journals.unizik.edu.ng/jcpl/index ISSN: 2736-0342
NNAMDI AZIKIWE UNIVERSITY, AWKA JOURNAL OF COMMERCIAL AND PROPERTY LAW Vol. 13(2), MARCH, 2026

LEGAL REGIME OF BIOSAFETY MANAGEMENT IN NIGERIA

Kudirat Abdulkareem[*]
Ahmed A. Muhammed-Mikaaeel[**]
Khadijat Kamaldeen Ibrahim-Eletu[***]

Abstract
Biosafety management in Nigeria is a critical aspect of ensuring the safe handling, transfer, and use of genetically modified organisms (GMOs) and other biological materials that may pose risks to human health and the environment. The country has established a legal and institutional framework to regulate biosafety, primarily through the National Biosafety Management Agency (NBMA), which was created by the National Biosafety Management Act of 2015 as amended. The method adopted is library-based research (Doctrinal Methodology) from Primary to secondary sources. This paper analyses the function of the agency in the implementation of biosafety policies, risk assessments, and compliance measures. The paper investigates whether Nigeria's biosafety framework aligns with international agreements such as the Cartagena Protocol on Biosafety, which the country ratified to promote safe biotechnological advancements. The paper discusses topic issues involved, such as the merits and challenges of biotechnology (GMOs), the inadequacy of funding, limited technical expertise, and limited public concerns over GMOs. The paper recommended pragmatic strengthening of biosafety management to enhance stakeholder engagement and pave the way for access to correct global information, capacity-building programs, doing away with political corruption and ensuring stricter enforcement of biosafety regulations.

Keywords: Analysis, National, Biosafety, Management, Agency, Environmental Safety

1. Introduction

Earth, as a planet, is a finite and precious resource containing many species of living organism which depends on one another for the continuous survival of humans by way of biodiversity. The increase in the population of humans and the need for their survival call for biotechnological Improvement and development because of human dependent on other bio-diverse species.[1] The introduction of biotechnological development by scientists did not come without some negative impact on human health under threat from human activities and their impact on the environment.[2] Raging from biotechnology emerging in the 1960s and 70s with molecular and cellular technologies to Genetically Modified Organisms (GMOs) in Agricultural products like Maize, Rice and Animals.[3] The urgency of crisis to human health and environment from this development cannot be overstated. Then, the need to control the risk, understand and uphold biosafety management laws became a greater global concern. This paper aims to explore the foundational concepts of biosafety management law in Nigeria, its impact on human and planet (Nigeria environment). The paper will also delve into the challenges faced in the application

[*] **Kudirat Abdulkareem,** Postgraduate Student of Faculty of Law, Yakubu Gowan University, FCT, Abuja, Nigeria. Tel: 080386227/08129332815 Email: kkudrot82@gmail.com
[**] **Ahmed A. Muhammed-Mikaaeel,** Lecturer, Department of Islamic Law, Kwara State University, Malete-Nigeria. Tel: 07035064745 Email: ahmed.muhammed-mikaaeel@kwasu.edu.ng
[***] **Khadijat Kamaldeen Ibrahim-Eletu,** Chief Lecturer and Deputy Provost, College of Arabic and Islamic Legal Studies, Ilorin, Kwara State. Tel: 08032947632 Email: kkibrahimeletu96@gmail.com
[1] VL Chopra and RP Sharma 'Biotechnology in crop improvement' *Plant and Biotechnology and Agriculture* 543-546
[2] ibid
[3] ibid

of Biosafety Management Act and the possible way forward to these challenges, in an effort to illuminate the path towards a more futuristic sustainable development.

2. Conceptual Analysis

The Black's Law Dictionary 12th edition, 2025 defines Biosafety as "Another word for Biosecurity."[4] Scientist define Biosafety as the prevention of large-scale loss of biological integrity, focusing both on ecology and human health.[5] These prevention mechanisms include the conduction of regular reviews of biosafety in laboratory settings, as well as strict guidelines to follow.[6] Biosafety is refers to the set of measures, policies, and procedures implemented to prevent the unintentional exposure to biological agents; including genetically modified organisms (GMOs), to protect human health and the environment from potential hazards. It involves risk assessment, containment, strategies, and regulatory frameworks to ensure the safe handling, use, and disposal of biological materials, particularly in research, agriculture, and healthcare settings that has major dangerous impact on human and environment. Biosafety is used to protect human and environment from harmful incidents of biotechnology.[7] Biosafety management refers to the systematic approach to identifying, assessing, and mitigating risks associated with the handling, use, and release of biological materials, including genetically modified organisms (GMOs) and potentially harmful microorganisms.[8] It involves implementing policies, regulations, and best practices to ensure the safety of human health, biodiversity, and the environment.

Key components[9] of biosafety management include Regulatory Frameworks (i.e. establishing laws and guidelines to govern biosafety practices, Risk Assessment (i.e. Evaluating potential risks associated with biological research and biotechnology applications), Containment Measures (i.e. implementing laboratory and field-level safety protocols to prevent contamination or unintended release). Monitoring and Compliance (i.e. ensuring adherence to national and international biosafety standard, Public Awareness and Training (i.e. educating stakeholders, including scientists, policymakers, and the public, on biosafety risks and management strategies).[10] Effective biosafety management is crucial in sectors such as agriculture, healthcare, and research, where biotechnology and microbiological agents are used to improve food security, medicine for environmental and human sustainability.[11] The World Health Organisation (WHO) views biosafety Management as a strategic and integrated approach to analysing relevant risks to human, animal and plant life and health and associated risks for the environment mainly on how these are managed and control.[12]

The need for improvement on biotechnological safety program already in existence for a new laboratory activity which may require that the program be modified to address the following issues:[13]

i. The unique hazards introduced by the new activity
ii. The methods of controlling these hazards
iii. The new procedures needed e.g. signs, waste disposal, personnel monitoring etc.
iv. The orientation of personnel and

[4] BA Garner, (ed) *Black's Law Dictionary* (9th Edition, Thomson/West, 2004)
[5] A Schwartz, *et al*, 'Biosafety Needs to Redefine itself as a Science' *Issues in Science and Technology* available at <https:issues.org> accessed 23 March 2025
[6] ibid
[7] ibid
[8] ibid
[9] JY Raymond 'The 1, 2, 3's of Biosafety Levels' 1-8 < https:///www.aphl.org> accessed on 22 March 2025
[10] ibid
[11] ibid
[12] See the World Health Organization Report <https:///apps.ho.int >accessed 23 March 2025
[13] ibid

v. Ways of ensuring that the new procedures are followed for the prevention of biodiversity technological development that metamorphose into Genetically Modifications Organism (GMOs) that comes with series of human and environmental hazards.

Biodiversity and genetically modified organisms (GMOs) are interconnected in various ways, with both positive and negative implications for ecosystems, agriculture, and conservation.[14] Biodiversity refers to the variety of life on Earth, including species diversity (different plants, animals, and microorganisms), genetic diversity (variations within species), and ecosystem diversity (forests, oceans, wetlands, etc.). It is essential for ecosystem stability, food security, and medicine.[15] Genetically Modified Organisms (GMOs) are organisms whose genetic material has been altered using biotechnology to introduce desired traits, such as pest resistance, drought tolerance, or increased nutritional value. Common GMO crops include maize, soybeans, cotton, and rice.[16]

3. Global Historical Development of Biotechnology at a Glance

The historical development of biotechnology, the emergence of genetically modified organisms (GMOs), and the need for biosafety management can be traced through several key phases:[17]

Early Biotechnology (Ancient – 19th Century)

Biotechnology dates back thousands of years when humans began using microorganisms for food production and fermentation:

6000 BCE: Fermentation used in brewing beer and making bread.

2000 BCE: Egyptians and Babylonians used yeast for baking and brewing.

19th Century: Louis Pasteur studied fermentation, leading to the germ theory of disease.

Classical Biotechnology (19th – Mid 20th Century)[18]

1865: Gregor Mendel's laws of inheritance laid the foundation for genetics.

1928: Alexander Fleming discovered penicillin, an early application of microbial biotechnology.

1953: James Watson and Francis Crick discovered the structure of DNA, crucial for genetic engineering.

Modern Biotechnology & Genetic Modification (1970s – Present)[19]

1973: Stanley Cohen and Herbert Boyer developed recombinant DNA technology, enabling the modification of organisms.

1983: First genetically modified (GM) plant (antibiotic-resistant tobacco).

1994: First GM food, the Flavoured tomato, approved for commercial sale.

1996: GM crops (herbicide-resistant soybeans, Bt corn) were commercialised globally.

2000s – Present: Expansion of GMOs in agriculture, medicine (insulin production), and industry.

Need for Biosafety Management[20]

As GMOs became widespread, concerns arose regarding:

Environmental Risks: Potential gene flow to wild species, loss of biodiversity.

Health Concerns: Allergic reactions, antibiotic resistance.

Ethical and Socioeconomic Issues: Corporate control of seeds, food security.

[14] T Begna and K Mohammed, 'Impact of Genetic Modified Crops on the Genetic Diversity of Cultivated and Wild Species of Plants' *International Journal of Research in Agricultural Sciences* (2021) 8(2) 79-85

[15] ibid

[16] ibid

[17] JE Smith, 'A Concise History of Biotechnology – Some Key Determinants' *Biotechnology* 1 available at htpps://www.eolss.net> accessed 24 March 2025

[18] ibid

[19] ibid

[20] ibid

Development of Biosafety Regulations[21]

To address these concerns, governments and international bodies established biosafety frameworks:
1992: Convention on Biological Diversity (CBD) recognized the need for biosafety.
2000: Cartagena Protocol on Biosafety established global guidelines for GMO regulation.
2003: Many countries, including the EU, implemented strict GMO labeling and safety assessments.
The advancement of biotechnology led to the development of GMOs, prompting the need for biosafety management to ensure environmental and human health safety. Ongoing research and regulatory frameworks continue to shape the responsible use of biotechnology.

4. Historical Account of Biosafety Management in Nigeria

The historical evolution of the Biosafety Management Agency Act in Nigeria centers on the need to regulate modern biotechnology and ensure safety. Here is a concise overview:[22]

Foundation:[23]

I. The need for a regulatory framework arose with the increasing advancements in modern biotechnology, particularly concerning Genetically Modified Organisms (GMOs).
II. Nigeria, being a signatory to the Cartagena Protocol on Biosafety, was obligated to domesticate the agreement through national legislation.
III. National Biosafety Management Agency Act 2015:
IV. This act established the National Biosafety Management Agency (NBMA).
V. The NBMA was tasked with providing a regulatory framework, institutional and administrative mechanisms for safety measures in the application of modern biotechnology.
VI. Its core objective was to prevent any adverse effects on human health, animals, plants, and the environment.

2019 Amendment:[24]

i. The Act was amended in 2019 to broaden its scope and application.
ii. This amendment addressed emerging aspects of modern biotechnology, including gene drive, gene editing, and synthetic biology.
iii. It also aimed to strengthen biosecurity measures in Nigeria.
iv. This amendment was to ensure that the NBMA was keeping up with the rapidly evolving field of biotechnology.
v. In essence, the evolution of the Biosafety Management Agency Act reflects Nigeria's commitment to:
vi. Safeguarding its environment and public health.
vii. Adhering to international biosafety protocols.
viii. Adapting to the evolving landscape of modern biotechnology.

5. Biosafety Management in Nigeria

Biosafety is essential for regulating the safe use of biotechnology, particularly genetically modified organisms (GMOs) and other biological materials that could impact negatively on human health and the environment. This paper intends to examine how Nigeria as a Nation has been so consistent in ensuring biodiversity conservation as security with the rapid advancement of biotechnology. Nigeria has recognized the need for a robust regulatory framework to manage potential risks while promoting scientific innovation and working towards economic growth of the country for a sustainable

[21] ibid
[22] MB Orovwuje, 'Nigerian Biosafety Law: The Journey and the Need to Act' (2016) available at https://aefjn.org accessed 23 March 2025
[23] ibid
[24] ibid

development.[25] The foundation of biosafety management in Nigeria is the National Biosafety Management Agency (NBMA), established under the National Biosafety Management Agency Act of 2015.[26] This agency is responsible for overseeing the implementation of biosafety policies, conducting risk assessments, granting permits for GMO-related activities, and ensuring compliance with national and international biosafety standards.[27] Nigeria is also a signatory to the Cartagena Protocol on Biosafety, which provides guidelines for the safe transfer, handling, and use of GMOs. Biosafety regulations in Nigeria cover areas such as research, agricultural biotechnology, environmental release, and food safety. The country has implemented measures such as public consultations, risk assessment procedures, and strict monitoring systems to address biosafety concerns. However, challenges remain, including limited public awareness, insufficient funding, lack of adequate information, corruption and the need for stronger enforcement of laws and mechanisms.[28]

As Nigeria continues to embrace biotechnology in agriculture, healthcare, and industry, effective biosafety management remains crucial in balancing innovation with the protection of biodiversity, human health, and the environment. Strengthening regulatory frameworks, enhancing public engagement, and improving scientific capacity are key to ensuring the safe and responsible use of biotechnology in Nigeria.

5.1 Impact of GMOS on Biodiversity

I. Potential Benefits[29]

a. Increased Crop Yields – GMOs can help farmers produce more food with fewer resources, reducing the need for deforestation and habitat destruction.
b. Reduced Pesticide Use – Some GMOs (e.g., Bt crops) produce natural insecticides, decreasing the need for chemical pesticides that can harm biodiversity.
c. Drought and Climate Resistance – GM crops can be engineered to withstand extreme weather, preserving agricultural biodiversity in changing climates.

II. Potential Risks[30]

a. Loss of Genetic Diversity – Large-scale planting of GMO monocultures can reduce genetic diversity, making crops more vulnerable to diseases and pests.
b. Crossbreeding with Wild Species – GM plants can potentially crossbreed with wild relatives, altering natural ecosystems in unpredictable ways.

Impact on Non-Target Species – Some GMO traits, like pest resistance, may harm beneficial insects (e.g., bees and butterflies), affecting biodiversity.[31] Resistance in Pests and Weeds – Overuse of GMOs can lead to the evolution of resistant pests and "super weeds," requiring stronger chemicals that harm biodiversity. Balancing GMOs and Biodiversity Conservation. Implementing biosafety regulations to monitor and control GMO impacts. Encouraging crop rotation and diverse farming practices to maintain soil and species diversity. Conducting long-term ecological studies to assess GMOs' effects on biodiversity leading to human, health and environmental hazards. The needs to control and manage this. Genetically modified organisms (GMOs), while offering potential benefits, can also pose risks to biodiversity, including the potential for reduced genetic diversity, the emergence of herbicide-resistant weeds, and harm to non-target organisms.

[25] BL Ijaiya, 'Analytical Legal Framework on Biodiversity Conservation in Nigeria, India and United Kingdom' *International Journal of Law, Justice and Jurisprudence* (2021) 1(1) 01-13
[26] ibid
[27] ibid
[28] ibid
[29] Begna and Mohammed (n 14)
[30] ibid
[31] ibid

III Potential Impacts on Biodiversity

Reduced Genetic Diversity:[32] The widespread cultivation of a few genetically modified crop varieties can lead to a decrease in the overall genetic diversity of plants and animals in the environment.

Herbicide-Resistant Weeds:[33] The use of herbicide-resistant GMO crops can lead to the evolution of herbicide-resistant weeds, which can be difficult to control, potentially harming other crops and ecosystems.

Harm to Non-Target Organisms:[34] GMOs, particularly those engineered to produce their own insecticides, can harm non-target species, including beneficial insects, birds, and other wildlife, disrupting food chains and ecosystems.

Disruption of Ecosystems:[35] The introduction of GMOs can disrupt natural ecosystems by outcompeting native species or altering the balance of predator-prey relationships.

Increased Pesticide Use:[36] While some GMOs are designed to reduce the need for pesticides, others may actually lead to increased pesticide use, further impacting biodiversity adversely

Land Use Changes:[37] The adoption of GM crops can lead to changes in land use, including agricultural expansion, which can further reduce biodiversity such as Gene Flow, Monoculture, Monarch Butterfly Study and Herbicide-Resistant Weeds, all having consequences on biodiversity and their Ecosystem. Genetic modification produces genetically modified animals, plants and organisms some of which if introduced into the environment they can affect biodiversity.

6. Review of the National Biosafety Management Agency Act, 2015

The National Biosafety Management Act in Nigeria was enacted in 2015 and later amended in 2019. The Act contained forty-four (44) Sections divided into Ten (10) Parts and covered many aspects of biotechnological safety, security and conservation. The Act provides the legal framework for regulating biotechnology and the safe use of genetically modified organisms (GMOs) in the country. The Act established the National Biosafety Management Agency (NBMA) to oversee biosafety-related matters through its Aims and Objectives. Summary of the Act includes the Establishment of the National Biosafety Management Agency, its aims, and Objectives.[38] Functions of the National Biosafety Management Agency.[39] Structure and Staff of the Agency;[40] Establishment of Governing Board, Tenure and Vacancy.[41] Function and Powers of the Board, PART V, Section 13, solely for the function of the Agency. Financial Provision,[42] Fund of the Agency, Expenditure, power to invest, borrow, Acceptance of gift, Annual estimate, Account and audit & Annual Report.[43] Request and Authorisation. Import and Export Permit, Application of Import and Export permit and Import or Transit of Products to be approved, public display of Application, Public Hearing, disclosable information, Procedure for granting approval, Revocation and Review of Application and Appeal by the Applicant.[44] Risk Assessment and Management. Mandatory Risk Assessment, Conflict of Interest, Risk Management Plan and Additional measures for Risk Management.[45] Offences, Penalties and Enforcement. Offences and penalties, False

[32] JE Carpenter, 'Impacts of GM crops on biodiversity' *GM Crops Review* (2011) 2(1) 1-17
[33] ibid
[34] ibid
[35] M Haris, *et al*, 'Impacts of Genetically Modified Organism (GMOs) on Environment and Agriculture: A Comparative Review' *Trends in Animal and Plant Sciences* (2023) 2 9-16
[36] ibid
[37] ibid
[38] PT I, Ss 1and 2 National Biosafety Management Agency Act, 2015 (As Amended).
[39] ibid, PT II, S3.
[40] ibid, PT III, Ss 4 to 9.
[41] ibid, PT IV, Ss 10 to 12.
[42] ibid, PT VI, Ss 14 to 21.
[43] ibid, PT VII, Ss 22 to 30
[44] ibid, PT VIII, Ss 31 to 34.
[45] ibid, PT IX Ss 35 to 40.

Information, Obstruction of Officers, Penalties where it is not specified in the Act, Power of Enforcement and Jurisdiction[46] and Miscellaneous Provisions. Regulation, Power to own Property, Interpretation and Citation.

Key Provisions of the Biosafety Management Act:[47]
Function and Powers of the Agency:[48]

a. Regulation of GMOs – Ensures that all genetically modified organisms (GMOs) undergo proper risk assessments before approval for research, importation, or commercialization. Section
b. Establishment of NBMA – The agency is responsible for regulating and ensuring the safe use of modern biotechnology.
c. Permit and Licensing Requirements – Entities dealing with GMOs must obtain permits from NBMA.
d. Risk Assessment and Management – Requires environmental and health risk assessments before approving GMOs.
e. Public Participation and Awareness – Encourages transparency by involving the public in decision-making processes related to biosafety.
f. Penalties for Violations – Prescribes fines and imprisonment for violations such as unauthorized GMO release.
g. Collaboration with International Organizations – Aligns Nigeria's biosafety regulations with international treaties such as the Cartagena Protocol on Biosafety
h. Amendments in 2019

The 2019 amendment strengthened regulatory control by broadening NBMA's powers to oversee new biotechnology developments, including gene editing and synthetic biology

7. National Biosafety Management Agency of Nigeria

The National Biosafety Management Agency (NBMA) was established by the National Biosafety Management Agency Act 2015,[49] to provide a regulatory framework to adequately safeguard human health and the environment from potential adverse effects of modern biotechnology and its products such as genetically modified organisms, while harnessing the potentials of modern biotechnology and its derivatives, for the benefit of Nigerians.

7.1 The UN International agreement

This is known as Cartagena Protocol on Biosafety which Nigeria signed is an environment protocol and it requires members to domesticate the agreement through law.[50] The Biosafety Act is, therefore, to domesticate the Protocol and address our National Biosafety requirements. The NBMA act 2015 was however amended in 2019 to enlarge its scope and application of the act by including new and emerging aspects of modern Biotechnology such as gene drive, gene editing, synthetic Biology and to ensure Biosecurity in Nigeria, with a view to preventing adverse effects on human health and the environment. The National Biosafety Management Agency in Nigeria regulates modern biotechnology activities and the release into the environment, handling, and use of genetically modified organisms which are products of modern biotechnology to prevent adverse impact on the environment and human health. The Biosafety protocol which Nigeria signed, requires biosafety management and Regulatory Agency separate from biotechnology promoting Agency for transparency and to avoid biosafety being

[46] Ibid, PT X Ss 36 to 44.
[47] ibid, S 13
[48] ibid, Ss 22 to 30
[49] The Act came into force in April 2015, with the appointment of a Director-General and Chief Executive Officer.
[50] S Jutta, 'International Agreement for the Conservation and Sustainable use of biodiversity- with special emphasis on Convention on Biological Diversity (CBD)' <https://www.tropentag.de> accessed on 24 March 2025.

compromised and to also avoid the promoter being a judge in its case. This is the situation in other countries where there are biosafety laws and agencies.

7.2. The Background

The Cartagena Protocol on Biosafety (CPB), which Nigeria signed in 2000, came into force on 11th September 2003. The protocol's major plank is to contribute to the global effort towards ensuring an adequate level of protection in the trans-boundary transfer, handling and use of living modified organisms resulting from modern biotechnology, focusing on the preservation of human health and the environment. Consequently, the Conference of Parties to the Convention on Biological Diversity, serving as Meeting of Parties (COP-MOP) to the Cartagena Protocol on Biosafety, in 2010, adopted a new protocol known as the Nagoya-Kuala Lumpur Supplementary Protocol on Liability and Redress, which Nigeria signed in 2012.[51] NBSMA Objective of the supplementary protocol is to contribute to the conservation of and sustainable use of biological diversity, by providing international rules and procedures in the field of liability and redress relating to living modified organisms. In compliance with this international requirement, a Biosafety Bill was developed and subjected to various stakeholders' review, to address the concerns associated with modern biotechnology and to domesticate both the Cartagena Protocol on Biosafety and the Nagoya-Kuala Lumpur Protocol on Liability and Redress. The Bill, which was passed by the 6th Parliament on 1st June 2011, became time-barred and was re-presented to the 7th National Assembly, passed in 2014, and was signed on the 18th of April 2015.[52]

7.3 NBSMA's Mandates

To provide regulatory framework, institutional and administrative mechanism for safety measures in the application of modern biotechnology and emerging modern biotechnologies in Nigeria with the view to preventing any adverse effects on human health, animal, plants, and the environment as well as to put in place measures to ensure biosecurity.

NBSMA's Mandate and Mission

To promote the basic tenet of biosafety by ensuring that only safe modern and emerging biotechnologies are practiced while putting in place measures to ensure biosecurity in Nigeria.

7.4 NBSMA's Vision

To be a global reference institution that ensures the safe practice of modern and emerging biotechnologies as well as effective measures for biosecurity.

7.5 NBSMA Overall Objective

The objective of the NBMA is to ensure adequate levels of protection in the field of safe transfer, handling, and use of genetically modified organisms resulting from modern and emerging biotechnologies that may have adverse impacts on the conservation and sustainable use of Biodiversity taking into account risks to human health, animals, plant, the environment, and to put in place measures to ensure Biosecurity.

8. Impacts of National Biosafety Management Agency in Nigeria

The impact of the National Biosafety Management Agency Act in Nigeria is enormous as stated below.[53]

i. Assurance of adequately regulated use of modern biotechnology for the improvement and increased productivity in the agricultural sector that would lead to improved socioeconomic status of Nigerian farmers and enhanced national economic prosperity[54]
ii. Pre- Impact Assessment of Biotechnology to human health and environment. The National Biosafety Management Agency (NBMA) Act is enacted to regulate the use of genetically

[51] ibid
[52] ibid
[53] JF Falcone and D Utain, 'The Application of Common Law in Present-Day Environmental Disputes' *II VILL. ENVTL. L.J.* (2000) 59, 69.
[54] ibid

modified organisms (GMOs) and ensure that biotechnology applications do not pose risks to human health, biodiversity and the Nigeria environment. The impact of the Act on Nigeria's biodiversity system has been both positive and controversial.

Regulation of GMOs

The Act provides a legal framework for the safe handling and use of GMOs, ensuring that their introduction does not harm native plant and animal species in Section 13 sub 6 NBMA 2015 to ensure:[55]

A. Environmental Protection – By setting safety guidelines, the Act helps prevent potential ecological disruptions caused by the uncontrolled release of GMOs.
B. Biodiversity Conservation – The NBMA works to assess potential risks of GMOs on biodiversity, ensuring that indigenous species are not displaced or threatened.
C. Promotion of Research – The law encourages responsible biotechnology research and education that can enhance food security and agricultural productivity. These has been achieved by various improvement on agriculture in Nigeria through Government Financial support to farmers and creation of colleges of Agriculture. e.g. Federal University of Agriculture Zuru, Kebi, Samaru College of Agriculture, Kaduna, Federal College of Agriculture, Kano etc.

Negative Impacts & Controversies[56]

1. Concerns Over GMO Risks – Critics argue that GMOs could lead to genetic contamination, where modified genes transfer to wild species, threatening Nigeria's rich biodiversity.
2. Monopolization of Seeds – Some fear that multinational corporations promoting GMOs could reduce farmers' control over local seed varieties, leading to biodiversity loss.
3. Regulatory Weaknesses – There have been allegations that the NBMA prioritizes approving GMO permits rather than strictly enforcing biosafety standards.
4. Potential Effects on Pollinators – Some scientists warn that GMOs resistant to pests could impact beneficial insects like bees and butterflies, disrupting ecosystems.

The NBMA Act plays a crucial role in balancing biotechnology advancements with biodiversity conservation. However, continuous oversight, transparency, and stakeholder engagement (including farmers, environmentalists, and researchers) are essential to ensure that biodiversity is protected while leveraging the benefits of modern biotechnology.

9. Challenges Faced on the Application of National Biosafety Management Act's in Nigeria

Challenges bedeviling the smooth application of the National Biosafety Management Acts in Nigeria are briefly discussed below.[57] The National Biosafety Management Agency (NBMA) Act in Nigeria faces challenges including inadequate funding, anti-GMO campaigns lacking scientific backing, and loopholes in the legislation that hinder its ability to protect public health and the environment. Here's a more detailed breakdown of the challenges:[58]

a) Loopholes and Weaknesses in the Act: The Act is said to be undemocratic in approach and hives room of certain weaknesses.
b) Arbitrary Composition of the Governing Board: The Act's governing board includes a major promoter and developer of GMOs (National Biotechnology Development Agency), which raises concerns about potential conflicts of interest.

[55] ibid
[56] ibid
[57] T Alatise, 'Common Law Approach to Environmental Litigation In Nigeria: Prospects and Challenges' NAU JCPL (2024) 11(3) 89-96
[58] ibid

c) Defective Liability and Redress Provisions: The Act deviates from the Cartagena Protocol's principles of liability and redress, instead instituting a fault-based system where the petitioner must prove negligence or intentional conduct.
d) Lack of Adequate Provisions: The Act lacks adequate provisions for the precautionary principle, public participation, and access to information.
e) Use of Slack Terms: The Act uses terms like "may" instead of "shall," giving the Agency excessive discretionary power.
f) Lack of access to information
g) No provision for adequate stakeholder engagement or consultation and participation
h) Subjective decision-making
i) Skewed provisions for appeals and reviews
j) Funding and Capacity Issues:
k) Inadequate Funding:
l) The NBMA faces challenges due to insufficient funding, which can hinder its ability to effectively implement its mandate.
m) Capacity Building: There's a need for increased capacity in areas like risk assessment, risk management, and risk communication.
n) Anti-GMO Campaigns: The presence of anti-GMO campaigns, often lacking scientific backing, can create obstacles for the safe and responsible use of modern biotechnology.
o) Public Perception: Public perception and understanding of GMOs and biosafety issues can also pose challenges to the effective implementation of the Act.
p) Federal Republic of Nigeria – National Biosafety Management Agency
q) The implementation of this policy requires the capacity to test for genetically modified foods, seeds, plants, animals and similar products which are being used.

10. Way-Forward and Recommendations

The suggested ways forward are:[59]

i. Awareness-raising: Educating the public about their rights under common law principles and the importance of protecting the environment can help to increase awareness and support for these principles.
ii. Enforcement: Strengthening enforcement mechanisms, such as increasing penalties for environmental violations and providing more training and resources to government agencies, can help to ensure that common law principles are applied consistently and effectively.
iii. Anti-corruption measures: Implementing anti-corruption measures, such as strengthening transparency and accountability in government, can help to reduce corruption and improve the effectiveness of environmental regulation.
iv. Community engagement: Engaging with local communities and incorporating their perspectives into environmental decision-making can help to build support for common law principles and ensure that they are applied in a way that is responsive to local needs.
v. Capacity-building: Strengthening the capacity of government agencies and non-governmental organizations to enforce common law principles and conduct environmental impact assessments can help to improve the application of these principles.
vi. Collaboration: Collaboration between government, industry, and civil society can help to achieve consensus on environmental issues and ensure that common law principles are applied effectively.

[59] ibid

vii. Legal reform: Reforms to the legal system, such as strengthening the independence of the judiciary and increasing access to justice for marginalized communities, can help to improve the effectiveness of environmental law in Nigeria.

viii. Public-private partnerships: Public-private partnerships can provide opportunities for private sector involvement in environmental protection, including the funding of environmental initiatives and the implementation of environmental best practices in business operations.

ix. Technological solutions: Developing and implementing technological solutions, such as remote sensing and GIS mapping, can help to improve monitoring and enforcement of environmental laws and regulations.

11. Conclusion

Biosafety management in Nigeria is a critical aspect of ensuring the safe handling, transfer, and use of genetically modified organisms (GMOs) and other biological materials that may pose risks to human health and the environment. The country has established a legal and institutional framework to regulate biosafety, primarily through the National Biosafety Management Agency (NBMA), which was created by the National Biosafety Management Act of 2015 as amended. The Act is said to align with international agreements such as the Cartagena Protocol on Biosafety, which the country ratified to promote safe biotechnological advancements. However, there are challenges to biotechnology (GMOs) practices in the country, such as the inadequacy of funding, limited technical expertise, and limited public concerns over GMOs. Pragmatic strengthening of biosafety management is therefore needed to enhance stakeholder engagement and pave the way for access to correct global information and capacity-building programs. The country cannot afford to do away with political corruption and ensure stricter enforcement of biosafety regulations. These would definitely address some of the challenges being faced in the region of biodiversity management in the country.