



# The Role of Intellectual Property Right in Agricultural Research System in Nigeria

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**Abstract:** *The protection of Intellectual Property is fast becoming an instrument and tool for expansion of trade and generation of income when adequately exploited. The study examines the role intellectual property right in national agricultural research system in Nigeria. The objectives were, To determine the extent to which court jurisdiction enforce intellectual property rights; Analyze the relationship between Intellectual property right and agricultural production in Nigeria; The problem of the study is as a result of lack of the information necessary to apply the analytic especially with respect to the incentive theory of intellectual property in the area of agricultural research. The method of the study is qualitative research design, while the methods of data collection were through secondary sources. The study found that intellectual property right has positive significant effect on national agricultural research system in Nigeria. The study observes existing low demand for agricultural IPR in Nigeria could be attributed to knowledge and capacity. The study concludes that protection of Intellectual Property is fast becoming an instrument and tool for expansion of trade and generation of income when adequately exploited. The study recommends that Agricultural firms should use trademark as a tool to protect their intellectual properties. Agricultural firms should also adopt the use of patent rights to protect and if possible combine it with other strategies that may be relevant. Since IP fulfill its mission to a large extent in industries especially when it is effectively managed, it is also recommended that industries should adopt the use of IP at all times as long as the product or process is IP compliance.*

**Keywords:** *Intellectual Property, intellectual property right, court jurisdiction, agricultural research, Agricultural firms*

## 1.1 Introduction

Research is a costly endeavor that necessitates significant investment from the research system as well as the individual scientist. While it is occasionally maintained that the motivation to solve problems via research must come from the public good, it is generally agreed upon that in order to ensure sustainability, the system and the scientist must be supported by funding and incentives. Intellectual property rights are the means by which individuals who use invention to solve issues are compensated for their efforts.<sup>47</sup> According to its definition, intellectual property rights (IPRs) are intangible rights that give one the sole authority to prevent others from profiting freely from an

<sup>47</sup> M I O Nwogu, The Role of Nigerian Patents Law in Biotechnology Transfer: *Journal of Law, (Policy and Globalization* , 2014) 31, 121-125 [www.iiste.org](http://www.iiste.org)

idea or work. These rights can be found in a variety of forms, such as copyrights, trademarks, industrial designs, and patents. Every form has distinct rights and carries diverse repercussions. For example, patents give their holders a legal monopoly on a new and useful innovation, so conferring exclusive rights.<sup>48</sup> A patent is a government-issued award that gives the owner of the invention the legal right to prevent anybody else from creating, marketing, utilizing, or offering for sale the invention for 20 years starting on the date the application was filed.

IPRs generally relate to works of human creativity. By granting creators ownership rights over their works, these rights safeguard their interests. It characterizes it as the rights granted by society to people or entities, usually in relation to creative works, such as inventions, literary and artistic creations, and names, symbols, images, and designs used in trade. For a restricted time, they grant the creator the authority to stop others from using their creations without permission. Commercial inventions fall under intellectual property, whereas artistic and literary works are considered cultural contributions. This line is becoming less obvious in light of recent technological advancements, and hybrid sui generis systems are beginning to appear.

Within the legal environment, intellectual property is defined as the class of intangible rights that safeguard intellectual property that has commercial value. This category encompasses rights to commercial secrets, patents, trademarks, copyrights, and morality as well as rights against unfair competition and geographical markers. Plant Breeders Rights (PBRs), a sui generis type of intellectual property intended to compensate commercial plant breeders, are also included in the category of intellectual property. IPRs were created with the intention of promoting knowledge sharing, innovation, and creativity in a commercial, industrial setting.

The process of guaranteeing and defending the benefits that come to people and systems whose unwavering inputs produce scientific and technological advancements for society depends on intellectual property rights. It was noted that it has been the most important type of protection for agricultural biotechnology, having the greatest impact on the freedom to function inside the innovation system, while describing its relevance to agriculture with particular reference to the agricultural research system. In national agricultural research, intellectual property rights can be safeguarded by trade secrets, utility patents, copyrights, trademarks, and plant breeders' rights. Intellectual property rights have a number of dimensions that are relevant here, including the requirements for obtaining the rights, the scope of what is protected, the geographical limits to the rights, and the duration of the rights. These dimensions vary according to the type of IP and the legal and administrative system of each country<sup>49</sup>.

The national agricultural research system in Nigeria scarcely lacks a coordinated implementation structure that enables scientists to appropriately own and defend their intellectual property, despite the fact that this is anticipated in the country's innovative legislative framework. Some people believe that the lack of a scientist-entrepreneur culture within the research system is mostly to blame for this.

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<sup>48</sup> Commission on Intellectual Property Rights (2002) Integrating Intellectual Property Rights and Development Policy

<sup>49</sup> V. Ibigbami Background and Status of National Partners Initiative (NPI) and Central Advisory Services on Intellectual Property (2010)

A strong system of patency must be established for the national IPRs policy to be developed in an efficient and long-lasting manner. This is due to the fact that patents are among the most frequently classed as Industrial Property (a functionally well-known class of IPRs). These are government-issued grants that give the creator the legal prohibition against anybody else producing, marketing, utilizing, or putting the invention up for sale for a period of 20 years, starting from the date the patent application was filed. Nigerian patents are only protected by patents across Nigeria and its territories and possessions. 6 pointed out that the Patents and Designs Act, however, does not define what a patent is. Global agricultural growth and economic development have been greatly aided by agricultural research. The 1960s and 1980s saw the Green Revolution in wheat and rice thanks in large part to crop improvement research, which has been a key national and international success story for public research systems. The Green Revolution, which resulted from agricultural research, has increased food production at a never-before-seen rate, with the benefits going equally to the impoverished in both urban and rural areas. According to the researcher, a practical guideline on intellectual property issues, particularly for agricultural research, other organizations, and institutions would enhance the understanding of the agricultural system for academics and other stakeholders working in the field. Additionally, it will significantly enhance our economic activity and generate income for the nation as a whole, agricultural products, and innovators alike. It will once more promote more creative endeavors and improved performance in the agriculture industry. If this isn't done, the aforementioned problems will worsen and there will be a greater unfavorable attitude toward creation, innovation, and invention. This will again have a negative impact on the agricultural research system and ultimately have a negative impact on the country. Consequent upon this, the study on the intellectual property right in national agricultural research system in Nigeria is being undertaken.

## **1.2 Research Questions**

The following research questions are formulated to guide the conduct of the study:

3. To what extent does court jurisdiction enforce intellectual property rights?
4. To what extent is the relationship between Intellectual property right and agricultural production in Nigeria?

## **1.3 Aim and Objectives of the Study**

The aim of this research is to examine the intellectual property right in national agricultural research system in Nigeria. The following specific objectives are as follows

3. To determine the extent to which court jurisdiction enforce intellectual property rights.
4. To analyze the relationship between Intellectual property right and agricultural production in Nigeria.

# **LITERATURE REVIEW**

## **2.1 Conceptual Review**

### **2.1.1 Biotechnology**

(British or processes to manufacturing and Biotechnologist) Biotechnology is the integrated use of biochemistry, microbiology, and engineering sciences in order to achieve technological (industrial) application of the capabilities of micro-organisms, cultured tissue cells. Biotechnology is the application of biological organisms, systems, or processes to manufacturing and service industries. (European Biotechnology Federation). The regulated application of biological agents, such as microbes or cellular components, is known as biotechnology. National Science

Foundation of the US. Bio-Technology is the use of living things especially cells and bacteria for production of various products for benefiting human beings<sup>50</sup>. It is a combination of various technologies, applied together to living cells, including not only biology, but also subjects like mathematics, physics, chemistry and engineering.

It is one of the fastest-growing fields because of its wide range of applications in agriculture (animal husbandry, cropping systems, soil science and conservation, plant physiology, seed technology, etc.) and industry (food, pharmaceutical, chemical, byproducts, textiles, etc.), medicine, nutrition, environmental conservation, and cell biology. The goal of biotechnology is to alter the genetic makeup of plants and animals to make desired improvements and produce useful goods. Biotechnology, which is defined as "the study of living tools," is applied in environmental remediation, industrial production, agriculture, food processing, and medicine.. A collection of contemporary instruments that make use of living things, or portions of them, including their genes, tissues, and cells, in order to create, alter, or enhance plants, animals, or microorganisms for particular purposes or large-scale production. "Utilization of organisms or its organells or biological process to make product or to solve problems for the welfare of mankind." Biotechnology is defined as "any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific us" by the Convention on Biological Diversity (CBD, 2000).

### **2.1.2 Hybridization**

As it relates to genomics, hybridization is the process by which two molecules of complementary single-stranded DNA or RNA join forces to generate a double-stranded molecule. The proper base pairing between the two single-stranded molecules is necessary for the bonding. As it relates to genomics, hybridization is the process by which two molecules of complementary single-stranded DNA or RNA join forces to generate a double-stranded molecule. Appropriate base pairing between the two single-stranded molecules is necessary for the bonding.. Hybridization is an important process in various research and clinical laboratory techniques<sup>51</sup>. Hybridization is a concept used in organic chemistry to explain chemical bonding in cases where the valence bond theory does not provide satisfactory clarification. This theory is especially useful to explain the covalent bonds in organic molecules.

To put it simply, hybridization is the process of mixing together atomic orbitals with varying shapes and almost equal energies to produce an equal number of hybrid orbitals with the same shape, energy, and orientation, with the least amount of repulsion possible between them. "Hybridization" is the process of mixing together atomic orbitals with similar energies to generate an equal number of completely new orbitals with the same shape and energy<sup>52</sup>. These newly formed orbitals are referred to as "hybrid orbitals." In valence bond theory, hybridization, often known as hybridization,

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<sup>50</sup> Jarvis, B. and Holmes, A.W., "Biotechnology in relation to the Food industry, Proc. 2nd Europea Congress on Biotechnology", J. Chem. Technol. Biotechnol., vol. 32, 1982, pp. 224–232.

<sup>51</sup> Zirkle C. (1934): More records of plant hybridization before Koelreuter. Journal of Heredity, 25: 3–18. Zwierzykowski Z., Kosmala A., Zwierzykowska E., Jones N.,

<sup>52</sup> Joks W., Bocianowski J. (2006): Genome balance in six successive generations of the allotetraploid *Festuca prat-ensis* × *Lolium perenne*. Theoretical and Applied Genetics, 113: 539–547.

is the process of combining atomic orbitals to create new hybrid orbitals that differ from their component atomic orbitals in terms of energy, shape, etc. and are appropriate for pairing electrons to form chemical bonds. For instance, in a carbon atom that forms four single bonds, the valence-shell s orbital joins forces with three valence-shell p orbitals to create four tetrahedral equivalent mixes that attach to four distinct atoms around the carbon. Hybrid orbitals are symmetrically arranged in space and are helpful in the explanation of atomic bonding characteristics and molecular geometry. Typically, atomic orbitals with similar energies are mixed to generate hybrid orbitals.

### **2.1.3 Copyright**

A jurisdiction's copyright laws give the author or creator of an original work a set of exclusive rights, including the freedom to reproduce, distribute, and modify the work. According to Okoye, Copyright (CR) refers to the legal advantage that an author or other creator of an intellectual work has over others, allowing them to sell and reproduce their creations only. On the other hand, copyright is defined by the Black's legislation Dictionary as the literary property right that has been approved and acknowledged by positive legislation.<sup>53</sup> An intangible incorporeal right given by statute to the creator of a certain work of literature or art, giving him the exclusive right to make multiple copies of the work for publication and sale for a set amount of time. Ekpo has defined it as "a legal right granted to creators and owners of creative works, whether literary, scientific, or artistic in nature, to regulate the performance of specific acts in connection with those works." This indicates that illegal use of the work is prohibited. From this perspective, the exclusive right to reproduce, license, and utilize any other kind of artistic or musical creation—be it printed, audio, video, or something else entirely—is granted under intellectual property law.

This right preserves the work for as long as the author(s) lives and for fifty years following their passing. In Laws of the Federation 2004, copyright is not defined precisely. However, it acknowledges that one has the right to forbid or stop others from acting, as well as the right to prevent others from printing or tampering with other people's creative output. From the several definitions, it can be concluded that the main goals of copyright are to prevent unlawful use of creative works and to regulate the duplication of intellectual resources found in the arts and literature. The duration of copyright protection is limited. The work is considered to enter the public domain after its application expires. There are 25 to 70 years during which the restriction is in effect.<sup>54</sup> The argument that copyright law does not enclose the concepts that form the basis of a work justifies this restriction. Over time, copyright was expanded to cover various uses, including translations and derivative works, from its original application just to published books. These days, it includes a broad variety of works, such as computer programs, sound recordings, motion movies, paintings, photographs, maps, and dramatic works.

## **2.2. Theories of Intellectual Property**

### **Labour Theory**

Lockes developed the labor theory in 1904. One of the most popular theories in the theoretical literature on intellectual property today is Locke's. According to his method, the state has an obligation to uphold and protect a person's inherent property rights to the products of their labor if they work with resources that are either not owned or held in common. John Locke's ideas are

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<sup>53</sup> <sup>53</sup> P. Okoye. P has threatened to deal with the Nigeria Copyrights Commission for (alleged kidnap 2020)

<sup>54</sup> <sup>54</sup> Black's Law Dictionary with Pronunciations, 6th Edition (Centennial Edition 1891-1991)

broadly applicable, particularly in the area of intellectual property, where labor appears to play a significant role in determining the value of completed goods and where relevant raw materials—facts and concepts—appears to be held in common. Remember that without the inventor's efforts, the inventions would not have existed at all. Critics counter that obtaining property rights through labor is legally enforceable and should only be permitted if no harm is caused to other people. For example, they claim that people shouldn't be left impoverished because their property rights have restricted their access to certain resources. Because of this, patents should not be granted for longer than the amount of time it would typically take for someone else to invent the same technology in the same situation or longer than the amount of time it would take for an inventor to recover their costs.

### SECTION THREE

#### **Strategy and Institutional Framework for I.P Right in the Nigerian Agricultural Research System**

##### **3.1.1 Plant Varieties Right**

The term "plant breeders' rights" (PBR) or "plant variety rights" (PVR) refers to the exclusive rights that a breeder of a new plant variety has for a certain period of time over the propagating material (such as seed, cuttings, divisions, tissue culture), as well as the harvested material (such as cut flowers, fruit, and foliage). With these rights, the breeder can decide whether to license the variety to third parties or take on the role of exclusive marketer. For a variety to be eligible for these exclusive rights, it needs to be fresh, unique, consistent, and stable. A variety is:

- ☐ *new* if it has not been commercialized for more than one year in the country of protection;
- ☐ *distinct* if it differs from all other known varieties by one or more important botanical characteristics, such as height, maturity, color, etc.;
- ☐ *uniform* if the plant characteristics are consistent from plant to plant within the variety;
- ☐ *stable* if the plant characteristics are genetically fixed and therefore remain the same from generation to generation, or after a cycle of reproduction in the case of hybrid varieties

A suitable "denomination" for the variety—which serves as its general name and must be used by anybody marketing it—must also be assigned by the breeder. Plant variety rights are usually awarded by national administrations following review. The plant variety office receives the seed and grows it for one or more seasons to ensure that it is consistent, stable, and distinct. Exclusive rights are awarded for a predetermined amount of time (usually 20/25 years, or 25/30 years for trees and vines) if these tests are successful. The rights must be renewed annually with costs.

Breeders have the legal right to sue to protect their rights and get compensation for violations. Patent law does not recognize the infringement exclusions included in plant breeders' rights. Generally speaking, farm-saved seed is exempt. Although farmers are free to keep this produce in their own bins for their own use as seed, brown-bag seed



sales are not always covered by this. Additional sales for the aim of propagation are prohibited without the breeder's written consent. Additionally, breeders are permitted to use protected varieties as sources of initial variation to generate new plant varieties (1978 Act) or for other experimental uses (1991 Act) under the breeders' exception (research exemption in the 1991 Act). There is also a provision for [compulsory licensing](#) to assure public access to protected varieties if the national interest requires it and the breeder is unable to meet the demand.

The link between plant breeder's rights and patent rights is contentious. The overlap of these rights has been the subject of legal action in Canada, the United States, and Australia. The underlying presumption in each of these judgments was that plant breeders' rights and patents overlapped and did not conflict. Therefore, the protected seed exemption and other exemptions from violating plant breeders' rights do not also offer protections against violating patents covering the same plants. Similarly, a patent on a variety would not necessarily be violated by actions that violate the rights of plant breeders; the patent merely forbids the maker, user, or seller of the patented invention from creating, using, or reselling it after the initial sale. United States legislation pertaining to intellectual property is known as the Plant Variety Protection Act of 1970 (PVPA). Breeders have up to 25 years of exclusive control over novel, distinct, uniform, and stable plant types that are propagated by tuber or sexual reproduction according to the PVPA. The Plant Breeders' Protection Act (PVPA), a significant manifestation of plant breeders' rights in the US, provides protection akin to that of patents, however there are several important distinctions between these two legal frameworks. Plant patents, which are restricted to asexually reproduced plants only (excluding tuber propagated plants), are not to be confused with the PVPA.

### **3.1.2 Plant Breeders Rights**

According to UPOV3, a plant breeder's right (PBR) is the sole authority to produce and distribute the protected variety's reproductive or vegetative propagating material for commercial purposes. The goal of creating this class of rights as a substitute for patents was to give the seed business incentives. Profit-making is therefore the main driving force behind these rights, which also draw in private sector investment and encourage the creation of stronger and more productive plant varieties. Plant breeders' rights legislation gives breeders the ability to control the commercialization of their variety, which in turn allows them to profit from their breeding investment and recoup costs. The development of a new variety is typically an arduous and expensive undertaking. This encourages breeders to keep creating new cultivars for the good of farmers and society at large.

In underdeveloped nations, farmer-to-farmer exchanges function in tandem with other, more formal processes to meet the need for seeds. Farmers' seed systems are largely based on traditional methods of selection between varieties as well as seed multiplication carried out on farms, but still involve modern varieties<sup>55</sup>. However, the rights of farmers over intellectual property rights (IPRs) over plant varieties are not consistently interpreted. Benefits of protecting farmers' rights include bettering the standard of living for farmers and their communities, protecting the environment and resource monitoring, preventing rural migration, reducing reliance on outside aid, and preventing biopiracy by honoring local farmers' contributions. Farmers' rights and intellectual property rights (IPRs) differ primarily in that the former focus on benefit sharing and

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<sup>55</sup> International Convention for the Protection of New Varieties of Plants: International Union for the Protection of New Varieties of Plants (UPOV), Geneva, (1991).

compensation, while the latter grant exclusive rights. Additionally, although they are clearly defined for IPRs, farmers' rights do not immediately define the subject matter or the title holder. Lastly, whereas farmers' rights are unrestricted, IPRs have a time restriction. Farmer's rights are a counter-balance to PBRs in recognition of the farmer's contribution to agricultural innovations, to promote the equitable sharing of genetic resources and in recognition of the importance of the conservation of such resources and traditional practices<sup>56</sup>. The legal scope of these rights is still in debate. Diverse opinions have been expressed about the purpose and positioning of the law's protection of farmers' rights. Among these opinions are the following: Farmers' rights and IPRs shouldn't be related; Laws pertaining to the rights of plant breeders should take farmers' rights into consideration. The current definitions under plant breeders' rights legislation should be expanded to protect farmers' varieties, and a sui generis system on farmers' rights should be formed apart from existing forms of IPRs.

### **3.1.2 FAO's**

1. The main goal of FAO's efforts to guarantee that everyone has regular access to enough wholesome food to enjoy active and healthy lifestyles is to achieve food security for everyone. The goals of FAO are to enhance rural populations' quality of life, boost agricultural output, increase nutrition levels, and support global economic expansion.<sup>2</sup> The most pertinent and pressing development concerns that member nations and the development community must address are closely matched with a set of five new cross-cutting strategic objectives identified in FAO's new Strategic Framework:

- a) Contribute to the eradication of hunger, food insecurity and malnutrition.
- b) Increase and improve provision of goods and services from agriculture, forestry and fisheries in a sustainable manner.
- c) Reduce rural poverty.
- d) Enable more inclusive and efficient agricultural and food systems at local, national and international levels.
- e) Increase the resilience of livelihoods to threats and crises.

3. One of the first UN organizations to realize that society as a whole would need to be involved in order to achieve this goal was FAO. To this goal, the Freedom from Hunger Campaign (FFHC) was founded in 1959<sup>1</sup>. FAO's technical departments and offices developed relationships with NGOs over time, through global discussion, information sharing, and fieldwork. These initiatives produced incredibly encouraging outcomes and made clear the necessity for creative and sensible operating protocols for sharing knowledge and lessons gained.

4. CSOs have gradually expanded in size, scope, number, and geographic spread since the 1980s. They have gradually gained significant national and worldwide influence to interact with international organizations, such as the FAO.<sup>5</sup> The United Nations summits of the 1990s – including the Rio de Janeiro Earth Summit in 1992 and the Rome World Food Summit in 1996 – were instrumental in paving the way for the large-scale participation of CSOs, raising their influence in global governance to unprecedented levels<sup>2</sup>.

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<sup>56</sup> Philippe Cullet, 'Plant Variety Protection in Africa: Towards Compliance with the TRIPS Agreement', *Journal of African Laws* 45 1 (2001).



6. The World Food Summits in 1974, 1996, 2002, and 2009, the High-Level Conference on Climate Change and Food Security in 2008, and the International Conference of Nutrition (ICN-2) in 2014 drew thousands of representatives from NGOs and civil society.

7. As required by Human Right Council Resolution 32/31, this paper includes comprehensive information about FAO's work with CSOs, including protocols, practices, and instances of international collaboration.

## **SECTION FOUR**

### **4.1 Important of Intellectual Property Rights Protection Laws**

The robustness of the Nigerian economy is greatly enhanced by the enforcement of intellectual property rights protection legislation, as this article highlights. These benefits include social, economic, and individual benefits. The specific advantages include, but are not limited to, higher foreign exchange revenues, increased taxes and tariff payments, high returns on intellectual investment (including royalties and proceeds from the sale of intellectual products), and the encouragement of creativity and innovation. The main purpose of legislation protecting intellectual property rights is to safeguard the rights of investors and creators with relation to their creative works. Nonetheless, different nations have different degrees of enforcing and implementing laws protecting intellectual property rights. These advantages cover the rights of authors and innovators. But there are social and economic advantages that can promote the country's economic growth in the following ways: (i) The production of income from the sale of intellectual property. (ii) A decrease in crime and criminal activity (iii) Establishing a steady market through the sale of intellectual property for artists and inventors (iv) The government's collection of taxes and tariffs on intellectual property

#### **Pre-production**

Researchers and farmers work to improve products during the pre-production phase by using techniques like genetic manipulation and selective breeding. When it comes to plants, these could be cultivars that are nutrient-rich or resistant to pesticides, drought, or other environmental factors. These inventions are intended to promote human health, offer financial advantages, and stop agricultural loss. For example, efforts have been made to alleviate hunger in the developing world using crops like zinc rice, iron beans, and vitamin A cassava, as well as biofortification through conventional breeding. The creation of agricultural inputs, such as bio-control products, is another aspect of this stage of the agricultural value chain. Patents, Plant Variety Rights and Trade Secrets are the main forms of Intellectual Property Protection applied in the pre-production stage.

Patents are exclusive rights granted over an invention to prevent acts such as production, use, sale or import of the invention without the authorisation of the owner. In agriculture, patents are often used in the field of agricultural biotechnology. A patent could apply to the product developed such as patents for "Roundup Ready" glyphosate tolerant crops. Enabling technology used in the field could also be patented such as the CRISPR gene-editing technology<sup>57</sup>.

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<sup>57</sup> U. Nwokocha, (2012). Nigerian intellectual property: Overview of development and practice. *Journal of Intellectual Property (NJIP)*, 100-16.

Plant breeders have the sole right to create new plant varieties thanks to Plant Variety Rights (PVRs). Plant variety rights and patents have different qualifying standards, coverage areas, and potential exclusions, even though certain states award plant patents. Under Article 27.3(b) of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS Agreement), member nations of the World Trade Organization (WTO) are required to protect plant varieties through patents, a sui generis system, or a mix of both.

A pertinent form of protection in agricultural research and development is trade secrets. Members of the World Trade Organization are required by Article 39 of the TRIPS Agreement to safeguard information that has been kept confidential and has economic value. Trade secrets are protected without needing to be registered, but the owner must have taken reasonable precautions to keep the information confidential. A good biological complement to the application of trade secrets in agricultural innovation is provided by hybrid crops. Because the yield of hybrid crops decreases after the first generation of seed, the farmer would have to purchase for the upcoming planting season rather than save money. Owners of patents, PVRs, and trade secrets use them to restrict innovation for profit, to recover costs associated with research and development, and in certain situations, to guarantee that a product intended for humanitarian purpose is directed in the right direction. Activities at this point in the value chain as well as those further down affect by the usage of these IPRs, notably those related to innovation, accessibility, affordability, and sustainability.

The grant of IPRs provides an incentive for innovation by corporations that may otherwise not undertake the research due to the high costs involved in a field like agricultural biotechnology<sup>58</sup>. According to a 2011 survey, the total cost of discovery, research, and approval for bringing a biotechnology crop to market was approximately US\$136 million. IPRs may be used by businesses to increase return on investment. The whole picture, however, also considers the fact that certain innovation—particularly user-generated innovation like small-scale farmers' breeding efforts—would still occur even in the absence of IPR grants. Small-scale farmers, in any case, frequently lack the organization and resources needed to benefit from conventional IPRs. The lesson is that there are several types of invention, and intellectual property rights (IPRs) such as patents may promote some but not others. Regarding access, the IPR owner largely determines who has access to it and under what conditions. IPRs have an impact on access at the research stage when they prevent innovators from using enabling technologies due to patent thickets, which hinders innovation in the future. There are obstacles to further growth in industries where wide patent claims overlap since it is challenging to innovate without violating an already-existing patent. One workable solution to this was the formation of alliances between major agrochemical-seed companies like BASF, Bayer, Monsanto, DuPont, Dow, and Syngenta through cross-licensing agreements (to share their innovations for transgenic crops). more down the line, farmers' inability to trade seed or an increase in seed prices as a result of limitations favoring rights holders are more instances of accessibility problems. IPR systems contain built-in exceptions, such as private and non-commercial use exceptions for patents and, in the case of PVRs, "breeder's exemption" exceptions for the purpose of breeding different varieties. Humanitarian needs-based policies can effectively reduce potential negative consequences on access. These policies might address legislation pertaining to farmers' rights, mandatory licensing, or competition laws. Farmers' rights are recognized by PVR legislation in a country like India, which has the Protection of Plant Varieties and Farmers' Rights Act of 2001. It permits

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<sup>58</sup> M. Blackeney, (2008). Guidebook on enforcement of intellectual property rights. Queen Mary Intellectual Research Institute, University of London. Retrieved from [https://www.academia.edu/1185442/Guidebook\\_on\\_Intellectual\\_Property\\_Enforcement](https://www.academia.edu/1185442/Guidebook_on_Intellectual_Property_Enforcement)

farmers to save, use, sow, re-sow, exchange, share or sell farm produce including seed of a protected variety in the same manner as before the law was passed<sup>59</sup>.

The increased use of IPRs in agriculture may impact agricultural biodiversity and sustainability due to the type of innovation encouraged. It has been argued that research into minor food crops (as opposed to commercially important crops like wheat and soya beans) is neglected because the likelihood of return is small and that requirements for protection such as uniformity and industrial applicability continue to encourage homogenous varieties. These result in monocultures that are susceptible to being wiped out by disease<sup>60</sup>.

## **ii. Production**

How they may influence farming methods farther along the value chain at the production stage has already been made clear by the debate about patents, PVRs, and trade secrets utilized at the pre-production stage. Furthermore, inventions covered by intellectual property rights (IPRs) can be employed in farming activities and procedures like planting, harvesting, and raising livestock during the production stage. With the advent of smart farming technologies, farmers may now employ technological instruments designed to improve efficiency, quality, and production. These include platforms to handle agricultural machinery, drones that scan the soil, tools to check inputs like animal feed, software for crop management, and applications that track seed production or offer data like climatic data.

Data and software are often not patentable, although computer-related inventions may qualify for digital patents, in which case the software's functionality would be covered by the patent. The names of these precision agriculture instruments could be trademarked, and they are also protected by copyright. As a result, others are unable to replicate the work or pass off another product as it. Innovations like software may have their copyright registered, but copyright protection does not depend on registration. Technology developers employ these intellectual property rights (IPRs) to control quality and stop others from making money off of their work.**iii. Post-Production**

The post-production stage features activities of processing, marketing, transportation, sales and consumption and is a good point at which to focus on IPRs like trademarks and geographical indications of origin (GIs) which play an important part in these processes<sup>61</sup>.

Words, signs, three-dimensional structures, and other comparable characteristics that are used to identify a product can all be protected by trademarks. Geographical indications (GIs) limit the use of a name to goods with a particular geographical origin and a reputation associated with that origin. Preventing a product unrelated to the brand or area from trying to capitalize on the goodwill of the protected products is one of their main effects. Customers can use them to identify or gauge the quality of the products that are protected.

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<sup>59</sup> C Correa, Trade-Related Aspects of Intellectual Property Rights: A Commentary on the TRIPS Agreement (Oxford: Oxford University Press, 2006)

<sup>60</sup> P Macrory, A Appleton, and M Plummer (eds), "e World Trade Organization: Legal, Economic and Political Analysis, Vol I (New York: Springer, 2005) 1041

<sup>61</sup> Ibid 100

For example, certain breeds, such the Arbor Acres and ISA Brown, are popular for day-old chicks in the Nigerian poultry market. The parent stock for breeding in this industry is imported from the US and Europe by licensed businesses. Hendrix Genetics' and Aviagen's trademarks, respectively, protect ISA Brown and The Arbor Acres (and Arbor Acres Plus). For many in the supply chain, such as commercial broiler farmers, importers, breeders, hatcheries, and layer farmers, it is crucial that the parent stock, fertilized eggs, or day-old chicks they buy have the attributes associated with those brands.<sup>62</sup> It is imperative for the trademark owners' business continuity that their work cannot be exploited by others, nor that their reputation be tarnished, by allowing inferior breeds to be sold under the brand's name. By telling the customer about the product's production process, trademarks can also help to advance sustainability in agriculture. Within the oil palm sector, certified palm oil meeting the standards of the Roundtable on Sustainable Palm Oil (RSPO) may be packaged under the RSPO trademark<sup>63</sup>.

GIs can help a product's market grow in ways that may help developing nations or smallholder farmers who typically cannot compete with mainstream products. They let customers know about the distinctive features of goods made in certain areas. According to an FAO report from 2018, GIs raise product prices, enable primary producers to get a larger portion of the proceeds, gradually boost production, and improve farmers' access to markets.<sup>64</sup> They can also be used to promote environmental sustainability in cases where the specifications are linked to sustainable practices. The FAO study showed that after registration of the Cameroon "Penja pepper" in 2013, organization of the supply chain and increase in pepper prices led to a 328 per cent increase in production (from 70 tonnes in 2010 to 200-300 tonnes in 2015).

This overview of IPRs at specific points in the agricultural supply chain demonstrates how they can either promote or inhibit innovation, act as a quality control mechanism for tools and products, affect agro biodiversity and sustainability, ease trade and possibly expand the market for produce, and support specific agricultural practices. The kind of system and how it is used determine how the IPRs work. Effective IPR systems must be given top priority by policymakers as essential components of the suite of linked concerns that are evaluated in an effort to boost agricultural productivity, including trade, the environment, and land use policy.

## **CONCLUSION AND RECOMMENDATIONS**

### **5.1: Conclusion**

When properly utilized, intellectual property protection is quickly emerging as a tool and instrument for increasing trade and generating revenue. It is now clear that developing nations like Nigeria can gain the same advantages from the intellectual property system as developed nations due to recent developments and issues coming from the application of IP rights. Nigeria has not yet advanced its agricultural technology to the point where it can effectively compete on the international stage. Overzealous owners and their dictatorship imposed strict restrictions to

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<sup>62</sup> G Evans, 'A Preliminary Excursion into TRIPS and Non-Violation Complaints' 2000 *Journal of World Intellectual Property* 3(6) 867

<sup>63</sup> G Evans and M Blakeney, 'Je Protection of Geographical Indications A[er Doha: Quo Vadis?]' 2006 *Journal of International Economic Law* 9(3) 575

<sup>64</sup> Frankel, 'WTO Application of "the Customary Rules of Interpretation of Public International Law" to Intellectual Property' 2005 *Virginia Journal of International Law* 46(2) 365

preserve intellectual property due to the vulnerability of underdeveloped countries, marginalization, and corruption. This is a result of their frequent inability to transfer intellectual property at reasonable rates, which raises the overall cost of registration. Nigeria's IP development has been hampered by these and other issues. But Nigeria will reap the economic benefits as long as knowledge grows, the IP system is strengthened, and managerial abilities are enhanced. This is because performance rises with more IP acquisition, and organizations perform better when IP is managed effectively and efficiently. To a large extent, the anticipated benefits of registration will not only be realized as long as the appropriate intellectual property (IPR) is obtained for the appropriate product or process, management and control are assumed by the appropriate employees, and application is done strategically, but also will improve innovation, creation, and invention, which will raise the nation's socioeconomic standard through better performance of the various firms. Thus, it is worthwhile to explore. Managers frequently believe that stifling competition is the best use of intellectual property. In the view of some, it is optimal for the company to share the value of intellectual property. The choice of IP that any firm uses depends on a few criteria. The degree of innovation a firm practices and/or the features of the product it offers are the primary factors that influence a firm's inclination to employ any of the tools. This is supported by the findings of Greenhalg and Rogers (2007), who note that increased trademark activity is somewhat positively correlated with service providers' success but has a weaker effect on manufacturing enterprises. To make better decisions when businesses need to combine several mechanisms to protect the same intellectual property, a better understanding of the various mechanisms and how they could interact and overlap would be helpful. The use of intellectual property rights (IPR) carries a great deal of risk, which undoubtedly affects the company's bottom line in the short term. However, over time, other advantages accrue, such as increased productivity, profit maximization, sustainability, market share, and market growth. According to the respondents' opinions as presented in the study's findings, intellectual property (IP) can positively impact agricultural firms significantly, provided that it is properly managed by qualified personnel and protected by IP rights. This is in contrast to the common belief that IP has little effect on businesses.

## **5.2: Recommendations**

Following the hypothetical example given earlier, the study makes the following recommendations;

1. Agricultural firms should use trademark as a tool to protect their intellectual properties.
2. Agricultural firms should also adopt the use of patent rights to protect and if possible combine it with other strategies that may be relevant.
3. Since IP fulfill its mission to a large extent in industries especially when it is effectively managed, it is therefore recommended that industries should adopt the use of IP at all times as long as the product or process is IP compliant.
4. IP management and control should not be left for the lawyers alone because many IP decisions are of strategic importance and should not be delegated to lawyers who have little knowledge of strategic formulation and implementation.
5. Corporate managers should be involved in decision making procedures regarding their IP and IPR. Management practitioners also need to develop a balanced and well founded understanding of the means of IP management. There is need for careful assessment and planning before and after acquisition.

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