

Between science and politics: Media framing and genetically modified organisms (GMO) regulation in Kenya

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ABSTRACT

Agriculture remains the backbone of Kenya's economy, contributing approximately 20% of the gross domestic product and employing over 40% of the population, particularly in rural areas. Despite its central role, the sector continues to face persistent challenges such as climate variability, pest infestations, crop diseases, and declining soil fertility, all of which threaten national food security. In response to these challenges, genetically modified organisms (GMOs) have emerged as a potential tool for improving agricultural productivity and resilience. Despite scientific evidence supporting the safety and potential benefits of GMOs, their adoption in Kenya has been slow and controversial. This study utilized a qualitative approach to investigate the socio-economic impacts of GMOs while also examining the legal and regulatory frameworks surrounding them in Kenya through the lens of participatory science communication and media framing. The targeted population was smallholder farmers from selected rural areas in Kenya. Fourteen farmers were purposely sampled to ensure representation of individuals actively engaged in crop production and affected by GMO-related policies. Interviews were conducted with farmers, and a content analysis was performed on the digital archives of eight major Kenyan newspapers. Thematic analysis revealed that perceptions of GMOs in Kenya are shaped by a complex interplay of knowledge gaps, cultural values, political influences, and economic considerations. While awareness of GMOs among farmers is relatively high, their understanding is often fragmented and susceptible to misinformation propagated through media and political discourse. Many farmers struggle to differentiate between GMO seeds and conventional varieties, leading to uncertainty and mistrust. The media plays a pivotal role in shaping the narratives surrounding GMOs in Kenya, with political conflict framing prevailing in coverage, frequently depicting GMOs as tools of foreign influence or governmental overreach. This study recommends that short-term interventions focus on participatory communication and immediate policy support. In contrast, long-term strategies should aim to institutionalize science communication, enhance regulatory frameworks, and integrate cultural values into the adoption of GMOs.

Keywords: Agricultural Policy; Biosafety Regulation; Food Security; GMOs; Media Framing; Public Perception; Kenya

I. INTRODUCTION

There is a low adoption of GMO crops in African countries due to fear of exploitation by large companies, unnatural and possible health risk, market loss of traditional crops, biopiracy, income disparities between rich and poor farmers, and its impact on the environment, biodiversity, and traditional farming (Mmbando, 2024). Also, some critics argue that the genetic modification of crops could lead to the privatization of the food supply, increasing corporate control over essential resources and potentially marginalizing small-scale farmers (Kavoi et al., 2014). According to the National Commission for Science, Technology, and Innovation (NACOSTI), the majority of Kenyans remain skeptical about the safety of GMOs (NACOSTI, 2017), due to these ethical concerns, environmental concerns, and economic concerns. However, the need for solutions to persistent agricultural challenges, such as maize crop failures due to the fall armyworm infestation in 2017 and droughts that affected over 3.1 million Kenyans, led to a shift in the public and governmental view (Mbugua et al., 2018), and the removal of the ban on the use of GMO crops in 2022. Moreover, international research, including studies by the World Health Organization, shows that consumption is increasing, yet concerns about unforeseen consequences persist (WHO, 2020). In response to these concerns, advocates for GMOs in Kenya emphasize the rigorous scientific assessments conducted by both local and international bodies to ensure GMO safety (Murenga, 2012).

Research on GMOs in Kenya is focused primarily on maize, cotton, and cassava, with resistance, drought tolerance, and nutritional enhancement. According to the Kenya Agricultural and Livestock Research Organization (KALRO), genetically modified maize, for example, has shown promising results in terms of resistance to the fall armyworm and drought (KALRO, 2020). Kovak et al., (2024) and De Groote et al., (2011) postulate that GMOs will enhance food security and agricultural productivity. For instance, Bt maize, genetically engineered to resist the stem

borer pest, has demonstrated considerable yields in experimental plots, making it a potential solution for Kenyan farmers facing crop loss due to pests (Kovak et al., 2024). Their opinions have been greatly criticized by some scholars, who argue that the long-term ecological and socio-economic consequences of GMOs have not been fully explored, particularly regarding cross-contamination between GMO and non-GMO crops (Ngongolo & Mmbando, 2025). This controversy forms a significant part of the ongoing debate on GMOs in Kenya. Meanwhile, the debate surrounding GMOs is a global issue. Given the potential of biotechnology to revolutionize agriculture, this study explores the legal and regulatory frameworks, the socio-economic impacts of GMOs, and the participatory science communication and media framing surrounding GMOs in Kenya.

1.2 Research Objectives

This study investigated;

- i. The legal and regulatory frameworks surrounding GMOs in Kenya.
- ii. The socio-economic impact of genetically modified organisms (GMOs).
- iii. The lens of participatory science communication and media framing on GMOs in Kenya.

II. LITERATURE REVIEW

2.1 Theoretical Framework

2.1.1 Participatory Science Communication Paradigm

This study adopted the participatory science communication paradigm and framing theory. Integrating these two theories, the study would therefore contribute to science communication on GM communication. For instance, the participatory model challenges the one-way approach to communicating scientific innovation and seeks to foster interaction between science communicators and various publics, thereby appreciating different experiences, knowledge, and ideas that are shared and negotiated (Momme et al., 2025). In the context of GMO communication in Kenya, scientist communicators face challenges in openly sharing their ideas, leading to a degree of mistrust among the broader population regarding their intentions. Conversely, the media plays a crucial role in this discourse by providing a platform for collaborative engagement, enabling scientists, the public, and policymakers to come together as equals. This interaction allows for the definition of problems, co-creation of knowledge, and thoughtful deliberation on scientific issues. As a result, it fosters a sense of ownership over scientific ideas and promotes dialogue, mutual learning, and democratic participation. Town hall meetings and online platforms, such as social media, serve as effective channels for these interactions. This approach shifts the focus from simply addressing the knowledge deficit through fact-sharing to encouraging a more democratic, two-way interaction (Metcalf et al., 2022).

2.1.2 Framing theory

Erving Goffman's framing theory identifies the frameworks through which individuals perceive the world (Goffman, 1974). This theory asserts that people are culturally oriented towards their belief systems. These systems shape their daily experiences, enabling them to interpret and reconstruct reality while simplifying complex information, thus functioning as a two-way process. In the context of GM reporting, individuals may accept certain frames that the media employs or reject messages based on their cultural orientation. The adoption of GMOs in Kenya has been a contentious issue among various stakeholders, and media framing of GMOs can influence their acceptance or rejection. This indicates that individuals interpret information through the lens of their beliefs, experiences, and knowledge (Chong & Druckman, 2007). For example, scientists and politicians may tailor GM campaigns for specific audiences, such as farmers or consumers of GMO products. Conversely, the media, as a fourth estate in democratic societies, can exhibit imbalanced reporting and may have both political and economic interests related to the issue. Therefore, this study posits that employing the participatory science communication paradigm and framing theory not only reveals the varying representations of a story across multiple news outlets but also helps identify media bias in GMO reporting in Kenya.

2.2 Empirical Review

2.2.1. The Socio-Economic Impact of Genetically Modified Organisms (GMOs)

GMO regulatory frameworks are policies, laws, and implementation regulations that guide the adoption, certification, and production of GMO produce and products. Kenya's GMO regulatory framework reflects both domestic priorities and international debates about biotechnology governance. Globally, scholars emphasize that acceptance of GM crops depends not only on scientific risk assessments but also on socioeconomic and cultural contexts (Mbandu, 2024). This resonates strongly in Kenya, where regulatory institutions have been criticized for limited transparency and heightened risk aversion, mirroring broader African skepticism toward GMOs. People are more open to exploring opportunities that have no potential harm to their economic situation and cultural heritage. Hence, a need to openly

discuss the concerns and benefits of GM crops through the establishment of a regulatory framework for GMOs (Ghimire, et al, 2023).

Internationally, harmonization with “best practices” is often presented as a pathway to competitiveness in seed industries (Akinbo et al., 2021). Yet, African countries remain divided: while some prohibit GMOs outright, others cautiously regulate them, balancing innovation with risk management. Ombogo (2023) notes that only 11 of Africa’s 54 countries have approved GMOs, and only 7 of these countries have comprehensive legislation. Kenya’s position is therefore distinctive, neither fully prohibitive nor unregulated, but situated in a contested middle ground.

Anchored in the Biosafety Act of 2009, Kenya’s framework established the National Biosafety Authority (NBA), which oversees GMO approvals through contained use, field trials, and commercial release. By 2018, 58 projects had been approved, reflecting a willingness to experiment under controlled conditions. Complementary legislation, such as the Seed and Plant Varieties Act (Cap. 326), ensures that GM crops undergo rigorous testing for distinctness, uniformity, and stability before release (Christinck et al., 2018). These measures align Kenya with international norms of risk assessment and certification, while also responding to domestic concerns about food safety and environmental protection.

However, despite these regulations, there has been significant debate over whether the current legal framework is robust enough to address emerging concerns related to GMOs. Masehela and Barros (2023) for instance, highlights the multiplicity of overlapping regulations, from biosafety laws to biotechnology policies, which involve agencies across health, agriculture, and environment. While this multi-agency approach reflects international calls for inclusive governance, critics argue that fragmented oversight undermines efficiency and public trust. Thus, Kenya’s regulatory framework embodies both the promise and the tension of global GMO governance, striving for harmonization while grappling with local skepticism and institutional limitations.

2.2.2. The Socio-Economic Impact of Genetically Modified Organisms (GMOs)

Kenya’s GMO debate cannot be divorced from its broader agricultural and socio-economic realities (Oloo, et al, 2020). Internationally, proponents argue that GMOs enhance food security, reduce dependency on imports, and improve the livelihoods of smallholder farmers, claims echoed in Kenya, where drought-resistant crops are seen as vital against climate change (Weru, 2023; Mwasijaji et al., 2022). Yet, as in many countries, these promises collide with deep-seated cultural and health concerns. Resistance in Kenya parallels global anxieties about GMOs being “unnatural” and disruptive to traditional farming practices. Local communities, much like counterparts in Europe or Latin America, fear that GMOs erode indigenous knowledge systems built on intercropping, crop rotation, and natural pest control (Munyu et al., 2025). While international debates often frame GMOs as complementary to traditional methods, Kenyan farmers remain wary of losing cultural autonomy in food production.

Health concerns further illustrate Kenya’s alignment with global controversies. Critics worldwide warn of gene transfer, hybridization, and herbicide resistance (Breckling et al., 2011). In Kenya, these fears are amplified by limited regulatory capacity, although the NBA conducts risk assessments, its underfunding and political interference raise doubts about enforcement (Kameri-Mbote, 2005). International agencies such as WHO and FAO have cleared GMOs as safe, but distrust persists, reflecting a broader global pattern where scientific consensus fails to quell public skepticism.

Thus, Kenya’s GMO debate is both unique and globally resonant. Unique, because it is shaped by rain-fed agriculture, indigenous farming traditions, and institutional fragility. Globally resonant, because it mirrors widespread tensions between scientific assurances and public distrust, between promises of food security and fears of cultural erosion. Moving forward, Kenya’s challenge lies in reconciling these competing narratives, ensuring that regulatory frameworks not only meet international standards but also address local socio-cultural realities.

2.2.3. The Lens of Participatory Science Communication and Media Framing on GMOs in Kenya

The literature on participatory communication and framing of GMOs in Kenya is still in its early stages. Most studies have focused on how newspapers frame GMOs in relation to food security. For example, Wanjiru (2021), through content analysis of major dailies in Kenya, found that the media heavily relied on the perspectives of political and scientific elites, with minimal input from farmers or local communities. These findings are crucial for examining farmers’ voices on this important issue, as the framing alternates between viewing GMOs as a solution to hunger and as a risk to health and the environment. This highlights the absence of participatory science communication in mainstream media framing.

Furthermore, Wandati (2024) argues that broadcast media, including TV and radio segments in Kenya, amplified government pronouncements but provided limited space for citizen voices. The participatory elements were minimal, with the framing dominated by the dichotomy of “scientific progress vs. public fear.” This indicates that participatory communication can counterbalance elite-driven framing. On the other hand, Monyenye et al., (2023) note

that Citizen TV's coverage of drought-related food insecurity depicted GMOs as urgent solutions, encouraging audience acceptance. However, participatory dialogue was lacking, with farmers and indigenous knowledge being sidelined.

These studies reveal significant gaps in involving citizens in GMO debates. Most communication is top-down, driven by government, scientists, and the media, with limited opportunities for participatory dialogue (Olomy et al., 2023). Farmers, indigenous communities, and civil society are rarely at the center of the framing process. Additionally, participatory approaches could involve community radio, farmer forums, and the integration of indigenous knowledge, areas that remain underexplored in Kenyan GMO discourse.

The dominant frames often oscillate between portraying GMOs as solutions to food security and as sources of risk and uncertainty. The media tends to amplify elite voices, sidelining participatory perspectives. This lack of participatory science communication reinforces elite-driven frames and limits pluralism in GMO debates. Print and broadcast outlets tend to emphasize political decisions, such as lifting bans and policy debates, over grassroots perspectives. Framing strongly influences public trust and resistance, especially when scientific voices dominate without a balanced participatory approach.

III. METHODOLOGY

This study adopted a qualitative research design (Lim, 2024), incorporating media content analysis (Erlingsson & Brysiewicz, 2017) and key informant interviews with farmers. The qualitative approach was appropriate for examining the regulatory, socio-economic, and communicative dimensions of GMOs in Kenya, particularly where perceptions, policy debates, and institutional frameworks are central to analysis. To examine how GMOs are framed in public discourse, the study conducted a search on the digital archive in eight major Kenyan newspapers (*Daily Nation*, *The Standard*, *People Daily*, *The Star*, *Taiifa Leo*, among others) over the period surrounding the lifting of the GMO ban (2022–2023). The newspapers included both English and Kiswahili publications to capture a broad audience perspective.

Articles were selected using a combination of Boolean keyword searches to ensure coverage of both general and specific GMO topics, such as (GMO, genetically modified, *genetically modified organisms*) and context-specific keywords such as “*Bt maize*”, “*biosafety*”, “*bioethics*”, “*food security*,” “*Kenya GMO ban*.” The inclusion criteria for the articles included those that explicitly discussed GMOs, biotechnology, biosafety, or GMO-related agriculture, news, editorials, feature stories, opinion pieces, and analyses, and those articles addressing Kenya’s socio-political, scientific, or economic context within the defined period. While the exclusion criteria include articles that mention “modification” unrelated to biological/genetic modification, those that were duplicated, syndicated content that appears across multiple newspapers, and international stories without relevance to the Kenyan context. The final dataset consisted of 120 articles drawn proportionately across the newspapers to avoid overrepresentation. The selected articles were categorized using a framing analysis approach (Winslow, 2017), focusing on four dominant frames: political/conflict frame, economic frame, scientific frame, and risk (health and environmental) frame.

This approach enabled systematic identification of dominant narratives and recurring themes in media reporting on GMOs in Kenya. Primary data were collected through semi-structured interviews with smallholder farmers from selected rural areas in Kenya. Fourteen farmers were purposely sampled to ensure representation of individuals actively engaged in crop production and affected by GMO-related policies. This strategy ensured that only those who most likely possess firsthand experience relevant to GMO debates, hence ensuring that they are directly engaged in crop farming, reside in areas where food security debates are pronounced.

The interviews explored farmers’ awareness of GMOs, sources of information, perceived benefits and risks, cultural attitudes, and views on government decision-making. This method allowed for in-depth exploration of lived experiences and perceptions that are often absent from policy-level discussions. The study location was in Kiboko, Makueni County, based on its agricultural activity, exposure to extension services, and existing GMO-related discourse.

Table 1

Demographic Breakdown of Farmers the sample (N = 14)

Demographic Category	Sample Characteristics
Gender	60% male, 40% female
Age range	25–70 years
Farm size	Mostly <2 hectares
Education level	Primary to tertiary
Main crops grown	Maize, beans, sorghum, and vegetables
Access to extension services	Varied across the county

This demographic spread ensured that the study captured heterogeneous agricultural experiences and perceptions.

particularly between the government and opposition parties and between stakeholders in the agricultural sector. For instance, the lifting of the GMO ban by President William Ruto's administration sparked significant political, civil, and religious group opposition. For example, Raila Odinga, leader of the Azimio la Umoja coalition, strongly opposed the move, stating that "GMOs, if allowed, will not only have adverse effects on people's health but also destroy the ecosystem." (Daily Nation, 21-Nov-2022). In this way, Odinga framed GMOs as an environmental and public health threat, leveraging public fear to oppose the government's decision. This opposition is further highlighted in articles where Raila urges the government to make a U-turn on GMO food (The People Daily, 21-Nov-2022), and The Standard (21-Nov-2022) reported Odinga's claims that foreign powers are pushing the President to import GMO foods regardless of the health risks involved. This statement suggests a geopolitical dimension to the debate, with concerns about external influence.

Furthermore, the conflict escalated to legal battles, with the High Court suspending the government's decision to allow GMO imports. The court's decision was seen as a victory for anti-GMO activists, with the Kenya Peasants filing a petition against the lifting of the ban (The Standard, 29-Nov-2022). The legal battles continued into 2023, with the Law Society of Kenya (LSK) suing the state over the GMO plan (Daily Nation, 26-Jan-2023). The People Daily (21-Nov-2022) noted that opposition lawmakers called to halt the importation debate. "Opposition leaders sought more public engagement" before implementation, arguing that the decision was rushed. In addition, The People Daily (26-Jan-2023) reported that the LSK sued the government over the decision to lift the ban. The legal fraternity challenged the move, arguing it lacked constitutional backing.

The GMO debate has also been framed as a political issue, with the government opposition taking opposing stances. For example, Martha Karua, leader of the Narc Kenya party, criticized the government's use of the previous cabinet to approve GMOs, calling it illegal (Daily Nation, 24-Nov-2022). The lifting of the GMO ban is portrayed as a contentious issue, with opposition leaders accusing the government of being influenced by foreign powers. For example, Raila Odinga accused President Ruto of being a "puppet" of Western forces (The Standard, 21-Nov-2022). Furthermore, The Standard (22-Nov-2022) indicated that the Council of Governors (CoG) faulted the way the ban was lifted, arguing it was rushed without adequate consultation. Local government officials criticized the top-down approach to policy changes. People Daily (23-Nov-2022) stated that MPs staged a fight in November 2022 in Parliament to prevent GMO maize imports. These parliamentary tensions showcased the extent of political polarization on this issue. On the other hand, Taifa Leo (26-Nov-2022) noted that Kenya stands alone in the region, as Tanzania, Uganda, and Burundi have all rejected GMOs. This indicates that regional differences in GMO policy raised concerns about Kenya's approach. The conflict frame reveals a deep political and social divide over GMOs, with the government pushing for their adoption while opposition activists resist, citing health and environmental risks, foreign influence, lack of inclusivity in decision-making, and economic marginalization of local farmers.

The Economic Frame portrays GMOs as a potential threat to Kenya's agricultural economy, particularly in terms of food security, farmer livelihoods, and trade. For instance, proponents of GMOs argue that they are shortages, especially in the face of prolonged droughts. The government's decision to import 10 million bags of GMO maize was framed as a necessary measure to combat hunger and inflation (Business Daily, 18-Nov-2022). The authorities framed GMOs to curb rising food prices. The Agriculture Sector Network (ASNET) lauded the government's move, stating that GMOs could boost food production (Saturday Nation, 05-Nov-2022). In addition, Taifa Leo (18-Nov-2022) expressed concerns, urging the government to prioritize sourcing maize locally instead of turning to imports. This reflected fears that local farmers would suffer economic losses. However, the importation of GMO maize has been criticized for undermining local farmers. MPs from the Rift Valley, a key maize-producing region, opposed the move, arguing that it would hurt farmers who were already harvesting their crops (The Standard, 22-Nov-2022). This was because of the farmers' representatives who sought dialogue on how GMO imports would affect domestic agriculture. The Standard (23-Nov-2022) reported that Rift Valley MPs demanded a meeting with the Agriculture CS to discuss the impact of maize imports on local farmers. The Kenya Kwanza Alliance faced backlash from its supporters, with farmers demanding that the government buy maize from local producers instead of importing GMO products (The Standard, 25-Nov-2022). The People Daily (22-Nov-2022) stated that "farmers warned that the flood of GM maize could lead to price drops, affecting their earnings." Market oversupply concerns fueled economic anxieties.

The lifting of the GMO bans also raised concerns about Kenya's trade relations, particularly with Europe. European buyers of Kenyan horticultural produce expressed contamination concerns, forcing exporters to provide certification (Daily, 02-Dec-2022). Exporters feared that European restrictions on GMOs could limit their market access. The People Daily (10-Jan-2023) highlighted concerns that lifting the GMO ban puts farmers at the mercy of corporations. This indicated that critics argued that multinational biotech firms would dominate local food markets. The Daily Nation (30-Nov-2022), on the other hand, noted that local maize prices skyrocketed to Sh6,200 per bag due to uncertainties surrounding GMO imports. This showed a potential market reaction to policy shifts with fluctuating prices. While some experts argue that GMOs can boost production and lower food prices, opponents highlight threats to smallholder farmers, fears of economic exploitation by multinational agribusiness firms, and concerns about market manipulation by cartels.

The scientific frame emphasizes GMOs as a technology-based solution to food security, supported by scientific research and innovation. Many articles highlight the scientific consensus on the safety and benefits of GMOs. For instance, Bill Gates is quoted as saying, "there is nothing harmful about GMOs; we have been consuming them for decades." (Standard on Saturday, 19-Nov-2022). Similarly, Dr. Willy Tonui, CEO of the African Genetic Biocontrol Consortium, argued that GMOs are safe and necessary to address food insecurity (The People Daily, 01-Nov-2022).

The government and scientific community have emphasized the need for increased research funding for GMOs. Experts have called for Kenya to dedicate 2% of its GDP to biotechnology research to realize its potential (Standard, 20-Dec-2022). The Network of African Science Academies (NASAC) also urged Kenyans to embrace GMOs, stating that they have been consumed safely for 25 years (Saturday Nation, 17 Dec 2022). The Saturday Nation (12-Nov-2022) quoted a report stating that Bt maize promises to be food secure, yielding 3 to 4 tonnes per hectare compared to 1.8 tons from conventional maize. Scientific proponents emphasized productivity gains. There is a recurring theme about the need to educate the public on the benefits of GMOs. For instance, Prof. Ratemo Michieka, Honorary Secretary of the Kenya National Academy of Sciences, called for more science writers to combat misinformation about GMOs (Daily Nation, 06-Dec-2022). Similarly, the People Daily (21-Dec-2022) reported that scientists plan to build confidence around GMOs by providing public education. Efforts were underway to counter misinformation. The Sunday Standard (27-Nov-2022) urged that scientists, not politicians, should lead the debate on the safety of GMO foods. Experts called for a depoliticized discussion. In addition, The Standard (20-Feb-2023) stated that medical experts are developing a policy statement on GMOs based on research and evidence. This is an attempt to ground policy in science. The Daily Nation (10-Jan-2023) presented a balanced argument, stating that scientists remain divided on the long-term impact of GMOs on human health. Reflecting ongoing debates within the scientific community. Proponents argue that GMOs can offer solutions to food insecurity, reduce pesticide use, and increase resilience against climate change, but there is a need for public education to counter misinformation.

The risk frame focuses on the potential dangers of GMOs, including health risks, environmental concerns, and socio-economic impacts. For instance, the opponents of GMOs have raised concerns about their impact on human health. Similarly, a public health minister from the Kibaki era revealed that the initial ban on GMOs was due to health concerns (Sunday Standard, 20-Nov-2022). The Daily Nation (22-Nov-2022) asked, beyond politics, are GMOs safe to eat? This highlighted conflicts of interest in GMO advocacy. Taifa Leo (22-Nov-2022) ran the headline GMO: (Death or Life?).

Environmentalists have also expressed fears that GMOs could harm biodiversity and lead to the loss of crops. On 22-Nov-2022, Bishop Muheria criticized the government for not considering the long-term environmental consequences of GMOs. The Kenya Peasants League argued that GMOs would "destroy the entire ecosystem (The Standard, 29-Nov-2022). This sentiment is echoed by activists who have taken the GMO issue to regional courts, arguing that GMOs pose a threat to Kenya's agricultural heritage (The East African, 21-Jan-2023). The Daily Nation (29-Nov-2022) reported that "the High Court temporarily suspended the importation and distribution of GMOs, terminating a lawsuit." Judicial intervention reflected public concerns.

The introduction of GMOs has been criticized for potentially benefiting foreign nationals at the expense of local farmers. Raila Odinga accused the government of betraying Kenyans by allowing GMO imports, which he claimed would benefit international firms (The People Daily, 21-Nov-2022). Additionally, the LSK argued that the lifting of the GMO ban was ill-advised and could have long-term negative impacts on the country's agricultural sector (The People Daily, 19-Jan-2023). There are widespread public fear and resistance to GMOs. For instance, on 19-Nov-2022, Trade CS Moses Kuria faced backlash for his remarks that GMOs could lead to death, further fueling public distrust. The Sunday Standard (11-Dec-2022) quoted Governor George Nitembeya, who called for a national dialogue on the safety of GMOs before any further action is taken. On the other hand, the East African (21-Jan-2023) reported that activists have taken the fight against GMOs to the regional court, seeking to block their adoption in Kenya. While regulatory bodies like the National Biosafety Authority insist on rigorous safety checks, public skepticism remains high due to past cases of scientific fraud, ethical concerns about corporate influence over food systems, and fears of unknown long-term effects.

4.2 Discussion

The findings from interviews with Kenyan farmers reveal a complex interplay between perceptions of GMOs, cultural heritage, and socioeconomic realities. While awareness of GMOs is widespread (90% of respondents), misconceptions and contradictions dominate understanding and attitudes. This discussion synthesizes key themes and situates them within broader debates about agricultural innovation, cultural preservation, and food security.

4.2.1 Media's Role in Polarization

Media platforms, including radio and social media, play a dual role in distributing both information and misinformation regarding GMOs. Sensational headlines such as "GMO: Death or Life?" suggest that foreign governments are imposing GMOs on Kenyans, prioritizing sensationalism over scientific facts, and framing the GMO debate as a political struggle (Daily Nation, 2022; The Standard, 2023). This, combined with conflicting narratives from

government and opposition figures, has contributed to significant public confusion. This media-driven polarization intensifies distrust among farmers, particularly in rural areas where access to verified information is limited. The absence of coordinated, community-based communication strategies exacerbate the issue, allowing emotion-driven narratives to dominate public discourse. For example, radios and social media channels spread essential information alongside misinformation and propaganda, leading to heightened misconceptions and distrust about the use of GM crops in Kenya. This knowledge gap creates a significant trust deficit, as farmers express considerable skepticism about the safety of GMOs. Research indicates that poor communication is linked to resistance against agricultural technologies.

The government has also not helped matters in clarifying things, as indigenous farmers stated they received several pieces of information from social media or word of mouth, where they heard different things every day. Some say GMO foods cause cancer, while others say they are safe. So, there is a lot of confusion as to what to believe. These have contributed to public anxiety, especially in rural communities, where access to information is out of reach. A study done by Kunyanga, et, al (2024) on public perception of genetically modified organisms and the implementation of biosafety measures in Kenya confirm this influence and Public Health Concerns, confirming this trust gap, as it highlights public skepticism, misinformation, and weak regulatory enforcement, inconsistent flow of news from the media and poor or inadequate public education would allow for the public. Without intentional, targeted, community-based communication, the media will continue to emotion and fact-less, baseless ways to shape the narratives of GMOs in emotionless, fact-less, baseless ways, thus increasing mistrust and resistance among farmers.

4.2.2 Farmer Distrust and Misinformation

While 90% of farmers are aware of GMOs, their understanding is often fragmented and frequently inaccurate. Definitions of GMOs vary among them; many believe that GMOs are simply organisms with a short maturation period, while some perceive them as 'chemical' entities. This highlights a significant gap in knowledge and the prevalence of misinformation. Farmers obtain their information from various sources, including radio, government communications, social media, and fellow farmers.

A considerable number equate GMOs with chemicals or unnatural organisms (Olomy et al., 2023), and 70% admit they cannot distinguish between GMO seeds and conventional seeds. Health concerns, including fears related to cancer and lifestyle diseases, are widespread despite the lack of scientific consensus on these issues. Economic worries also exist, as farmers view GMO seeds as costly, dependent on inputs, and environmentally risky. These perceptions reflect a broader trust deficit stemming from poor communication and limited experiential knowledge.

None of the farmers interviewed could accurately state whether they had used GMOs. However, 70% acknowledged their inability to differentiate between GMO and non-GMO seeds. While GMO seeds are often perceived as artificial, about 30% of farmers expressed positive views, stating that GMO seeds lead to plentiful harvests and grow quickly with minimal rainfall, which they believe addresses food challenges and is cost-effective. Conversely, around 70% of farmers believe that GMO products are quite expensive and made with chemicals, thus rendering them artificial and unhealthy for human consumption. Additionally, over 83% of farmers voiced concerns about being compelled by their European clients and trade partners to provide extra certifications confirming that their agricultural products are free of GMOs (Kavoi et al., 2014).

4.2.3 Cultural and Ethical Dimensions

Agriculture in Kenya is intricately linked to cultural identity and generational practices. Farmers predominantly prefer indigenous seeds, citing their affordability, storability, taste, and spiritual significance. GMOs are often perceived as foreign intrusions that undermine self-sufficiency and traditional seed-saving customs. Ethical concerns arise regarding corporate control over seed technologies, potential biodiversity loss, and increased dependency on agrochemical inputs. While a minority view GMOs as complementary, especially for enhancing drought resilience, the prevailing narrative champions traditional farming as a symbol of autonomy and heritage.

Research indicates that Africans take their traditional livelihoods seriously, making it difficult for them to embrace new agricultural methods (Missanga & Mmbando, 2025). Despite approximately 30% of farmers supporting GMOs, they all advocate for the use of natural seeds and traditional farming techniques over genetically modified options. Their preference for traditional farming stems from reasons such as accessibility, better storage capability, affordability, and perceived nutritional superiority when compared to GMOs.

Traditional agricultural methods in Kenya, as in many other African countries, are well-established and documented (Mmbando, 2024). Convincing farmers to adopt new seed varieties, which are surrounded by controversy, presents a significant challenge. This resistance reflects global patterns where traditional agriculture is deeply connected to heritage and identity. Nevertheless, a minority regards GMOs as a useful complement, particularly in addressing drought challenges, illustrating Kenya's struggle to balance food security with cultural preservation. Concerns about food preservation persist, particularly regarding the impact of GMOs on soil fertility and seed-saving practices. This underscores the ethical dilemmas surrounding corporate control and biodiversity loss, which are recurrent themes in critiques of industrial agriculture.

4.2.4 Regulatory and Labeling Challenges

Kenya's regulatory environment for GMOs is characterized by inconsistency and a lack of clarity. The government's changing position, banning GMOs in 2012 and lifting that ban in 2022, has created significant uncertainty. Farmers report insufficient education and engagement from authorities, and existing labeling laws are either weak or nonexistent. Exporters face additional challenges, as over 80% require GMO-free certification to comply with European standards. This lack of transparency not only increases operational costs but also poses risks of reputational damage and market exclusion. Regulatory bodies are perceived as under-resourced and ineffective, further undermining public trust.

Due to fears of stigma, GMO labeling in Kenya and much of the world remains poorly structured. South Africa appears to be one of the few countries with mandatory GMO labeling; however, even there, enforcement is weak, and the capacity to monitor compliance is lacking (De Beer & Wynberg, 2018). A study in South Africa found that many food products claiming to be GMO-free contained GM ingredients (Viljoen et al., 2006). This situation fuels public skepticism regarding the efficacy of regulatory bodies in fulfilling their responsibilities.

While the need for public transparency is urgent, there is also the challenge of providing consumers with accurate information without inducing unnecessary fear. Policies must be practical and tailored to the specific realities of Kenya. Moreover, concerns have been raised regarding the economic implications of private companies asserting ownership of GMOs while failing to share reasonable costs with the public. Consequently, these companies are mandated to undergo environmental and social evaluations to ensure accountability and promote careful decision-making.

The economic risks associated with private ownership of GMOs are complex and vary in magnitude. A report by Eurofins Scientific (2025) in the current approvals of GMOs in the EU highlights that European buyers typically require GMO certification. As a result, about 80% of surveyed farmers in Kenya who engage in exports report needing to provide additional documentation to prove that their crops are GMO-free. This not only increases their operational costs but also creates uncertainty regarding the marketability of their produce. Ultimately, this issue stems from the absence of clear labeling laws. As noted by Viljoen et al. (2006), without a transparent domestic system for identifying and regulating GMO content, Kenyan produce may face import rejections or suffer reputational damage.

V. CONCLUSION & RECOMMENDATION

5.1 Conclusion

This study investigated the socio-economic impact of genetically modified organisms (GMOs) while also examining the legal and regulatory frameworks surrounding GMOs in Kenya through the lens of participatory science communication and media framing. The research revealed a significant knowledge gap stemming from misinformation and a lack of structured government education on the topic. As a result, stakeholders must develop clear strategies to effectively communicate the benefits of GMO adoption to farmers. The GMO debate in Kenya is influenced by misinformation, political conflict, and socio-economic concerns.

To bridge the knowledge gap, short-term interventions should prioritize participatory communication and immediate policy support. Proposed strategies include launching community radio programs in local languages to counter myths surrounding GMOs and deliver evidence-based information. Additionally, organizing farmer-scientist dialogues at the county level would facilitate direct engagement between agricultural researchers and farmers, allowing for questions to be answered and GMO benefits to be demonstrated. The development and distribution of simplified brochures and infographics through cooperatives and extension officers can further help to dispel misinformation. For immediate policy outcomes, relevant authorities should consider providing subsidies or seed vouchers to help reduce the initial cost barrier for smallholder farmers. Training agricultural extension officers in participatory science communication would also enable them to serve as trusted intermediaries in this process.

5.2 Recommendations

Long-term strategies must institutionalize science communication, enhance regulatory frameworks, and integrate cultural values into the adoption of GMOs. These strategies should prioritize the incorporation of GMO education into the agricultural training curricula at universities and vocational colleges. Establishing permanent farmer-scientist advisory councils is essential to ensure continuous dialogue and collaborative knowledge creation. Additionally, providing long-term funding to community radio stations will help sustain agricultural programming. It is also crucial to harmonize GMO policies with regional frameworks, such as the East African Community, to minimize political conflicts and ensure consistency. Furthermore, encouraging community-led storytelling initiatives can help reframe GMOs as not foreign impositions but as tools that align with local food security needs. It is important to acknowledge that this study has limitations due to the small sample size of farmers. Future research should focus on cross-country surveys to better understand farmers' perceptions regarding GMO adoption.

Declaration of Interest

The author declares that he does not have any known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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