



Between Promise and Concern: Experts Perspectives and Science Communication on Genetically Modified Foods in Nigeria

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Abstract. The introduction of genetically modified foods (GMFs) as a means of addressing the growing food security challenge in Nigeria has thrown up quite a number of mixed narratives and divergent views among experts and even the citizens. This is due to the widespread apprehensions about health and safety, ecological impacts, technological capability, external influence, and public confidence in regulatory bodies. This study therefore investigated expert perspectives on genetically modified foods and its implications on science communication in Nigeria. The study was anchored on constructivist theory. The study employed a qualitative research design by way of In-depth interview with experts such as agricultural scientists, biotechnologists, nutritionists, regulatory agency officials and bioethicists. The Data was analysed by way of thematic analysis using the Nvivo 15 application. Findings from the study indicated that the rationale from experts for advocating GMFs focused on economic advantages, enhanced productivity, biotechnological progress, food safety, and possible health improvements. On the other hand, objections to their implementation were linked to health and safety issues, insufficient public knowledge, external influence, diminished soil productivity, limited technological capability, opposition and ambiguity, disinformation, lack of faith in policy, and religious factors. The results suggest that the discourse on GMFs in Nigeria transcends a mere pro- or anti-biotechnology dichotomy, encompassing scientific, economic, institutional, cultural, and political factors. The study therefore recommends that governmental and regulatory bodies ought to formulate policies that optimise the agricultural and nutritional advantages of GMFs,

while concurrently addressing issues pertaining to environmental sustainability, human health, biodiversity preservation, and socioeconomic equity.

Keywords: Genetically modified foods, expert opinions, food security, health and safety, Nigeria.

1. Introduction

Food insecurity is one of the major socioeconomic problems in Nigeria, affecting millions of citizens. Nigeria faces a paradoxical struggle with pervasive hunger and food insecurity (Kasuwa, 2024). The introduction of genetically modified foods therefore seems to be one of the measures adopted in Nigeria to address food insecurity due to its potential to increase crop yield, enhance pest resistance, and reduce dependence on chemical inputs (FAO, 2022).

The integration of genetically modified (GM) crops into agricultural methods has attracted worldwide interest, with the resultant effects being especially evident in the varied and agricultural landscapes of Africa (Akinbo et. al., 2021; Gbadegesin et. al., 2022; Mmbando, 2023). Genetically modified (GMF) foods present both opportunities and threats, as countries grapple with the pressing necessity to protect food security and enhance agricultural resilience (Bjornlund et. al., 2022; Jayne et. al., 2021). Even though biotechnology has remained in active public discussion and debate since the first commercialisation of GM plants in the mid-1990s, consumer/audience knowledge about GMOs has not increased at the same rate as the adoption of GM foods (Wunderlich & Gatto 2015).

The discussion around genetically modified (GM) foods is a contentious one in Nigeria, as it is in many other countries globally (Trommsdorff et. al, 2021; Scherer et. al, 2020). For example, a study by Akinwale et al. (2024), revealed that over 60% of Nigerians are either unaware of GM foods or hold misconceptions about their safety. Certain experts believe and argue that GM foods are not only hazardous to human health but also not environmentally viable due to potential disruptions to existing farming methods.

Common concerns include health risks such as toxicity and allergenicity, environmental harm, and ethical fears about “tampering with nature.” Misinformation campaigns and weak science communication infrastructures further complicate public understanding, leading to low trust in government and biotech regulations (Lynas, Adams, & Conrow, 2025). However, advocates of the initiative see economic prospects in advocating for the adoption of genetically modified (GM) crops, which may lead to an increase in both revenue and agricultural production. The ensuing discussion has fostered a contentious communication landscape where scientific assertions, expert viewpoints, popular apprehensions, and perhaps deceptive information vie for prominence and trustworthiness. The research results indicate that these opposing viewpoints are articulated using unique argumentation narratives instead of a straightforward pro- or anti-biotechnology spectrum. The communicative aspect of the GMF debate is notably important, as public comprehension of intricate scientific and technological matters relies not solely on the accessibility of scientific data but also on the interpretation, dissemination, and attribution of that information to various sources.

While current research has explored genetically modified foods through various lenses such as consumer perceptions, health and environmental concerns, agricultural efficiency, biotechnology integration, and food regulations, there has been relatively scant focus on how experts formulate and convey conflicting narratives regarding GMFs in Nigeria. This disparity is crucial as they serve as vital reservoirs of scientific and technological knowledge, potentially shaping public dialogue, media narratives, and policy discussions around contentious technology.

The issue, then, is not only that Nigerians possess differing views on genetically modified foods. Competing interpretations of GMFs are formulated and conveyed through various expert narratives, affecting public comprehension, trust, and information

dissemination. The existence of disinformation and the impact of cultural and religious interpretations hinder the efficient communication of scientific facts. The research thus deems it essential to analyse the narratives employed by professionals to convey the benefits and apprehensions linked to GMFs, as well as the ramifications of these narratives for scientific communication and public dialogue in Nigeria.

1.1 Objectives of the Study

The aim of this study is to examine expert perspectives on genetically modified foods in Nigeria. The specific objectives are as follows, to:

- Examine the dominant narrative by experts for the introduction of genetically modified foods in Nigeria.
- Examine the dominant narrative by experts against the introduction of genetically modified foods in Nigeria.
- Find out the communication factors that shape experts interpretation of genetically modified foods in Nigeria.

2. Literature Review

2.1 Genetically Modified Foods in Nigeria

Genetically modified organisms (GMOs) were first introduced into Nigeria in 2001, with the endorsement of the National Biotechnology Policy by the Federal Executive Council on April 23, 2001. This policy recognised the significance of biotechnology in economic development for the nation. In November 2001, the National Biotechnology Development Agency (NABDA) was established. The organisation was established with the purpose of implementing the plan to effectively promote, coordinate, and prioritise research and development, particularly in the field of biotechnology, for Nigeria (OyozeBaje, 2022). In 2003, Nigeria received 11,000.6 metric tons of soy meal as food aid from the US Food for Progress programme. In 2004, Nigeria and the United States governments entered into a Memorandum of Understanding (MOU) to provide assistance for genetically modified (GM) crops. Nevertheless, similar to several other nations, Nigeria has seen intense and contentious discussions on the implementation of GMF. In July 2018, Nigeria made significant progress in adopting biotech crops by granting approval for its first commercially accessible GMO crops. This allowed farmers to get genetically modified soybean seeds specifically bred to exhibit resistance to local pests. The pest-resistant genetically modified *Bacillus thuringiensis* (Bt) cotton is regulated by the National Varietal Release Committee,

the highest regulatory body. In 2019, Nigeria achieved significant advancements in agricultural biotechnology by granting approval to two genetically modified (GM) crops: cowpea (specifically, pod-borer resistant cowpea known as SAMPEA 20-T) and pest-resistant Bt cotton (Boluwade and Uche, 2021). Several other African nations are now undertaking field trials of Bt crops, after an extensive decade-long investigation by its experts.

According to Jawo et. al., (2020), Nigeria as a nation has been slow in adopting GM crops due to the political debate and public opinion that have been tailored by fear of the unknown which is exacerbated by the social media. The discussions revolved around the potential of the GMF to introduce additional hazards to food security, natural environment, and public health, including environmental pollution and biodiversity threats (Kuzma and Haase, 2012). Nevertheless, those who possess knowledge about GM crops strongly advocate for the technique. Given its recent introduction in Nigeria, this technology has naturally generated concerns over public health and safety. Generatively modified crops have also raised widespread apprehension about their impact on health and the environment. This includes concerns about pesticide resistance, the implications of these crops for farmers, and their role in global food production (Newswire, 2013).

According to the international service for the acquisition of agri-biotech applications, about 33 major food crops have been genetically modified worldwide. Four of these, that is maize, cowpea or beans, cotton and soya bean have been officially approved for commercial production by the authorities in Nigeria, making Nigeria one of the six leading countries in biotech crop adoption in Africa. In January 2024, the Nigerian government approved the open cultivation and commercial release of Tela maize in the country.

2.2 Controversies, misconceptions and challenges of genetically modified foods

As the proponents are claiming GM Crops have not come along with benefits only. There are various risks associated with the Genetically Engineered (GE) crops. Despite burden of problems being faced by the country, many individuals and pressure groups are of the opinion that rushing to adopt GMFs in the country may not be the best option as there are still a lot of unanswered questions.

According to Ogunwola (2025), the growing population of the country and the introduction of

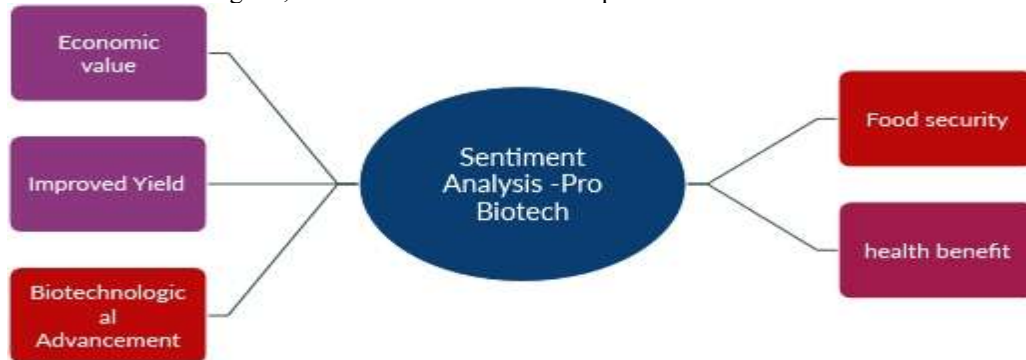
infertility hybrid corns by Monsanto and other seed companies have raised a suspicion that these multinational companies have an intention to depopulate Nigeria and not to help us achieve food security. According to Pontianus (2021), Nigeria is projected to have an estimated population of 239 million as at 2025 and 440 million by 2050 with half of its people less than 30 years of age. Population growth means industrial power, and could Nigeria be the next China or India in terms of industrial power. Nigeria may in the next decade attain the critical 300 persons per sq Km mark in population growth that could spiral it into industrial development. Njemanze, (2019) opines this is what is most feared by some Western Eugenics who intends to keep Africa poor and underdeveloped. They have opted to apply deceptive means to achieve mass population control in Nigeria. The low acceptability of contraceptives among the Nigerian population has led the world population controllers including the Bill Gates Foundation, Rockefeller Foundation, WHO and even UN agencies to partner with biotechnology food companies such as Monsanto, Syngenta, Bayer, Cargill and Dupont among others to introduce genetically modified (GMO) foods and Hybrid seeds that will have genes and traits that control fertility inserted into it to make Nigerian men and women infertile (Njemanze, 2019). This is concomitant to the fact that the GM seeds themselves are not capable of reproduction (Ogunwola, 2025). Unlike the natural process, the seed from GM crop cannot be used to grow another crop which means that the farmers have to depend on the seed companies for production. Several strategies have been mounted by the multinational seed companies to gain approval of the federal government of Nigeria to introduce GMO and Hybrid seeds in the country.

3. Theoretical Framework

3.1 Social Constructionism Theory

Social constructionism seemingly emerged in the 1980s to elucidate the essence of reality. Numerous research in the social sciences and humanities have articulated diverse perspectives on social constructionism theory, including realist, relativist, interpretivist, and constructivist methods, among others. "The Social Construction of Reality," Berger and Luckmann (1966), articulate that the reality of everyday life is socially built via human interactions. They differentiate between factual reality and subjective reality. They classified some natural occurrences, including celestial and aquatic bodies, as objective. Conversely, they characterise an

The figure below is a mind map showing themes regarding major arguments for the introduction of genetically modified foods in Nigeria, based on the narratives of experts.



Source: Field Work 2026

Figure 2 above shows the themes that emerged from the major argument for the introduction of genetically modified foods in Nigeria, based on the narratives of experts, the themes are economic value, improved yield, biotechnological advancement, food security and health benefits. This presents the major argument in support of the introduction of genetically modified foods in selected television channels in Nigeria.

Research Objective Two: Find out the major arguments by experts against the introduction of genetically modified foods in Nigeria.

Anti-Biotech/Against the Introduction of GMO

The figure below is a mind map showing themes regarding major arguments against the introduction of genetically modified foods in Nigeria, based on the narratives of experts.

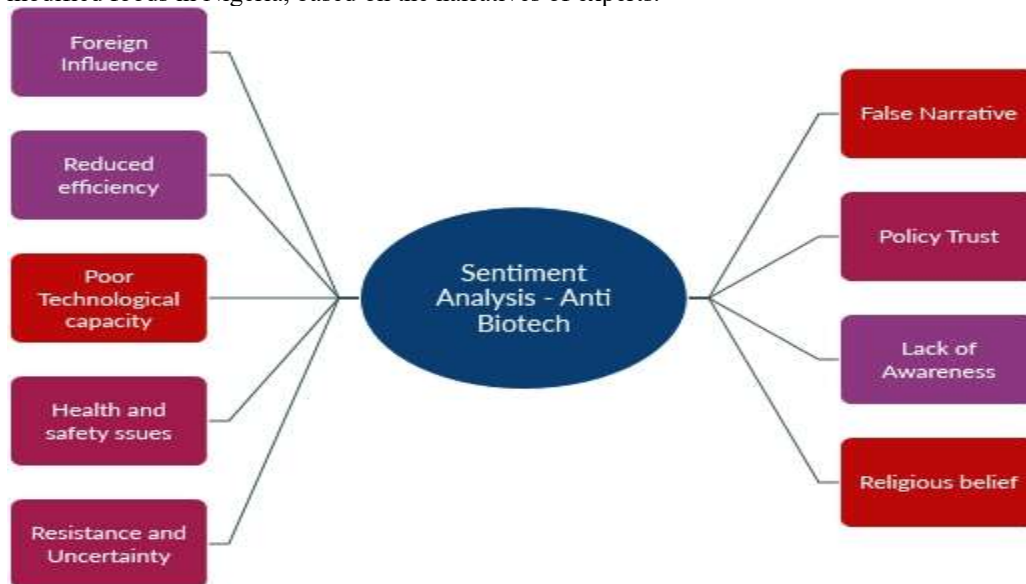


Figure 3: Anti-Biotech/Against the Introduction of GMO

Figure 13 above shows the themes that emerged from the major argument against the introduction of genetically modified foods in Nigeria, based on the narratives of experts, the identified themes are foreign influence, reduce soil efficiency, poor technological capacity, health and safety issues, resistance and uncertainty, false narrative, lack of policy trust, lack of awareness and religious belief. This presents the major argument against the introduction of genetically modified foods in selected television channels in Nigeria.

Research Objective Three: Find out the communication factors that shape experts interpretation of genetically modified foods in Nigeria

Health and Safety as a contested communication terrain

A significant discovery in communication is that all participants raised concerns in the area of health and safety, making it the most universally cited theme against GMO introduction. Proponents of GMFs utilised health and safety to allay public concerns over the technology's safety, whilst opposing viewpoints employed health and safety as a rationale for scepticism and opposition. This discovery holds considerable importance for scientific communication since it illustrates that a singular topic may be conveyed through fundamentally diverse interpretative frameworks. Thus, even supplying additional scientific data may not inherently settle disputes.

Source Credibility, Awareness and Cultural Meaning

The findings further demonstrate that communication about GMFs extends beyond the transmission of scientific facts. Participants identified lack of awareness and public ignorance as important problems, while another expert emphasised that people tend to trust religious and community leaders and that the identity of the person communicating a message influences public response. The prominence of religious belief also demonstrates that GMF communication occurs within broader cultural and moral systems. Some forms of opposition therefore cannot be adequately addressed through scientific information alone because audiences may interpret biotechnology through religious, ethical and cultural frameworks.

6. Discussion of Findings

Findings from the in-depth interview carried out revealed that experts advanced both supportive and opposing arguments concerning the introduction of genetically modified foods (GMFs) in Nigeria. The dominant arguments in support of the introduction of genetically modified foods in Nigeria, based on the narratives of experts, include economic value, improved yield, biotechnological advancement, food security and health benefits.

Findings from the qualitative data for the study also show the themes that emerged from the major argument against the introduction of genetically

modified foods in Nigeria, based on the narratives of experts, the identified themes are foreign influence, reduce soil efficiency, poor technological capacity, health and safety issues, resistance and uncertainty, false narrative, lack of policy trust, lack of awareness and religious belief. This presents the major argument against the introduction of genetically modified foods in Nigeria. Some of the arguments of the participants that spoke about economic value include:

Well, in this kind of maize there is no disadvantage the only form of disadvantage that people may claim, which is not peculiar to GMOs, it is common to all hybrid maize, is the fact that you have to go back and buy the seed from where it is being produced. — Participant 1

If I want to wake up tomorrow and see a new set of yams in the market within the next one or two months, or if I want to be able to buy maize even as I'm walking on this our street, who are the people that can do that? Obviously, it won't be the aged farmers, it is the young ones who are technologically savvy... embracing off-season cropping will go a long way in elevating hunger in our food system. — Participant 5

Also, the people who will patronize you, they are customers that is your market. You don't want to tamper with your market, you don't want to destroy your market, because if you destroy your market, at the end of the day you will still be the one to incur the loss. — Participant 6

While some of the arguments of the participants who spoke about improved yield are highlighted below:

Unless if, for example, when you plant within 1 acre and it gives me, let's say, 20 tons, I want to introduce a technology that I will use the same one acre to generate, let's say, 100 tons there is nothing bad in that, it is just one of the benefits. — Participant 3

High yield, tolerance to abiotic factor, or whatever. — Participant 6

I'm talking about the previous Sampea. For example, the Sampea 20-T was introduced to address the problem of Maruka that was dealing with the previous Sampea variety, and they had tried a lot of methods before, but it was not really working. — Participant 4

Some other experts highlighted health benefits and safety as the main argument for introduction of genetically modified foods, their argument is highlighted below:

Another reason why I said it is safe is in the aspect of food and feed safety. Food is for human consumption while feed is for the animals, and for the food and feed

safety, we conducted a compositional analysis where we looked at the concentration of the protein. — Participant 4

By the time you finish the issue of breeding and you come up with another variety, then we could as well say that hybrid seeds are also not safe — [but] they have been proven to be safe. — Participant 8

So I'm already talking about the policy implementation. So, in my own opinion as a seed scientist, I think it is safe for human consumption. — Participant 8

From everything that I just explained now, it is not dangerous for human consumption because it is just the genes that you are altering. — Participant 2
I cannot disclaim the fact that has to do with human health, but for me, in agriculture, I do not see it as unsafe. — Participant 8

While some others highlighted that genetically modified foods as possible panacea towards food security in Nigeria, their arguments are highlighted below:

There's nothing bad in introducing a technology that can aid food production, in the sense that, for example, some foods that will take maybe 6 months to grow, you can say okay, in 3 months I want you to be good for consumption — or you can say that is early maturity. — Participant 3

The people that have not adopted GMO foods, we call them hunger-striking countries that is, countries whereby you are moving about on the street and you can see people dying of hunger because of food. Food shortage countries are those that have food to eat but are already on amber lights, and this is the category where Nigeria belongs. It will amaze you that countries where GMOs are being planted and consumed are better off in agriculture and more food secured. — Participant 2

I want to wake up tomorrow and see a new set of yams in the market within the next one or two months... embracing off-season cropping will go a long way in elevating hunger in our food system. — Participant 5

The stark contrast between the uniformly positive arguments-for theme set (economic value, improved yield, health/safety, food security) and the uniformly critical arguments-against theme set (health and safety issues, lack of awareness, religious belief, plus six further-but-unelaborated concerns) is itself a notable finding. It suggests that expert discourse on GMOs in Nigeria is not organised around a single continuum of

more-or-less supportive, but around two largely separate argumentative repertoires that experts move between depending on rhetorical purpose one repertoire mobilised to justify adoption, another to explain resistance to it.

Strikingly, health and safety appear as a cited concern in the arguments-against theme (all participants) and simultaneously as a cited reassurance in the arguments-for theme (3 participants). Here is an excerpt from one of the participants regarding that:

So anyway, those are some of the things that the suppliers of this GMO seeds are preaching, that it is high yielding, this and that. But the scientists are now saying it is not good for our environment and even the health of consumers too. — Participant 1

This is not a contradiction so much as evidence that health and safety is the central contested terrain of the entire GMO debate in Nigeria the same category of concern is deployed by proponents to reassure and, in other moments, to acknowledge public anxiety. This dual invocation of health and safety as both the primary justification and the primary source of resistance underscores why it should be the central focus of any public communication. Closely related to health and safety is lack of awareness. Some of the excerpts that highlight this include:

The truth is even some of the foods that you consume in Nigeria are products of GM. So, the major problem is ignorance and laziness to carry out simple research. But you see, Nigerians love a lot of hearsay. — Participant 2

Well, that is just because of ignorance of the people... the lack of knowledge that people have about it, but GMOs are safe. — Participant 6

The prominence of religious belief as a distinct sub-theme is also worth dwelling on. Participant 9's framing that genetic modification may be perceived as encroaching on divine creative authority situates GMO resistance within a cosmological and moral register that cannot be resolved through scientific literacy campaigns alone. Some excerpts from the interviewees on religious beliefs are highlighted below:

You see, one thing you must understand is that people tend to trust their religious or community leaders, and as a result of this they have a kind of sentiment, having placed their trust in this category of people. So a lot really now depends on who is saying what, and that is one of the factors that determines the noise. — Participant 8

God that can create life and create beans so when you are trying to do this whole process of genetic modification to them, it is like you're trying to create a

new being; maybe it does not resonate with their spiritual beliefs. — Participant 9

This finding cautions against science-communication approaches that treat public skepticism purely as an information-deficit problem (a critique long made of the deficit model in science communication; see Wynne, 1992), since religious and cultural meaning-making operates on different terms altogether.

The findings of this study resonate most strongly with the Constructivist Theory because experts were actively constructing different meanings of GMFs: Supporters constructed GMFs as tools for development, innovation, and food security. Opponents constructed GMFs as threats to sovereignty, health, environmental sustainability, and cultural values. The themes of foreign influence, policy distrust, religious beliefs, and false narratives show that perceptions of GMFs are not based solely on scientific facts but are socially created through discourse and interpretation.

The observation that experts articulated GMFs in terms of economic value aligns with research indicating that biotechnology might augment farmers' earnings by improving production and minimising losses from pests and illnesses. Elena, Ramona, and Holban (2018), discovered that genetically modified crops have produced substantial economic advantages for farmers in underdeveloped nations via increased yields and enhanced efficiency. Klümper and Qaim (2014) similarly indicated that the introduction of GM crops correlated with significant increases in farm profitability and agricultural production. The subject of enhanced yield supports the conclusions of Brookes and Barfoot (2020), who said that genetically modified crops have substantially augmented worldwide agricultural output by elevating crop yields and minimising yield losses. Akinbo et al. (2021) similarly observed that advocates of GM technology in Africa often highlight its capacity to enhance food supply amid climate change and population expansion.

The health benefits framework described in this research is also evident in the literature on biofortified crops. De Steur, Mogendi, Blancquaert, Lambert, Van Der Straeten, and Gellynck (2014) contended that genetically modified crops, such as Golden Rice, has the capacity to mitigate micronutrient shortages and enhance public health outcomes. Similarly, Qaim (2020) observed that nutritional improvement is a primary public health rationale for agricultural biotechnology.

The discovery that experts expressed apprehensions over foreign influence significantly bolsters critical viewpoints in the literature that see GMFs as tools of external domination over African food systems. Howard (2015) contends that transnational firms use patents and intellectual property rights to exert control over seeds and agricultural output. Kamau, Odhiambo, and Mwangi (2025) assert that GM technologies are often advocated via discourses of food security, concurrently augmenting corporate dominance in African agriculture.

The subject of diminished soil efficacy highlights concerns articulated by Fatima, Magomedova, and Parvez (2024), who contended that intensive biotechnology-driven agricultural systems might lead to ecological imbalances and prolonged environmental deterioration. Stone and Glover (2017) observed that detractors often link GM agriculture to unsustainable agricultural methods and diminished biodiversity.

The discovery about inadequate technical competence aligns with research highlighting the physical and institutional obstacles to biotechnology adoption in underdeveloped nations. Masehela & Barros (2023) noted that several African nations lack the regulatory, scientific, and technological capabilities necessary for efficient biotechnology governance.

Health and safety risks are well reported in the literature. Cabelkova, Sanova, Hlavacek, Broz, Smutka, and Prochazka (2024) discovered that public trepidation over the possible health ramifications of GMFs continues to be a major obstacle to their adoption. Costa-Font, Gil, and Traill (2008) indicated that consumer opposition to GM foods is often associated with perceived health hazards and ambiguity over long-term impacts.

The themes of resistance and uncertainty correspond with Verpaalen's (2024) results, which indicate that doubt about scientific discoveries often fosters public scepticism and opposition. The idea of deceptive narratives aligns with research on disinformation and media discourse. Lynas, Adams & Conrow (2025), discovered that media portrayals often influence public views of biotechnology via selective interpretations, exaggerations, and conflicting narratives. This indicates that experts' apprehensions over misleading information are not exclusive to the Nigerian setting.

The issue of unawareness corroborates the results of Gbashi et al. (2021), who noted that public understanding of biotechnology is notably deficient in several African nations, thereby fostering

misunderstandings and opposition. Dolapo et al. (2025) observed that insufficient public education continues to shape attitudes of GMFs in sub-Saharan Africa.

The discovery that religious belief affects hostility to GMFs corresponds with research indicating that food preferences and perceptions of biotechnology are influenced by cultural and religious values. Waldhof & Kopp (2024) discovered that ethical and moral factors often influence consumer perceptions of GM foods. In a similar vein, Ogunwola (2025), in his examination of the ethical ramifications of genetically modified foods (GMFs) in Nigeria through the lens of the Yoruba ethical philosophy of *Omólúàbí*, asserted that the scientists responsible for GMFs disregard significant food taboos and abominations prevalent in various cultures and religions. Christians, Jews, and Muslims promptly rejected this GM/Hybrid tomato upon its distribution in the United States, leading to its eventual prohibition by the U.S. Food and Drug Administration due to its association with life-threatening intestinal haemorrhaging (Smith, 2017).

7. Conclusion

This study examined expert perspectives on the major arguments for and against the introduction of genetically modified foods in Nigeria. The results indicate a multifaceted and divided expert dialogue. Proponents of GMFs highlight their prospective economic advantages, enhanced agricultural productivity, role in biotechnology, contribution to food security, and potential health benefits. On the other hand, resistance is based on health and safety apprehensions, insufficient understanding, external influence, potential impacts on soil productivity, limited technological capability, ambiguity, disinformation, scepticism about policy, and religious factors.

The results indicate that the GMF discourse in Nigeria cannot be comprehensively grasped thru a purely pro- or anti-biotechnology lens. It signifies a convergence of empirical data, food-security requirements, economic motivations, institutional capabilities, ecological issues, cultural factors, and public confidence.

From a communicative standpoint, these results indicate that the GMF debate transcends mere disagreement on biotechnology; it is a struggle over the definition, interpretation, and dissemination of the technology. The interpretations of GMFs are influenced by knowledge, the reliability of sources, institutional confidence, cultural principles, and

conflicting stories. The transmission of GMF-related information in Nigeria should evolve from merely transmitting scientific data to fostering transparent, culturally attuned, and interactive dialogue with various audiences.

8. Recommendations

In light of the conflicting perspectives regarding the implementation of GMFs in Nigeria, governmental and regulatory bodies ought to formulate policies that optimise the agricultural and nutritional advantages of GMFs, while concurrently addressing issues pertaining to environmental sustainability, human health, biodiversity preservation, and socioeconomic equity. Ongoing scientific evaluation and public communication of research outcomes must be prioritised to facilitate evidence-based decision-making.

Furthermore, science communication efforts have to embrace culturally and socially attuned strategies that acknowledge the role of religious figures, community influencers, and other credible communicators in moulding public perceptions of contentious scientific advancements.

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