The Journal of Sustainable Development Law and Policy

Journal homepage: https://www.ajol.info/index.php/jsdlp

ISSN: 2467-8406
Online ISSN: 2467-8392
Volume 17, Issue 3
Pamela, Oghenefego, & Olubiyi 2026

INTELLECTUAL PROPERTY RIGHTS IN NIGERIA'S AGRICULTURAL SECTOR: PROMOTING SUSTAINABLE DEVELOPMENT AND FOOD SECURITY THROUGH INNOVATION

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Article Information:

Article Type:
Research Article

Manuscript Received:
07 March 2025

Final Revision Received:
16 June 2025

Published Online:
15 November 2025

Keywords:
Agricultural practices, Economic challenges, Intellectual property rights, Sustainable development.

The agricultural sector plays a major role in enhancing the Nigerian economy and contributes to its development. Despite this promising advantage, the sector is faced with challenges ranging from food insecurity to environmental crises caused by limitations in the advancement and efficiency of eco-friendly production practices, poor technological innovations, and economic instability. Intellectual property rights (IPR) seek to protect inventions and inventors, who encourage innovative creation and foster a conducive environment for investments and sustainable development. This paper examines the roles of IPRs in the agricultural sector, specifically in promoting sustainable development and food security in Nigeria. It explores the opportunities and economic challenges faced in ensuring sustainable development in Nigeria through agricultural practices. This paper explores regulatory hindrances that may arise in promoting food security and sustainable development. To achieve the paper's objectives, the doctrinal research methodology was adopted. The paper's findings highlight key challenges faced, such as poor awareness of IPRs, limited resources, a lack of specialised courts in the enforcement of IPRs, and poor technological capacity. It recommends regulatory reforms that encourage agricultural practices that promote sustainable development, increased rural public enlightenment schemes, and investment in technological advancement. A shift in creating effective technologies and adopting sustainable practices with IPRs will contribute to food security, industrial growth, and sustainable development.

Cite this article: Igbogbo Oritsemisan Pamela, Omobo Joy Oghenefego, and Ifeoluwa A. Olubiyi (2026). Intellectual Property Rights In Nigeria's Agricultural Sector: Promoting Sustainable Development And Food Security Through Innovation. The Journal of Sustainable Development, Law and Policy. Vol. 17:3. 24-56. DOI: 10.4314/jsdlp.v17i3.2

Publisher: Institute for Oil, Energy, Environment and Sustainable Development (OGEES Institute), Afe Babalola University, Ado Ekiti, Nigeria.

1. INTRODUCTION

According to the World Intellectual Property Organisation (WIPO), Intellectual Property (IP) refers to creations of the mind, such as inventions; literary and artistic works; designs; and symbols, names, and images used in commerce.[1] Intellectual property is an intangible property that emerges from an individual's creativity. These intellectual representations are then protected under Intellectual Property Rights (IPR) subject to their forms of expression. Such protection is granted under the following types of intellectual property rights; Copyrights, Patents, Trademarks, Trade Secrets, Geographical Indication, Plant Varieties, Utility Models, and Image Rights. Intellectual property laws are meant to give statutory expression to the moral and economic rights of inventors in their creations and the rights of the public to access those creations. They also promote creativity, dissemination, application of inventions, and encourage fair trading to contribute to economic and social development.[2] This aims to ensure just rewards and recognition of an author's intellectual effort. 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 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.[3] Intellectual property can become an instrument for

[1]WIPO, 'What is Intellectual Property' (2004) <https://www.wipo.int/about-ip/en/#:~:text=Intellectual%20property%20(IP)%20refers%20to,and%20images%20used%20in%20commerce> accessed 30 November 2024.

[2] WIPO, 'WIPO Intellectual Property Handbook: Policy Law and Use' (World Intellectual Property Organization, 2004) < https://www.bbau.ac.in/dept/Law/TM/10.pdf> accessed 30 November 2024.

[3] JI Daniel, 'Intellectual Property Right in Agricultural Research System in Nigeria' (2023) 10 (4) International Journal of Diplomatic Legal & International Studies, 18 -31. < https://www.arcnjournals.org/images/4272-1453-54-1042.pdf> accessed 30 November 2024.

economic growth and development in the agricultural sector when adequately exploited. The use of these technologies promotes sustainable practices in the agricultural and industrial sectors, however, limiting factors such as age, illiteracy, cost, and intellectual property infringements affect farmers and manufacturers productivity. This leads to economic challenges that could reduce a nation's productivity growth, inflation, recession, unemployment, hardship, low wage growth, and more.

The country's national population is currently around 223.8 million. A report by Cadre Harmonisé led by the Federal Government and supported by partners, including the United Nations World Food Programme, warned of deteriorating food security in Nigeria, with 33.1 million people projected to face high levels of food insecurity during the next lean season (June-August 2025).[4] Analysis showed that the 33.1 million people represents an increase of seven million people compared to the same period last year.[5] This will double the demand for food and accentuate food insecurity. In that regard, agricultural production needs to increase alongside the growing population that aids in the productive capacity of the agricultural sector. [6] The state of food insecurity is worsened by socio-economic issues such as loss of jobs, business failure, a fall in the price of output, and an increase in the price of inputs and food items, among others. Factors such as destruction of harvest by fire, poor rain and flood, pest and disease invasion that cause harvest failure, conflicts, and wars, among others, are listed as the major environmental issues responsible for food insecurity.[7] These challenges can rest on solutions from innovations invented by individuals upon the foundations of intellectual property.

[4] Channels Television, '33 Million Nigerians May Face Food Insecurity In 2025 — Report' <https://tinyurl.com/43purx9u> accessed 21st April 2025.
[5] ibid.
[6] MK Anser, R Osabohien, O Olonade and others, 'Impact of ICT Adoption and Governance Interaction on Food Security in West Africa. Sustainability' (2021) 13(10) 5570 MDPI <https://ideas.repec.org/a/gam/jsusta/v13y2021i10p5570-d555920.html> accessed 30 November 2024.
[7] ibid

There is a high need for sustainable agricultural practices which can be promoted by intellectual property rights. Sustainable agriculture is defined as engaging in farming practices that promote long-term food and livestock production while minimizing negative effects on the environment. The goal is to produce the greatest quantity of food over the longest time to feed a growing human population while keeping the environment intact.[8] Both subsistence and mechanized farming require sustainable agricultural practices supported by intellectual property rights to aid food security in Nigeria. The International Institute of Sustainable Development (IISD) describes sustainable development as the development that meets the needs of the present without compromising the ability of future generations to meet their own needs.[9] The United Nations (UN) states that sustainable development is how we must live today if we want a better tomorrow.[10] As a result, 17 Sustainable Development Goals were established to encourage a sustainable world. Essential to this paper are sustainable development goals (SDGs) 1, 2 and 9; No poverty, zero hunger and industry, innovation and infrastructure respectively.

Countries have laws to protect intellectual property for two main reasons. One is to give statutory expression to the moral and economic rights of creators in their creations and such rights of the public in access to those creations. The second is to promote, as a deliberate act of government policy, creativity and the dissemination and application of its results and to encourage fair trading which would contribute to economic and social development.[11] The fundamental purpose of patent protection is to catalyze innovation while simultaneously ensuring that the resultant benefits are disseminated to the broader societal landscape. This safeguard

[8] E Schap and M Cuningham, 'Sustainable Agriculture, Definition, Importance & Practices' (Study.com) <https://study.com/learn/lesson/what-is-sustainable-agriculture.html> accessed 4 January 2025.

[9] IISD, 'Sustainable Development' <https://www.iisd.org/mission-and-goals/sustainable-development> accessed 29 November 2024.

[10] United Nations (UN), 'Fun Facts: What is Sustainable Development?' <https://www.un.org/sustainabledevelopment/blog/2023/08/what-is-sustainable-development/> accessed 29 November 2024.

[11] B Mersha and G/Hiwot Hadush, *Law of Intellectual Property* (2008) 12

assumes paramount significance for a diverse array of professionals, including technicians and technologists, medical scientists, space scientists, and academics (comprising lecturers, researchers, and professors) within institutions of higher learning. Furthermore, patent protection is of critical importance to Agricultural experts in securing a profitable and sustainable environment for agricultural practices.[12] Plant variety rights recognizes the contributions made by plant breeders by granting exclusive rights to prevent unauthorized production or sale of new plant varieties that are similar to those of the breeder.

The world is growing rapidly and the need for an evolving system that induces and encourages the innovation of mechanisms and infrastructure that boosts agricultural produce cannot be over emphasized. PVR system is crucial as the world population struggles with the demands of food security, climate resilience, and sustainable development. Intellectual property rights for plant varieties can help create a more resilient, inclusive and sustainable agricultural future by negotiating the complex relationship between innovation and equality.[13] Intellectual Property protection for plant breeders boosts investment in breeding and developing new plant varieties, as investors can now rely on a structured protection system.[14] Intellectual property plays a vital role in achieving the SDG goals 1, 2, and 9 (No poverty, zero hunger and industry, innovation and infrastructure).

Patented innovations will ensure plentiful harvest as well as increase in farmer's income which serves as a major source of feeding in the country especially the rural and undeveloped areas. Communities will not only have food to eat, the income generated can be invested in other areas and this may lead to a boosted desire for entrepreneurship amongst farmers. Patented technologies and PVRs can foster foreign investment and licensing with developing countries. The enforcement of these rights

[12] F Babafemi, *Intellectual Property and the Practice of Copyright, Trademarks and Industrial Designs in Nigeria* (Justinian Books Limited 2007) vi.
[13] V Oluwaseyi, 'Plant Variety Right and Intellectual Property Law in Nigeria: A Review' 20(1) Journal of Management and Technology 451-462.
[14]n 16.

should be regulated in order to maintain a sustainable equality amongst innovators and users.

Technologies that foster sustainable agricultural development are invented by individuals or organisations who require intellectual property protection to recover their investments and generate returns on their creative efforts, motivating them to continue innovating. The Federal Government of Nigeria administers the intellectual property system under different agencies: - The National Office for Technology Acquisition and Promotion (NOTAP) is an agency under the Federal Ministry of Science and Technology which is responsible for the registration of developed technologies for patent rights. Trademarks, patents, and designs are administered by the Trademarks and Patents Office under the Federal Ministry of Industry, Trade and Investment. Copyright is an integral part of intellectual property rights but the scope of this study will not extend to copyright protection. This paper explores the promotion of food security through innovation engineered by the grant of intellectual property rights through the use of patents and plant variety rights in Nigeria for sustainable development. It reviews related literature on the subject, examines national legal framework on intellectual property rights in the Nigerian agricultural sector and the use of eco-friendly technology in promoting food security. The economic challenges and regulatory hindrances faced in ensuring sustainable development in Nigeria through agricultural and industrial practices were also considered.

2. CONCEPTUAL CLARIFICATION

The role of intellectual property rights (IPRs) in fostering innovation, promoting sustainable development, and ensuring food security has gained significant scholarly attention. This review examines existing literature on the subject, discussing authors' perspectives as it relates to sustainable development goals (SDGs) 1, 2, and 9.

Y'au and Yusuf[15] discussed the integration of digital technologies into Nigeria's agricultural sector as a means to enhance productivity and

[15] Y Ya'u and Y Yusuuf and others, 'Implementing Digital Agriculture in Nigeria for Sustainable Development and Food Security' (2022) International Halich Congress on

achieve food security. Various strategies, such as economic, environmental, social, and technological, were examined as solutions to food insecurity in Nigeria. It highlights the challenges faced due to the neglect of agriculture in favor of oil revenues and emphasizes the need for mechanization and policy reforms. The challenges include corruption, insecurities, policy inconsistency, and structural imbalance of the nation. The paper provides a comprehensive overview of digital agriculture's potential, which this research agrees with. Sustainable agriculture practices through digital technologies can enhance economic growth in Nigeria. This research paper also discusses how IPRs and its established legal framework can protect innovations in this field as a solution to promote sustainability and food security in Nigeria.

Itayi[16] examined the necessity of a comprehensive enforcement system for intellectual property rights in Nigeria. It discusses the importance of accessible and adequate judicial mechanisms to address infringements and emphasizes the need for experienced judges in intellectual property law. The author stated that there is no need to make comprehensive provisions for the protection of various intellectual property rights without also providing a corresponding comprehensive system for enforcing the same when the rights are or about to be infringed. Therefore, there should be an accessible, sufficient, and adequate system/procedure in the intellectual property system. The author advocated for an effective system that addresses both civil wrongs and criminal offences with an adequate number of judges with the requisite experience in intellectual property law. This research paper identifies a similar need for specialized courts with equipped judges to adjudicate on intellectual property matters. While the author's study provides a thorough analysis of enforcement

Multidisciplinary Scientific Research, <https://www.researchgate.net/publication/364308008_IMPLEMENTING_DIGITAL_AGRICULTURE_IN_NIGERIA_FOR_SUSTAINABLE_DEVELOPMENT_AND_FOOD_SECURITY> accessed 17 January 2025.

[16] N Itayi, 'Enforcing Intellectual Property Rights in Nigerian Courts' (2018) The Journal Law & Development Review <https://www.degruyter.com/document/doi/10.1515/ldr-2018-0032/html?srsltid=AfmBOopb9uSChoxgC1SCZgrW2mh56tP_cTgyi42Y1Fdc3uDfY7cJA6Ok> accessed 10th January 2025.

mechanisms, this research paper will delve into the specific challenges faced by the agricultural and industrial sectors regarding IPR enforcement.

Echendu[17] examines the relationship between flooding events and food security in Nigeria, analysed through the lenses of assemblage theory and systems thinking. The study underscores the multifaceted nature of flooding, emphasizing its significant impact on agricultural productivity and, consequently, on the nation's food security. The author employs assemblage and system thinking approaches to illustrate how various components, such as environmental factors, infrastructural elements, and human activities, interact and contribute to the occurrence and impact of floods, which have ripple effects throughout the entire food supply chain, affecting the availability, accessibility, and affordability of food. The study discusses how flooding poses challenges to achieving several SDGs in Nigeria, particularly zero hunger (SDG 2), by disrupting livelihoods, displacing communities, and degrading essential resources. The study advocates for adaptive strategies such as disaster risk reduction initiatives. The research paper discusses inadequate disaster preparedness as a challenge towards ensuring sustainable development and food security in agriculture through IPRs.

Ogunyemi and Olubiyi,[18] delved in to the significance of Nigeria's Plant Variety Protection (PVP) Act of 2021 in achieving Sustainable Development Goal 2 (SDG 2), which aims to end hunger, achieve food security and promote sustainable agriculture. The authors analyze how the PVP Act can stimulate agricultural innovation, enhance crop yields, and contribute to food security in Nigeria. The study discussed criticisms on the Act and identified sections for amendments. This research paper analyses the Plant Variety Protection Act 2021 as a part of the legal framework of IPRs protecting agricultural practices in Nigeria.

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[17] AJ Echendu, 'Flooding, Food Security and the Sustainable Development Goals in Nigeria: An Assemblage and Systems Thinking Approach' (2022) 11 (2) 59 MDPI <https://doi.org/10.3390/socsci11020059> accessed 20 February 2025.

[18] JJ Ogunyemi and IA Olubiyi, 'Attaining SDG 2 (Zero Hunger) in Nigeria: The Role of the Plant Variety Protection Act 2021' (2023) 11 (1) Abuad Law Journal 1 – 16 <https://doi.org/10.53982/alj.2023.1101.01-j> accessed 26 February 2025.

Bello, Yahaya, and Adamu[19] examine the challenges and prospects of achieving sustainable agricultural productivity to ensure food security in Nigeria. The authors analyze various factors affecting agricultural productivity and propose strategies to enhance food security in the country.
The authors identify several challenges hindering agricultural productivity in Nigeria, including climate change, land degradation, inadequate infrastructure, and limited access to modern farming technologies, as contributors to low crop yields and food insecurity. Emphasis was placed on the importance of adopting sustainable agricultural practices, such as agroforestry, crop rotation, and conservation agriculture, to enhance soil health and increase crop yields.

Amaechi[20] identifies the need for food security and sustainable agriculture. Government intervention, policies and programmes, and challenges encountered, such as soil problems, climatic conditions, forest zone challenges, policy change, and lack of elective implementation and evaluation strategy in agriculture policy, were enumerated. The author recommended that improved agricultural facilities be made available to farmers. As stated in this research paper, these improved facilities should be sustainable and made of eco–friendly technologies.

3.0 THE LEGAL FRAMEWORK FOR INTELLECTUAL PROPERTY RIGHTS (IPRS) PROTECTION IN THE NIGERIAN AGRICULTURAL SECTOR.

The laws governing the Nigerian agricultural sector on Intellectual Property Rights (IPRs) protection are crucial for fostering innovation that promotes food security and sustainable development. This framework

[19] MM Bello, JU Yahaya, and I Adamu, 'An Analysis of Sustainable Agricultural Productivity and Food Security in Nigeria' (2024) 2(1) Journal of Political Discourse 2<https://jopd.com.ng/index.php/jopdz/article/view/111/103> accessed 3 March 2025.
[20] LN Amaechi, 'Food Security and Sustainable Agricultural Development in Nigeria' (2018) 5(6) The International Journal of Social Sciences and Humanities Invention 4765 <https://www.researchgate.net/publication/358700909_Food_Security_and_Sustainable_Agricultural_Development_in_Nigeria> accessed 5 February 2025.

comprises of both international and national laws but this paper will focus on the national legislation such as the 1999 Constitution of the Federal Republic of Nigeria (as amended 2011), Patents and Designs Act 2004, National Office for Technology Acquisition Promotion (NOTAP) Act 2004, Trademarks Act 1965, and Plant Variety Protection Act 2021, which provide a legal foundation for safeguarding agricultural innovations, ensuring that farmers and researchers benefit from their intellectual contributions.

1. The 1999 Constitution of the Federal Republic of Nigeria (as amended) 2011

The right to food is not one of the fundamental rights guaranteed in Chapter IV of the 1999 Constitution of the Federal Republic of Nigeria (as amended) 2011, it is part of the fundamental objective and directive principles of State policy, contained in Chapter II of the CFRN 1999, to ensure that suitable and adequate food is provided for all citizens.[21] As a general rule, provisions on fundamental objectives and directive principles of state policy under the CFRN 1999 are not justiciable or enforceable in a court of law in Nigeria.[22] This is because section 6(6)(c) CFRN 1999 states that the judicial powers shall not except as otherwise provided by this Constitution, extend to any issue or question as to whether any act of omission by any authority or person or as to whether any law or any judicial decision is in conformity with the Fundamental Objectives and Directive Principles of State Policy set out in Chapter II of this Constitution. However, scholars argue that the right to food can be implied from the right to life, which is enforceable under Chapter IV of the CFRN 1999.

They also argue that the right to food can be enforced in Nigeria based on the relevant obligations in international law instruments to which Nigeria is a State party. Their argument is hinged on the principle that state parties to a treaty cannot rely on the provisions of their domestic laws to avoid the obligations contained in a treaty. The Nigerian constitution also

[21] 1999 Constitution of the Federal Republic of Nigeria (as amended) 2011, s 16(2)(d)
[22] 1999 Constitution of the Federal Republic of Nigeria (as amended) 2011, s 6(6)(c)

provides respect for international law and treaty obligations.[23] Nonetheless, access to food is a necessity for human survival. It is also part of the United Nations' Sustainable Development Goals to end hunger in all its forms across the world.[24] Successive government administrations have established programmes and agencies aimed at improving food security through skills improvement for farmers, and providing access to affordable land and farm inputs such as fertilizers, high-quality seedlings, tools for harvesting and processing, and a no-tax policy on subsistence food production and products.[25] These efforts toward improving food security may be regarded as part of the social contract between the government and the governed, highly dependent on the political will of any given administration, rather than a binding legal duty on the government that citizens can enforce directly through the courts.[26]

This Constitution is the supreme provision that has a binding force on the authorities and persons throughout the Federal Republic of Nigeria.[27] It established the legislative,[28] executive,[29] and judicial bodies, powers, and functions.[30] The courts and their original and appellant jurisdictions were established for individuals to seek redress for the breach of their constitutional rights. With regards to intellectual property rights, the constitution confers original jurisdiction on the Federal High Court to try matters on any Federal enactment relating to copyright, patent, designs, trademarks and passing-off, industrial designs and merchandise marks, business names, commercial and industrial monopolies, combines and trusts, standards of goods and commodities and industrial standards.[31] This provision gives individuals security for their intellectual property rights. Matters on infringements and other IP violations can obtain remedies at the Federal High Court Jurisdiction. However, the

[23] 1999 Constitution of the Federal Republic of Nigeria (as amended) 2011, s 19(d)
[24] SDGs 2
[25] P Obani, 'Reflections on the Right to Food under The Constitution of the Federal Republic of Nigeria 1999' (2019/2020) Nigerian Current Law Review <https://ssrn.com/abstract=4269469> accessed 20 February 2025.
[26] ibid
[27] 1999 Constitution of the Federal Republic of Nigeria (as amended) 2011, s 1
[28]1999 Constitution of the Federal Republic of Nigeria (as amended) 2011, s 4(1)
[29] 1999 Constitution of the Federal Republic of Nigeria (as amended) 2011, s 5 (1)
[30] 1999 Constitution of the Federal Republic of Nigeria (as amended) 2011, s 6 (1)
[31] 1999 Constitution of the Federal Republic of Nigeria (as amended) 2011, s 251 (1) (f)

effectiveness the litigation processes are not positive. The judiciary is faced with challenges of long court processes, lacunae in the laws, inadequate number of intellectual property equipped judges and slow litigation process. To achieve sustainability and food security in Nigeria though IPR, the court contributes greatly to the enforcement and implementation of those rights.

2. Patents and Designs Act 2004

The Patent and Design Act is an Act to make comprehensive provisions for the registration and proprietorship of patents and designs in Nigeria. The act stipulates the requirements for a patent grant as newness, inventive ability, and industrial applicability.[32] According to the Act, an invention is new if it does not form part of the state of the art, while an invention results from inventive activity if it does not follow from the state of the art (everything concerning that field of knowledge which has been made available to the public anywhere and at any), either as to the method, the application, the combination of methods, or the product which it concerns, or as to the industrial result it produces. An invention is capable of industrial application if it can be manufactured or used in any kind of industry, including agriculture.[33]

A patent confers upon the patentee the right to preclude any other person from making, importing, selling, or using the product, or stocking it for sale or use and where the patent has been granted in respect of a process, the act of applying the process or doing, in respect of a product obtained directly by a process.[34] Patents cannot be granted in respect of plant or animal varieties, or essentially biological processes for the production of plants or animals, or inventions contrary to public order or morality, and principles and discoveries of a scientific nature.[35] While a patent can be granted for microbiological processes and their products.[36]

Patent grant as an intellectual property right, plays a crucial role in advancing agricultural innovation, productivity, and food security in

[32] Patent and Design Act 2004, s 12
[33] Patent and Design Act 2004, s 1(2)(a)-(c)
[34] Patent and Design Act 2004, s 6
[35] Patent and Design Act 2004, s 1(4) – (5)
[36] Patent and Design Act 2004, s 1(4)(b)

Nigeria. The exclusive protection motivates agribusinesses, scientists, and research institutions to develop new agricultural technologies, hybrid seeds, and biotechnology solutions that enhance productivity. It promotes mechanized farming, drives investments and protects the industry from substandard invention and processes. By securing intellectual property rights, inventors are motivated to develop technologies that improve farming efficiency. For example, Professor Christopher Akinbile of the Federal University of Technology, Akure, was granted a patent for his Integrated Digital Soil Moisture and Temperature Device (MOISTEMP). This invention facilitates precise soil measurements, aiding in effective irrigation scheduling and water management, thereby boosting crop yields and contributing to food security.[37] Patents on new agricultural technologies ensure that farmers have access to high-quality seeds and tools. This access leads to better crop performance, reduced losses, and increased food availability, directly impacting food security.

3. Trademarks Act 1965

Trademark refers to a mark used or proposed to be used in relation to goods for the purpose of indicating a connection in the course of trade between the goods and the person having the right either as proprietor or as a registered user to use the mark, whether with or without any indication of the identity of that person.[38] It is a registrable intellectual property right in respect of a particular good or classes of goods[39] that grants the registered user exclusive right to the use of that trademark in relation to those goods.[40] A registered trademark is divided into two parts (A & B)[41] subject to the nature of their distinctiveness.[42] The grant of trademark as an intellectual property right can effectively protect the agricultural and industrial products of individuals by enabling mark differentiation. A customized name, words, sign, symbol, or logo can

[37] A Ogbekile, 'Government Grants Patent Rights to Don on Soil Measurement Device' (Bushlink, June 2024) <https://bushlink.ng/government-grants-patent-rights-to-don-on-soil-measurement-device/?utm_source=c> accessed 6 February 2025.
[38] Trademark Act 1965, s 67
[39] Trademark Act 1965, s 4
[40] Trademark Act 1965, s 5
[41] Trademark Act 1965, s 2(3)
[42] Trademark Act 1965, s 5 & 6

establish a brand identity, promote market competition, build consumers' trust, and foster industrial sustainability.

In order to ensure uniformity across various jurisdictions, the International Classification of Goods and Services (Nice Classification) was established by the Nice Agreement 1957. This classification system is used in Nigeria as well as several countries globally for the registration of trademarks. The Nice Classification groups together similar goods and services into 45 different classes. Goods are listed in classes 1 to 34, while services are listed in classes 35 to 45.[43] An applicant may choose to register a trademark in more than one class at an extra cost.[44] The classes of goods and services relating to agricultural practices in Nigeria include;[45]

a) Class 7 - Machines and machine tools; motors and engines (except for land vehicles); machine coupling and transmission components (except for land vehicles); agricultural implements other than hand-operated; incubators for eggs; automatic vending machines.
b) Class 18 - Leather and imitations of leather; animal skins, hides; trunks and travelling bags; handbags, rucksacks, purses; umbrellas, parasols and walking sticks; whips, harness and saddlery; clothing for animals.
c) Class 20 - Furniture, mirrors, picture frames; articles made of wood, cork, reed, cane, wicker, horn, bone, ivory, whalebone, shell, amber, mother-of-pearl, meerschaum or plastic which are not included in other classes; garden furniture; pillows and cushions.
d) Class 22 - Ropes, string, nets, tents, awnings, tarpaulins, sails, sacks for transporting bulk materials; padding and stuffing

[43] T Emuwa and D Oturu, 'Lists and Classification of Trademarks in Nigeria' (AELEX, September 2019) <https://www.aelex.com/wp-content/uploads/2019/09/LISTS-AND-CLASSFICATION-OF-TRADEMARKS-IN-NIGERIA.pdf > accessed 6 February 2025.
[44] ibid
[45] WIPO, 'Nice Classification' <https://nclpub.wipo.int/enfr/?basic_numbers=show&class_number=18&explanatory_notes=show&gors=&lang=en&menulang=en&mode=flat&notion=&pagination=no&version=20250101> accessed 6 February 2025.

materials which are not made of rubber or plastics; raw fibrous textile materials.

e) Class 23 - Yarns and threads, for textile use.
f) Class 29 - Meat, fish, poultry and game; meat extracts; preserved, dried and cooked fruits and vegetables; jellies, jams, compotes; eggs, milk and milk products; edible oils and fats; prepared meals; soups and potato crisps.
g) Class 30 - Coffee, tea, cocoa, sugar, rice, tapioca, sago, artificial coffee; flour and preparations made from cereals, bread, pastry and confectionery, ices; honey, treacle; yeast, baking-powder; salt, mustard; vinegar, sauces (condiments); spices; ice; sandwiches; prepared meals; pizzas, pies and pasta dishes
h) Class 31 - Agricultural, horticultural and forestry products; live animals; fresh fruits and vegetables, seeds, natural plants and flowers; foodstuffs for animals; malt; food and beverages for animals.
i) Class 44 - Agriculture, horticulture, and forestry services.

4. National Office for Technology Acquisition Promotion (NOTAP) Act 2004

The National Office for Technology Acquisition and Promotion (NOTAP was established to monitor the transfer of foreign technology to Nigeria. The functions include,

The encouragement of a more efficient process for the identification and selection of foreign technology, development of the negotiation skills of Nigerians to ensure the acquirement of the best contractual terms and conditions by Nigerian parties entering into any contract or agreement for the transfer of foreign technology, provision of a more efficient process for the adaptation of imported technology, and registration of all contracts or agreements having effect in Nigeria.[46] Part of this policy stipulates the encouragement of the flow of technology into the country to strengthen industrial development and encourage domestic enterprises to acquire foreign technologies that are suitable to the local environment to improve Foreign Direct Investment in Nigeria.[47] The National Office registers

[46] NOTAP Act 2004, s 4
[47] NOTAP ACT 2004, s 4(d)

contracts in connection with the use of trademarks or patented inventions[48] which encourages the acceptance of safe and efficient technologies, including those customized for agricultural and industrial practices.

As Nigeria advances its technological landscape, the regulatory oversight of NOTAP becomes indispensable in creating an environment ripe for innovation, collaboration, and sustainable development. The delicate equilibrium maintained between welcoming foreign technology transfers and safeguarding national interests promotes IPR in the agricultural and industrial sectors.[49] The Minister of Innovation, Science and Technology, Chief Uche Nnaji, stated that Nigeria can only derive maximum economic benefits from patents when they are translated into services and products that drive economic growth. He made this remark during the official presentation of patent certificates to researchers and inventors, facilitated by the National Office for Technology Acquisition and Promotion (NOTAP) in Abuja. The minister explained that NOTAP had secured 340 patents for indigenous inventors and researchers since 2010. He emphasised that obtaining patents is a step towards true economic benefits, which can only be realised when these innovations are developed into tangible products and services.[50] Through training programs and workshops organised by NOTAP[51], the skills of Nigerian farmers and agricultural stakeholders can be enhanced. This empowerment would enable the adoption of modern, efficient, and sustainable farming techniques.

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[48] NOTAP ACT 2004, s 4(d)(i)(ii)

[49] T Bashir and others, 'National Office for Technology Acquisition and Promotion (NOTAP)' (Mondaq, 2004) <https://www.mondaq.com/nigeria/contracts-and-commercial-law/1432044/national-office-for-technology-acquisition-and-promotion-notap> accessed 6 December 2025.

[50] S Akpe, 'NOTAP Issues 340 Patent Certificates to Nigerian Inventors' (Science Nigeria, 31 January 2025) <https://sciencenigeria.com/notap-issues-340-patent-certificates-to-nigerian-inventors/> accessed 19 February 2025.

[51] NOTAP ACT 2004, s 4(b)

5. Plant Variety Protection Act 2021 (PVP ACT)

In May 2021, President Muhammadu Buhari of the Federal Republic of Nigeria signed the Plant Variety Protection (PVP) Act 2021, and the International Union for the Protection of New Varieties of Plants (UPOV) reaffirmed Nigeria's conformity with the UPOV Convention's 1991 Act on August 27, 2021, allowing Nigeria to become a UPOV member.[52] Plant variety rights are the rights granted to the breeder of a new variety of a plant. They are a form of intellectual property right that recognizes the contributions made by plant breeders by granting exclusive rights to prevent unauthorized production or sale of new plant varieties that are similar to those of the breeder. Essentially, plant breeders have the vested rights to control the propagating and harvested materials of their new plant varieties for several years.[53] This Act was established with the objective to promote increased staple crop productivity for smallholder farmers in Nigeria and encourage investment in plant breeding and crop variety development; promote increased mutual accountability in the seed sector; and protect new varieties of plants.[54] The Act applies to a breeder, who is a person who has bred or discovered and developed a plant variety. This includes an employer or someone who has commissioned the work of such a person, and their successors-in-title respectively; and to the protection of any plant genera and species.[55]

The Act comprises the establishment of the Plant Variety Protection Office, which is domiciled in the National Agricultural Seeds Council.[56] The office is required to grant breeder's rights, maintain a register and provide information on plant breeders' rights issued in Nigeria, facilitate transfer and licensing of plant breeder's rights, collaborate with local and international bodies whose functions relate to plant breeders' rights

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[52] n(14)

[53] U Emerole and E Ogunlaja, 'Intellectual property developments in the Nigerian agricultural space: Plant breeders' rights' (DentonsACAS&LAW 2022) <https://www.dentonsacaslaw.com/en/insights/articles/2022/january/4/intellectual-property-developments-in-the-nigerian-agricultural-space-plant-breeders-rights> accessed 30 November 2024.

[54] Plant Variety Act, 2021, s 1

[55] Plant Variety Act, 2021, s 2

[56] Plant Variety Act, 2021, s 3

matters.[57] Conditions and Procedures for the Grant of a Breeder Right[58] includes, new, distinct, uniform, and stable.[59] The variety is deemed to be new if, at the date of filing of the application for a breeder's right, propagating or harvested material of the variety has not been sold or otherwise disposed of to any person with the consent of the breeder, for purposes of exploitation of the variety in Nigeria, earlier than one year before the date of filing the application and in a territory other than Nigeria earlier than four years or six years before the said date in the case of a tree or vine.[60] While a variety is deemed to be distinct where it is clearly distinguishable from any other variety whose existence is a matter of common knowledge at the time of the filing of the application.[61] In addition, a variety is a said to be uniform if it is sufficiently uniform in its relevant characteristics and stable, where its relevant characteristics remain unchanged after repeated propagation or, in the case of a particular cycle of propagation, at the end of each such cycle.[62]

The scope of a breeder's right includes; production or reproduction, conditioning for the purpose of propagation, offering for sale, selling or marketing, exporting, importing, and stocking.[63] The rights shall not extend to acts carried out privately, and for non-commercial and experimental purposes.[64] A right granted shall expire after 20 years from the date of the grant, except for trees and vines, whose breeders' rights expire after 25 years. The Registrar may extend the duration for an additional five years where he receives a six-month written notice from the holder of the breeder's right before the expiration of the original term.[65] The Act also provides that a suit by the holder of breeder's right against any person who infringes on the breeder's right may be brought to the court.[66]

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[57] Plant Variety Act, 2021, s 5
[58] Plant Variety Act, 2021, s 13-16
[59] Plant Variety Act, 2021, s 13 (1)
[60] Plant Variety Act, 2021, s 14 (a)(b)
[61] Plant Variety Act, 2021, s 15
[62] Plant Variety Act, 2021, s 16 (a)(b)
[63] Plant Variety Act, 2021, s 29 (1)
[64] Plant Variety Act, 2021, s 30 (1)
[65] Plant Variety Act, 2021, s 32
[66] Plant Variety Act, 2021, s 33(2)

The first United Nations Sustainable Development Goals (SDGs 1) advocates against poverty. Poverty and hunger are inextricably linked, and eradicating poverty will have a direct impact on eradicating hunger. Farmers' livelihoods are improved when they have access to improved plant varieties, which increase crop yields, improve quality, and create market opportunities. As a result, the Act directly contributes to the abolition of hunger by allowing farmers to grow more food and, as a result, sell more crops.[67] This helps to reduce poverty, develop rural areas, and raise income levels. The Act also establishes the Plant Variety Protection Office in Nigeria[68] to promote increased staple crop productivity among smallholder farmers, highlighting the act's goal to achieve the target of doubling the productivity and income of small-scale food producers.[69] The new law for Nigerian plant breeders can play a significant role in achieving SDG2 in a variety of ways, including the provision of a regulatory framework protecting IP in new plant varieties and breeder's rights, promoting foreign collaboration and partnerships with plant breeders in Nigeria; increased research; promoting competition; price reductions for end-products for consumers, allowing poorer people to gain access to food; improved product quality; and improved product safety.[70] It is expected that the implementation of the Act will also encourage more investment by foreign and local companies in Nigeria's plant breeding sector, which could lead to improved crop varieties and income generation in the agricultural sector in Nigeria. The Nigerian Economic Summit Group (NESG) projects that with the implementation of the PVP Law, Nigeria could generate over $2 billion annually from seed exports within the first five years, significantly enhancing the agricultural economy.[71] However, the Act has been criticised to have some challenges and limitations, most of which were

[67] n(14)
[68] Plant Variety Act, 2021, s 3
[69] Plant Variety Act, 2021, s 1(a)
[70] N Idih and M Ikemefuna, 'Intellectual Property Protection for Food Security in Nigeria: An Overview of the Nigerian Plant Variety Protection (PVP) Act 2021' (2022) (4) (3) IRLJ
[71] C Egesi and F Okelola, 'The economic gains of the Plants Varieties Protection Law for Nigeria' (Tribune, 19 October 2021) <https://tribuneonlineng.com/the-economic-gains-of-the-plants-varieties-protection-law-for-nigeria/?utm_source> accessed 2 March 2025.

highlighted in the petition by the Health of Mother Health Foundation HOMEF rejecting the PVP Act 2021.[72]

The major criticism of the Act was about its foreign nature stating that the Act failed to take into account the country's specific seed and agricultural context. According to studies, local seed systems are valuable and have provided farmers with seed security over time. These systems are innovative in that they acquire materials and adapt to new technologies.[73] The law creates a climate in which farmer rights are not balanced adequately and commercial seed trumps farmers and local seed systems. The Act prioritizes the rights of breeders over the rights of and support for smallholder farmers, who produce the majority of the food consumed in the country and have long served as food custodians. The Act is more likely to serve the needs of large seed companies or breeders who have exclusive rights to protected varieties, rather than the needs of small-scale farmers who make up the majority of the agricultural sector. This concentration has the potential to reduce competition and diversity in the seed market, potentially limiting farmers' options and increasing their reliance on a limited range of commercial seeds.

Another critique of the Act is the provisions of Section 43(2) of the PVP Act. The Act establishes the Registrar's office, which monitors the grant of breeder's rights and maintains the register for the provision of information on breeder's rights issued in Nigeria. The Act also empowers the Registrar to make decisions that affect the rights of breeders and applicants alike, such as the denial of a breeder's right application, as well as the nullification and cancellation of a breeder's rights. If a party is dissatisfied with the Registrar's judgment, Sections 42 and 43 of the Act provide for an appeal to the Minister, who will then make a decision based on the facts. Section 43(2) of the Act, in particular, renders the Minister's judgment final. This section has sparked much debate because a strict interpretation of finality implies that appeals from the Minister's decision

[72]HOMEF Petition, 'Nigerians Reject the UPOV-91 Based Plant Variety Protection Law' <https://homef.org/2021/08/23/petition-nigerians-reject-the-upov-91-based-plant-variety-protection-law/> accessed 25 February 2025.

[73] C Almekinders and N Louwaars 'The Importance of the Farmers' Seed Systems in a Functional National Seed Sector' (2002) (4) (1) Journal of New Seeds.

to the Courts are not permitted.[74] This would imply that the Minister's decision is final both administratively and legally, and as such, will not be subject to appeal or adjudication before the Court, which makes it an ouster clause.[75] In addition, the Act has been criticised for containing criminal sanctions particularly in terms of imprisonment, which are considered extreme and unnecessary for the purpose of attaining food security.

3.1 The Role of Intellectual Property Rights (IPRs) in Promoting Sustainable Development and Food Security in the Agricultural Sector

Intellectual Property Rights (IPRs) contribute to promoting innovation, economic growth, and competitiveness in the agricultural sector. World Intellectual Property Organization (WIPO) provides that new varieties support the development of urban agriculture and the growth of ornamental plants, shrubs, and trees, which improve the quality of life in urban environments.[76] The rural areas hold undeniable significance in knitting the fabric of nations, contributing their quota to economic growth, and preserving cultural diversity and social cohesion. In Nigeria, communities play a pivotal role in the nation's development trajectory.[77] Agricultural practices suffer a major setback encompassing crucial challenges such as poor infrastructure; bad roads, irrigation systems, and storage facilities, lack of basic amenities; access to electricity, clean water, and illiteracy. A well-connected network of roads, transportation systems, access to electricity, education, and healthcare are fundamental for facilitating the movement of goods and services to drive economic activities and food security.[78] Intellectual Property Rights (IPRs)

[74] I Okonkwo, B Udo, and K Ikumelo, 'Overview of Nigeria's Plant Variety Protection Act 2021 and the Impact of Section 43(2) on Plant Breeders (2021)' <https://ssrn.com/abstract=3928965> accessed 10 February 2025.
[75] n(17)
[76] WIPO, 'How SMEs Can Benefit from Plant Variety Protection' (World Intellectual Property Organization) <https://www.wipo.int/ip-outreach/en/ipday/2021/toptips/upov.html> accessed 30 November 2024.
[77] TS Ezeudu and TJ Fadeyi, 'Examining the Influence of Infrastructure Deficit on Economic Activities, Education and Healthcare in Rural Areas of Nigeria' (2024) 9(1) Nnamdi Azikiwe Journal of Political Science (NAJOPS) 155
[78] n(73)

significantly empower agricultural activities, foster economic development, and protect indigenous knowledge in Nigeria. Other contributions include;

1. Encouraging Innovation, Research and Adoption of Modern Practices

The grant of patents for agricultural inventions, research, and development motivates innovators to create new inventions, practices crop varieties, pest-resistant plants, and efficient farming techniques, knowing their intellectual efforts are rewarded with an exclusive right to aid commercial benefits. [79] Patents and Plant Variety Protection rights on improved seeds, fertilizers, or farming technologies encourage farmers in rural areas to adopt innovative practices, improving yields and productivity. IPRs motivate small-scale rural industries to develop and implement better production methods, enhancing efficiency and product quality.[80]

2. Promote Trade and Economic Growth

IPRs encourage business transactions, negotiations, competition, and the circulation of funds. This leads to economic growth and trade. Industrial designs help industries differentiate their products, enabling competitiveness in domestic and international trade.[81] Farmers benefit from increased income through IP-protected products, which creates job opportunities in processing, marketing, and distribution. Protected rural crafts and industries can scale operations, creating employment opportunities and contributing to local economies. Farmers in rural areas can use geographic indications and trademarks to differentiate their products such as Yams from Abuja or Garri from Ijebu, attracting premium prices locally and internationally. Local industries producing handmade goods can use branding and trademarks to build a reputation for quality and authenticity, increasing demand and revenue.

[79] Patents & Design Act 2004, s 6

[80] WIPO 'Intellectual Property Needs and Expectations of Traditional Holders' (2001) 146 <https://www.wipo.int/publications/en/details.jsp?id=283> accessed 10 February, 2025

[81] Patent & Designs Act 2004, s 13 & 19

3. Attracting Investment and Partnerships

Industries gain confidence to establish partnerships that promote development and modernization in Nigeria when IPRs are protected.[82] Businesses that generate intellectual property exhibit a reduced inclination to engage in foreign production within countries characterized by inadequate IPR protection regimes. The rationale behind this phenomenon is that weak IPR protection amplifies the risk of imitation and the potential for licensees to morph into direct competitors of the original producer or seller.[83] Strong intellectual property rights protection in rural areas attracts investments from agro-businesses, NGOs, and research institutions seeking to collaborate on local farming projects. Industrial investors are more willing to partner with rural enterprises when their intellectual assets, such as designs or methods, are adequately protected.

4. Combating Counterfeiting and Piracy

IPR ensures that farmers have access to quality materials by controlling the production and distribution of counterfeit seeds, fertilizers, pesticides, and agrochemicals. IP laws prevent the replication of industrial products, preserving quality standards and consumer trust. IP laws protect urban industries from losing revenue to imitations of their products.[84]

5. Technological Advancement

Through licensing agreements, Nigeria can access cutting-edge agricultural technologies developed in other countries. Technology

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[82] A Akejelu, 'Improving Intellectual Property Rights Protection as a Catalyst for Increased FDI Inflows in Nigeria' (Omaplex, 2024) <omaplex.com.ng/improving-intellectual-property-rights-protection-as-a-catalyst-for-increased-fdi-inflows-in-nigeria/#:~:text=Robust%20IPR%20protection> accessed 21 January 2025.

[83] P Walter and L Douglas, 'International Licensing and the Strengthening of Intellectual Property Rights in Developing Countries during the 1990s' (2005) 1 OECD Economic Studies 40.

[84] TK Amentae and others, 'Intellectual property rights in the agri-food chains: A systematic review and bibliometric analysis' (2024) 11 Science Direct Journal <https://www.sciencedirect.com/science/article/pii/S017221902400019X> accessed 4 January 2025.

transfer agreements, underpinned by IPRs, enhance industrial productivity and technical know-how.[85]

6. Encouraging Sustainable Practices

Farmers and organizations are encouraged to adopt sustainable practices when they see potential rewards for developing eco-friendly methods and products. Industries are motivated to innovate sustainable solutions for production processes, knowing they can monetize these innovations.[86]

7. Protecting Traditional Knowledge (TK) and Traditional Cultural Practices (TCP)

Intellectual Property Rights (IPRs) such as Geographical Indications (GIs) and Traditional Knowledge (TK) protection ensure that generational secrets and recipes, farming techniques, crop varieties, and local biodiversity are recognized and safeguarded.[87] For example, specific methods for cultivating indigenous fruit like cocoa or processing kernel pomade can be protected. Also, copyrights and trademark rights protect traditional crafts, textiles, and artisanal products from rural areas, such as Ase-Oke cloth, Tie & dye materials, or woven mats. This helps to ensure that cultural heritage is preserved and commercialized. Such acknowledgment encourages production and international recognition that fosters sustainable development in the agricultural and industrial sectors.

8. Supporting Small and Medium Enterprises (SMEs)

IPRs empower rural agricultural SMEs by enabling them to commercialize their innovations and gain competitive advantages in local and global

[85] ibid

[86] L Tedeschi, 'Protecting Intellectual Property' <https://croplife.org/our-work/protecting-intellectual-property/> accessed 30 January 2025.

[87] UC Kalu and C Kene, 'Protecting Traditional Knowledge/Secrets Under Intellectual Property Law: A Comparative Analysis Of The Adequacy Of Protections Using Nigeria As A Case Study' (2019) 6 Nnamdi Azikiwe University Journal of Commercial and Property Law (NAU.JCPL) 1.

markets. Artisans and small-scale manufacturers in rural areas can leverage IPRs to access funding, partnerships, and market opportunities.[88]

3.2 The Use of Eco-Friendly Technologies in Promoting Sustainable Development and Food Security in Nigeria.

Eco-friendly technologies refer to innovations and solutions designed to protect the environment. These include practices, processes, and products that either reduce or eliminate the pollution and waste associated with conventional technologies, aiming to minimise the ecological footprint.[89] Eco-friendly technologies, when protected by robust IP rights, play a crucial role in advancing Nigeria's agricultural and industrial sectors. They drive sustainable development and strengthen food security by encouraging innovation, attracting investment, reducing environmental impact, and enhancing agricultural productivity.

Farmers need to meet both environmental goals and economic viability, eco-friendly agricultural practices can help them do so. The agriculture industry continues to evolve as it harnesses the latest tools and technologies that make producers more productive, efficient, and sustainable.[90] These innovations reduce agriculture's environmental footprint and make farming operations more profitable. Such technologies include: Digital Sensors, Advanced Irrigation Systems, Drones, Biotechnology, and Fleet Management.

(a) **Digital Sensors** – these are eco-friendly equipment used to monitor cattle movement to micro-climate data collection and

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[88] O Komolafe, 'Intellectal Property SMEs and Economic Recovery in Nigeria' (World Intellectual Property Organisation, 2021) <https://www.wipo.int/web/wipo-magazine/articles/intellectual-property-smes-and-economic-recovery-in-nigeria-55919> accessed 12 January 2025.

[89]StudySmarter, 'Eco-Friendly Technologies' (Study Smarter, 2004) <https://www.studysmarter.co.uk/explanations/environmental-science/living-environment/eco-friendly-technologies/#:~:text=Eco-friendly%20technologies%20are%20innovative,promoting%20sustainability%20across%20the%20globe> accessed 10 January 2025.

[90] M Moore, '5 Tools and Technologies That Drive Sustainable Agriculture' (US Farmers Ranchers in Action, 2020) <https://usfarmersandranchers.org/stories/sustainable-food-production/5-tools-and-technologies-that-drive-sustainable-agriculture/> accessed 5 February 2025.

determining precise pH level of the soil. For example, farmers make precise irrigation decisions, conserve water, and minimise resource waste through digital sensors. Environmental sensors offer real-time data that supports tracking of a wide range of parameters, while mobile access to this data empowers farmers to take timely actions to protect crops, improve productivity, and enhance food security and food safety.[91]

(b) **Advanced Irrigation Systems** - Technology has made significant headway in making irrigation practices more efficient and sustainable. Wireless remote monitoring and control systems enable farmers to gain better control and visibility over the operations of their irrigation systems, and to make better decisions regarding water, chemical and electrical usage.[92]

(c) **Drones** - Drones can carry a wide array of sensors and cameras that continually monitor crop growth. Initially, drones where used for spraying chemicals, today drones are a great tool for capturing aerial imagery with platform-mounted cameras and sensors. These images can range from simple visible-light photographs to multi-spectral imagery that can be used to assess different aspects of plant health, weeds and assets. There is huge potential for drones to continue to revolutionise the agriculture industry. The eventual goal is fleets of drones that can tackle agricultural monitoring and other tasks collectively from both the ground and the air.[93] As a relatively new technology, some industries are still trying to hash out the details of widespread

[91] M Sugrim, 'Training on the Use of Digital Sensors Enhances Agricultural Practices in Saint Kitts and Nevis' (Food and Agriculture Organisation of the United Nations, 2024) <https://www.fao.org/americas/news/news-detail/training-digital-sensors/en> accessed 9 January 2025.
[92] ibid
[93] W Condon, 'The Future of Drones in Agriculture' (Toll Uncrewed Systems, 28 November 2023) <https://tolluncrewedsystems.com/blog/how-drones-are-used-in-agriculture/> accessed 10 February 2025.

drone adoption and what that will look like for each individual company.[94]

(d) **Fleet Management** - Advanced telemetry systems and GPS that are protected by intellectual property rights have positively affected fleet management in agriculture. The most basic systems can locate equipment in use. More advanced systems can give precise information, including engine speed, fuel usage, and immediate maintenance alerts. The collection of data can then be analysed to identify where specific crop inputs are needed and where they are not.[95]

Eco-friendly technologies significantly bolster intellectual property (IP) rights in Nigeria's agricultural and industrial sectors, thereby promoting sustainable development and enhancing food security through innovation; by encouraging sustainable agricultural practices, innovations in eco-friendly technologies, such as solar-powered cold storage solutions, help reduce post-harvest losses and maintain food quality. For instance, Nigerian company Ecotutu provides solar-powered cold storage for farmers, preserving produce and reducing waste. Eco-friendly innovations also helps in the reduction in environmental impact and protecting such innovations through IP rights ensures that creators can benefit from their inventions, encouraging further advancements in sustainable agriculture.[96]

Attracting investment, fostering collaboration, and strong IP protection for eco-friendly technologies makes Nigeria's agricultural and industrial sectors more attractive to investors and collaborators. For example, ThriveAgric's initiative to plant fruit trees alongside crops generates carbon credits, enhancing farmer income and contributing to climate change mitigation. ThriveAgric is rolling out a pilot program across Nigeria with plans to expand into Ghana, Uganda, and Kenya as well,

[94] n(87)
[95] n(86)
[96] O Taiwo-Oguntu, 'Our Investment in Tacking Post – Harvest Losses. Critical to Nigeria's Future – CEO Ecotutu' (Independent, 28 April 2023) <https://independent.ng/our-investment-in-tackling-post-harvest-losses-critical-to-nigerias-future-ceo-ecotutu/> accessed 10 February 2025.

under which one hectare (2.47 acres) of fruiting trees like mango and guava would be planted alongside each hectare of corn, rice, and soybeans. As the trees sequester carbon from the air, the farmers will earn carbon credits, which can be purchased by industry through the multi-national bank Rabobank, both bringing revenue to the agricultural sector and reducing Africa's role in climate change.[97] Securing IP rights for such innovative practices can lead to increased investment and partnerships, furthering sustainable development goals.

Innovations like solar-powered cold storage and sustainable farming practices help preserve food quality and reduce waste, ensuring a more stable food supply. Protecting these innovations encourages their dissemination and implementation, directly impacting food security in Nigeria. By promoting the adoption of eco-friendly technologies, IP rights contribute to increased agricultural productivity and food security.

3.3 Economic Challenges and Regulatory Hindrances Faced in Ensuring Sustainable Development in Nigeria through IPRs and Agricultural Practices.

Agriculture, since independence, has been a major contributor to the Nigerian economy. The industrial sector metamorphosed through commercial activities from small to medium and large-scale market levels. However, the discovery of petroleum created a decline in Nigeria's agricultural prowess. Nigeria has rapidly grown into a major food-importing nation as the government has become neglectful of the agricultural sector since petroleum is considered a more viable resource for economic development.[98] Currently, imported products have a competitive edge over local products in the Nigerian market.[99] In addition

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[97] J Kluger, 'Time100 Climate 2024' (Time, 24 November 2024) <https://time.com/7172521/uka-eje/?utm_source=chatgpt.com> accessed 10 February 2025.
[98] S Matemilola, I Elegbede, 'The Challenges of Food Security in Nigeria' (2017) 4 Scientific Research Journal 12 <https://www.scirp.org/journal/paperinformation?paperid=81175> accessed 30 November 2024.
[99] M Russon, 'The Challenge of Creating Successful Nigerian Products' BBC News (Lagos, 31 January 2019) <https://www.bbc.com/news/business-47070644> accessed 15 February 2025.

to socio-political instability which precluded the economic downturn, civil unrest,[100] dwindling human resource base, gender inequality, education decadence, poor health facilities, and the general loss of good governance, food accessibility[101] has further degenerated. Some of the challenges include;

1. Economic Policies Leading to Inflation

Nigeria has experienced policy shifts that have adversely affected agricultural productivity. Economic reforms, such as the removal of fuel subsidies and currency devaluation, have led to high inflation rates, increasing the cost of food and other essentials.[102] This situation exacerbates food insecurity, as a significant portion of the population struggles to afford basic necessities. Addressing these regulatory challenges requires comprehensive policy reforms that prioritize agricultural development, disaster preparedness, market stability, sustainable practices, and economic resilience to enhance food security and promote sustainable development in Nigeria.

2. Inadequate Disaster Preparedness

Recurrent flooding in Nigeria poses a significant threat to food security. Despite its impact, current agricultural policies, such as the Nigeria Agriculture Promotion Policy (APP), lack comprehensive strategies to address disaster risks like flooding. This oversight leaves the agricultural sector vulnerable to climate-related disruptions.[103]

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[100] C Asadu, 'Nigeria's independence anniversary is marked by protests and frustration over economic hardship' APnews (Lagos, 1 October 2024) <https://apnews.com/article/nigeria-independence-protests-tinubu-d321d54a7750e82b4391c27b28db68f2> accessed 5 February 2025.

[101] O Adetayo, 'Milllions of Nigerians go hungry as flood compound hardship' (Reuters, 13 November 2024) <https://www.reuters.com/world/africa/millions-nigerians-go-hungry-floods-compound-hardship-2024-11 13/?utm_source=>

[102] L Afolabi, 'Grappling with tough economic implications of total fuel subsidy removal' Punch Newspaper (Lagos, 18 October 2023) <https://punchng.com/grappling-with-tough-economic-implications-of-total-fuel-subsidy-removal/#:~:text=The%20subsidy%2C%20which%20for%20years,surge%20in> accessed 20 December 2024.

[103] n(16)

3. Lack of Specialised Courts for IP Enforcement

Nigeria faces significant enforcement challenges due to the absence of specialized courts dedicated to intellectual property disputes. The current legal framework relies on general courts, which often lack the expertise to handle complex IP cases effectively. As a result, disputes take longer to resolve, discouraging innovators from seeking legal protection. The weak enforcement mechanisms contribute to high levels of infringement and piracy, reducing the incentives for innovation in the agricultural and industrial sectors.

4. Export Restrictions and Market Distortions

In response to domestic food shortages, Nigeria's Senate approved a bill to criminalize the export of large quantities of unprocessed corn. While aiming to combat hunger, such measures can disrupt market dynamics and may not address underlying issues like production inefficiencies or supply chain challenges.[104]

5. Poor Technological Capacity

A lack of technological infrastructure further impedes the effective implementation of intellectual property rights in Nigeria's agricultural sector. Many farmers and agribusinesses lack access to modern technology, digital tools, and research facilities necessary for innovation and patentable advancements. Additionally, the slow adoption of digital IP management systems limits efficiency in the registration and tracking of IP rights. This technological gap places Nigeria at a disadvantage compared to other countries actively leveraging IP for agricultural and industrial transformation.

6. Poor Awareness of Intellectual Property Rights

One of the significant challenges hindering the adoption of Intellectual Property (IP) rights in Nigeria's agricultural sector is the limited awareness and knowledge gap among stakeholders. Many farmers, agric

[104] C Eboh, 'Nigeria's Senate Seeks to Criminalize Corn export to tackle Hunger' (Reuters, 6 December 2024) <https://www.reuters.com/world/africa/nigerias-senate-seeks-criminalise-corn-exports-tackle-hunger-2024-12-06/?utm_source> accessed 10 January 2025.

entrepreneurs, and industry players are unaware of the benefits of patents, trademarks, and copyrights in protecting agricultural innovations. The lack of structured IP education and advocacy programs has resulted in low demand for IP protections, leaving many inventions unprotected and susceptible to exploitation.

7. Limited Resources

The process of securing and enforcing intellectual property rights requires financial, technical, and legal resources that are often inaccessible to many stakeholders in Nigeria's agricultural and industrial sectors. Small-scale farmers and agribusinesses struggle with high registration costs, complex procedures, and inadequate legal support, making it difficult for them to protect their innovations. This financial limitation discourages many from pursuing IP rights, ultimately stifling innovation and economic growth in the sector.

4.0 RECOMMENDATION

To address the challenges hindering the effective use of Intellectual Property Rights (IPRs) in Nigeria's agricultural and industrial sectors, the following recommendations should be implemented:

1. Regulatory Reforms to Encourage Sustainable Agricultural and Industrial Practices

The government should enact and enforce policies that support sustainable agricultural and industrial growth while protecting intellectual property rights. This includes: streamlining IPR registration procedures to reduce bureaucratic hurdles and processing times; establishing specialized IP courts to expedite the resolution of intellectual property disputes and strengthen enforcement; providing legal support for small-scale farmers and agribusiness owners to help them navigate the complexities of IP law; and encouraging private-sector partnerships to drive investments in sustainable agricultural practices, ensuring compliance with environmental and food safety standards.

2. Increased Public Enlightenment Schemes

A more efficient IPR system requires strategic awareness campaigns and capacity-building programs targeted at farmers, agribusiness owners,

manufacturers, researchers, and institutions. Government agencies, universities, and industry associations should collaborate to organize workshops, training sessions, and digital campaigns that educate stakeholders on the importance of intellectual property protection, the application process, and enforcement mechanisms. Establishing IP resource centers across major agricultural and industrial hubs can further enhance accessibility and knowledge-sharing.

3. Implementation of Sustainable Practices

Sustainability should be at the core of Nigeria's agricultural and industrial policies. Encouraging eco-friendly innovations such as climate-smart agriculture, biotechnology, and organic farming will ensure long-term food security while minimizing environmental degradation. Stakeholders should be incentivized to adopt green technology patents, fostering the development of eco-friendly fertilizers, improved seed varieties, and sustainable irrigation systems. Additionally, research institutions and universities should prioritize R&D funding for agricultural innovations that balance productivity with environmental conservation.

4. Investment in Technological Advancement

To enhance Nigeria's global competitiveness in agriculture and industry, there must be significant investment in technology-driven innovation. The government and private sector should: (a) establish technology incubation hubs to support agricultural startups and innovators in developing patentable solutions; (b) provide financial incentives, grants, and low-interest loans to encourage agribusinesses to adopt modern technology; (c) strengthen digital infrastructure for efficient patent registration, tracking, and enforcement mechanisms; and (d) foster collaboration between universities, research institutes, and industry players to develop cutting-edge agricultural technologies that align with intellectual property protection.

5.0 CONCLUSION

Intellectual Property Rights (IPR) serve as the cornerstone of modern innovation and sustainable development by providing the legal protection and economic incentives necessary to drive creativity, investment, and

technological advancement. In Nigeria's agricultural and industrial sectors, a well-structured IPR system can foster innovation, enhance productivity, and ensure the long-term sustainability of food security initiatives.

By raising awareness, strengthening enforcement mechanisms, investing in technology, and implementing regulatory reforms, Nigeria can create an environment where innovators, researchers, and businesses are empowered to develop and commercialize groundbreaking solutions without fear of exploitation. A robust IPR framework not only safeguards the rights of inventors but also stimulates economic growth, attracts foreign investments, and positions Nigeria as a leader in sustainable agricultural and industrial development.

Moving forward, a collaborative effort among policymakers, industry stakeholders, and research institutions is crucial in ensuring that intellectual property laws are effectively implemented and leveraged for national growth. By prioritizing innovation alongside regulatory compliance, Nigeria can harness the full potential of intellectual property to drive sustainable development, food security, and global competitiveness.