THE REGULATION OF GENETICALLY MODIFIED ORGANISMS IN NIGERIA: ISSUES ARISING AND LEGAL IMPLICATIONS

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Abstract

This paper examined the topic: "The Regulation of Genetically modified organisms in Nigeria- Issues arising and Legal implications". The methodology adopted is the doctrinal research method. Primary sources of law were derived from statutes, subsidiary legislations, protocols; while the secondary sources were derived from journals and electronic articles from verified sources which were acknowledged. The aim of the paper is to evaluate the regulatory framework, if any, for genetically modified organisms in Nigeria and the extent of these laws which covers the handling and acceptability of the subject and whether it is encompassing and far reaching. This paper further seeks to scrutinize the efficacy and effectiveness of the legislations to be able to checkmate the importation of genetic seeds into the country, presuming that relevant personnel in the field are ready to allay the fears and debates which have engaged the minds of Nigerians on the subject; it highlights the various laws in Nigeria and sheds light on the various protocol and conventions Nigeria has participated in on the subject of discuss; National Biosafety Management Agency (Amendment Act) 2019, the Convention on Biological Diversity, Cartagena Protocol on Biosafety. It considered issues in the country since the commercialization of genetically modified organisms, which organisms have the ability to resist insects, viruses, and herbicides, reducing pesticide use and improving yield. It concludes that with the future prospect of commercial GMFs in Nigeria, there should be an assessment of the relevant agency's capacity to continually monitor the effect of consuming these products, that promulgating laws are not enough, training personnel in the relevant agencies must be taken into consideration as genetically modified organisms raise concerns as to health and environment, especially in a country like Nigeria that is yet to advance in technology.

Keywords: *Biosafety, Biotechnology, gene splicing, Transgenesis.*

1.0 Introduction

The Nigerian economy, has experienced a serious downturn and witnessed high inflation, which has affected food security, and led to hunger, poverty and starvation, whereas the less privileged with low purchasing power has found it difficult to compete with the elites in purchasing the little commodity available in the market. It is in a bid for the Federal Government of Nigeria to boost the economy of Nigeria, ensure food security, the government having participated in several International Conventions and protocols, like the Convention on Biological Diversity, reaffirming its commitment under the Convention, signed into Law, The National Biosafety Management Agency Act, 2015, (amended) 2019[1], which is the major regulation on genetically modified organisms in Nigeria.

The application, commercialization, and regulation of Genetically Modified Organisms (GMOs) are some of the most highly debated issues globally. These organisms have several potential applications, most significantly in agriculture, medicine, industry, and environmental matters. However, despite the

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[1] Cap N. 1 Laws of the federation of Nigeria 2004

seeming benefits to be derived from the use of GMOs, there is resistance to efforts to fully embrace them. Apparent drawbacks include possible loss of biodiversity, unintended negative impact on animal and human health, elimination of non-target species, and destruction or disruption of ecosystems[2], inadequacy of relevant environmental laws in place, have raised the following issues to be resolved in this paper; are there any regulation or legal framework for genetically modified organisms in Nigeria and globally? If the answer is in the affirmative, what are the implications of this regulation. Which agency or government ministry should answer any questions about genetically modified organisms in Nigeria, and be held responsible for any complexities which may arise if any.

Following the debates and uncertainties globally, about commercializing genetically modified organisms, does Nigeria need GMOs and is Nigeria equipped for their use and regulation. What was the extent of stakeholder engagement in the development of the National biosafety law[3], are these regulations and its agencies in Nigeria ready to undertake to be held responsible and compensate for damages for any misinformation that may arise in the long-run following their acceptance of marketing and commercializing genetically modified organisms in Nigeria.

This paper seeks to solve these problems, and enunciates the various legislations in place in Nigeria which guides the adoption of genetically modified organisms in Nigeria, grants certifications and permits for sale, importation and exportation of the said product. This paper will consider the efficacy of the said legislations in place, are they enough to curb the fears of citizens, or are they the source of rising fears, as legislations in Nigeria, have faced queries and marred with inadequacies, especially legislations on the environment. Are the relevant agencies aware that by commercializing GMO's high expectations are required from them to carry out their obligations under the legislation creating them. The assurances which they wield out to Nigerians under the legislations, are they enough, or do these assurances undermine the benefits or dangers, if any of genetically modified organisms. Are there gabs in the extant legislations, which must be filled via conducting further research on the subject before further assurances from these agencies.

2.0 Definition of Terms

The different concepts, terms, and phrases relevant to genetically modified organisms in Nigeria will herein be defined and explained to provide a proper understanding of this work. This is intended to remove ambiguity and any form of vagueness in understanding key concepts.

a. Genetic Modification

Genetic modification is a means of transferring genes from one biological source to another. It is a deliberate attempt that uses laboratory techniques and allows the recombination of genes of a host organism that serves as an expression host which is then said to be genetically modified, enhanced, or improved. The universal nature of genetic codes makes it possible for genes to be transferable and

[2] The Nigerian Academy of Science, "GENETICALLY MODIFIED ORGANISMS (GMOs) IN NIGERIA: FACTS AND FICTION" file:///C:/Users/HP%20Elitebook/Downloads/Genetically-Modified-Organism-...pdf assessed on 30-11-2024 by 4:00pm

[3] Ibid

functional in organisms other than that from which they are derived. Organisms (agricultural crops, animals, or microbes) that have been altered in such a manner are referred to as GMOs.[4]

b. Genetic Modified Organisms

They are organisms in which the genetic material has been altered in a way that does not occur naturally by mating or natural recombination. The first example of this occurred in 1978 when Herbert Boyer, took a version of the human insulin gene and inserted into the bacterium Escherichia coli to produce synthetic "human" insulin. GMOs are produced through various techniques including genetic modification, modern biotechnology, genetic engineering, gene technology, recombinant deoxyribonucleic acid (DNA) technology, gene slicing, and transgenesis. These methods allow for the manipulation of the DNA (the molecule that carries the genetic information in all cellular forms of life and some viruses) of cells to produce biological products or to change hereditary traits[5].

c. Genetic Engineering

In Genetic engineering, scientists modify an organism's genome, creating recombinant DNA which process combines genetic material from different organisms[6]. Through genetic engineering, man can increase the productivity and growth rate of livestock, animal products, and crops, or even the yield of antibiotics produced by bacteria and fungi. Genetic modification enables the production of resilient crops which are resistant to pesticides and are selectively toxic to insects. Scientists have engineered E.coil bacteria to produce insulin, providing treatment for diabetes[7].

d. Gene Splicing

Gene splicing is a phrase that is often used to describe the process of making specific changes in microorganisms[8]. It is a post-transcriptional modification in which a single gene can code for multiple proteins. It is done in eukaryotes (organisms that possess clearly defined nucleus), prior to mRNA (Messenger RNA- involved in protein synthesis) translation, by the differential inclusion or exclusion of regions of pre-mRNA (the immature form of messenger RNA in eukaryotic cells.[9].

e. Transgenesis or Transgenic

Transgenesis is the process of adding or replacing a gene in an organism's genome with a gene from a whole different species. It has the potential to improve animals' welfare, productivity or even produce a crucial drug to save human lives[10].

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[4] P Byrne, "Genetically Modified Crops: Techniques and Applications" https://agsci.colostate.edu > assessed 4/08/2025 by 9:05 pm

[5] (n2)

[6] A Robb, "Video: Genetic Engineering | Definition, Process & Examples" https://study.com/academy/lesson/video/what-is-genetic-engineering-definition-and-examples.html >assessed 28/07/2025 by 12:56am

[7] A L Johnson, C Snider, K R W Matthews, "what is genetic engineering" <https://www.bakerinstitute.org/ research/what-genetic-engineering >assessed 4/8/2025 by 8:18pm

[8] Ehowhealth, "what is geneslicing" < https://www.youtube.com/watch?v=c2PDGcN0p18 > assessed 28/07/2025

[9] https://www.premierbiosoft.com/tech_notes/gene-splicing-html > assessed 4/8/2025 by 8:18pm

[10] Roslin, "What is Transgenesis all about" https://www.youtube.com/watch?v=nVaaxm_U-Tw >assessed 28/07/2025 by 01:37 pm

f. GMO Technology

This involves inserting DNA into the genome of an organism. To produce a GM plant, new DNA is transferred into the plant cells. The cells are then grown in tissue culture where they can develop into plants. The seeds produced by these plants will inherit the new DNA. To determine the genetic makeup of all living organisms, their characteristics and interaction with the environment is important. The genetic makeup of an organism is its genome, which in all plants and animals is made of DNA (recombinant deoxyribonucleic acid)[11].

g. Biosafety

The process of managing potential risks associated with introducing GMOs and their derivatives into the environment or the market place can be referred to as Biosafety.

Biosafety means the application of measures, policies, knowledge, techniques, equipment and procedures for minimizing potential risks that modern biotechnology may pose to the environment and human health[12].

h. Biotechnology

Traditional biotechnology does not use DNA manipulation techniques, while modern biotechnology uses genetic engineering to manipulate the DNA of organisms.

Biotechnology means a field of applied biology that involves the use of living organisms, plant cells and bio processes in engineering, technology, medicine, agriculture and other fields requiring bio products[13].

i. Modern Biotechnology

Means the application in-vitro nucleic deoxyribonucleic acid techniques, including recombinant acid (DNA) and direct injection of nucleic acid into cells or organelles; or fusion of cells beyond the taxonomic family that overcome natural physiological reproductive or recombination barriers and that are not techniques used in traditional breeding and selection[14].

3.0 Legal Frameworks

The legal and institutional framework discussed hereunder, addresses the legal and institutional instruments for the governance, regulation, management, and handling of genetically modified organisms, including protection, and rights of persons and the natural environment with regard to the threats to the environment. It is a combination of national and international legal instruments and practices that regulate the subject matter;

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[11] The Royal Soceity, "what is genetic modification of crops and how is it done" https://royalsoceity.org/news-resources/projects/gm-plants/what-is-gm-and-how-it-is-done/ assessed 4/8/2025 by 8:18pm

[12] s 43 NBMA Act. Cited in NBMA,"National Biosafety Management Agency Act 2015". s 3 cited in chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://nbma.gov.ng/wp-content/uploads/2021/04/National_Biosafety_Management_Agency_Act_2015-signed.pdf > assessed on 11-4-2025 by 9:52 am

[13] s 35 NABDA Act cited in FAOLEX, "National Biotechnology Development Agency (Establishment) Act, 2022" https://www.fao.org/faolex/results/details/en/c/LEXFAOC217484/#:~:text=The%20National%20Biotechnology%20Development%20Agency,and%20its%20powers%20and%20functions. assessed on 11-4-2025 by 9:16pm

[14] (n12)

a. Constitution of the Federal Republic of Nigeria, 1999 (as amended)[15]

The Constitution is the grundnorm. It provides that the State shall protect and improve the environment and safeguard the water, air and land, forest and wildlife of Nigeria[16]. The fundamental objectives and directive Principles in Chapter II are mere ideals by virtue of its provisions that have declared them as 'non justiciable' and cannot be enforced judicially by virtue of Section 6(6)(c) thereof have now been declared justiciable by the courts in its combined reading of s 4(2) and Item 60(a) Second Schedule, and notably in the case of *Centre for Oil Pollution Watch v Nigerian National Petroleum Corporation*[17]; This case ensures good environmental practices and sustainable development. Further the supreme court gave recognition to environmental citizen suit[18].

Furthermore, in *COPW v NNPC*[19], the most significant step of the Supreme Court in greening the Constitution is its explicit recognition, that Section 33 of the Constitution which guarantee's the 'right to life', implicitly includes and constitutes a fundamental right to a clean and healthy environment for all. Acts and omissions which degrade the environment and threaten the health of people also threaten their lives which all others have a constitutional duty to refrain from violating, and which the government has a duty to protect[20]. The ongoing criticism about commercializing genetically modified organisms, is the fear that it is dangerous to health and environment. This paper advocates that with respect to GMOs, Nigerians may, if they so wish, take the bold step and follow the precedent that has already been set in the case of COPW v. NNPC in enforcing their rights to a clean and healthy life and environment.

b. National Biosafety Management Agency Act, 2015 amended 2019

This Act provides regulatory framework, institutional and administrative mechanism for safety measures in the application of modern biotechnology in Nigeria with a view to preventing any potential adverse effect on human health, animal, plant and the environment. The amended section is to enlarge the scope of application of the Act by including the emerging aspects of modern biotechnology and biosecurity in Nigeria with a view to preventing any adverse effect to human health and environment and for related matters. The function of the agency among others is to take samples and carry out laboratory analysis of crops, products or materials for purposes of determining if they contain genetically modified organisms and ensure compliance with this Act[21].

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[15] Constitution of the Federal Republic of Nigeria 1999 (as amended).

[16] Ibid s. 20

[17] Centre for Oil Pollution Watch (COPW) v NNPC [2019] 5 NWLR (Pt. 1666) 518. Cited in I L Worika and E P Amechi, "Access to Justice for Victims of Oil Pollution in the Niger Delta Region of Nigeria: Exploring Contemporary Judicial Trends and Implications for Sustainable Development" Journal of Law Policy and Globalization Vol. No. 134. 2023

[18] T A Francis, C C Ezeribe, " Overview of the Sustainable Development Principle in Promoting Development of the Environment in Nigeria" (2024) vol. 4, issue 7 *Journal of Environmental and Human Right Law Faculty of Law Rivers State University*. 365

[19] (n3) supra

[20] U Etemire CCLR - Carbon & Climate Law Review: The Future of Climate Change Litigation in Nigeria: COPW v NNPC in the Spotlight (lexxion.eu)

[21] NBMA,"National Biosafety Management Agency Act 2015". s 3 cited in chrome-extension://efaidnbmnnnn ibpcajpcglclefindmkaj/https://nbma.gov.ng/wp-content/uploads/2021/04/National_Biosafety_Management_ Agency Act_2015-signed.pdf assessed on 11-4-2025 by 9:52 am

The Act establishes a governing body, which among others, has a representative of the Nigeria Customs service[22], this section does not cover the gap in the legislation[23] which provides for import and export permit, application of import and export permit and procedure for granting approvals, does not clearly spell out the place and role of the Nigeria Customs service. This section presupposes that, once a person has been granted approval by NBMA, he can show his approval at the borders, and this is enough. The section should be amended to bring in approval from the Nigeria Customs Service as part of the procedure for approval, this is because, NBMA personnel may not be at the border at all times. The author believes that approval and permits for genetically modified organisms, before they can be granted permits and approvals, must pass through a rigorous procedure as it concerns issues of health and environment.

c. National Biotechnology Development Agency (Establishment) Act[24], 2022

The National Biotechnology Development Agency (NABDA) was established in November 2001. It was founded under the Federal Ministry of Science and Technology to implement the National Biotechnology Policy, which aimed to promote and coordinate biotechnology research and development in Nigeria. The establishment was a response to recognizing the importance of biotechnology for national development[25]. The agency carries out research and development on biotechnology in priority areas of food, agriculture, health, industry, environment and other strategic sectors for national development, and draw up programmes and policies for biotechnology utilisation in Nigeria[26].

This act provides for biotechnology[27], whereas, the NBMA Act provides for a definition of modern biotechnology[28]. The NBMA Act further provides that the agency shall "ensure safety in the use of modern biotechnology and provide holistic approach to the regulation of genetically modified organisms"[29]. The challenge here, is how and in what ways does the NBMA intend to carry out this function, was not stated in the section. A reading of the NABDA Act on biotechnology says, "the NABDA shall coordinate all aspects of biotechnology in Nigeria"[30], this suggests that "modern biotechnology" is included in the functions of NABDA. The author perceives a conflict in the future in the functions of these agencies (NABDA and NBMA) as it relates to which agency coordinates biotechnology, and which agency ought to ensure the safety of biotechnology. This paper advocates that the agencies should collaborate to resolve this conflict as a matter of necessity.

[22] Ibid s 10
[23] Ibid s 22, 23, 28
[24] Cap N3 LFN 2004
[25] FAOLEX, "National Biotechnology Development Agency (Establishment) Act, 2022" https://www.fao.org/faolex/results/details/en/c/LEXFAOC217484/#:~:text=The%20National%20Biotechnology%20Development%20Agency,and%20its%20powers%20and%20functions. assessed on 11-4-2025 by 9:16pm
[26] (n7) s 7
[27] (n13) NABDA Act s 7 (c & u)
[28] (n14) respectively
[29] (n6) NBMA Act s 2(c)
[30] (n21)

d. National Agency for Food and Drug Administration and Control (NAFDAC) Act[31] it mandates NAFDAC to regulate and control the manufacture, importation, exportation, distribution, advertisement, sale and use of food, drugs, cosmetics, chemicals, detergents, medical devices and packaged water (known as regulated products).

The NBMA Act provides for a Review of the food safety assessment and the determination that the food is safe for human consumption shall be certified by the National Agency for Food, Drug Administration and Control"[32]. Under this section, food here refers to genetically modified organism. This in effect presumes that NAFDAC as an agency has obligations to fulfil when issues of genetically modified organisms comes to play. The section sounds like NAFDAC is at the beck and call of NBMA, and shall certify such food whether in conformity with its (NAFDAC) legislation or not. This assertion is further given weight after NAFDAC DG admitted that GMOs could be used for non-food crops such as timber, furniture, and rubber plantation, Adeyeye asserted that there was no evidence from her agency that it is safe for human consumption[33].

NAFDAC DG was quoted as saying, "In terms of GMOs, we do not think it is safe. We do not think it is safe for our consumption"[34]. NBMA DG, reacting, in a letter dated 2 July, Asagbra claimed that it was completely misleading for the DG of NAFDAC to categorically state on national television that GMOs are not safe, having admitted that her agency has not carried out research, does not have the competency nor the mandate to carry out any study to determine GMOs' safety. Consequently, NAFDAC reacted to this letter by stating that they were misunderstood[35]. NAFDAC approbating and reprobating, making political comments of being misunderstood, clearly shows the inadequacy of the said legislation in addressing the concerns about genetically modified organisms.

Ikeotuonye posited that "GMOs are pesticides and should not meet NAFDAC's food criteria; that Seeds are the foundation of human and animal life on Earth. She goes on to say that whoever controls your seeds controls your life, and that in Nigeria, genetically modified organisms (GMOs) are transgenic, created by crossing organisms that are taxonomically different which is a problem. The presence of glyphosate residue in the body is one such problem associated with genetically modified organisms"[36].

NAFDAC must understand that Nigerians are curious and concerned about the safety of their health and environment, and must of necessity amend its legislation to provide for procedures which must be followed to certify genetically modified organisms.

[31] CAP N1 Laws of Federation 2004 cited in NBMA, "Federal Ministry of Environment" file:///C:/Users/HP%20Elitebook/Downloads/NATIONAL-BIOSAFETY-POLICY-REVISED-2017.pdf assessed on 11-4-2025 by 110:49 am

[32] (n6) s 24 (5) NBMA Act

[33] The Nation, "GM food controversy: Health Minister summons NAFDAC, NBMA bosses" https://thenationonlineng.net/gm-food-controversy-health-minister-summons-nafdac-nbma-bosses > assessed 02/08/2025 by 11:36pm

[34] Ibid

[35] Ibid

[36] Ikeotuonye, "GMOs Are Pesticides and Should Not Meet NAFDAC's Food Criteria" https://www.youtube.com/watch?v=K6T9hun-LdM >assessed 02/08/2025 by 11: 52pm

e. Customs Service Act 2023

This Act repeals the Customs and Excise Management Act[37]. The Functions is to promote trade facilitation in line with international conventions and agreements as it relates to customs administration; prevent smuggling, customs fraud and all other violations under this Act; carry out all border enforcement and regulatory activities required by law in collaboration with relevant agencies[38].

This paper advocates that there should be a proviso to the provision of this section[39] which should read, "nothwithstanding any provision in any legislation whatsoever, the importation, exportation and transit in goods must be in conformity with the provision of this Act with respect to genetically modified organisms. With such proviso, the NBMA will collaborate with the Nigeria customs service, to ensure and clearly spell out in its provisions procedure for approval as stated earlier in this paper.

f. The Federal Competition and Consumer Protection Act (FCCPA) 2018

This is the primary legislation governing competition and consumer protection in Nigeria. It was enacted to promote fair, efficient, and competitive markets, ensuring access to safe products and protecting consumer rights. The FCCPA established the Federal Competition and Consumer Protection Commission (FCCPC) and the Competition and Consumer Protection Tribunal (CCPT) to enforce its provisions. The FCCPA[40] outlines several consumer rights, consumers rights to safe, good quality goods, including the right to information, duty to label goods properly, full price disclosure, and the freedom to choose suppliers[41]. It also empowers the FCCPC to investigate and address unfair trade practices, ensuring transparency and fairness in the marketplace.

g. Standard Organisation of Nigeria Act, 2015[42]

Standard Organisation of Nigeria (SON) governing body is known as the Nigerian Standards Council. This is the Policy making body for supervising the administration and financial management of the Organisation. SON was established by the SON Act, 2015, which repeals the Standards Organisation of Nigeria Act[43], and Enacts the Standards Organisation of Nigeria Act. 2015 for the purpose of providing additional functions for the organisation, increasing penalties for violations, and for related matters. The mandate of the Organisation includes evaluate quality assurance activities, including certification systems, products and laboratories throughout Nigeria, preparation of Standards relating products, measurements, materials, processes and services amongst others and their promotion at National, Regional and International levels; certification of products, assistance in the production of quality goods and services; improvement of measurement accuracies and circulation of information relating to standards[44].

[37] CAP. C45, LFN 2004

[38] NCS, "Nigeria Customs Service Act 2023" file:///C:/Users/HP%20Elitebook/Downloads/nig.%20customs%20service%20act%202023.pdf >

[39] Part viii, ss 46 to 66

[40] FCCPC, "FCCPA" https://fccpc.gov.ng/resources-library/fccpa/#:~:text=The%20Federal%20Competition%20and%20Consumer%20Protection%20Act%2C%202018%20(FCCPA),Menu >Assessed 31/07/2025 by 8:44 am

[41] Ibid part xv, pt xvi

[42] Act No 14 of 2015

[43] Cap 59 LFN 2004,

[44] SON, "Standards Organisation of Nigeria" < https://son.gov.ng/about-son/ > Assessed 31/07/2025 by 8:44 am

Both the FCCPA and the SON Act, are incidental legislations on the issue of discuss, they are not specifically intended to address genetically modified organisms but contain elements which affect and regulate the sale and consumption of genetically modified organisms, especially as to its quality and safety, and the issue of proper labelling of products.

h. The Nigeria Agricultural Quarantine Service (Estsablishment) Act, 2017

This Act establishes the Nigeria Agricultural Quarantine Service for the purposes of preventing the entry, establishment and spread of foreign pests and diseases of plant, animal and aquatic resources and products into the country and to promote sanitary and phytosanitary measures as it relates to import and export of agricultural products with a view to minimising the risk to agriculture, food safety and environment. The function of the service is to prevent the introduction, establishment and spread of exotic pests and diseases of plants, animals and aquatic resources and their products into and outside the country and so on[45]. The Service has the following Departments; Plant Quarantine, Animal Quarantine, Aquatic Resources, Laboratory Management, Planning, Research and Development, Finance and Account; and, Human Resource Management[46].

The gap created in most legislations in Nigeria, and the perceived docility of these institutions including this Act[47] is part of what has given the Nigerian customs service unlimited jurisdiction in carrying out their functions. No wonder the 2023 Customs service Act intentionally omitted to define the term "goods". These lacunas have made our borders to be porous. For instance, the NAQS Act[48] provides for the powers of an authorized officer, and defines an authorized officer as a quarantine inspector in the pre-entry and post-entry borders of the service (that is NAQ service). What comes to mind after a reading of this section[49], with reference to imports, exports, and reshipment, if any, does this authorized officer work hand in hand with the Nigeria customs service, and is he always on standby with the customs officials at the border? These gaps have to be filled by the NAQS.

i. National Agricultural Seeds Council Act,[50] 2019

This law charges the National Agricultural Seeds Council with the overall development and regulation of the national seed industry. This Act repeals the National Agricultural Seeds Act[51], and establishes the National Agricultural Seeds Council to promote and stimulate the development of dependable seed industry, regulate and control the registration of released varieties, protect the farmers from the sales of poor quality seeds, facilitate the production and marketing of high quality seeds in Nigeria, and provide legal backing for official testing, certification, sales, importation, exportation and use of seed.

[45] Ibid s 6
[46] Ibid s 7
[47] Ibid s 20 (c,d,k)
[48] Ibid ss 20, 27
[49] Ibid
[50] Cap 192 LFN 2004 cited in Seedportal, "National Agricultural Seeds Act" chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.seedportal.org.ng/admin/media/documents/Seeds%20Decree%20(1992).pdf assessed on 11-4-2025 by 10:44 am

[51] Cap. N5, Laws of the Federation of Nigeria, 2004

This Act also promotes greater private sector participation in the seed subsector in line with the current agricultural seed policy globalization and export trade promotion. It provides for the appointment and functions of seed inspectors[52]. It also provides for seed registration and release, whereby genetically modified varieties are considered if they conform to the biosafety regulations of Nigeria[53], etc.

To further link FCCPA and SON, NASCs, NAQS to genetically modified organisms, The National Biosafety management Agency, recently assured Nigerians that its agency has done a proper risk assessment and analysis to ensure the safety of the Tela maize for human health and the environment. The agency posits[54] that the application for TELA Maize was thoroughly examined by two committees comprising of experts and scientists from the various relevant Agencies and the Academia, namely National Agency for Food and Drug Administration and Control (NAFDAC), Standard Organization of Nigeria (SON), Nigerian Agricultural Quarantine Service (NAQS), Federal Competition and Consumer Protection Commission (FCCPC), National Agricultural Seed Council (NASCs), universities, research institutions among others who are renowned professionals in the particular field and our internal review process confirmed that TELA Maize meets safety standards[55].

j. National Environmental (Access to Genetic Resources and Benefit Sharing) Regulations,[56] 2009

This regulation was made pursuant to the NESREA Act 2007, now NESREA (Amendment) Act 2018. It has the following provisions, Environmental Impact statement, Conservation of threatened species, Inventory of biological Diversity, and benefit sharing[57].

The intention of the legislator in promulgating the above legislations, is for them to fulfil the letters and the spirit of these legislations, and not for these legislations to die in the books. The legislators at this point, have to exercise legislative oversight. That is, they should stop making legislations and take out time to assess the legislations they have made, investigate the institutions and agencies with power to enforce the legislations, to see if these legislations are actually working and enforceable.

The NBMA Act may be described as a demi-god legislation, cutting across the functions, duties and powers of other legislations, which may cause conflict. The author perceives that while making most of these regulations, that there was minimal stakeholder participation, reason for the conflicts and perceived overlaps in the regulations, and recommends a quick amendment.

[52] Part iv, s 9 cited in NASC, "SEED ACT 2019" chromeextension://efaidnbmnnnibpcajpcglclefindmkaj/https://seedcouncil.gov.ng/wp-content/uploads/2020/02/Seed-Act-2019.pdf > assessed 30/07/2025 by 1:41pm
[53] Ibid Part v, s 13(5)
[54] NBMA, "Tela Maize is safe, NBMA assures Nigerians" https://nbma.gov.ng/tela-maize-is-safe-nbma-assures-nigerians/ > assessed 29/07/2025 by 2:10pm
[55] Ibid
[56] Regulation S.1.No 30 p B 1121-1141
[57] Ibid part 1, ss 1,2,3, part 111 s 18

4.0 International Conventions and Protocols

This has to do with the various Conventions and Treaties that Nigeria is a signatory to. The various conventions listed hereunder, reaffirms Nigeria's commitments towards the goals, principles and objectives of these conventions;

a. Convention on Biological Diversity, 1992

The Convention on Biological Diversity (CBD) has three main objectives: the conservation of biological diversity; the sustainable use of the components of biological diversity; the fair and equitable sharing of the benefits arising out of the utilization of genetic resources. This Convention reaffirms Nigeria's commitment to the principles, goals and objectives of the CBD, especially: Principle of Sovereign Rights and Responsibilities, control of risks associated with Genetically Modified Organisms, assessment and minimization of environmental impact, access to genetic resources, access and transfer of technology, handling of technology and distribution of benefits[58].

The author, while assessing Nigeria's commitment under this convention, and looking at the ongoing debates and criticisms about the commercialization of GMOs, and the responses and feedback from NBMA discussed hereunder, the NBMA is yet to state whether there are environmental impacts associated with genetically modified organisms, talk more of assessing and minimizing environmental impact[59].

a. Cartagena Protocol on Biosafety to the Convention on Biological Diversity

This protocol governs the movements of living modified organisms – LMOs – resulting from modern biotechnology from one country to another: In regard to the establishment of a Biosafety Clearing-House, Parties committed to " Assist Parties to implement the Protocol, taking into account the special needs of developing country Parties, in particular the least developed and small island developing States among them, and countries with economies in transition as well as countries that are centres of origin and centres of genetic diversity"; in regard to capacity-building, financial resources and access to and transfer of technology and know-how, Parties commit to cooperating in the development and/or strengthening of human resources and institutional capacities in biosafety in developing country Parties, "in particular" the LDCs and SIDS among them, and in Parties with economies in transition[60].

b. Rio Declaration on Environment and Development, 1992

It reaffirms Nigeria's commitment to the Principles of the Declaration on Environment and Development, especially in liability and redress as well as compensation for damage, including that occasioned by trans-boundary movements, incidents and processes. Also, the Precautionary Principle, which stipulates that "lack of reasonable scientific certainty about environmental and human risks shall not be used to justify avoiding or postponing cost-effective measures to prevent these risks[61]. Both the United Nations Conference on Environment and Development (UNCED), provide for the regulation of

[58] (n39) Articles 3, 8g, 14, 15, 16, 19
[59] Ibid Article 14
[60] *Ibid* article 22 and 28
[61] (n39) Principle 13, 15 of the Rio Declaration

trans-boundary movement of Living Modified Organisms (LMOs) which may cause harm to biodiversity or human health[62].

c. The Advanced Informed Agreement (AIA)

This is a procedure, established by the Cartagena Protocol on Biosafety, is a mechanism for ensuring the safe handling of living modified organisms (LMOs) during their first intentional transboundary movement. It requires the exporting country to notify the importing country before the first shipment of an LMO intended for intentional release into the environment, providing detailed information about the LMO and its intended use. The importing country then has time to assess the risks and decide whether to allow the import, potentially with conditions, or to prohibit it[63].

An assessment of the various laws and conventions under study, raises the question whether the production, use, import, export, sale, or trans-boundary movements of modern biotechnology applications, practices and products conform fully to all relevant national legislations and international agreements and obligations to which Nigeria is signatory, which includes a mechanism to ensure the traceability of GMOs and their products? The answer is in the negative as the gaps in the NBMA Act must be filled as a matter of urgency. The amended NBMA Act did not address pressing issues, debates and concerns about genetically modified organisms especially on the issue of undertaking as to damages and compensation for any misrepresentation of facts if any, which may arise in the future. The NBMA Act provides for offences, penalties and enforcement[64]. It does not make any provision for compensation for damages as envisaged by the 1992 Rio Declaration.

d. World Trade Organisation Agreement

The WTO addresses GMOs through its core agreements, particularly the SPS (Sanitary and Phytosanitary) Agreement and the TBT (Technical Barriers to Trade) Agreement. These agreements aim to ensure that trade barriers, including those related to GMOs, are based on scientific evidence and are not used as disguised protectionist measures. WTO plays a crucial role in shaping international trade rules related to GMOs, aiming to ensure that regulations are based on science and do not create unnecessary trade barriers. However, tensions can arise between the WTO's trade rules and other international agreements, such as the Biosafety Protocol, particularly when it comes to balancing trade and environmental concerns[65].

The World Trade Organisation is an institution that has played a role in globalization and trade liberalization. Trade liberalization means elimination or removal of restrictions and barriers on free exchange of goods between nations[66]. Member states of the WTO are supposed to allow free flow of trade, which includes free flow of trade in genetically modified organisms. The author states that

[62] Ibid

[63] BCH, "AIA"https://bch.cbd.int/help/topics/en/The_Advance_Informed_Agreement_procedure.html <assessed 11-4-2025 by 11:50 am

[64] (n6) part ix

[65] WTO, "The Law" https://www.google.com/search?q=World+Trade+Organization+(WTO)+Agreements+on+gmo&oq=World+Trade+Organization+(WTO)+Agreements+on+gmo&gs_lcrp=EgZjaHJvbWUyBggAEEUYOTIHCAEQIRigATIHCAIQIRigAdIBCTE1ODA0ajBqNKgCALACAQ&sourceid=chrome&ie=UTF-8 <assessed on 11-4-2025 by 11:37 am

[66] C C Wigwe, "International Economic And Trade Laws" (Chrismarcus chambers Publishers 2023) 64

developing countries like Nigeria, while not using its laws as protectionist measures against the free flow of trade, should not allow its country to be a dumping ground for substandard products and genetically modified organisms. The government of Nigeria must get expert scientific evidence before allowing genetically modified organisms to be imported into Nigeria. This assertion finds strength in 1992 Rio Declaration, which states that "lack of reasonable scientific certainty about environmental and human risks shall not be used to justify avoiding or postponing cost-effective measures to prevent these risks[67].

e. 1995 Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS)
Allows for patent protection of inventions in all fields of technology, including those related to plant varieties and genetically modified organisms (GMOs). This framework has implications for both developed and developing countries, particularly regarding the protection of traditional knowledge and the access to seeds[68].

Under this agreement, Nigeria's obligation includes recognition and respect for intellectual property rights with respect to GMOs and their products, will only be granted if it contributes to the promotion of technological innovation and to the transfer and dissemination of technology, to the mutual advantage of producers and users of technological knowledge and is done in a manner that is conducive to social and economic welfare, and to a balance of rights and obligations[69].

5.0 Issues Arising and Legal Implications Relating to Genetically Modified Organisms In Nigeria
The Nigerian government approved the commercialization of TELA maize, a drought- tolerant and insect-resistant variety, and Bt cowpea, a crop with built-in pest resistance on the 17th of January 2024 and 2018 respectively[70].

Yerima, posited that GMO technology is not just limited to foods; but also has applications in industry. For example, Bt- cotton farming could resuscitate the textile industry in Nigeria, in the long run creating much needed new employment opportunities[71].

TELA maize is a genetically modified (GM) maize variety developed to be insect-resistant and drought-tolerant, and it has been approved for commercial release in Nigeria. The National Biosafety Management Agency (NBMA) has assured the public of its safety, emphasizing that it is as safe as conventional maize varieties[72].

[67] (n56)
[68] WTO, "Uruguay Round Agreement: TRIP" https://www.wto.org/english/docs_e/legal_e/27-trips_01_e.htm#:~:text=Agreement%20on%20Trade%2DRelated%20Aspects,Morocco%20on%2015%20April%201994. assessed 11-4-2025 by 11:50 am
[69] (n6) s 7 Trips Agreement
[70] Biotech Updates, "Nigeria Approves GM Maize for Commercialization" https://www.isaaa.org/kc/cropbiotechupdate/article/default.asp?ID=20598 <assessed on 12-4-2025 by 9:58 am
[71] (n2)
[72] NBMA, "Tela Maize is safe, NBMA assures Nigerians" https://nbma.gov.ng/tela-maize-is-safe-nbma-assures-nigerians/ > assessed 29/07/2025 by 2:10pm

Nigeria reached a major food security milestone with the commercial release of insect-resistant cowpea. Bt cowpea, a genetically modified cowpea variety resistant to the pod borer pest, was commercially released in Nigeria in 2019, making it the first country to do so. This Bt cowpea variety, also known as Sampea 20-T, was developed by Nigerian scientists and is significant because cowpea is a staple food and major source of protein for millions of Nigerians. The introduction of Bt cowpea aims to address yield losses due to the pod borer (*Maruca vitrata*), which can be over 90%, and potentially increase farmer income and reduce poverty This new variety has been genetically engineered to provide built-in resistance to the insect pod borer (*Maruca vitrata*). It will significantly decrease pesticide use to just two applications per cropping cycle, primarily to control other insect pests. The crop is also resistant to striga and alectra, two parasitic weeds that contribute to yield losses. The pod borer-resistant variety will also increase yields by about 20 percent, helping Nigeria to reduce its dependence on imports and achieve food security. Nigeria, is the world's largest producer and consumer of cowpea, currently imports about 500,000 tonnes of cowpea yearly to meet demand[73]. Nigeria, being the first African country to commercialize a GM variety of this important indigenous legume, Nigeria's actions are likely to have an influential effect across the continent. It has also approved pest-resistant Bt cotton, which can resuscitate the textile industry in Nigeria[74].

Ishiyaku posits that the GM cowpea tastes just the same as conventional varieties and has the same protein and nutrient content, the legume does not have any killer gene, and farmers can replant the seeds if they wish. Research also has determined that the Bt protein, which dwells freely in the soil, is harmless in the guts of humans and livestock. The Bt cowpea has gone through the necessary, relevant, vigorous experimental confined field trials since 2009. "It has undergone multiplication trials for gene stability in other ecological zones, demonstration field trials for farmers to appreciate its performance and multilocational trials." Bt cowpea will provide farmers with an alternative to costly and hazardous insecticide spraying and reduce the expense of applying pesticides on their farms, he further posited[75]. A farmer stated that he has about 7.3 hectares dedicated to Bt Cowpea, a genetically modified version of the traditional cowpea known as ***iron beans***. Reflecting on his transition from a struggling farmer to successful farm owner, he used to farm the common variety of beans, and from a hectare, he could only harvest two or three bags. After several rounds of pesticide fumigation, he would still get only few bags[76]."

SAMPEA 20-T was developed through a partnership that brought together Nigeria's Institute for Agricultural Research (IAR), National Biotechnology Development Agency (NABDA) and the Agricultural Research Council of Nigeria (ARCN); Australia's national science agency, CSIRO, and the Danforth Plant Science Center. Bayer CropScience provided the Cry1Ab (Bt) gene on a royalty-free humanitarian basis to ensure the seeds are affordable to smallholder farmers. The partnership was

[73] Joan Conrow, "Nigeria clears Bt-Cowpea for farmers use" https://allianceforscience.org/blog/2019/12/nigeria-clears-bt-cowpea-for-farmers-use/ >assessed 29/07/2025 by 5:19pm

[74] Ibid

[75] Ibid

[76] AATF, "From despair to prosperity: Nigerian farmer's success story with Bt-cowpea" https://www.aatf-africa.org/from-despair-to-prosperity-nigerian-farmers-success-story-with-bt-cowpea/#:~:text=Emmanuel%20recalled%2C%20%E2%80%9CFrom%20that%20one,that%20has%20helped%20him%20thrive. >assessed on 29/07/2025 by 5:36pm

coordinated by the African Agricultural Technology Foundation (AATF) with sustained funding by United States Agency for International Development[77].

Amua linked Nigeria's food insecurity to economic deprivation and poor post-harvest technology, rather than seed genetics. Nigeria's issue is the lack of economic opportunity, absence of processing capacity, and no preservative technology, further linking GMO's as a commercial and geopolitical strategy, a marketing strategy to erode the national sovereignty of countries supposedly independent[78].

On 16th May, 2024, a lawmaker presented a motion in the house of rep, which was adopted that there should be a comprehensive investigation of the introduction of genetically modified organisms (GMOs) into Nigeria and for a halt on approval of new products pending the completion of that investigation. Also, NAFDAC should ensure labelling of GM crops already in Nigeria. Further, noting that some people do not read labels, a law maker advised that permits for commercialisation of the Bt Cowpea, Tela Maize, Bt Corn and all other. GMOs be suspended pending the result of the investigation by the House Committee on Agriculture and others[79].

6.0 Lessons from other Jurisdictions

Brazil is a leading country in the development and implementation of genetic improvement programs. For livestock, particularly in dairy cattle, genetically modified livestock with improved traits like growth rate, meat quality, milk composition, and disease resistance are being developed in Brazil. It is worthy to note that in 2019, Brazil was all set to create the country's first herd of genetically dehorned dairy cows, then errors in the cows' DNA cropped up and it was scrapped[80].

Countries like Brazil, US and China, place emphasis on labelling of genetically modified organisms. For instance, the United States National Bioengineered Foods Disclosure Standard Act 2016 makes it mandatory for GMOs to be labelled, it provides that foods containing bioengineered ingredients be disclosed to consumers either by text, a symbol or electronic or digital link[81]. In US and China, genetically modified plants can be used to produce edible vaccines,

[77] Ibid

[78] Amua, "GMOs Are Marketing Strategies" https://www.channelstv.com/2025/07/29/gmos-are-marketing-strategies-prof-amua/ > assessed 29/07/2025 by 8:28pm

[79] HOMEF, "House of Reps pulls a Stop on GMOs" https://homef.org/2024/05/21/homef-gmo-free-nigeria- alliance-applaud-house-of-reps-decision-to-investigate-the-introduction-of-gmos-in-nigeria/#:~:text=As%20the%20lawmaker%20rightly%20explained%2C%20the%20introduction,their%20potential%20impacts%20on%20the%20country's%20biosafety.&text=Brown%20advised%20that%20permits%20for%20commercialisation%20of,the%20House%20Committee%20on%20Agriculture%20and%20others. Assessed on 12-4-2025 by 09:52am

[80] Euro Group for Animals, "Brazil's plans for gene-edited cows got scrapped because of errors in DNA" https://www.eurogroupforanimals.org/news/brazils-plans-gene-edited-cows-got-scrapped-because-errors-dna#:~:text=errors%20in%20DNA-,Brazil's%20plans%20for%20gene%2Dedited%20cows%20got,because%20of%20errors%20in%20DNA&text=The%20country%20was%20going%20to,of%20genetically%20dehorned%20dairy%20cows. Assessed on 12-4-2025 by 2:05 pm

[81] Sciencedirect, 'GMO Food Labels in the United States: Economic Implication of the New Law' accessed 8/8/2025 by 12:19pm https://www.sciencedirect.com/science/article/abs/pii/S0306919218301295#:~:text=Nevertheless%2C%20in%20July%202016%2C%20the,also%20prevented%20this%20from%20happening

potentially reducing the cost and increasing the accessibility of vaccination programs[82]. Also, GMOs are being investigated as potential sources of biofuels and bioplastics[83].

From the foregoing, and lessons from other jurisdictions, especially Brazil, it will be noted that countries like Brazil which are leading in genetically modified organisms, and with high advancement in technology, are still making mistakes, which means that Nigeria is in a hurry to embrace and commercialize genetically modified organisms. Nigeria should give the product more time, and research carefully, learning what other countries are doing. *Nigeria, being the first country in the world to approve the commercialization of genetically modified cowpea resistant to pod borer*[84] , seems like an achievement, but is like a learner driver, driving a vehicle on a very fast lane.

While research is on-going for genetically modified organisms, the government must, as a matter of urgency, resurrect institutions in the country which are gradually going into extinction, like the Nigeria Institute of stored products. These institutions if resurrected, can also ensure food security and availability.

7.0 Conclusion and Recommendations

The fact is that embracing modern biotechnology would serve as a way of getting Nigeria out of the brink of joblessness, economic hardship, technological backwardness, food insecurity, solutions to malnutrition, disease burden, effective pollution control, as well as achieving the Sustainable Development Goals, food and drug manufacturing lie in the adoption of GMOs. GMOs, GMFs, is made possible by improved molecular techniques backed with corresponding sophisticated equipment, personnel, and policies which are enforceable. Nigeria is in the right direction, but must slow down to understand seed genetics and how it works. Acting like a busy body in embracing modern technology which relates to genetically modified organisms, whereas relevant agencies in the country should spend time and finance learning and researching on the subject, will not achieve the much needed advantage which it seeks to attain. The following recommendations should be noted:

1. The Nigerian Institute of stored products should be adequately funded, personnel trained, to ensure food availability, especially seasonal foods all year round.

2. There should be an assessment of the country's capacity periodically to continually monitor the effect of consuming GM products by the National Assembly.

[82] T Phillips, "Genetically Modified Organisms (GMOs): Transgenic Crops and Recombinant DNA Technology" https://www.nature.com/scitable/topicpage/genetically-modified-organisms-gmos-transgenic-crops-and-732/ assessed on 10-4-2025 by 10:23pm

[83] Science Direct, "Trends in the global commercialization of genetically modified crops in 2023" https://www.sciencedirect.com/science/article/pii/S2095311924003332 < assessed on 10-4-2025 by

[84] ISAAA, "Biotech Country Facts and Trends: Nigeria" https://www.isaaa.org/resources/publications/biotech_country_facts_and_trends/nigeria/default.asp > assessed 02/08/2025 by 4:22pm

3. Awareness about GMOs should be carried out, and consumers should be fully informed on the use and workings of biotechnology

4. GMFs sold in the market should be properly labelled for consumers to make informed choices

5. NAFDAC should revise its legislation to properly capture GMOs, GMFs, and GMPs.