara Mustard Hybrid) in 2017 which is a high yielding, genetically modified hybrid variety of mustard species *Brassica jumeer* created by Professor Deepak-Pental from the Centre for Genetic Manipulation of Crop Plant (GMCP), Delhi University. This was developed in order to decrease India's dependency on importing of edible oil. A transgenic technology was used for the development of this genetically modified variety of mustard, which included the isolation and modification of three genes- *Bar*, *Barnase* and *Barstar* genes into mustard plants. Even though GEAC had called for the testing of DMH11 on honey bees for pollination, the Environment Ministry has put on hold its commercial release.<sup>47</sup>

The research and development expenses incurred for the biotechnology implementation and its research can be recouped by way of getting royalties from farmers for their usage of the seeds with desirable traits generated through biotechnology measures. The existence of subsistence and small scale farming has made the enforcement of intellectual property rights extremely problematic, especially in the developing countries. Moreover, the implementation of licensing agreements with farmers regarding the usage of the patented seeds is hardly feasible.

Mitigation of costs pertaining to investments is a problem. This has led to the advent of increasing use of GURTs (Genetic Use Restriction Technologies) which involve genetically modified plants and hybrids with low levels of reproducibility. Hybrid technology aids in curbing the reproduction of patented protect seeds without an authorised license. This technology aids in giving higher yields in a consistent manner and is more resistant to abiotic and biotic stress factors and offers better advanced handling. Unlike other innovations in the agriculture sector, GURT has no physiologically or agronomically beneficial and desirable traits. GURTs attempt to formulate a way of safeguarding intellectual property in the sphere of biotechnology. It

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<sup>46</sup> *Id.*

<sup>47</sup> *Supra* 27.

comprises of genetically modified plants which have the inability to propagate and regenerate owing to the terminator technology which is patented by Delta and Pine Land Corporation in association with the US Department of Agriculture.<sup>48</sup>

The trait genetic use restriction technology also called T-GURT, is a biotechnological measure which involves the use of traitor genes, terminator and verminator.<sup>49</sup> The users have to lean on chemically dependent plants possessing characteristics of proprietary genes in this scenario. This aids in curbing unauthorised copying and infringement of monopoly patent rights in international marketing. However, there has been significant conflict of interest between business ethics concerns and humanitarian concerns. This is due to the fact that farmers are unable to save seeds of their harvest crop to be used in the next crop season. Realising its detrimental impact on biodiversity and socio-economic conditions of various countries, the Consultative Group on International Agriculture (CGIAR) made the decision not to employ the use of T-GURT in plant breeding schemes of international institutions.<sup>50</sup>

The Clustered Regularly Interspaced Short Repeats technology, popularly known as CRISPR technology is a major innovation in the sphere of agriculture and biotechnology. This technology is a great mechanism for editing genomes.<sup>51</sup> It can be used as an instrument to treat and correct genetic defects, enhance the quality of crops and curbs the spread of diseases. It helps the researchers to modify the DNA sequences and gene functions. It aids in improving the bacterial defence system and lays the foundation for CRISPR-Cas9 technology which edits genomes. Cas9 has an imperative part in this process as the protein in it is used in improving the immunological defense of bacteria in order to protect it from DNA viruses and plasmids. It aids in modifying a cell's genome by cutting its DNA. This plays a major role in the introduction of desired traits in a target organism.

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<sup>48</sup> Eva Willnegger, *A Retrospective with Special Emphasis on the TRIPS Agreement, Innovation in Today's Food Sector, Patents in the Food Sector*, (2008), Nomos Verlagsgesellschaft mbH.

<sup>49</sup> R T Gahukar, *Issues Relating to the Patentability of Biotechnological Subject Matter in Indian Agriculture*, 9, 11, 8 Journal of Intellectual Property Rights, (2003), NISCAIR.

<sup>50</sup> *Id.*, 12.

<sup>51</sup> Malathi Lakshmikumaran, GM Plants: IP and Regulatory Concerns in India, Kung-Chung Liu, Uday S Racheria, *Innovation, Economic Development, and Intellectual Property in India and China: Comparing Six Economic Sectors*, 368, 1<sup>st</sup> Edition (2019), SpringOpen.

## 2.8 Patentability in agriculture

The advent of scientific and technical innovations in the agriculture sector, there exist a close association between patents and agriculture. There are a lot of instances of patentable inventions in the agriculture sector. There have also been major innovations in the sphere of agriculture and food sector. Hence, patenting should be encouraged in this sector.

The patent system and protection of plant varieties varies from one country to another. The US scenario is unique as there is a dual system of intellectual protection which has provisions for the protection of plants under the Plant Patents Act 1930 and also the Plant Variety Protection Act 1970. However, this was not always the case and even in US, there was opposition with regard to the granting of plant patent protection.

The product of nature doctrine was a major hindrance to patent protection on any form of life. This was based on the premise that life and living beings are essentially products of mother nature, which in effect are the result of God's creation in which humans must not interfere to disrupt its nature status. This doctrine which curbed the patenting of all biological and natural products was a judicial creation developed as a result of the decisions in various cases such as *Exparte Latimer case*<sup>52</sup>, *American Fruit Growers, Inc. v. Brogdex Company case*<sup>53</sup> and *Funk Brothers Seed Company v. Kalo Inoculant Company*.<sup>54</sup>

A milestone in the evolution of patenting of life forms is the historic judgement of the US Supreme Court in the case *Diamond v. Chakrabarty*.<sup>55</sup> In the instant case, the Apex Court had ruled that patent can be granted on genetically modified bacteria which had the ability to gobble oil spills on the ground that it is not a naturally occurring bacteria but a genetically modified, man-made life form of a microorganisms. This decision brought in a distinction between man-made and naturally occurring life forms thereby upholding that the involvement of human ingenuity does not make it a product of nature and is therefore patentable. This view was followed by the European Patent Appeal in the case of *Genetic-I/Polypeptide expression*,<sup>56</sup> wherein a plasmid which is a

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<sup>52</sup> 1899, Dec. Comm'r. pat.123.

<sup>53</sup> 283 U.S 1.111.51 S.ct, 328, 330, 75 L. Ed. 801 (1931).

<sup>54</sup> 33 U.S 127 (1948).

<sup>55</sup> 447 U.S 303 (1980).

<sup>56</sup> T 292\ 85 (1989) O.J.E.P.O 275.

microorganism was held to be patentable by giving due credit to the role of human agency in its creation, thereby making it a man-made product rather than a naturally occurring product of nature. Hence, a new principle was evolved which stated that all products of man are patentable and this includes within its purview non-natural living matter created through biotechnological measures.

In the landmark decision in the US case *Ex parte Hibberd*<sup>57</sup>, a mutant of a maize plant created through human agency was held to be patentable. This view was adopted by Europe in the case of *Ciba Geigg*<sup>58</sup> wherein a patent was granted on a non-natural product. In the instant case, the European Patent Office Technical Board of Appeals had conferred patent on a plant. The Article 53(b) of the European Patent Convention disallows the grant of patents on plants and also curbs the patenting of the propagating materials of the plants in their naturally occurring form. However, in the instant case, the propagating material was one not which existed in its naturally occurring form. In fact, the propagating material was created through a non-natural process which involved the treating of cultivated plants in their propagating material's natural form. The board held that the resultant product was a non-natural plant developed by way of treating a plant or its natural propagating material with chemical agents is patentable. Hence, the patentability of a non-natural plant was upheld.

A major criticism against plant patenting was that plants were regarded as living organisms and their patenting was seen as an unethical interference in a life form. Once, human ingenuity is in play, it is no longer natural or god created, thereby making it free to be patented.<sup>59</sup> Another criticism was that plants did not have the capacity to fulfil the novelty criteria of patentability. However, the plant varieties require a novelty criterion to be conformed for giving protection to plant varieties and plant breeders' rights. There was yet another criticism that plants could not fulfil the patentability criteria of being non-obvious or involve an inventive step. However, there are various instances where biotech measures or processes involving human agency could prove non-obviousness and inventive step when it results in a new result not known earlier as prior art. There was a criticism against patent protection in agriculture due to the fact that plant

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<sup>57</sup> 277 U.S.P.Q 443 (Bd. Pat. App. 1985).

<sup>58</sup> (1984) O.J EPO 112, Tech, Bd.App.

<sup>59</sup> Malathi Lakshmikumaran, GM Plants: IP and Regulatory Concerns in India, Kung-Chung Liu, Uday S Racheria, *Innovation, Economic Development, and Intellectual Property in India and China: Comparing Six Economic Sectors*, 368, 369, 1<sup>st</sup> Edition (2019), SpringOpen.

breeders' or farmer's products did not have industrial utility or applicability. Nevertheless, there are inventions in agriculture pertaining to agricultural products such as agricultural machines and fertilisers. Hence, a blanket ban on patenting in this context is not desirable.

### **2.8.1 Legislation covering Plant protection in Various Countries**

#### ***US Scenario***

The first step towards the protection of plants was made by the US through the enactment of the Plant Patent Act 1930 by offering patent protection to plants which are asexually reproduced, especially asexually reproduced cultivars, but excluding edible tubers. The Plant Variety Protection (PVP) Act in 1970 provided intellectual property protection to plant breeders for their sexually reproduced plant varieties. The Utility Patent Act 1952 also conferred patent protection for genes, traits, methods, plant parts or varieties in the aftermath of the decision in *Diamond v. Chakrabarty*<sup>60</sup>. A plant variety has to possess characteristics of being stable, uniform, new and distinct in comparison to other varieties. This is an essential requirement for conferring plant variety protection. However bacteria, first generation hybrids, fungi and varieties either used or commercially sold in US for more than one year or longer than a four year period in any foreign jurisdiction are excluded from plant variety protection<sup>61</sup>.

#### **European Scenario**

The plant protection provisions were formulated in many nations in Europe. The Netherlands established the Plant Variety Protection Act 1942. The Netherlands established the Plant Variety Protection Act 1942 and later Germany also followed suit in 1953 with the German Plant Variety and Seed Act 1953. The criterion for patentability in Europe is that the invention must not be conferred to the specific variety which is sought to be protected but the invention must be able to reproduce its specific characteristics in more than one variety.<sup>62</sup> Realising the need to extend the plant protection laws to other countries, the International Convention for the Protection of

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<sup>60</sup> *Supra* n.27.

<sup>61</sup> Mohan Devan, *IPR Protection in Agriculture: An Overview*, 16 Journal of Intellectual Property Rights, 131, 132 (2011), NISCAIR.

<sup>62</sup> Mohan Devan, *IPR Protection in Agriculture: An Overview*, 16 Journal of Intellectual Property Rights, 131, 133 (2011), NISCAIR.

Plants 1961, also called UPOV Convention was established. The impugned Convention established an International Union for the Protection of New Varieties of Plants, popularly known as UPOV (*Union Internationale pour la protection des obtentions ve'ge'tables*) which aims at protecting new varieties of plants by conferring intellectual property rights on the plant breeders. It also opened up the access to genetic resources of protected plant varieties.

This led to the international recognition of the plant breeder's intellectual property rights. In response to this in 1968 Germany adopted a new Plant Variety Protection Act. Netherlands also adopted a new breeders' rights law in 1967 which is the National Seed and Plant Material Law. The European Patent Convention provided for plant protection in Europe. The European Patent Convention under Article 53 (b) provides that European patents are not to be conferred with regard to plants or animals or for essentially biological processes for the production of animals or plants. This provision in fact narrowed the scope of patentability as compared to national legislations and brought in more exclusions for patentability.

The EU Biotechnology Directive of 1998<sup>63</sup> disallows the patenting of plant varieties. However, this Directive provides for a Farmer's exception when there is a patent on a genetic material which prevents its reuse on the farm. This directive allows for compulsory licensing, when a breeder's usage of genetic material would possibly violate a patent right and the granting of license is subject to certain conditions.

### **Indian Scenario**

Initially, India did not provide any intellectual property protection for plants. Moreover, the Indian Patents Act 1970 did not provide for product patents but only process patents for inventions on substances intended for use or capable of being used as food or medicine or drug relating to substances prepared or produced by chemical processes (including alloys, optical glass, semi-conductors, inter-metallic compounds).<sup>64</sup> In compliance to India's obligation under the TRIPS Agreement, India had to revamp its intellectual property regime with the enactment of new legislations and modifications in the existing statutes. As a result of this, the Patent (Amendment)

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<sup>63</sup> 98/44EC for the Protection of Biotechnological Inventions.

<sup>64</sup> Section 5(1), Patents Act 1970.

Act 2005 was brought in and this made it possible for agrochemicals to be issued product patents. India had the option to either adopt a patent protection or a *sui generis* protection system or a combination thereof in the case of plant varieties.<sup>65</sup> India, adopting the *sui generis* protection system, enacted the Protection of Plant Varieties and Farmer's Rights Act 2001. The impugned legislation afforded protection to plant varieties thereby integrating the rights of farmers, breeders and village communities over the plant varieties they have developed and propagated. India adopted the UPOV criteria test by giving protection to plant varieties fulfilling the requirements of novelty, stability, uniformity and distinctiveness.

### **2.8.2 Distinction between patents and plant variety protection**

Although plant variety protection and patents are both intellectual property rights, they have substantial differences between them. The similarity lies in the fact that they both afford exclusive monopoly rights for a limited period for the creation of a new plant variety for commercial purposes. However, the duration of a patented invention is twenty years, duration which gives the patented holder limited exclusive right to sell, make or use the invention which comply with the requirements of utility, novelty and non-obviousness. Whereas, plant variety protection is for a lesser duration and it gives rights to the plant breeders for safeguarding the genetic material of a plant variety which has uniformity, novelty, distinctiveness and stability.

### **2.8.3 Restrictions on Agriculture Related Inventions in India**

The Indian patent system has put up numerous restrictions with regard to patenting inventions concerning agriculture and life forms. Sections 3 and 4 of the Indian Patents Act 1970 stipulate the non-patentable inventions. Section 3(j) of the Patents Act excludes the patenting of plants and animals either wholly or partially. It also excludes seeds, varieties, species and essentially biological processes used for the purpose of propagation or production of plants and animals from the purview of patentability. As a result of the famous decision in *Diamond v. Chakraborty*<sup>66</sup> and its recognition by the Calcutta High Court in the case of *Dimminaco A.G v. Controller General of Patents & Designs*<sup>67</sup>, microorganisms were held to be patentable. In the

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<sup>65</sup> Article 27.3(b), Agreement on Trade Related Aspects of Intellectual Property Rights 1995.

<sup>66</sup> 447 U.S 303 (1980).

<sup>67</sup> (2002) I.P.L.R 255 (Cal).



*Dimminaco* case,<sup>68</sup> a patent was granted for a process of preparation of a live vaccine called the *bursitis* vaccine as a means to protect poultry from getting infected with the *bursitis* vaccine. Section 3 (h) excludes agriculture and horticulture methods from patentability. Section 3(i) curbs the patenting of medicinal, diagnostic, therapeutic, surgical, curative or other similar treatment of human beings or animals in order to cure them of diseases or their economic significance or that of their resultant products. All these sections when read together, hinder the growth of patenting of inventions in agriculture, thereby narrowing the scope of patentability in the agriculture sector. This in turn gives the presumption that India is not too keen on patenting agriculture related inventions.

In *Monsanto Technology LLC v. Controller General of Patents*,<sup>69</sup> the Controller General of Patents rejected the patent application filed by Monsanto for an invention regarding a method for creating a transgenic plant with properties of high heat tolerance on the ground that it fell within the scope of Section 3(j) of the Patents Act. However, when it came before the Intellectual Property Appellate Board (IPAB), the board upheld the view put forth by Monsanto that the said transgenic plant variety included an element of substantial human agency in its creation and hence could be patentable. This is due to the fact that the making of the transgenic plant variety involved the non-natural process of incorporating a recombinant DNA construct into the plant genome. This suggests that it involves an act of human intervention. Hence, it is not an essentially biological process for the propagation or production of plants and animals when it involves substantial human intervention and steps of tissue culture.

In spite of the acceptance of this contention of Monsanto by the board, the patent application was ultimately rejected on the ground that it lacked an inventive step and that it fell within the patent excludability laid down u/s 3(d) of the Patents Act 1970. Section 3(d) provides that a mere discovery of a generally known substance that does not give any improvement in the known efficacy of a new property of that particular substance precludes it from patentability. It also states that a patent cannot be granted for a mere discovery of any new property or use of a substance which is generally known or a mere use of a genetically known process, machine or apparatus. Hence this

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<sup>68</sup> *Id.*

<sup>69</sup> IPAB Order No. 146 of 2013 dated 5 July 2013.

interpretation by the IPAB gives the inference that an essentially biological process for the production or propagation of plants and animals u/s 3(j) of the impugned Act does not preclude an invention having substantial human agency or human intervention and tissue cultural steps from being granted a patent.

In the case *Nuziveedu Seeds Limited & Ors. v. Monsanto Technology LLC & Ors* case,<sup>70</sup> the Monsanto's patent no. 214436 was invalidated by the Delhi High Court Division Bench on the ground of non-patentability u/s 3(j) of the Patents Act. This verdict was later set aside in 2019 January judgment by the Apex Court in *Monsanto Technology LLC & Ors v. Nuziveedu Seeds Limited & Ors*.<sup>71</sup>

Transformation is a method whereby a recombinant DNA construct is incorporated into a plant genome which is essentially a microbiological process and not an essentially biological process. A gene of interest expressed by way of a recombinant DNA construct is therefore essentially a protein of bacterial origin (which is a completely different, unrelated species from plants) and not a plant part. Such a process is performed in laboratories under stringently regulated conditions of tissue culture which does not amount to a conventional method of breeding or an essentially biological process for plant production or propagation.<sup>72</sup> Even if a recombinant DNA construct expresses or functions genes in a plant species, it does not come within the purview of non-patentability u/s 3(j) of the Patents Act. This is due to the fact that the very inclusion of a recombinant DNA technology suggests that it involves substantial human intervention since such DNA constructs are prepared in laboratories where the experiments are conducted by humans. Moreover, the term 'plant' u/s 3(j) of the impugned statute refers to a 'living organism' whereas genes or DNA or DNA constructs are not living entities but plainly inanimate molecules that merely code so as to aid the creation of protein in living organisms. Hence, DNA constructs which are inanimate products cannot be regarded as plants or plant parts as they are incorporated

<sup>70</sup> FAO (OS) (COMM) 86/2017, C.M. APPL. 14331, 14335, 15669, 17064/2017; *Monsanto Technology LLC & Ors v. Nuziveedu Seeds Limited & Ors* FAO (OS) (COMM) 76/2017, CAV. 328/2017, C.M. APPL. 133348-13352/2017.

<sup>71</sup> CA. Nos. 4614-4617/2018.

<sup>72</sup> Malathi Lakshmikumaran, *GM Plants: IP and Regulatory Concerns in India*, Kung-Chung Liu, Uday S Racheria, *Innovation, Economic Development, and Intellectual Property in India and China: Comparing Six Economic Sectors*, 368, 370, 1<sup>st</sup> Edition (2019), SpringOpen.

in to a plant by using a recombinant DNA technology which requires human agency and ingenuity.<sup>73</sup>

## **2.9 Conclusion**

Hence, it is found that the patenting scenario in India is not very welcoming. This is due to the fact that there are immense restrictions with regard to patentability in relation to the agriculture and food security. The major premise behind such restricted scope of patenting is to avoid the monopolisation of plant genetic materials including its parts and components like genes. This is in a sense detrimental as the protection afforded under the Protection of Plant Varieties and Farmer's Rights Act 2001 is not as strong as patent protection and is of lesser duration than the 20 year patent period. However, there are various technical measures such as rDNA, tissue culture steps and CRISPR genome editing technology which involves substantial human intervention in the development of plant production and production which is capable of being patented. These techniques can be a great tool to improve the efficacy of crop production and enhance the quality of food crops, provided adequate and appropriate legislative policies and stringent measures are adopted to ensure that there arises no abuse of power by the patent holders in this regard. In a world where population is increasing at a rapid rate, and the land available for agriculture and related activities is small and scattered, there is a need to employ the use of biotechnological and other measures to enhance the availability and accessible of good quality food at reasonable prices, thereby curing the problem of food insecurity.

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<sup>73</sup> *Id.*

## Chapter III

# FOOD SECURITY AND INTERNATIONAL REGULATIONS

### 3.1 Introduction

Food Security is defined as economic access to food along with food production and food availability.<sup>74</sup> The Rome Declaration on World Food Security is a crucial instrument in the realm of food security. It is pertinent to note that the Rome Declaration embodies a set of general principles to be complied in order to ensure that quality food is accessible and affordable to all. It states that –“Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.<sup>75</sup>” This definition of food security propounded in the 1996 World Food Summit points out the various dimensions of food security which are food availability, food accessibility, utilisation of food and stability in terms of access. Food availability refers to availability of adequate levels of food having sufficient quality which is steadily supplied by means of imports or domestic production. Food access implies that individuals must have adequate access to sufficient resources so as to enable them to procure adequate food appropriate to their dietary and nutritional needs. Utilisation refers to the utilisation of food by means of adequate facilities such clean air, water, health care and sanitation in order to achieve nutritional well-being including the fulfilment of physiological needs. Stability refers to stability in terms of access and availability to adequate food by all members of the population at all times. Hence, food security does not merely mean the physical and economic access to sufficient food<sup>76</sup> but also access to food that is safe and nutritious.<sup>77</sup> It is pertinent to note that a state of food security exists in a country

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<sup>74</sup> Surabhi Mittal, Deepthi Sethi, Working Paper No.240- *Food Security in South Asia: Issues and Opportunities*, (September 2009), East Asia Bureau of Economic Research.

<sup>75</sup> William D. Coleman and Melissa Gabler, 46 *Agricultural Biotechnology and Regime Formation: A Constructivist Assessment of the Prospects*, *International Studies Quarterly*, 481, 485 (Dec., 2002), Wiley on behalf of The International Studies Association.

<sup>76</sup> Principle 1, Rome Declaration on Food Security.

<sup>77</sup> Principle 2, Rome Declaration on Food Security.

when all the people in that country have accessibility and availability to good quality and nutritional food which is affordable at reasonable prices at all times.

In order to analyse the issues pertaining to food security, it is pertinent to look into the regulatory framework governing food security in the international perspective. International Law recognises the right to food as a basic human right and it is also related to right to human dignity. An obligation is imposed on the State parties under Article 11.1 of the International Covenant on Economic, Social and Cultural Rights 1966 to recognise “the right of everyone to an adequate standard of living for himself and his family, including adequate food, clothing and housing to the continuous improvement of living conditions”.<sup>78</sup> In the light of the growing issue of food insecurity in today’s rapidly increasing population and the increasing prominence of intellectual property rights in all walks of life, it is pertinent to analyse the issue of food security in relation to the intellectual property rights. Food security is an essential requirement of the whole world and needs to be analysed at the international level. The international Conventions dealing with food security are dealt herein.

## **3.2 Legal and Institutional Framework in relation to Agriculture**

### **3.2.1 Food and Agriculture Organisation**

The Food and Agriculture Organisation, popularly called FAO was established in the year 1945 and serves as one of the oldest specialised agency under the United Nations and is headquartered in Rome, Italy. FAO’s efforts are directed towards the enhancement of global nutrition and food security, thereby combating the threat of hunger and malnutrition. It goes by the motto of ‘*fiat panis*’ meaning ‘let there be bread’. FAO aids various developmental agencies and governments in ensuring food security by synchronising the operations aimed at enhancing and promoting the advancement of forestry, fisheries, agriculture, land and water resources. It performs activities of research, supply technological aid for undertaking projects, provides training and educational schemes, and helps in the collection of data pertaining to agricultural development, production and output.

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<sup>78</sup> M. M Dodeen, *Analysis of Legal and Regulatory Framework of Food Security in Palestine*, (2017). [www.fao.org/3/AVO3](http://www.fao.org/3/AVO3) accessed on November 23, 2019.

The concept of food security was evolved in the World Food Conference in 1974 wherein it was defined on the basis of food supply as an assurance to the availability and supply of basic food substances at both the national as well international levels. FAO defined food security in 1983 in terms of demand and supply of food as thus- “ensuring that all people at all times have both physical and economic access to the basic food that they need.”<sup>79</sup> Thus, food security is ensured when all people are provided with not mere physical accessibility but also economic accessibility to adequate and basic food stuff that is required to be consumed by people in order to sustain themselves. The multi-dimensional definition of food security as laid down in World Food Summit in the year 1996 stipulates the four dimensions of food security- availability of food, accessibility of food, facilities to ensure the proper utilisation of food to meet physiological needs and the stable availability and access to affordable food at all times. This is the most popular definition which is widely recognised all over the world.

FAO has been instrumental in supplying a legislative framework governing agriculture, thereby fulfilling its objective as the UN organisation which focuses on agriculture. In this regard, it is significant to examine two major instruments- i.e., the 1983 Undertaking for Plant Genetic Resources (International Undertaking) and the 2001 International Treaty on Plant Genetic Resources for Food and Agriculture (PGFRA). The International Treaty on Plant Genetic Resources for Food and Agriculture 2001 renegotiated an existing International undertaking to make it in consonance with the Convention on Biodiversity and to control the access and benefit sharing mechanism especially for plants, genetic resources and agriculture.

FAO has provided legislative measures for the attainment of food security. However, these measures fail to meet the ever- increasing need and demand for food amongst the people. An access and benefit sharing of plant genetic resources in tune with the Convention on Biological Diversity was made. Though a cooperation mechanism between the FAO and the WIPO was developed with focus on matters such as genetic resources for food and agriculture, farmer’s rights and traditional knowledge, agricultural biotechnology, a total reconciliation or balancing of interests was not

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<sup>79</sup> *Food Security*, Policy Brief, June 2006, Issue 2, Agricultural and Developmental Economics Division (ESA), FAO. <http://www.fao.org>pdf> accessed on November 20, 2019.

possible<sup>80</sup> as FAO favoured accessibility of food over intellectual property protection whereas WIPO favoured a more pro-intellectual property approach, sidelining the interests relating to access to food.

### **3.2.2 International Undertaking for Plant Genetic Resources**

The rationale behind the International Undertaking for Plant Genetic Resources for Food and Agriculture is that the germ plasm which is a common heritage of all people has to be adequately protected, preserved and improved so as to be distributed for the benefit of the public. Hence, private entities were left unable to utilise the rights under PGFRA Treaty. When a germ plasm is patented and extracted from its germ pool so as to facilitate more breeding, it in turn creates a loss to the society that needs to be compensated by reimbursement into a fund to encourage the use of genetic resources. The 1983 International Undertaking was initially considered as undesirable by many countries and hence this Undertaking remained a non-binding resolution till 1991 when the rights over PGFRA proved to be a challenge for the developed countries which had made huge investments in genetic engineering. The International Undertaking gained wider acceptance only after 1989 and 1991 when FAO Conference passed interpretative resolutions.<sup>81</sup> The International Undertaking was further revised later on. In 1992, Agenda 21 Action Plan as well as the Earth Summit acknowledges the vital significance of having innovations in the field of agricultural biotechnology which can serve as an endorsement as well as hinder the conservation of biological diversity and sustainable use of its resources.

The International Undertaking was found to be inadequate to meet the needs of promoting innovations in the ambit of agricultural biotechnology and therefore had to be modified and revised to make the necessary changes to make it more suitable to meet the changing demands of technological innovations.

### **3.2.3 International Treaty on Plant Genetic Resources for Food and Agriculture**

The PGRFA Treaty is widely considered as the first treaty which offered a legislative mechanism that acknowledges the necessity of conservation and sustainable

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<sup>80</sup> Michael Blakeney, *Intellectual Property Rights and Food Security*, 77, (1<sup>st</sup> ed., CABI), 2009.

<sup>81</sup> International Undertaking for Plant Genetic Resource, Res. 8/83, *Report of the Conference of FAO*, 22<sup>nd</sup> Session, Rome, 5-23 Nov. 1983, Doc. C83/REP [hereafter International Undertaking].

use of PGRFA and demarcates a scheme for access and benefit sharing, and offers links - directly and indirectly linking it to intellectual property instruments.<sup>82</sup> It also serves as a connecting factor between plant genetic resource conservation, sustainable agriculture, intellectual property rights and food security. The impugned treaty acknowledges the contribution of farmers towards the conservation and enhancement of PGRFA. It recognises the need for the protection of traditional knowledge, the right of the farmers to be a part of benefit sharing mechanisms (such as the right to save, use, exchange and sell farm-saved seeds), and the right to participate in decision making process in relation to the management of plant genetic resources.

The PGFRA Treaty is the result of numerous negotiations and is a crucial link connecting the preservation and protection of PGRFA, its use, the rights of farmers over resources and knowledge and the intellectual property rights system. The access and benefit sharing provisions attempt to fill the gaps when comparing this treaty with the other treaties such as the TRIPS agreement. The treaty has a largely general character, and lacks specificity, as it displays how difficult it is to bring about a balancing of interests of the developing nations and the developed nations, small farmers, the large private seed companies and other actors involved.<sup>83</sup>

### **3.2.4 International Fund for Agricultural Development**

The International Fund for Agricultural Development, also known as IFAD is an international financial institution founded in the year 1977. It is widely credited as being a direct result of the 1974 World Food Conference that was aimed at addressing the 1970's food crisis that adversely impacted the African Sahelian countries. It also serves as one of the UN's specialised agencies which seeks to provide financial assistance to projects of agricultural development, thereby increasing the food production in developing countries. The Conference threw light on the fact that the most significant underlying cause of food insecurity is the structural issues that arise in connection with poverty and poor living conditions. Food insecurity arises when the concentration of the poor population amongst the developing countries are largely

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<sup>82</sup> Article 12.3 (f), PGRFA Treaty.

<sup>83</sup> Dr Philippe Cullet, *Food Security and Intellectual Property Rights in Developing Countries*, 1<sup>st</sup> Edition (2003), Geneva International Academic Network.



situated in rural areas.<sup>84</sup> IFAD collaborates with the Consultative Group for International Agricultural Research (CGIAR), the International Land Coalition (ILC) and the Global Forum on Agricultural Research and Innovation (GFAR) as well as the private agencies so as to undertake research and development activities<sup>85</sup> on the improvement of seed technology, value chain enhancement, farming and the use of water, soil and conservation technologies.<sup>86</sup>

The IFAD has significantly contributed to the financing of development of agriculture, thereby aiding the attainment of food security. The CGIAR is one such entity which collaborates with IFAD in this process of agricultural development and aiding agricultural research. The biological resources stored in the centres of CGIAR are utilised for developing plant genetic resources for food and agriculture. The increasing incidence of biopiracy can be substantially reduced if the nations agree to contribute germplasm to these CGIAR Centres.

### **3.3 Legal and Institutional Framework With Regard To Intellectual Property Rights**

The rise of the twentieth and twenty-first centuries has seen a rapid growth in the field of intellectual property, thus promoting original and innovative creations. Intellectual property rights are a bundle of negative rights conferred to the creator or owner of an intellectual property work created as a result of their intellectual skill, and labour. These are essentially a set of exclusive monopoly rights that allow the intellectual property holder the sole right to use, sell, import, or make copies of their intellectual works and creations over which they own intellectual property rights to the exclusion of all others. The various kinds of intellectual property include copyright, patents, trademark, geographical indications, industrial designs, semi-conductor and integrated circuits layout-design, traditional knowledge, trade secrets and plant variety protection.

The rationale behind the granting of intellectual property rights is to reward the inventor or creator of an intellectual property for his intellectual labour and skill and

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<sup>84</sup> <http://www.ifad.org/pub/policy/innovation/e.pdf> accessed on November 20, 2019.

<sup>85</sup> *Guidelines Proposed by the European Community for the Negotiations on Trade Related Aspects of Intellectual Property Rights* GATT Doc. No. MTN.GNG/NG11/W/17 (20 November 1987).

<sup>86</sup> Michael Blakeney, *Intellectual Property Rights and Food Security*, 16, (2009), CABI.

also to serve as an incentive for future innovations and intellectual creations. Moreover, intellectual property rights leads to scientific and technological progress, thus promoting the welfare of the people. In today's world, intellectual property rights are all-pervasive. With the growing use of intellectual property in all spheres of life including but not limited to agriculture, genetic resources, life forms and food sector, it is only natural that intellectual property rights have a close connection with food security. However, since intellectual property rights have a tendency to create a monopoly and concentration of power in the hands of the intellectual property holder, there is a need to regulate the scope of intellectual property so as to promote food security by way of harmonization of interests in relation to intellectual property rights and the public interest to promote food security. In order to achieve this, various legal and institutional regulatory frameworks are formulated.

The major legal and institutional frameworks with regard to regulation of intellectual property rights are-

### **3.3. 1 TRIPS Agreement**

The WTO - Agreement on Trade Related Aspects of Intellectual Property Rights is the most comprehensive legislative framework with respect to the protection and conservation of the rights of the intellectual property holders. It is not directly concerned with agriculture management and environment and only bears an indirect link to environment management. The objectives of the TRIPS Agreement<sup>87</sup> are to safeguard and effectively implement the intellectual property rights in such a way that it adds to the progress in technological innovation and to the transmission and distribution of technology in such a way that it mutually benefits both the users and producers of technological knowledge through means of a method favourable to the social and economic welfare of the nation with a balancing of rights and obligations. The principles underlying the TRIPS Agreement as set out under Article 8 provides that the members have the discretion to incorporate certain measures in their national laws and regulations so that the public health, nutrition, public interest are preserved.<sup>88</sup> Members are also afforded the opportunity to make measures to avoid the intellectual property right holders from abusing these rights and also

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<sup>87</sup> Article 7, TRIPS Agreement.

<sup>88</sup> Article 8.1 , *supra* n.9

to prevent all sorts of unreasonable and fair trade practices and practices that detrimentally impact the transferring of technology.<sup>89</sup>

With regard to patenting of life forms, it is found that Article 27.3(b)<sup>90</sup> allows the patentability of microorganisms. Moreover, all WTO members have to protect plant varieties. This protection may be afforded through patent protection or by way of an alternate *sui generis* system or both. This provision of the Agreement is subject to a periodical review in every four years. The impugned provision of the Agreement has far reaching importance in relation to aspects of intellectual property rights, food security, managing the environmental system and in human rights perspective. This facilitates the member states to take measures to incorporate any mode of protection to plant varieties bearing in mind their commitment towards ensuring affordability and accessibility of quality food, commitments under the PGRFA treaty and Biodiversity Convention with respect to management of the agricultural system.

Geographical Indications (GIs)<sup>91</sup> are a type of intellectual property protection that is of particular significance in relation to food security. GIs helps in identifying the geographical origin of a product that is characterized as possessing certain characteristics or qualities or reputation that the product derives due to it being originated from that particular geographical area.<sup>92</sup> The WTO members are obliged to ensure adequate legal protection to geographical indications so as to prevent the designation or presentation of a good in such a manner that it misleads the public with regard to the actual geographical indication of the good.<sup>93</sup> The member states also have to afford legal protection to avoid an act of unfair competition in this context.<sup>94</sup> Moreover, special protection is afforded for geographical indications for wines and spirits.<sup>95</sup>

The TRIPS Agreement has often been criticised as being contrary to the provisions of the Convention on Biological Diversity.<sup>96</sup> This is due to the fact that

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<sup>89</sup> Article 8.2, *supra* n.9

<sup>90</sup> Article 27.3 (b), *supra* n.9

<sup>91</sup> Hereinafter referred as GI.

<sup>92</sup> Article 22(1), *supra* n. 10.

<sup>93</sup> Article 22(2), *supra* n.10.

<sup>94</sup> *Id.*

<sup>95</sup> Article 23, *supra* n.10.

<sup>96</sup> Ruchi Tripathi, *Food Patenting- A Threat To Food Security*, ActionAid UK, 6, ActionAid 2001.

TRIPS Agreement has a tendency to speed up the process of exploitation of genetic resources. Moreover, the TRIPS Agreement does not contain any provision requiring prior informed consent for accessing genetic resources, and does not mandate the acknowledgement of the source of origin, all of which are essential elements of the Convention on Biological Diversity<sup>97</sup>.

### **3.3.2 WIPO Measures**

The World Intellectual Property Organization (WIPO) is one of UN's specialised agencies which specifically focus on promoting as well as safeguarding intellectual property throughout the world. WIPO Measures to a certain extent dealt with food security. Food security is a matter of growing concern closely interlinked with health and climate change. The issues concerning food security can be mitigated to certain extent through the adoption of initiatives like the Climate-Smart Agriculture (CSA). CSA embodies a comprehensive approach towards the improvement of agricultural development with major objectives such as-

1. Improving the productivity of agricultural activities,
2. Enhancing resilience
3. Mitigating the susceptibility to climate change and
4. Decreasing the emission of green house gases.<sup>98</sup>

It is important to consider the fact that equilibrium of the interests of FAO and WIPO did not come to full effect as the latter was more focused on development of intellectual property protection whereas the former laid more emphasis on the accessibility of food.

### **3.3.3 UPOV**

The International Union for the Protection of New Varieties of Plants (UPOV) essentially serves as an intergovernmental organisation which seeks to cater to the need to generate new varieties of plants in an attempt to attain food security and sustainability of agriculture, particularly with regard to climate change and global population growth. The 2030 Agenda for Sustainable Development embodies the vision of attaining a

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<sup>97</sup> Convention on Biological Diversity 1992.

<sup>98</sup> Amy Dieterich, *WIPO Global Challenges Division Bolsters Innovation in Global Health, Climate Change and Food Security*, 74 INTABulletin, 1, September (2019), International Trade Association.

world with global security wherein safe and nutritious food is adequately available and affordable.<sup>99</sup> In order to achieve sustainable development, it is pertinent to breed new varieties of plants that fulfil the technological criteria stipulated under the 2030 Agenda for Sustainable Development. However, fulfilling this task is not easy, especially because the land available for agriculture is limited, population is rapidly rising, urbanisation is increasing, need for food and requirements of energy production and other needs are escalating in response to the changes in the environment.

The International Union for the Protection of New Varieties of Plants has immense significance in the context as a measure to mitigate the impact of these growing challenges. The UPOV offers a mechanism which facilitates the plant breeders to conserve and preserve their novel improvements. Moreover, it facilitates the plant breeders in getting returns on their investment in propagating varieties of plants which fulfils the requirements of consumers as well as the farmers. This process thereby works as an incentive to induce them to invest them in these mechanisms to develop new varieties.

The UPOV Convention<sup>100</sup> is widely regarded as the sole Convention that has a direct bearing on the agriculture. The impugned Convention advocates the conferring of plant breeder's rights to persons who breed plants. The Convention seeks to afford measures to safeguard novel plant varieties, thereby promoting development in the agricultural sector by introducing diversity, as well as protecting the rights of persons commercially engaged in plant breeding.

Even though plant breeder rights and patent rights are distinct from one another, yet they have significant points of similarity in them. The impugned Convention confers sole commercial rights to the breeders of new varieties of plants. The Convention provides protection for an inventive process for a restricted duration before they fall into the public domain. This enables the plant breeders the sole rights to propagate new varieties of plants, to acclimatize these plant varieties so as to be used for commercial purposes such as selling, importing, exporting, stocking etc.<sup>101</sup>

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<sup>99</sup> Benjamin Rivoire, *UPOV : supporting food security with plant variety protection*, WIPO Magazine, February 2019, WIPO. [https://www.wipo.int/wipo\\_magazine/en/](https://www.wipo.int/wipo_magazine/en/) accessed on November 18, 2019.

<sup>100</sup> International Convention for the Protection of New Varieties of Plants 1961.

<sup>101</sup> Article 14(1), UPOV Convention.

The criteria for conferring the breeder's rights is that the proposed plant variety has to be novel, distinct, stable and uniform.<sup>102</sup> The variety satisfies the test of novelty if the propagated or harvested material has not been sold or disposed to others for commercialisation.<sup>103</sup> This implies that there is a direct link between commercialisation of a variety and its novelty. The plant variety in question must not have been commercialised a year prior to the date of application in the country where such application is filed and for a period of four years prior to such application in the case of other countries. This period of prior art consideration for grant of breeder's rights to variety subject to the satisfaction of novelty criteria is extended to a period of six years in the case of trees or vines.<sup>104</sup> A variety conforms to the test of distinctiveness if it can be clearly differentiated from an existing variety which is of common knowledge.<sup>105</sup> A particular variety satisfies the criteria of uniformity, if it is uniform in significant characteristics apart from the expected variation in specific features.<sup>106</sup> A variety conforms to the test of stability if its pertinent characteristics do not undergo a change subsequent to repeated propagation or propagation cycle.<sup>107</sup> The Convention also specifies certain exceptions to plant breeder's rights. One exception is the 'farmer's privilege' which affords an opportunity to the farmers to preserve and propagate protected variety and swap it with other farmers.<sup>108 109</sup> Another exception is that the scope of protection of breeder's rights is limited and does not cover acts undertaken in a private manner and for acts undertaken for purposes other than commercial purposes. The scope of protection also falls short from covering acts performed for experimental purposes and the usage of protected variety for propagating other variety.<sup>110</sup> The duration of breeder's rights is for a fixed period of twenty years from the date of grant of breeder's rights and for a period of twenty-five years in the case of trees and vines.<sup>111</sup>

The UPOV system of plant breeder's rights is limited and confined in such a manner that it does not extend to farmer's rights and community rights to innovate, and

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<sup>102</sup> Article 5(1), UPOV Convention.

<sup>103</sup> Article 6(1), UPOV Convention.

<sup>104</sup> *Id*

<sup>105</sup> Article 7, UPOV Convention.

<sup>106</sup> Article 8, UPOV Convention.

<sup>107</sup> Article 9, *supra* n.16.

<sup>108</sup> Article 15, *supra* n. 16.

<sup>109</sup> Viola Pfrifti, *An Answer to the Plant Variety Controversy in Chile*, 30The Journal of World Intellectual Property, 1, 25, (2016), NISCAIR.

<sup>110</sup> *Id*.

<sup>111</sup> Article 19, UPOV Convention.

develop new plant varieties. Moreover, the UPOV system stipulates a specific criterion for giving protection to plant varieties, i.e., it states that plant varieties must conform to the test of being novel, stable and distinct. The UPOV system is not categorically stated as a *sui generis* system for the protection of plant varieties as stipulated under the TRIPS Agreement. However, numerous developing nations who were not inclined to provide patent protection on plants were compelled to adopt the UPOV system of plant variety protection.

### **3.4 Legal Framework In Relation To Environment**

#### **3.4.1 Convention on Biological Diversity**

The Convention on Biological Diversity 1992 is a complete, all inclusive and detailed International Convention that sets forth provisions for the protection of biological diversity, sustainable use of the components of world's biological resources and biological diversity and the fair and equitable sharing of benefits from derived from the use of genetic resources.<sup>112</sup> The impugned Convention was the result of the Rio Earth Summit held in June 1992. With regard to the protection of environment in a bid to achieve food security, the Convention on Biodiversity (CBD) remains a significant regulatory framework in this aspect. The impugned convention spells out its 3 major objectives as- (1) the conservation of biodiversity, (2) sustainable use of its components, (3) fair and equitable sharing of benefits of genetic resources.

This Convention is significant in the context of food security and intellectual property rights. The impugned Convention has introduced the concept of genetic resources within the sphere of national sovereignty and countries have to undertake steps to fulfil these three objectives and to have prior informed consent for accessing these resources of the state. Bilateral agreements could be made by the nations to achieve this aim.<sup>113</sup> This Convention attempts to regulate the management of biodiversity and genetic resources and intellectual property rights. It embodies the basic notion that intellectual property rights should not detrimentally impact the working of the impugned Convention.

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<sup>112</sup> Convention on Biological Diversity 1992.

<sup>113</sup> Geoffrey Tansey, *Food for Thought: Intellectual Property Rights, Food, and Biodiversity*, 24 Harvard International Review, 54, 55 (SPRING 2002), Harvard Law Review Association.

The Conference of Parties to the Convention on Biological Diversity in its third meeting held in Buenos Aires, Argentina in November 1996 acknowledged the significance of agricultural biodiversity and thus formulated a special multi-year Programme of Work on Agricultural Biodiversity.<sup>114</sup> The Programme of Work on Agricultural Biodiversity strived to enhance the positive results and mitigate the negative effects of agricultural systems biodiversity practices in relation to the agro-ecosystems and its links with other eco-systems. This programme also sought to protect and safeguard the genetic resources and its sustainable use for promoting the significance of food and agriculture. Moreover, it supports the fair and equitable sharing of benefits derived from the utilisation of genetic resources. This programme has intensified its ties with the Food and Agriculture Organisation and scrutinised the cross-sectoral issues including the probable adverse effects on farmers with regard to the patented genetic use restriction technologies.

Before the Convention on Biological Diversity was adopted in 1992, genetic resources were considered as a heritage of mankind that facilitated restriction-free use of these resources, irrespective of the location where it is found. This meant there was no obligation to either obtain any authorisation from the nation where such resources were it is located or to distribute the benefits arising from the utilisation of genetic resources. Subsequent to the adoption of the Convention on Biological Diversity in Rio Earth Summit, the position changed completely. As of now, the Convention clearly specifies the stipulations to be considered for the equitable and fair sharing of the benefits derived from the use of genetic resources with nations in whose territories, such resources were found. Thus the Convention promotes the exercise of sovereignty by states over the natural and genetic resources found in their geographical resources.

The Convention has significantly contributed towards the advancement of access and benefit sharing schemes. Moreover, the Bonn Guidelines<sup>115</sup> adopted in 2002 by the Conference of Parties to the Convention on Biological Diversity at its sixth meeting held in Hague, furthers this objective. The impugned Convention stipulates that the access and benefit sharing schemes must be based on prior informed consent

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<sup>114</sup> See Decision III/11, 'Conservation and Sustainable Use of Agricultural Biological Diversity', *Report of the Third Meeting of Conference of the Parties to the Convention on Biological Diversity*, Buenos Aires, 4-15 Nov. 1996, UN Doc. UNEP/CBD/COP/3/38.

<sup>115</sup> Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits Arising out of their Utilization



of the country of origin of the biological and genetic resources sought to be used and the access to these resources has to be on mutually agreed terms among the parties.<sup>116</sup> The Bonn Guidelines offers assistance to the governments of various nations in adopting measures to regulate the access and benefit sharing schemes in their nations and in negotiating the mutually agreed terms in these access and benefit sharing schemes. These guidelines are not mandatory, but rather voluntary. The Bonn Guidelines is widely regarded as a significant stage towards enforcing the access and benefit sharing schemes as stipulated under the impugned Convention.

The impugned Convention is one of the few international instruments that deal with inter-relation between the intellectual property rights and management of biological and genetic resources. The Convention stipulates that the enforcement of the intellectual property is to be done in such a manner that it does not affect the effective functioning of the Convention.<sup>117</sup> There exists a serious conflict between the TRIPS Agreement and the Convention on Biological Diversity in this regard. It is often argued that the provisions of the TRIPS Agreement overlap into the sphere of the Convention on Biological Diversity which is a significant issue that needs to be addressed. TRIPS tends to promote innovators who are willing to invest in financially feasible uses pertaining to genetically encoded information. However, the Convention on Biological Diversity promotes and incentivises the preservation of information pertaining to indigenous community as well as farmers. Whilst the CBD focuses on collective rights based claims in relation to knowledge and management of information, the TRIPS does not adopt such an approach based on collective rights. The CBD provides for the access and benefit sharing approach in the context of genetic resources, under the TRIPS the whole benefit of appropriation goes to the user.

The donor countries of the natural and genetic resources such as micro-organisms, plants or animals which are used commercially by the user countries have the right to a fair and equitable sharing of the benefits arising from such use. The benefit sharing schemes are in the form of monetary benefits or non-monetary benefits as per the provisions of the impugned Convention and the Bonn Guidelines. The non-monetary benefits include the sharing of results of research and development, access to

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<sup>116</sup> Article 15, Convention on the Biological Diversity 1992.

<sup>117</sup> Article 16, Convention on the Biological Diversity 1992.

scientific information pertinent to protection, conservation of biological diversity and sustainable use of its resources, as well as collaboration in scientific research. The Biodiversity Convention and the PGFRA Treaty are in a way complementary in nature with respect to access and benefit sharing.

The Convention affords protection of traditional knowledge, which in turn ensures that agro - biotechnology is protected by means of intellectual property rights and thereby meeting the crucial food needs. Agro - biotechnology enhances food production and propagation of plants with specific traits like increased yield, herbicide and pest resistant as well as drought resistant properties. Agro - biotechnology helps in controlling the spread of diseases caused by insects with the introduction of genetically engineered crops with disease resistant traits such as in the case of sweet potato, cassava and maize. Agro - biotechnology also aids in incorporating quality traits such as improved dietary and nutritional value, or removal of toxins as well as providing enhanced food processing and storage qualities. Temperature and salt tolerance as well as increased efficiency in the use of water and nitrogen are also specific traits which agro - biotechnology introduces in food crops.

The Convention acknowledge the fact that indigenous and local communities are dependent on biological diversity for their sustenance and how these communities pay a major part in the conservation of life. The Convention thus acknowledges the mutual interdependence between these communities and biological diversity as stated in it its preamble and other provisions, thereby recognising the integral role of conserving biological diversity. The Convention stipulates that each contracting party is bound to value, protect, preserve and retain the innovations, knowledge and practices followed by the local and indigenous communities, thereby reflecting the traditional lifestyles pertinent for the conservation of biological diversity and the sustainable use of its resources.<sup>118</sup> It also encourages the wider use of these biological resources with the prior authorisation of the holders of these innovations, knowledge and practices and promotes equitable benefit sharing derived from its use.<sup>119</sup> The Conference of Parties to the Convention in its fourth meeting in the year 1998 constituted a Working Group, thereby enhancing the protection to traditional knowledge afforded by Article 8(j). The

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<sup>118</sup> Article 8(j), Convention on the Biological Diversity 1992.

<sup>119</sup> *Id.*

Working Group plays a major role by providing advice on all legal and non-legal methods that can be employed for safeguarding traditional knowledge.<sup>120</sup> It is pertinent to note that the issue of ownership with regard to the traditional knowledge associated with biodiversity remains a significant issue which needs to be addressed. In response to the Convention, many nations have made intricate regulations with regard to the ways in which plant materials and genetic resources can be exported, imported and shared among the nations. The Convention also incorporates provisions pertaining to agricultural biotechnology products. It stipulates that all member states are bound to take measures in regulating, managing or controlling the risks attached to the release and use of living modified organisms (LMOs) derived from such biotechnology that has probable detrimental effects on environment and biological diversity.<sup>121</sup>

Although the Convention on Biological Diversity provides for equitable sharing of benefits of genetic resources with the consent of the host state and the protection of traditional knowledge for the sustenance of biodiversity, it fails to provide the manner in which it is implemented by the member states. It does not contain any specific provision as to ensure its strict compliance. It fails to provide a possible and remedial course of action in case such sharing of benefits results in adverse effects to the host state even though it acknowledges a state's national sovereignty over its genetic resources. The traditional knowledge of the indigenous communities are exploited without giving due credit to the source of origin. The member states are not bound to make adopt any legislative measures to ensure its effective enforcement.

### **3.4.2 Cartagena Protocol on Biosafety**

The Cartagena Protocol on Biosafety<sup>122</sup> is a significant international agreement supplementing the Convention on Biological Diversity. It facilitates in the regulation of movements of living modified organisms (LMOs) derived from the use of biotechnology among the nations which is likely to have detrimental effects on the conservation and sustainable use of biological diversity and its resources, by considering risk factors associated with human health.<sup>123</sup> This in turn allows the nations

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<sup>120</sup> Decision IV/9, Implementation of Article 8(j) and related provisions, *Decisions Adopted by the Conference of the Parties to the Convention on Biological Diversity at its Fourth Meeting*, Bratislava, 4-15 May 1998, UN Doc. UNEP/CBD/COP/4/27 (1998).

<sup>121</sup> Article 8(g), Convention on Biological Diversity 1992.

<sup>122</sup> Cartagena Protocol on Biosafety to Convention on Biological Diversity 2003.

<sup>123</sup> Article 1, *supra* n.40.

in banning the import of genetically modified organisms if it is found that there is insufficient scientific evidence to prove that the biotechnology product is safe. The protocol is based on the precautionary principle. It states that the products arising out of the modern biotechnology must be subject to the application of the precautionary principle, thereby ensuring that the developing nations are permitted to balance conflicting interests of public health and economic benefits derived from such biotechnology products.

The Cartagena Protocol on Biosafety facilitates in regulating the movement of living modified organisms, and allows countries to ban the import of genetically modified organisms if found to be unsafe, it does not suggest any measure as to how to control the existing living modified organisms or genetically modified organisms within its geographical territory and how to combat the detrimental effects attributed to these organisms.

### **3.4.3 Desertification Convention**

A major international instrument in relation to environment is the Desertification Convention which establishes a connection between desertification, which is essentially an environmental problem and food security which is an issue having socio-economic implications.<sup>124</sup> The impugned Convention stipulates that member states are bound to constitute national action programmes which incorporate various methods to alleviate the consequences of drought, as well develop food security measures comprising of storage and marketing provisions.<sup>125</sup> The impugned Convention stipulates the member states to value the significance of food security as well as afford adequate protection to meet the same.<sup>126</sup>

The Desertification Convention is a welcome measure to combat the issue of drought and food scarcity, thereby leading to food insecurity. The Convention ought to address this issue in the light of production of food products such as the Plumpy'Nut that prevent as well as reduce the occurrence and impact of severe acute malnutrition

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<sup>124</sup> United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa 1994.

<sup>125</sup> Article 10, United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa 1994 .

<sup>126</sup> Article 16 and 18, *supra* n.42.

and nutritional deficiencies in the people so as to combat the problem of food production, access and distribution of food products associated with food insecurity.

### **3.5 Conclusion**

Intellectual property rights have become an essential element of every walk of life in today's society. The rising use of intellectual property in the supply and production of food, agriculture and plant genetic resources etc has led to a close connection between the exclusive intellectual property rights and attainment of food security. If used and regulated properly, intellectual property can be used as an effective tool to ensure food security. This is sought to be ensured by numerous legal and institutional regulatory framework at the international level including various conventions, treaties and institutions and organisations, thereby aiming to bring about a harmonious relationship between the fundamentally different concepts of intellectual property and food security.

The PGFRA Treaty and the Convention on Biological Diversity aims at the preservation of plant and genetic resources for food and agriculture. This can be achieved if both these instruments are worked together to ensure that the requirements of prior informed consent, acknowledging the source of origin etc are met. However, the TRIPS Agreement is in conflict with the Convention on Biological Diversity in this regard as the impugned agreement fails to recognise the principles of prior informed consent, acknowledgement of the source of origin and access to benefit sharing which are necessary for the protection of the intellectual property and the attainment of food security. The TRIPS Agreement offers the member countries to choose either patent protection or plant variety protection for plants or sui generis system. The impugned agreement does not specifically mention the UPOV system as a sui generis system. However, numerous developing nations were forced to adopt the UPOV system of protection for new varieties. The inherent contradictions in these various legislative instruments have to be reconciled in such a manner that it protects the interests of intellectual property protection and the attainment of food security.

## Chapter IV

# PATENTING IMPLICATIONS ON FOOD SECURITY

### 4.1 Introduction

Patents form a crucial form of intellectual property which has a direct bearing on food security. The increasing significance of patent protection in relation to food security is reflected in the advent of genetically modified plants and other innovative techniques such as tissue culture. Patent protection is widely regarded as the most powerful form of intellectual property protection in relation to achieving food security. This is due to the fact that patents offer a protection period of twenty years as compared to the lesser duration of protection offered by other forms of intellectual properties such as plant variety protection and geographical indications. Although patents are beneficial for the protection of new agricultural innovations, it is pertinent to note that it also comes with certain disadvantages which need to be discussed. Hence, it is vital to analyse the implications of patent protection on food security.

It is imperative to look into the WTO TRIPS Agreement<sup>127</sup> whilst discussing patent protection. This is because the TRIPS Agreement of 1994 has revolutionised intellectual property protection regime across the world by bringing about a set of minimum standards of protection to be made available in all states which ratified this agreement. The WTO member nations were left with no option but to ratify this agreement which was annexed in the Marrakesh Agreement establishing the WTO of 1994. The ratifying states to this agreement were forced to adapt modifications in their domestic legislations pertaining to intellectual property protection so as to make it in consonance with the TRIPS Agreement. The TRIPS Agreement provides for a robust system of intellectual property regime, including patent rights, in a bid to bring about uniformity in the standards of intellectual property regime throughout the world.

Article 27.3 of the TRIPS Agreement deals with the exclusions from patenting. Clause (b) of the impugned provision states that plants and animals are beyond the scope of patentability. Moreover, essentially biological processes employed for the

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<sup>127</sup> WTO Agreement on Trade Related Aspects of Intellectual Property Rights 1994.

propagation and production of plants or animals have also been excluded from the purview of patentability. However, micro-organisms are regarded as patentable subject matter.<sup>128</sup> The impugned provision also states that non-biological processes as well as micro-biological processes for the propagation or production of plants or animals can be patented.

It is significant to look into the EC Directive of 1998 pertaining to the Legal Protection of Biotechnological Inventions<sup>129</sup> and the US Patent law<sup>130</sup> when it comes to granting of patents for genetically modified plants and animals. According to the EC Directive, a biological matter can be afforded patent protection once it has been isolated from its natural environment. It is pertinent to note that even though biological matter is not patentable *per se*, the mere act of isolating a biological matter could make it patentable. Here, the act of isolating it from its natural environment is regarded as an innovation. This can lead to serious repercussions as there is a likelihood of increasing incidence of biopiracy.

The peculiar feature of plants, animals and other living organisms is their ability to multiply biologically. The EC Directive<sup>131</sup> acknowledges this by providing patent to the biological matter which is new or novel, as well as to its progeny having the same characteristics u/A 8.2. The ambit of patent protection was extended to the progeny as well so as to allow the innovator to recoup their profits from more than one generation, as the profit from one generation alone would be insufficient. In effect, there is no clear demarcation between an innovation and a discovery. Moreover, this adversely affects the farmer as they become tied to the seed/animal manufacturer beyond one generation.

The TRIPS Agreement provided two options to member countries, ie, either to adopt patent protection for plant varieties or a *sui generis* for the protection of plant varieties. Developing countries like India adopted the *sui generis system* for safeguarding the rights of the plant breeders rather than granting patents on plant varieties. This was the result of the popular belief that if patents are granted on food crops and farm yields, it would have an adverse effect on the basic human right to food,

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<sup>128</sup> Article 27. 3(b), Agreement on Trade-Related Aspects of Intellectual Property Rights.

<sup>129</sup> EC Directive 98/44/EC, dated 6<sup>th</sup> July 1998, EC Directive on the Legal Protection of Biotechnological Inventions.

<sup>130</sup> Section 101 OF Title 35 U.S.C.

<sup>131</sup> *Id.*

thus depriving people of the access to quality food at affordable prices. Patents create monopolies on inventions pertaining to stable food and crops. These monopolies exist for large durations, like twenty years or more if renewed. A monopoly right granted to patentees on essential commodities like food have crucial repercussions on the society at large.

Most developing countries which chose to protect breeder's rights were forced to ratify the UPOV system, thus depriving them from formulating their own *sui generis* protection over the plant varieties and its ownership.<sup>132</sup> However, the UPOV system substantially limits the rights of farmers and the community to save, exchange, innovate, develop and sell seeds. The criterion for the protection of plant varieties under the UPOV system is that plant varieties must be uniform, distinct and stable.

In Africa, the Organisation of African Unity (OAU) formulated a Model Law<sup>133</sup> in order to regulate the accessing of biological resources as well as for safeguarding the rights of farmers, breeders and the local communities. This Model law was created in order to bring the African Law in conformity with the TRIPS *sui generis* system as well as the Convention on Biological Diversity 1992.

The impugned Model Law acknowledged the fact that the state as well as its people are entitled to sovereign and inalienable rights respectively on the biological resources in its geographical territory. It also provides that life forms and biological processes are excluded from the purview of patentability. This is expressly stipulated in its Preamble and also in the clause pertaining to accessing biological resources. The access to biological resources is to be regulated in such a manner that prior informed consent is obtained before it is used and accessed. The impugned Model Law further contains provisions for the protection of breeders' rights, farmers' rights and community rights.

However, the WIPO was completely against the practice of curtailing patent protection on life as it is not in consonance with the TRIPS Agreement. Moreover, the UPOV opined that the UPOV system, rather than the system in the impugned Model

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<sup>132</sup> Ruchi Tripathi, *Food Patenting- A Threat To Food Security*, 101, ActionAid UK, 6, ActionAid 2001.

<sup>133</sup> The African Model Law for the Protection of the Rights of the Local Communities, Farmers and Breeders for the Regulation of Access to Biological Resources 2001.



Law is an effective *sui generis* system according to the TRIPS Agreement.<sup>134</sup> In effect, the way in which WIPO and UPOV interpreted the TRIPS Agreement were vastly different. This in effect, posed a major problem to the member states regarding the choice of system which is to be applied for the protection of new varieties. It is essential to look into the patent protection afforded to plant varieties as provided by various countries in the light of the TRIPS Agreement and the Biotechnology Directive 1998.

## 4.2 Intellectual Property Protection for Plant Varieties

Inventions come within the purview of patentable subject matter provided it is novel, involves an inventive step and possess utility and is capable of industrial application. However, living organisms were not patentable until the 1980s. The famous US decision rendered in the case of *Diamond v. Chakrabarty*<sup>135</sup> is revolutionary in this regard wherein a genetically modified bacteria, which is essentially a microorganism capable of eating up oil spills was held to be patentable subject matter. The microorganism was held to be patentable as it was new, possessed utility, was not something naturally occurring in nature and involved substantial human intervention. In the case of agriculture, inventions such as harvesters, fertilisers, tractors are patentable but seeds and runners were not patentable earlier. This was because utility patents for the protection of runners and seeds were introduced only in 1985<sup>136</sup>. Moreover, up until 1985, farmers were permitted to preserve the seeds of one season to be used in the next season, thereby thwarting any efforts on the part of the inventor to profit from the invention.

In the *Exparte Hibberd*<sup>137</sup> decision of 1985, the USPTO upheld the view that plants are patentable in accordance with the general patent legislation. This was a landmark decision which made plants patentable. Prior to this decision, the USPTO was of the opinion that the general patent statute was not suited for protecting plants and the impugned statute was not in consonance with the Plant Protection Act 1930 and the Plant Variety Protection Act 1970. The *Exparte Hibberd*<sup>138</sup> decision overruled this view

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<sup>134</sup> *Supra* 5.

<sup>135</sup> 447 U.S. 303.

<sup>136</sup> Jacob Moscona, *Patent Protection, Invention and Productivity Evidence from US Agriculture*, 9, 2019, [www.semanticscholar.org](http://www.semanticscholar.org) accessed on 30 May 2020.

<sup>137</sup> 227 USPQ 443, 447.

<sup>138</sup> *Id.*

by holding that plants are not excluded from patentability neither under the Plant Protection Act 1930 nor under the Plant Variety Protection Act 1970. Hence, there is no scope of contradiction between the provisions of the general patent law u/s 101<sup>139</sup> and the provisions of the specific statutes, i.e., the Plant Protection Act 1930 and the Plant Variety Protection Act 1970.

When it comes to intellectual property protection for plants, hybridization is a process which is often attributed to possess *de facto* intellectual property protection.<sup>140</sup> This is due to the reason that farmers were not keen on saving the seeds of the hybrid plant variety as the second generation seeds obtained from the first generation hybrid variety do not possess all the beneficial traits of the first generation hybrid variety. Thus, farmers cannot use these second generation hybrid seeds for use for sowing in the next season, nor can they use it for commercial exploitation. Instead, the farmers have to resort to approaching the patentee every time they want to cultivate hybrid varieties. Hence, hybrid plant varieties pose no threat of potential commercial exploitation, in breach of intellectual property like patents.

Plant patents are granted for new varieties of plants for a 20 year duration computed from the date of filing. Initially, plant patents were introduced with the intention to protect plant varieties generated by means of asexual reproduction. However, the restrictive rules have loosened up over the years. The US Supreme Court ruling in the 2001 case of *J.E.M. AG Supply Inc., d/b/a Farm Advantage Inc. et al. v. Pioneer Hi-Bred International Inc.*<sup>141</sup> is significant in this regard. The Supreme Court of United States took the view that plant patents could be granted for new varieties developed by way of employing genetic engineering techniques as well as other breeding methods. As a result, many of the plant patents are granted for genetically modified crops those of which are held by agribusiness and corporate farms. Moreover, patent protection for plants is also granted for the DNA of the seeds.

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<sup>139</sup> Section 101 OF Title 35 U.S.C- Subject matter which can be patented:  
Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent thereof, subject to the conditions and requirements of this title.

<sup>140</sup> *Id* at 10.

<sup>141</sup> 534 U.S. 124 (2001).

### 4.3 Monsanto's tryst with patent litigation

Monsanto Company is a company largely involved with biotechnological inventions and have patented several of these inventions. Monsanto Company has been a party to many patent litigations concerning agriculture related inventions. It becomes crucial to look into the patent cases involving Monsanto which have cropped up in various jurisdictions in order to analyse the effect of patents on agriculture related inventions.

#### American Scenario

Monsanto Company was a company founded in US in the year 1901 which is extensively involved in agrochemical as well as biotechnological innovations in the agriculture sector. This company was later acquired by Bayer Corporation. Monsanto is well known for its Roundup Ready® products, which are essentially genetically engineered crops. Roundup is a glyphosate<sup>142</sup> based herbicide which was created by Monsanto during the period of 1970s. Roundup Ready® is the trademark owned by Monsanto over the herbicide Roundup which are essentially genetically engineered crops that are patented by it. Monsanto is widely regarded as a major producer of genetically modified crops.

*Monsanto Company v. Scruggs*<sup>143</sup> is significant in this regard. In the instant case, Monsanto owned Patent '605 ( US Patent Number 5, 352,605) which covers the insertion into a plant DNA a synthetic gene comprising a 35s cauliflower mosaic virus promoter as well as a stop signal for the purpose of making the plant herbicide resistant. This helps in the indiscriminate killing of weeds without harming the crops. Monsanto had created seed technology in order to shield cotton plants from getting damaged by pests such as moth larvae and bollworms.<sup>144</sup> Monsanto has ownership of 'McPherson patents' which is the collective name of three other patents which were developed on the '605 patent having insect-resistant characteristics. Monsanto established glyphosate herbicide resistant Roundup Ready® cotton and soybeans as well as stack-strait cotton

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<sup>142</sup> Glyphosate refers to a systemic herbicide which is a broad-spectrum in nature and also acts as a crop desiccant. It is used in agriculture and farming activities for the purpose of killing weeds.

<sup>143</sup> 342 F. Supp. 2d 602 (N.D. Miss. 2004).

<sup>144</sup> Jason Savich, *Monsanto v. Scruggs: The Negative Impact of Patent Exhaustion on Self-Replicating Technology*, Berkeley Technology Law Journal, 22 ANNUAL REVIEW OF LAW AND TECHNOLOGY, 115, 118, (2007).

which were sold as Bollgard/Roundup Ready cotton. These crops were glyphosate herbicide resistant developed with the help of the '605 patent technology. Monsanto gave the license for this technology to seed companies, thus permitting these seed companies to insert this technology into the plant genome, in order to produce crops which were herbicide and insect resistant. The seed companies or seed sellers were however restricted from selling the seeds generated through this technology to the growers unless such growers sign a license agreement which permits them to grow not more than a single commercial crop.

Scruggs is the collective name for the defendants Eddie Scruggs, Mitchell Scruggs, Scruggs Joint Venture, Scruggs Farm and Supplies LLC, HES Farms Inc., MHS Farms Inc., and MES Farms Inc. who are farmers. Scruggs had bought the Monsanto technology infused seeds without signing any licensing agreement. Scruggs retained the seeds originated from the Monsanto seeds which were planted and harvested by them. The resultant seeds from the harvest and seeds from subsequent generation of crops were also planted by them.

Monsanto sued Scruggs for violating its '605 patent as well as the McPherson patents. The district court held Scruggs liable for infringing the patents and therefore issued an injunction against them so as to prevent them from selling and using the seeds infused with Monsanto's patented technology. Scruggs appealed against this decision to the Federal Circuit which upheld the district court's decision, thereby making Scruggs liable for infringement of patents.

### **Canadian Scenario**

The case of *Monsanto Canada Inc. v. Schmeiser*<sup>145</sup> is a landmark decision rendered by the Supreme Court of Canada regarding biotechnology patents. The defendant in this case was Percy Schmeiser, who was a canola farmer alleged to have intentionally grown Monsanto's patented seeds. Monsanto had created a glyphosate resistant gene, the insertion of it in canola plants to make it glyphosate resistant was patented by it. Monsanto marketed these seeds under the name Roundup Ready Canola. Monsanto only allowed licensed users, who entered into a licensing agreement with Monsanto to use these seeds. The licensees however had to buy new seeds every year.

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<sup>145</sup> [2004] 1 S.C.R. 902, 2004 SCC 34.

The purchase price of buying new seeds embodies a licensing fee to utilise the patent rights. Monsanto in the year 1998 found that the defendant was growing Roundup Ready Canola and asked him to sign a licensing agreement for using their patent rights, along with the payment of license fee. However, the defendant argued that the contamination of Roundup Ready Canola in his field was accidental and therefore, refused to enter into any licensing agreement with Monsanto. The averment made by the defendant was that he owned the seed which was harvested by him in his field, and therefore had the liberty to use the harvested seed which was his physical property in any manner he wished to do. Monsanto filed a suit for infringement of patents against Schmeiser. The dispute was decided in favour of Monsanto by the Federal Court of Canada, and later upheld by the Federal Court of Appeal. The Federal Court of Appeal pointed out that an accidental genetic contamination of a crop which is beyond the control of the farmer should be treated as an exception to the general rule that intent is not an issue when it comes to patent disputes. The Federal Court of Appeal emphasised on the relevance of finding out whether Schmeiser had used the seed knowingly. Schmeiser Enterprises Ltd, which was Mr Percy Schmeiser's farming corporation was found liable for damages, as Mr Schmeiser was acting in the capacity of the director of the corporation.

When the matter came before the Canadian Supreme Court, the major issue was whether the planting and cultivation of GM canola by Schmeiser amounted to 'use' of Monsanto's patent over the GM canola cells. The Supreme Court in a 5-4 majority decided in favour of Monsanto. However, Schmeiser had a partial victory as he was exempted from paying the profits from his crops to Monsanto as there was no real advantage to him and had not secured any profits on the crop which is credited to Monsanto's patented invention. It is observed that although plants propagate even in the absence of human intervention, in modern agriculture, there is an involvement of human intervention in the growth and cultivation of plants, and therefore farming is said to be a method involving the usage of plant genes. The Court found that the defendant had denied Monsanto of enjoying its monopoly over the genetically modified canola plant by saving it and growing the Roundup Ready Canola seeds to satisfy his commercial interests. Due to this reason, the defendant was held liable for violating section 42 of the Canadian Patent Act 1985 which provides for the exclusive right of making, selling and all other activities that a patent bestows on the patentee of an

invention. The underlying aim of section 42 of the impugned Act is to define the exclusive monopoly right which a patentee obtains when a patent is granted to them over an invention. Section 42 prohibits any act which intervenes in the patentee's full enjoyment of the monopoly right. The dissenting judgement rendered by Arbour J. held that a company can only patent products and processes and not higher life forms such as a whole plant referring to the decision in the *Harvard oncomouse*<sup>146</sup> case concerning the patentability of higher life forms with reference to the Patent Act. In the *Harvard oncomouse*<sup>147</sup> case dealt with the patentability of a mouse with a genetically altered genome by virtue of the cancer promoting gene called oncogene. The dissenting judgement implies that patent subsists only for the founder plant and not for the offsprings. *Monsanto Canada Inc. v. Schmeiser*<sup>148</sup> provides that the protection afforded to a patented cell or gene includes within it the patented cell or gene present in a plant, irrespective of the fact that the plant cannot be patented due to it being a higher life form.

### **European Scenario**

A landmark case involving the agrochemical giant Monsanto is *Monsanto Technology LLC v. Cefetra BV and Others*<sup>149</sup>. This is the first case dealing with European Court of Justice's interpretation of Article 9 of the 1998 EU Directive.<sup>150</sup> Monsanto had been granted a European patent (EP0546090) for a soybean variety infused with genes making it resistant to the herbicide Roundup. The resultant plant was marketed as Roundup Ready (RR) soybean and were grown in Argentina. Monsanto seized cargoes of soy meal which were imported to Amsterdam by the Dutch importer Cefetra, which upon testing were found to have Monsanto's patented gene in it. This led to the deduction that that the imported soy meal was developed from Monsanto's RR soybean crops. Monsanto sued Cefetra before the District Court of Hague for infringement of its patent. However, Cefetra, by relying on Article 9 of the EC Directive<sup>151</sup> argued that there was no patent infringement. Article 9 states that the ambit of patent protection for a product embodying genetic material includes all

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<sup>146</sup> *Harvard College v. Canada (Commissioner of Patents)* 2002 SCC 76.

<sup>147</sup> *Id.*

<sup>148</sup> [2004] 1 S.C.R 902, 2004 SCC 34.

<sup>149</sup> Case C-428/08.

<sup>150</sup> Directive 98/44/EC.

<sup>151</sup> *Id.*

material wherein the product as well as the genetic information is incorporated and subject to the condition that it performs its function. The term all material here refers to all material except human genetic material as provided u/A 5(1) of the 1998 EC Directive<sup>152</sup> on biotechnology inventions. Monsanto's averment was that the Dutch national law provided absolute patent protection to product claims, and hence, Monsanto's patent benefitted from this protection as it was a product *per se*. As a result of uncertainty as to the interpretation of the Biotech Directive in relation to the national law, the Dutch court referred a few questions to the ECJ in order to solicit a preliminary ruling.

One such question was regarding the interpretation of the Article 9 of the 1998 EC Biotech Directive. ECJ had to look into whether the DNA sequence which is part of the imported material must necessarily perform its function at the time the alleged infringement took place, as required by the function or purpose bound clause u/A 9. The ECJ rejecting Monsanto's averment of absolute protection to product patents, interpreted the Directive in a narrow manner, thereby restricting the scope of patent protection for gene sequences only if it was purpose bound. The ECJ held that as the patented gene ceased to perform its function of making it resistant to herbicide in the dead soy meal, the act of importing the soy meal did not violate Monsanto's patent.

Another question regarding the Biotech Directive was its relation with national laws, i.e., whether the impugned Directive precludes the application of national legislations which afford broader scope of patent protection to biotechnological inventions, such as the gene sequences being protected as patents *per se*. The ECJ answered this question in the affirmative by pointing out that Article 9 of the impugned Directive intends an exhaustive harmonisation of patent protection, thereby preventing the national laws from affording higher and absolute protection to product *per se*.

The next question which was referred to the ECJ was regarding the relevance of the date when the Biotech Directive came into effect. This question was referred as there was confusion regarding the application of the impugned Directive to the present case as the granting of the patent had occurred before the Directive came into effect. The ECJ ruled that the new rules regarding the patenting of biotechnological inventions was to have immediate application on the future consequences of a scenario which

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<sup>152</sup> Directive 98/44/EC.

resulted from the old rules. Therefore, the coming of effect of the Biotech Directive post the granting of the instant patent did not have any real consequence on the answers in relation to the first two questions.

The final question before the ECJ was whether Articles 27 and 30 of the TRIPS Agreement is in conflict with the 1998 Biotech Directive. Article 27 of the TRIPS Agreement deals with patentable subject matter whereas Article 30 of the TRIPS Agreement deals with the exceptions to the rights of the patent holder. The ECJ after looking into Articles 27 and 30 of the TRIPS Agreement ruled that there is nothing contradictory in the provisions of the TRIPS Agreement and the provisions of the 1998 Biotech Directive.

### **UK Scenario**

Yet another landmark decision concerning the 1998 Biotech Directive is in the case of *Monsanto Technology LLC v. Cargill International SA*.<sup>153</sup> The instant case involved the importing of genetically modified soy meal by Cargill from Argentina to the United Kingdom. The seed company Monsanto owned a patent EP0546090 over RR soy plant which had herbicide resistant properties. The invention claimed comprised of an isolated DNA sequence which possessed the characteristic trait of encoding for the desired enzyme. Moreover, it also claimed that it involved rDNA molecule possessing glyphosate resistant traits. In the instant case, 5000 tonnes of processed soy meal was imported from Argentina to the UK by Cargill. Monsanto found that the imported meal was originated from the RR soy plant and therefore alleged before the British Court that the defendant had infringed upon their patent by importing the soy meal. The defendant importer's averment was that the importation of soy meal had not infringed the patent as it was not a valid one. The defendant contended that Monsanto had promoted the cultivation of Roundup Ready soy beans in Argentina for a long time without demanding any sort of royalty payment from them. Later on, Monsanto changed its stand when Argentina cultivated RR soy plants on a large scale and demanded the Argentinean farmers to pay royalty for the export of soy to Europe. Cargill claimed that this implied that Monsanto had not endured any real loss or damage as they themselves had encouraged the non-payment of royalty in the first instance. Cargill also put forth the argument that the protection afforded to genetic material was

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<sup>153</sup> [2007] EWHC 2257 (Pat) 153, [2008] F.S.R. 7 (Eng.).



in effect based on its existence in isolated form and Monsanto's exclusive right over the invention was confined to situations wherein the genetic sequence was used. As the claims specified in Monsanto's patent application dealt with this kind of protection cover and therefore there was no need for a broader interpretation to be made.

The British Court ruled that the vestiges/ remnants of the genetic sequence located in the soy meal was not in its isolated form as specified in the patent application, and therefore, there was no infringement of Monsanto's patent. The traces of genetic material did not match with the patent claims. The discovery of traces of genetic material in the soy meal does not in any way affect the feeding of animals, which was the actual reason behind the purchasing of bran. The herbicide resistant traits do not have any significance as the isolated gene will be incapable of carrying out the function it sought to achieve. Thus Monsanto lost the case as there was no patent infringement found in the instant case.

These patent litigations show that the courts have a tendency to narrow down the scope of the patent protection especially in the cases involving the import of products derived from the patented invention which ceased to perform its function at the time of its import. However, in cases involving the usage of Monsanto's seeds infused with patented genes without the signing of a license agreement, the courts have upheld the view that such usage amounts to an infringement of Monsanto's patent such as in the case of *Monsanto v. Scruggs*<sup>154</sup> and *Monsanto Canada Inc. v. Schmeiser*<sup>155</sup>.

#### **4.4 A Comparative Approach of Patent Protection for Plants**

While looking into the approach taken by the US and EU with regard to patent protection for plants, due consideration has to be given to plant biotechnological inventions. The development evolved in plant breeding with regard to the technology evolved in plant biotechnology area has outgrown the objections regarding the absence of novelty, absence of inventiveness and the inability to describe.<sup>156</sup> Earlier, the US as well as the EU were reluctant to provide patent protection for plants due to these objections. However, the US and EU have now taken a more lenient approach towards

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<sup>154</sup> 342 F. Supp. 2d 602 (N.D. Miss. 2004).

<sup>155</sup> [2004] 1 S.C.R. 902, 2004 SCC 34.

<sup>156</sup> Geertrui Van Overwalle, *Patent Protection For Plants: A Comparison Of American and European Approaches*, 143, 191, 39. J.L & TECH. (1999), PTC Research Foundation of Franklin Pierce Law Centre.

patent protection in plants by not resorting to a blanket ban on patent protection in plants. The plant variety protection law does not exclude protection on the grounds of lack of industrial applicability and non-obviousness, unlike the laws relating to patents. Hence, both patent laws and plant variety protection laws can co-exist together simultaneously for the intellectual property protection with respect to plants. Patent protection for plants has evolved due to path breaking decisions in *Diamond v. Chakrabarty*<sup>157</sup> and the *Ex Hibberd*<sup>158</sup> case laws. Article 53(b) of EPC was earlier construed very strictly to completely exclude the patentability of plants. Moreover, the product of nature doctrine was prevalent in both the US and the EU which lead to a narrowed scope of patent protection, which has since been leniently construed to restrict only the patentability of essentially biological processes for the production or propagation of plants. Therefore, processes for the production or propagation of plants which are not essentially biological processes and which involves substantial human intervention allows for the patent protection in plants in such cases.

#### **4.5 PlumpyField Network**

Nutriset is a company, set up in the year 1986 and which is based in France and essentially deals with the development of nutritional and food products which can aid in the prevention and treatment of diseases like diarrhoea and malnutrition, especially in the developing countries.

Plumpy’Nut, which is a ready-to-use therapeutic food used to treat acute malnutrition is Nutriset’s most famous product.<sup>159</sup> Plumpy’Nut is a peanut-based product packed with 500 kcal along with essential vitamins and minerals is packed in a 92 gram foil, which is having a shelf life of two years without refrigeration. The Plumpy’Nut is regarded as one of the most effective therapeutic remedies to prevent and treat child malnutrition and is widely used by various health agencies such as the World Food Programme (WFP) and the United Nations Children’s Fund (UNICEF).

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<sup>157</sup> 447 U.S 303.

<sup>158</sup> 227 USPQ 443, 447.

<sup>159</sup> Jay Sanderson, Can Intellectual Property Help Feed the World? Intellectual Property, the PLUMPYFIELD® Network and a Sociological Imagination, Charles Lawson and Jay Sanderson, *The Intellectual Property and Food Project: From Rewarding Innovation and Creation to Feeding the World*, 152, 1<sup>st</sup> Edition (2013), Ashgate Publishing Ltd.

Other food and nutritional products developed by Nutriset include the Plumpy'Soy, Plumpy'Doz, Nutributter, Plumpy'Sup and Qbmix.

The PlumpyField Network is a network developed by Nutriset to make its products and services available to the developing nations.<sup>160</sup> The development of PlumpyField Network in 2005 as a supply and distribution network for Nutriset's products was a reaction to the increasing demand for Plumpy'Nut. The PlumpyField Network functions as a franchising scheme by offering the developing nations a way to easily access Nutriset's products, its technical know-how and information regarding its quality control and management, production processes as well as matters concerning its staff training. The PlumpyField Network along with the ZincField Network enables Nutriset to easily control as well as monitor the manufacture of its nutritional and food products. It allows Nutriset to support and encourage local participation in the production of its products in developing nations.

Nutriset has also developed an online Patent Usage Agreement so as to allow the issuance of non-exclusive licenses to the various companies based in developing nations, thereby permitting them to gain from the common patents of Nutriset. The eligibility criteria for entering into the Patents Usage Agreement is that the entities involved should be local non-governmental organisations whose production and business activities, headquarters as well as a majority of the shareholders must be based in any of the developing nations where Nutriset has valid patent rights. Nutriset had valid patent rights in various nations such as Ghana, Benin, Cameroon, Burkina, Kenya, Uganda, Tanzania, Faso etc.

Nutriset's ownership of the intellectual property involved in their brands, products as well as names helped Nutriset in formulating a licensing and franchise scheme. Nutriset has a patent titled 'High Energy Complete Food or Nutritional Supplement, Method for Preparing Same and Uses Thereof'<sup>161</sup> over the Plumpy'Nut which was registered with various patent offices such as WIPO, European Patent Office, French Patent Office, the USPTO and the Canadian Intellectual Property Office.

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<sup>160</sup> Guimo'n , J. And Guimo'n, P, How Ready-To-Use Therapeutic Food Shapes A New Technological Regime To Treat Child Nutrition, *Technological Forecasting & Social Change* 79(7), 1319-1327, (2012).

<sup>161</sup> Nutriset, *High Energy Complete Food or Nutritional Supplement, Method for Preparing Same and Uses Thereof*, World Intellectual Property Organization (Publication No. WO2002034077).

Nutriset holds registered trademarks such as Plumpy’Nut, Nutributter, ZincField, Plumpy’Doz and PlumpyField in various jurisdictions such as the US and quite a few developing nations. Due to its IP holdings, Nutriset is able to control the accessibility and usage of its protected products, brands and processes so as to prevent unauthorised usage by implanting a franchise and licensing scheme.

In India, NutriVita Food is a company established in 2010 which aims to eliminate undernourishment in India and forge a nourished and healthy generation. NutriVita, through its membership of PlumpyField Network acquired Nutriset’s authorisation for the production and distribution of its patented products such as Plumpy’Doz, Plumpy’Nut and Plumpy’Sup. In addition to this, NutriVita Food is also permitted to use Nutriset’s trademarks such as Plumpy’Doz, Plumpy’Nut, Plumpy’Sup, its packaging and branding.

It is necessary to emphasis on the importance of food security in not just incentivising agricultural research. It is crucial to note that purely linking intellectual property to food security by describing it as a technology leads to problem of technology trap which involves specifying food security as a mere technology, thereby ignoring the methods of food accessibility, production and its distribution. This is due to the fact that food insecurity is a problem with physical, economic, social and political implications which needs to be addressed. Intellectual property also leads to the introduction of new products and processes which aid in eradicating food insecurity. Nutriset along with PlumpyField Network helps in creating and supporting local participation in the production of food and nutritional products by using intellectual property as a tool thereby furthering the reach of accessibility and distribution of their products in order to eliminate food insecurity.

#### **4.6 Conclusion**

Whilst critically examining the law relating to patents and plant variety protection, it is found that both patents and plant variety protection is essential and one cannot overemphasis one over the other. Both patents as well as the plant variety protection have its positives as well as negatives. While examining case laws regarding the patent related inventions, it is found that patent protection has definitely helped the productivity, cultivation and enhancement of the quality of crops. The genetically

modified plants and plant varieties have shown qualities which are beneficial towards the elimination of poverty and supply of good quality food. Therefore, blanket objections against patenting are not beneficial because continuously ignoring the implications of genetically modified seeds and plants will not result in substantial advancement in the production of food. Moreover, the introduction of therapeutic food and nutritional products such as Nutriset's PlumpyNut will help to eliminate malnutrition and diseases associated with nutritional deficiency. The Nutriset's PlumpyField Network offers a unique franchise and licensing scheme which aims to provide easy access to Nutriset's products and related information, as well easy supply and distribution mechanism of its products, thereby stimulating local support and participation in this endeavour.

To meet the emerging needs of growing population, it is highly essential to ensure maximum food production in the available cultivable land so as to feed the global population. It is seen from the experience of the US and EU that the employment of technological inventions in the agriculture and food sector, thereby allowing genetically modified plants and plant varieties have provided a huge impetus for the higher yield in food production, which is required to meet the food demands of the people. Scientific or research development in the agricultural and related fields has introduced pest resistant and high yielding varieties of plants. The farming community in India is the poorest of the poor as their food productivity get affected by natural calamities and they get further stooped in poverty and incur huge debts. It would be a welcome initiative if the government takes up the agriculture sector u/s 100 of the Patents Act 1970 and allow the introduction of patented products and processes by making use of the compulsory licensing on notification by the Central Government u/s 92 under the Patents Act 1970 to meet the situations of urgency and public health. Section 100 of the Patents Act 1970 provides for the power of the Central Government to use inventions for purposes of the government and section 92 provides for special provisions for compulsory licences on notification by the Central Government. These provisions could be used for the benefit of the people. These provisions which provide exceptions to a patentees monopoly rights are seldom used by the central government. However these provisions found their way in Patents Act to balance the private interest of the patent holder and the public interest of the people at large. By making use of these provisions, the problem of food insecurity can be eliminated to a certain extent.

Food production needs to be enhanced by making use of the genetic and technological advancements in research. The tremendous scientific and research inputs in plants and seeds has to be translated into crops to feed the population. Hence proper utilisation of the patent law in balancing the patentee's rights and public needs is the need of the hour. Enhanced food production ensures that the growing requirements of food of the nation are met. Our legal system can be modified to find a harmonious balance in this regard.

## **Chapter V**

# **INTELLECTUAL PROPERTY PROTECTION AND FOOD SECURITY**

### **5.1 Introduction**

Intellectual property and food security are inextricably linked to each other in more than one way. The nexus between the two is largely left unexplored although the link is widely recognised. In this age of globalisation which has brought the world closer and closer, the incidence of intellectual property violations are rampant, the need for stronger enforcement of intellectual property rights is acknowledged. The relatively newer forms of intellectual property rights such as plant variety protection and geographical indications are testimony to this fact. This is due to the reason that India being a WTO member and a signatory to the TRIPS Agreement was left with no other option but to enact national legislations for the protection of the various forms of intellectual property as mandated by the TRIPS Agreement. As intellectual property is all pervasive, and even found in the simplest of things in life such as access to good quality food, it is essential to look into the nexus between intellectual property rights and food security which involves access to quality food at affordable prices. This chapter tries to focus on the various intellectual property rights that have a bearing on the attainment of food security in India. In this context, it is imperative to understand the role of geographical indications, plant variety protection etc other than patent rights in the attainment of food security in a country like India.

### **5.2 Protection of Plant Varieties and Farmers' Rights Act 2001**

The Protection of Plant Varieties and Farmers' Rights Act 2001 was enacted for the purpose of conserving seeds and registered plant varieties so as to enable greater yield of food production and sustainability of food thereby ensuring food security. The Protection of Plant Varieties and Farmers' Rights (PPV&FR) Act 2001 was enacted in response to the WTO TRIPS Agreement which u/A 27.3 stipulates that all member nations are bound to provide patent protection or an alternative *sui generis* mechanism for the protection of plant varieties and breeders' rights within the realm of intellectual

property or a combination thereof. India adopted a *sui generis* system rather than allowing patent protection for plant varieties and thus, the Protection of Plant Varieties and Farmers' Rights Act 2001, thereby fulfilling its obligations under the TRIPS Agreement. A *sui generis* system, is an attempt by the Indian Government to recognize and protect the rights of both commercial plant breeders and farmers under the impugned Act of 2001 subject to the fulfillment of the criteria of being distinct, uniform and stable (popularly called the DUS test) in order to distinguish and identify a new, extant<sup>162</sup>, essentially derived variety<sup>163</sup> and farmer's variety.<sup>164</sup>

According to Section 2(za) of the Protection of Plant Varieties and Farmers' Rights Act 1999, a 'variety' refers to a plant grouping apart from microorganism which are within a single botanical taxon of the lowest known rank, which can be -

- (i) Defined by the expression of the characteristics resulting from a given genotype of that plant grouping;
- (ii) Distinguished from any other plant grouping by expression of at least one of the said characteristics; and
- (iii) Considered as a unit with regard to its suitability for being propagated, which remains unchanged after such propagation, and includes propagating material of such variety, extant variety, transgenic variety, farmers' variety and essentially derived variety.

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<sup>162</sup> Section 2(j) of the PPV&FR Act defines "Extant Variety" as "a variety available in India which is- (i) notified under section 5 of the Seeds Act, 1966 (54 of 1966); or (ii) farmers' variety; or (iii) a variety about which there is common knowledge; or (iv) any other variety which is in public domain."

<sup>163</sup> Section 2(i) of the PPV&FR Act states that an "Essentially Derived Variety" in respect of a variety(the initial variety) "shall be said to be essentially derived from such initial variety when it- (i) is predominantly derived from such initial variety, or from a variety that itself is predominantly derived from such initial variety, while retaining the expression of the essential characteristics that results from the genotype or combination of genotype of such initial variety; (ii) is clearly distinguishable from such initial variety; and (iii) conforms (except for the differences which result from the act of derivation) to such initial variety in the expression of the essential characteristics that result from the genotype or combination of genotype of such initial variety."

<sup>164</sup> Section 2(l) of the PPV&FR Act defines a "Farmers' Variety" as "a variety which- (i) has been traditionally cultivated and evolved by the farmers in their fields; or (ii) is a wild relative or land race of a variety about which the farmers possess the common knowledge.



### 5.3 Difference between Plant Variety Protection and Patent Regime

It is important to consider why India adopted for a *sui generis* protection for plant varieties rather than a stronger form of protection such as patents which have a relatively higher period of protection of twenty years. A major reason for the same is that patents have a larger shelf life than the plant variety protection. The major difference between patent rights and plant variety protection is that a gene cannot be equivalent to a variety in which a trait is ascertained through the expression of one or more genes.<sup>165</sup> Therefore, a gene consisting of nucleic acid which is a chemical compound may in fact grant a particular characteristic or trait to a plant, yet it would not be regarded as a variety according to the Protection of Plant Varieties and Farmers' Rights Act 2001. Another important point to be noted is that when an insertion of a gene or a DNA molecule into a plant species by way of the transformation method, such method would not be conferred protection under the Protection of Plant Varieties and Farmers' Rights Act 2001 unlike in the case of the Patent regime, which affords protection for the same. This is because the Protection of Plant Varieties and Farmers' Rights Act does not contain any provision for the protection of a method of transforming a plant or the regeneration of a plant through the method of tissue culture.

A trait for the resistance to abiotic and biotic stress may be regarded as a distinct characteristic as per the Protection of Plant Variety and Farmers' Rights Act 2001. Nevertheless, protection under the plant variety protection regime is for all the characteristics of a plant variety and not for a specific and distinct trait of a variety which distinguishes it from other similar and related varieties. This indicates that components such as genes, enhancers, proteins, promoters and traits in plants which do not receive protection under the Protection of Plant Varieties and Farmers' Rights Act 2001 can be protected under the Patents Act 1970. Therefore a recombinant DNA construct, which does not come under the ambit of a plant or a part thereof or a variety, will get protection under the patent regime even if it is ineligible for protection under the Protection of Plant Varieties and Farmers' Rights Act 2001.

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<sup>165</sup> Malathi Lakshmikumaran, Genetically Modified Plants: Plant Variety Protection, Kung-Chung Liu, Uday S Racheria, *Innovation, Economic Development, and Intellectual Property in India and China: Comparing Six Economic Sectors*, 381, 1<sup>st</sup> Edition (2019), SpringOpen.

The TRIPS Agreement u/A 27.3(b) provides flexibility to member nations to consider plants and animals as non-patentable subject matter, provided that these member nations arrange an alternative mechanism for the protection of plant varieties by way of a *sui generis* system (such as Protection of Plant Varieties and Farmers' Rights Act enacted by India) or through the patent regime or both.

The Patents Act allows the use of patentable invention only for research or experimental use as per the experimental/research exemption provided u/ss. 47(3) and 107 A (a).<sup>166</sup> According to Article 47(3), any person can use patented product or process for the purpose of experiment or research including imparting of instructions to pupils. This provision is merely for academic purpose and further research or experiment. This exemption can be used as a statutory defence against infringement where the patented invention has been used for research or experimental purpose. The amended Section 107 A(a) states that any act of making, selling or importing a patented invention solely for uses related to the development and submission of information does not amount to infringement of patent. This enables the pharmaceutical companies to perform further research and developmental activities over the patented product for preparing regulatory approval. This exemption is specifically useful for generic version in advance of the patent expiry. When these 2 exemptions u/ss. 47(3) and 107A (a) are taken together, it appears to be extremely useful for experimental and research purposes for pharmaceutical sector. However, the Protection of Plant Varieties and Farmers' Rights Act 2001 u/s 30 permits the breeders to utilise even the protected varieties under the impugned Act for purpose of developing new varieties.<sup>167</sup> According to section 30 of the Protection of Plant Varieties and Farmers' Rights Act 2001, a researcher is allowed to use any of the registered variety under the Act for the purpose of conducting experiment or research. Such use encompasses within its ambit, the use of a variety as an initial source of variety in order to develop another variety. However, repeated use of such protected variety under the Protection of Plant Varieties and Farmers' Rights Act requires the prior permission of the registered breeder.

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<sup>166</sup> Gopakumar G Nair, Vol.13, *Impact of TRIPS on Indian Pharmaceutical Industry*, Journal of Intellectual Property Rights, 439, September 2008.

<sup>167</sup> M. Lakshmikumaran, Genetically Modified Plants: Plant Variety Protection, Kung-Chung Liu, Uday S Racheria, *Innovation, Economic Development, and Intellectual Property in India and China: Comparing Six Economic Sectors*, 384, 1<sup>st</sup> Edition (2019), SpringOpen.

Yet another major difference between the Protection of Plant Varieties and Farmers' Rights Act 2001 and the Patents Act 1970 is that while the former statute provides for a benefit sharing system, the latter does not embody such a provision in it. A striking feature of this benefit sharing mechanism is that it is applicable only with respect to registered varieties under the Protection of Plant Varieties and Farmers' Rights Act 2001. The benefit sharing provision is provided u/s 26 of the impugned Act of 2001 which stipulates that the concerned authority may invite claims of benefit sharing of any variety registered under the Act, and shall determine the quantum of such award after ascertaining the extent and nature of the benefit claim, after providing a reasonable opportunity to be heard, to both the plant breeder and the claimant. It is crucial to note that the system of benefit sharing is limited to varieties registered under the Protection of Plant Varieties and Farmers' Rights Act 2001. The benefit sharing system allows the third parties who have significantly contributed to the development of a registered variety a right to claim a portion of the benefits that is made available to the owner of a registered variety. The benefit sharing system under the impugned Act indicates that it was primarily constituted to cater to farmers and tribal communities who have played a substantial role in the conservation of a plant germplasm that may have lead to the development of a registered variety. The benefit share may be disbursed from the National Gene Fund to eligible individual, community or institution.

#### **5.4 Infringement under the Protection of Plant Varieties and Farmers' Rights Act 2001**

The Protection of Plant Varieties and Farmers' Rights Act 2001 u/s 28(1) allows the owner of a registered variety or a breeder of a variety the right to produce, sell, market, distribute and to export the registered variety. The impugned Act u/s 64 seeks to prevent the infringement of a registered variety by a non-breeder or who is not a registered licensee of the registered owner. The acts constituting infringement by a non-breeder or an unauthorized licensee include the act of selling, importing, and production of a registered variety. The act of selling, importing or production of any other variety by giving it an identical or deceptively similar denomination to that of a registered

variety under the impugned Act in a manner that creates confusion in the minds of the general public also constitutes infringement of a registered variety.<sup>168</sup>

Moreover, section 65 of the Protection of Plant Varieties and Farmers' Rights Act 2001 stipulates that a suit for infringement of a registered variety or of any rights pertaining to a registered variety must be instituted only in a court having the rank of a District court and not a court inferior to a District Court. Hence, an infringement suit can be filed only by a person who has access to district headquarters and is not accessible to people living in remote areas. Thus, recourse by way of a suit for infringement can only be made with respect to a registered variety under the impugned Act in case there is an act of infringement by an unauthorised person.

This indicates that the Protection of Plant Varieties and Farmers' Rights Act does not afford any protection in case of unauthorized use, sale, export, import, and production of the specific distinct trait, such as an insect resistant trait, which may be inserted into another plant variety through means of conventional breeding methods by utilising the initial transgenic plant. Accordingly, neither the benefit sharing system u/s 26 nor infringement u/s 64 of the PPV&FR Act can aid an innovator in relation to matters regarding the protection of a specific distinct trait in a plant variety. Therefore, it is necessary to have protection under the Patents Act for such inventors as a compensation for the disclosure and sharing of their creation for the benefit the general public.

Technical knowledge is a requisite for the registration of a variety under the impugned Act. However, farmers who develop plant varieties usually do it with the use of traditional methods which does not involve any scientific process requiring technical knowledge.<sup>169</sup> So, this method of registration of a plant variety is an unrealistic method. Moreover, the testing and registration fees are fixed at exorbitant levels. The validity period of a registered plant variety is lesser than the patent period. The period of plant protection is generally nine years for trees and six years for other crops and the validity period can be extended up to eighteen years by renewal after payment of necessary fees

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<sup>168</sup> Malathi Lakshmikumaran, Genetically Modified Plants: Plant Variety Protection, Kung-Chung Liu, Uday S Racheria, *Innovation, Economic Development, and Intellectual Property in India and China: Comparing Six Economic Sectors*, 383, 1<sup>st</sup> Edition (2019), SpringOpen.

<sup>169</sup> Dr. N.S Gopalakrishnan, *Problems with Indian Plant Varieties Regime (V): Farmer's Rights – A Myth or Reality(I)?*, Pankuri Agarwal, Decoding Indian Intellectual Property Law, SpicyIP, October 2018.

in the case of trees and vines from the date of registration of the variety and up to fifteen years for other crops.<sup>170</sup> The patent protection exists for a longer duration of twenty years. However, the protection afforded to a registered variety would not benefit the farmers and breeders as the farmers cultivating their seeds has the right to save, sow, reuse, resow which in effect does not lead to any significant gain to the farmer as these seeds can be saved and reused by anyone without having to collect seeds every season from the farmer. Therefore, there is no significant economic benefit to the traditional farmers even after undertaking all the expensive procedural requirements in getting the plant variety registered under the Act. Further, only modern breeders who make use of modern technology in the development of a variety will be benefitted. There is not much scope for protection of varieties developed by farmers by way of traditional breeding methods under this impugned Act. While analysing the benefits accrued to the traditional farmers by way of the intellectual property based approach, it appears that the protection under the Plant Varieties Act falls short of the objectives of the enactment which was to promote the rights of the farmers in respect to their contributions made at any time in conserving, improving and making available plant genetic resources for the development of a new plant variety.<sup>171</sup> Hence, the incentive based approach in the context of plant varieties need to be re-examined and revamped.

Through this analysis, it is found that while plants and plant parts are excluded from patentability u/s 3(j) of the Patents Act, the Protection of Plant Variety and Farmers' Rights Act 2001 provides for the protection of plant varieties and the rights of farmers and breeders in relation to it. Moreover, whilst essentially biological processes are not patentable and only insertion of traits such as genes, proteins etc through non-biological processes involving substantial human intervention are protected under the former Act, the latter provides for the protection of new plant varieties which satisfy the DUS test evolved through biological processes. While it is significant to note that plant variety protection regime and the patent regime in India provide entirely different forms of intellectual property protection, each offering a completely different set of rights to the owners of these intellectual properties, it is significant to note that both play a crucial role towards the fulfilment of food security. Both patents and plant variety protection may seem to be foes at first glimpse, but they

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<sup>170</sup> Section 24(6), The Protection of Plant Varieties and Farmers' Rights Act, 2001.

<sup>171</sup> Objectives of The Protection of Plant Varieties and Farmers' Rights Act 2001.

are in fact friends in disagreement who perfectly fill in the voids created by the other. Thus, both these forms of intellectual property protection do not contradict each other, but supplement one another, thereby aiming at reducing food insecurity in India.

## **5.5 Geographical Indications**

Geographical indications are an essential form of intellectual property protection wherein the goods having such indications are attributed superior quality, performance and other distinct characteristics owing to its source of origin from a particular place that distinguishes such goods from other goods which do not originate from a place having a geographical indication. Such indications help in identifying a particular good as originating from a given designated source of origin which attributes to it greater efficiency, quality, performance etc. Geographical indications conferred on agricultural goods and food products help in the protection of such products and their quality, it enhances its reputation and market demand, and increases its price. All these factors in turn contribute towards the attainment of food security in a nation.

Prior to 1999, India did not have any legislation governing geographical indications. In order to meet the challenges posed by the lack of proper legislative framework in accordance with international standards of protection, the Indian parliament was forced to enact the Geographical Indications of Goods (Registration and Protection) Act 1999.

According to Article 22.1 of the TRIPS Agreement, geographical Indications are indications which identify a good as originating in the territory of a Member, or a region or a locality in that territory, where a given quality, reputation or other characteristic of the good is essentially attributable to its geographical origin. This definition has been incorporated u/s 2(1)(e) of the Geographical Indications of Goods (Registration and Protection) Act 1999 which stipulates that with respect to goods, geographical Indications refers to an Indication which identifies such goods as agricultural goods, natural goods or manufactured goods as originating, or manufactured in the territory of a country, or a region or locality in that territory, where a given quality, reputation or other characteristics of such good is essentially attributable to its geographical origin. It further provides that in relation to manufactured goods, it is essential that one of the activities of either the production or

of processing or preparation of the goods concerned must take place in such territory, region or locality as the case may be, in order to be granted a valid geographical indication.

The impugned Act provides for the establishment of a Geographical Indications Registry u/s 5 which is the authority that receives and processes the applications filed for the grant of geographical indications in India.

The impugned legislation disallows the registration of a geographical indication as trademark u/s 25 of the impugned Act in consonance with Art 22.3 of TRIPS. Under this statute, the term 'goods' refer to any agricultural, natural or manufactured goods or any goods of handicraft or any industry, and also encompasses foodstuffs within this definition u/s 2(1)(f). The Geographical Indications of Goods (Registration and Protection) Act 1999 u/s 22(1)(c) prevents the infringement of geographical indication as well the registration of indications which in spite of being true as to the territory, region or locality wherein the goods originate, makes a false representation to the public that the goods originate in another territory. The instant provision is based on Article 22.4 of the WTO TRIPS Agreement<sup>172</sup>. The Act<sup>173</sup> u/s 22(1)(a) seeks to prevent the use of misleading geographical indications, which indicate that the goods originate in a geographical area other than the true place of origin. Moreover, the Act deems an act of unfair competition, i.e., any act amounting to disparagement or tarnishment of a competitor, as an infringing use of a geographical indication u/s 22(1)(b). The registration of geographical indication under the impugned Act is granted to any association of persons or of producers entered in the register as a proprietor of the geographical indication for a period of ten years which is renewable after an opposition period.

Geographical indications serve many functions such as aiding in product differentiation, provides guarantee of efficiency of the goods, indicates high quality of the goods, it indicates the source of origin, helps in the advertisement and promotion of the country, rural development<sup>174</sup>, protection of traditional knowledge.<sup>175</sup> The other

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<sup>172</sup> Agreement on Trade Related Aspects of Intellectual Property Rights 1994.

<sup>173</sup> The Geographical Indications of Goods (Registration and Protection) Act 1999.

<sup>174</sup> Jhamtani H, *The Green Revolution in Asia: Lessons for Africa*, 3, FAO: Rome, 2010.

<sup>175</sup> Mas Rahmah, Vol.22, *The Protection of Agricultural Products under Geographical Indication: An Alternative Tool for Agricultural Development in Indonesia*, Journal of Intellectual Property Rights, 95, March 2017.

advantages of geographical indications include the promotion of marketing strategies at both domestic and international level, developing rural areas on the basis of its reputation of possessing high quality, provides greater value to the goods likely to have geographical indications, enhances the livelihood of the producers of these goods, enhances the reputation of such goods in the global trade, dissuades unfair competition, as well as curbs the act of misrepresentation, or deceptively misleading behaviour, ensures fair and equal treatment etc.

Geographical indications allows for the identification of goods having unique quality, standard and distinct characteristics due to geographical factors and aids in the differentiation of the products having the tag of geographical indications from other similar products in the market. For example, Nagpur oranges are agricultural goods having the GI (geographical indications) tag which are popular for their superior quality and nice flavour. The Basmati rice derives its quality on account of being originating from the banks of the River Ravi. The quality of such agricultural products are generally associated with the geographical aspects such as local tradition, natural factors, culture, human factors etc which contribute to the excellence and reputation of these products. This kind of association in turn helps in forming a link between the quality, origin and reputation which is derived from their source of origin.

It is pertinent to note that in the absence of geographical indications which differentiates products in the market, the producers will not have any incentive to produce high quality products to remain in the market, as all goods tend to be sold at the same price.<sup>176</sup> It aids in developing a competitive spirit in the minds of the market players to compete with each other's products in a fair manner, thereby ensuring the continued sustenance of players in the market. Goods having geographical indications have the tendency to provide incentives for the producers of agricultural products by permitting the producers to obtain a premium price and also adding to the economic value of the goods, and attracting other producers or farmers to enter into the market.

Many factors contribute to distinct characteristics of GI products, especially in the case of agricultural products.<sup>177</sup> The environment, on account of its soil

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<sup>176</sup> Asian Development Bank, *Indonesia Strategic Vision for Agriculture and Rural Development*, 36, 2006.

<sup>177</sup> Bagal M. N & Vittori M, *Practical Manual on Geographical Indications for ACP Countries*, 12, CTA and origin, Agridea-Switzerland, 2011.



composition, climate, biodiversity, confers distinct and specific quality and characteristic features on the products having GI tags, thereby making them unique.<sup>178</sup> The good reputation enjoyed by these products aids in enhancing its consumer demand, expansion of its market as well as contributes towards agricultural development.

Geographical indications serve as a tool for assuring and guaranteeing a specific level of quality and efficiency. It helps in ensuring the continuity of a product's quality and creates a positive perception about it in the minds of the public. Consumer's positive perception about these products in turn leads to greater market access as well as higher market demand. It affords the producers an opportunity to acquire competitive advantage and comparative advantage in the market in comparison to other products. This therefore confers on the producers of these products with designated source of origin a higher market power as well as market recognition. This is due to the reason that a product bearing a GI tag inherently has unique and specific qualities attributed to it on account of its source or place of origin.

When agricultural products are conferred a GI tag, the producers of these products become successful in creating an image of 'scarcity' or 'exoticism' to the product that helps them in getting premium prices for their products in the market. Scotch Whiskey, Darjeeling tea, Wayanadan Manjal are all examples of exotic GI products. The GI products have specific qualities which are due to the geographical area in which it is originated. These geographical features enhance the quality of the products in such a way that the product has a superior and inherent quality which is its peculiarity. This differentiates it from similar products produced elsewhere.

Geographical indications also serve as a tool for the conservation of traditional knowledge. This is because GI products are essentially the traditional knowledge accumulated over the years as well as due to natural and cultural factors. This form of intellectual property protection thereby allows for substantial contribution towards the preservation and development of traditional plants, natural resources, biodiversities, and soil as well as the overall environmental setting. Since GI is a result of collective traditions and collective decision making processes, it thereby repays the traditions which allowed for its development by rewarding it with benefits of continued evolution

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<sup>178</sup> Michael Blakeney, *Intellectual Property and Food Security*, 184, Cambridge: CABI, 2009.

of the traditions.<sup>179</sup> GI helps maintain the local wisdom and traditional plantation along with its intrinsic values, thereby promoting the local traditions and culture.<sup>180</sup>

However, geographical indications do not result in any significant value addition to the products especially when it comes to agricultural products. This is because the maintenance and care required for the products having GI tag is very high and it may also lead to high maintenance cost. For example, the Vechur Cow which has a GI tag needs extreme care. The Changilakodan Nendran banana, a particular type of banana having GI tag requires a great amount of care for its cultivation. It is difficult to cultivate such products on a large scale without devoting higher amount of care and time. In such cases, only a small variety can be protected with the help of geographical indications. There is great uncertainty as to how it can be adequately protected due to the high incidence of adulteration when it comes to the marketing of GI products. Moreover, there are instances when the Basmati rice exported from India involved large quantities of rice which was not Basmati mixed with Basmati rice.<sup>181</sup> Hence GI can provide protection only for certain products which can be produced on small scale basis as it demands a great amount of care and maintenance related expenditure.

Geographical indication affords enhanced distribution of added value throughout the production chain, commencing from the raw materials' producers to the manufacturer of finished products and also allows for greater diversification of production. The diversification in agricultural production in turn promotes greater balance between the competing market forces of demand and supply, thereby promoting enhanced levels of food distribution and availability of food.<sup>182</sup>

## 5.6 Conclusion

Thus, geographical indications play a major role in protecting the regional diversities in plants and also the traditional methods of cultivation of such crops. Geographical Indications Act helps in ensuring and preserving the divergent varieties of cultivation of various food crops. Moreover GI helps in greater market access and

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<sup>179</sup> *Supra* 11.

<sup>180</sup> Albayarek M & Ozdemi M, *The role of geographical indication in brand making of Turkish handicrafts*, 2(3) International Journal of Business and Social Research, 111, June 2012.

<sup>181</sup> Prashant Reddy T. and Sumathi Chandrashekar, *Queen of All Rices, Create, Copy, Disrupt: India's Intellectual Property Dilemmas*, 293, 1<sup>st</sup> Edn. (2017), Oxford University Press.

<sup>182</sup> *Supra* 11.

market recognition for the products bearing GI tags, thereby allowing the producers of these products to capture premium prices for their products owing to the special and unique characteristics attached to such products on account of their source of origin. Moreover, it aids in building a competitive spirit amongst the market players to strive their best, thereby regulating the market and avoiding anti-competitive practices. The positive perception which is etched in the minds of the public with regard to the reputation and quality of products having geographical indications, in turn results in the more consumer demand for these products. Since, geographical indications are given to certain products as a result of numerous factors such as natural and geographical factors as well as cultural factors and the accumulation of centuries' old traditional knowledge, it can be said that geographical indications therefore in effect protect traditional knowledge.

The enhanced value addition, along with better distribution as well as diversification of the agricultural production allows for the creation of a balance between the supply and demand in the market, thereby ensuring food distribution and availability leading to food security.

The plant variety protection envisaged under the Protection of Plant Varieties and Farmers' Rights Act 2001 which allows for the protection and conservation of seeds and registered plant varieties ensures that the rights of the farmers and the plant breeders with respect to the registered plant varieties developed by them are not exploited by unauthorised users. Further, the benefit sharing scheme under the impugned Act contributes significantly towards the attainment of food security in India. The plant variety protection law and the patent law in India are not contrary to each other and can be harmoniously construed for giving intellectual property protection for plants.

Although each intellectual property has its own drawbacks, it is necessary to look at the bigger picture where the advantages outweigh the disadvantages. Hence, it can be rightly said that intellectual property rights such as geographical indications and farmers' and breeders' rights with respect to the conservation of plant varieties as well as patent rights play a major role in the attainment of the goal of food security in a nation like India which is crippled with poverty and malnutrition.

## Chapter VI

### CONCLUSION

*“Food security means all people have access to culturally appropriate, nutritious food at all times without relying on emergency supplies”*

-Pattie Baker, in *Food for My Daughters*.

The issue of food insecurity is a crisis which plagues the whole world. With the introduction of intellectual property in the agriculture and food sector, it is pertinent to look into the relationship between food security and intellectual property rights, especially patent rights. With the advancement and innovation in agriculture and the food sector, patents have become a crucial form of intellectual property which has a bearing on the food security of a nation.

On a closer analysis of the patent system in various nations, it is found that patents have become increasingly important in the agriculture and food sector with the advent of the WTO Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS Agreement). This is due to the fact that the TRIPS Agreement provides for the patenting in relation to plant varieties. Article 27.3 of the TRIPS agreement prohibits the patenting of plants and animals and the use of essentially biological processes for the propagation and production of plants as well as animals. However, it provides that member nations are to afford intellectual property protection to plant varieties either in the form of patents or plant variety protection or a *sui generis* system. Moreover, microorganisms are patentable as they are not excluded from patentability under the impugned Agreement owing to the landmark decision in *Diamond v. Chakrabarty*<sup>183</sup> wherein a bacteria capable of gobbling up oil spills was held patentable.

In the aftermath of *Diamond v. Chakrabarty*, there has been a series of landmark decisions regarding the patentability of life forms. The decision in the US case of *Exparte Hibbert*<sup>184</sup> in which a maize variety was regarded as patentable and a similar

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<sup>183</sup> 447 U.S. 303 (1980).

<sup>184</sup> 277 U.S.P.Q. 443 (Bd. Pat. App. 1985).

decision in the European case of *Ciba Geigg*<sup>185</sup> wherein patent was granted to a non-natural plant have expanded the scope of patents.

The ‘product of nature’ doctrine proved to be an obstacle in the way of patenting of plants. This is due to the fact that according to this doctrine, all biological and natural products must not be patentable as living beings are products of nature created by the Almighty which humans must not tamper with. However, human made non-natural products are patentable provided that there is sufficient human intervention involved in the process of evolving such a man-made product through the application of biotechnological measures. The basis for the product of nature doctrine is found in the TRIPS Agreement and the European Patent Convention. Article 27.3 of the TRIPS Agreement curbs the patenting of essentially biological processes for the propagation and production of plants as well as animals, but permits the patenting of the application of non-biological and microbiological processes for the same purpose. Article 53(b) of the European Patent Convention also excludes the patenting of plants and animals as well as the use of essentially biological processes for the production of plants or animals. India also excludes the patenting of plants and animals u/s 3(j) of the Patents Act 1970 irrespective of whether it is sought to be patented wholly or partially. It further excludes seeds, varieties, species and essentially biological processes used for the purpose of propagation or production of plants and animals from the purview of patentability.

The intellectual property protection afforded to plants can either be patents or plant variety protection or *a sui generis* kind of protection. Various countries have afforded different kinds of intellectual property protection in relation to plants.

In the US, the Plant Patents Act 1930, the Plant Variety Protection Act 1970 as well as the Utility Patent Act 1952 come into play. The Plant Patents Act 1930 offers patent protection to plants which fall in the category of asexually reproduced plants, especially asexually reproduced cultivators but excludes edible tubers from the purview of patentability. The Plant Variety Protection Act of 1970 affords protection to sexually reproduced plants. The Utility Patents Act 1952 affords protection to genes, traits,

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<sup>185</sup> (1984) O.J EPO 112, Tech, Bd. App.

methods, plant parts or varieties provided it exhibits characteristics of stability, uniformity, novelty and distinctiveness.

When it comes to Europe, it is found that many European nations have enacted plant variety protection provisions. The Netherlands formulated The Plant Variety Protection Act in 1942, and subsequently Germany also followed suit in 1953. The patentability criteria in Europe is that invention must be capable of exhibiting the specific characteristic traits in more than one variety. In order to extend the plant variety protection in other nations, the UPOV Convention was established which led to the formation of the UPOV which protects plant variety rights by conferring intellectual property rights on plant breeders. This aided in the international recognition of plant breeders' intellectual property rights. Germany adopted a novel Plant Variety Protection in 1968. Moreover, Netherlands adopted a novel breeders' rights law, i.e. the National Seed and Plant Material Law in 1967.

The EU Biotechnology Directive of 1998<sup>186</sup> curbed the patenting of plant varieties. The impugned directive permitted a farmer's exception when a patent on a genetic material in effect prevents its reuse on a farm. This directive also known as the EU Directive regarding the Legal Protection of Biotechnological Inventions 1998 includes provision for compulsory licensing when a breeder's use of genetic material holds a strong likelihood of patent violation. The granting of license is subject to certain conditions.

India does not afford patent protection to plants. Therefore, India adopted the TRIPS option for a *sui generis* protection for plant varieties, thereby enacting The Protection of Plant Varieties and Farmer's Rights Act 2001 which promoted the integration of the rights of farmers, breeders, village communities over the plant varieties which they had actively developed and propagated. For the protection of plant varieties, India incorporated the UPOV criteria of stability, uniformity and distinctiveness in addition to having novelty as a characteristic.

The reason for providing plant variety protection rather than patent rights in plants is largely because a patent lasts for a long period of twenty years, whereas plant variety protection affords a relatively shorter duration. Moreover, patents are

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<sup>186</sup> 98/44EC Directive for the Protection of Biotechnological Inventions.

considered as a stronger form of intellectual property than plant variety protection. The longer patent duration gives the patentee the sole monopoly right to sell, distribute, dispose, make or use the invention. The plant variety protection provides rights to the plant breeder for safeguarding and preserving the genetic material of a plant variety. The patentability criteria which involves the satisfaction of conditions like novelty, utility and non-obviousness is starkly different from the criteria for plant variety protection which involves the fulfilment of conditions like novelty, stability, uniformity and distinctiveness.

Moreover, there are inherent restrictions regarding the patentability of plants and plant parts in India expressly mentioned in the Patents Act 1970. Section 3(j) curbs the patenting of plants and animals, irrespective of whether it is done partially or wholly. Further exclusions from the purview of patentability include seeds, varieties, species and essentially biological processes involved in the propagation or production of plants and animals. Moreover, section 3(h) of the Patents Act excludes any method of horticulture or agriculture from the purview of patentability whereas section 3(1) prevents the patenting of any medicinal, curative, therapeutic, diagnostic, surgical, curative or other treatment of human beings or animals to cure them of any disease or enhance their economic significance or that of its resultant products. This in turn becomes a hindrance to the patenting of plants and agriculture related inventions.

There exists a link between patenting and genetic engineering as genetically engineered or genetically modified crops are often sought to be patented. When it comes to genetically modified crops, the patent is usually granted for the insertion of a trait gene into a food crop which positively enhances its efficacy and makes it more resilient. The seed giant corporation-Monsanto has patented many food crops which involve the insertion of glyphosate in it, in order to make it pest resistant.

In the landmark case *Monsanto Technology LLC v. Controller General of Patents*<sup>187</sup>, the patent application was rejected for a method of production used to make a transgenic plant having enhanced salt tolerance, heat tolerance and drug tolerance was rejected on grounds of absence of an inventive step, the process being a prior art as excluded u/s 2j(a) of the Patents Act, evergreening u/s 3(d) of the Patents Act and the inclusion of essentially biological process struck by section 3(j) of the Patents Act 1970.

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<sup>187</sup> IPAB Order No. 146 of 2013 dated 5 July 2013.

On an appeal to the IPAB, it was found that the method of producing a transgenic plant involved substantial human intervention and was therefore not struck by section 3(j) of the Patents Act 1970. However, the invention was still held to be non-patentable as it was struck by the evergreening clause u/s 3(d) of the Patents Act owing to being a mere use of an already known substance and also due to the fact that it lacked an inventive step which is essential for making it patentable.

In *Monsanto Technology LLC and Ors. v. Nuziveedu Seeds Ltd and Ors.*<sup>188</sup>, the Division Bench of the Delhi High Court overruled the decision rejecting the patent application which was rendered by the Single Bench. The Division Bench held that the infusion of a Bt gene in the cotton genome amounts to a process having substantial human intervention and not an essentially biological process, and is therefore not excluded u/s 3(j) of the Patents Act 1970.

The use of biotechnological measures in agriculture to create genetically modified crops is frowned upon due to the prevailing view that it leads to adverse effect on public health, biodiversity and sustainable development. Moreover, the prevalence of subsistence farming as well as small scale farming has made the enforcement of intellectual property rights a very difficult task. However, it is found that patents in the agriculture and food sector can be utilised in such a manner that it becomes beneficial to agriculture and food production. This is because it leads to a reduction in prices which benefits the consumers by providing access to inexpensive agriculture materials. The utilisation of biotechnological measures in food production helps in enhancing the agronomical traits of the plants. Moreover, it leads to sustainable production of food as it aids in the sustainable use of water. Genetically modified plants that are resistant to herbicides in turn help in lowering the pollution of water. These insect and herbicide resistant plants do not require repeated application of the herbicides.<sup>189</sup> The delayed ripening trait associated with genetically modified crops such as the Calgene's tomato leads to delayed rotting, thereby resulting in longer lasting produce. Further, the development of genetically modified plants through the infusion of plant biotechnology in the production of food leads to enhanced nutritional quality. GoldenRice® is one

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<sup>188</sup> FAO (OS ) (COMM) 76/2017, CAV. 328/2017, C.M.

<sup>189</sup> Eva Willnegger, *A Retrospective with Special Emphasis on the TRIPS Agreement, Innovation in Today's Food Sector, Patents in the Food Sector*,(2008), Nomos Verlagsgesellschaft mbH. See also Bennett, *The Foundation of Food Security*, 2003(2), Syngenta Lectures 4.



such example wherein a rice strain was genetically modified so as to contain higher levels of Vitamin A in it. The GoldenRice® was regarded as an indication of progress in global nutrition as it was hailed as a measure to cure Vitamin A deficiency which is directly linked as a potential cause of blindness. The infusion of health-related traits in genetically modified crops aids in increasing the yield.

Another significant aspect regarding the application of biotechnology in the food and agriculture sector is that the associated research and development expenses for its research and implementation can be recouped by getting royalties from the farmers for their utilisation of the seeds infused with desirable traits through this technology. However, the problem lies in the implementation of licensing agreements with the farmers concerning the usage of the patented seeds which is not always feasible.

A crucial problem with regard to the use of genetically modified crops is the mitigation of costs pertaining to investment which had led to the use of T-GURTs (Trait-Genetic Use Restriction Technologies). This resulted in a conflict of interest between business ethics concerns and humanitarian concerns as the farmers were prevented from saving the seeds of the harvest crop so as to use it in the next season. Due to the detrimental effects to the biodiversity and socio-economic conditions of numerous nations on account of this practice, the CGIAR (Consultative Group on International Agriculture) decided not to employ this technology in the plant breeding schemes of international institutions.<sup>190</sup>

The use of the CRISPR Technology to edit genomes is a significant innovation in this area which aids in enhanced quality of crops, boosting the immunological defence system of bacteria<sup>191</sup>, prevents the spread of diseases, modify DNA sequences and treat genetic defects. This is an alternative to the T-GURT technology as it aids in the infusion of desired traits in a target organism without preventing reuse. This is due to the fact that it aids farmers in sustainable development without comprising on the biodiversity and without any restriction on the saving of the seeds for reuse.

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<sup>190</sup> R T Gahukar, *Issues Relating to the Patentability of Biotechnological Subject Matter in Indian Agriculture*, 9, 12, 8 Journal of Intellectual Property Rights, (2003), NISCAIR.

<sup>191</sup> Malathi Lakshmikumaran, *GM Plants: IP and Regulatory Concerns in India*, Kung-Chung Liu, Uday S Racheria, *Innovation, Economic Development, and Intellectual Property in India and China: Comparing Six Economic Sectors*, 368, 1<sup>st</sup> Edition (2019), SpringOpen.

India adopts a stringent stand when it comes to the use of genetically modified crops. India has banned the commercialisation of genetically modified food crops such as Bt Brinjal. India has however, permitted the commercialisation of Bt cotton, a genetically modified crop, mainly due to the fact that it is not an edible crop. In such a situation where excessive restrictions are imposed on the patenting in relation to agriculture and food sector, it will inadvertently effect India in the long run when by the time we relax our patent restrictions and open up market, perform research and patenting in the agriculture and food sector, we will be lagging behind as a nation when competing with other nations of the world. India has to increase research and patenting activities in the food and agriculture sector, so that we do not end up being the ultimate consumers of all the patents procured by other nations, with little patents to boast of as our own. Increasing the level of patenting will substantially increase the revenue of the nation, thereby leading to economic development. Hence, it is crucial that India adopts patenting as a strategy to attain food security and eradicate hunger and malnutrition, rather than wholly resisting any form of patenting in the agriculture and food sector.

The use of therapeutic food and nutritional products such as Nutriset's PlumpyNut will help to eliminate malnutrition and diseases associated with nutritional deficiency. The Nutriset's PlumpyField Network offers a unique franchise and licensing scheme which aims to provide easy access to Nutriset's products and related information, as well easy supply and distribution mechanism of its products, thereby stimulating local support and participation in this endeavour.

Moreover, the government can take up the agriculture sector as per section 100 of the Patents Act which deals with the power of the Central government to use inventions for the purposes of the government. Such a measure can be resorted to avoid a situation of dire poverty and uncertainty in the event of natural calamities which wreck havoc on agriculture and the farming community. By making use of section 92 of the Patents Act, patented products and processes can be introduced by way of compulsory licensing on notification by the Central Government in order to meet the situations involving public health and urgency. These measures can aid in eradicating food insecurity to some extent.

## Suggestions

Based on this study, these are a few suggestions that I have put forth which can help in addressing the issue of food insecurity-

- 1) Exceptions to the monopoly right of a patent holder u/ss. 100 and 92 of the Patents Act 1970 by way of compulsory licensing and acquisition of patents by the Central government can be effectively used to eradicate poverty and provide adequate food at reasonable prices.
- 2) Patenting in agricultural methods and gene patenting can be introduced into our patent regime so that the technical advancements in these crucial areas can be used beneficially. When other developed countries grant patents in these spheres, in course of time, India will face a situation where we need to import food stuffs unless suitable modifications to the Patent law is not undertaken at the earliest.
- 3) Patenting in genetically modified seeds and crops can be introduced in our Patent regime so that we don't lag behind other nations of the world in terms of patenting activities. This would help in ensuring that we do not become a mere importer of patented technologies.
- 4) Plant variety protection to traditional varieties does not result in desired benefits. The registration of a plant variety under the Protection of Plant Varieties and Farmers' Rights Act 2001 involves huge expenditure even though the farmers do not receive any significant benefits as envisaged under the law.
- 5) Our country needs to be self sufficient in areas effecting the basic requirements of the people. Food security is one aspect where a pro-active approach needs to be taken. In this regard, protecting traditional farming and introducing modern technical methods where minimum investment yields maximum production needs to be undertaken.

Genetically modified crops have proved to be highly useful and productive. GM crops with its high yielding and pest resistant qualities provide a great impetus in boosting the food production. Hence a realistic approach needs to be adopted to incorporate the benefits of GM crops in enhancing food production and making it

accessible and affordable to the farming community. The experiences of farming using GM crops have revealed its utility in producing high yielding good quality products. Genetically modified crops enhance food productivity and can aid in eliminating poverty if the benefit of the research is made accessible and affordable. Innovations that equip the small farmers which are suitable to the local conditions and feasible for the economy and are friendly to the environment are pertinent things while ensuring food security for the future.

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