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PERCEPTIONS OF MAIZE FARMERS ON GENETICALLY MODIFIED ORGANISM USAGE IN ORIIRE LOCAL GOVERNMENT AREA OF OYO STATE NIGERIA

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ABSTRACT

In comparison to other developing continents such as South America and Asia, the acceptance of genetically modified (GM) crop technology to tackle food security and poverty alleviation in Nigeria has progressed slowly. Issues persist regarding the possible health benefits and risks associated with consuming genetically modified crops. The study assessed the perception of maize farmers on usage of Genetically Modified Organism crop in Oriire local government area of Oyo state, the specific objectives were to describe the socio-economic characteristics of the respondents, identify the GMO crops respondents were aware of, as well as the problem facing usage of GMO crops. In other to achieve these objectives, data were collected from 60 maize farmers, using a well-structured interview schedule. Data collected were analyzed using frequency count, percentage, and mean, Chi-square was used to test the stated hypothesis. The mean age of 53 years was recorded, 53.3% of the respondents were male, while 46.3% were female. it was observed that respondents in the study area were aware of different GMO varieties of maize, respondents largely view GMO maize favorably, especially emphasizing its safety and practical benefits like drought tolerance, food security, and yield improvements, while some concerns about health risks and socio-economic implications exist. Public perception, Cultural and social concerns and Conflicting policies were the top problems facing the usage of GMO crop in the study area. Also, there is an association between Agee (x= 53.400, p= 0.001), Marital status (2=35.267, p=0.000), Religion (2= 39.900, p= 0.000), Academic qualification (2= 38.033, p= 0.001), Secondary occupation (2= 107.167, p= 0.000), Household size (2= 22.000, p= 0.001), Annual income (2= 24.000, p= 0.004), Social organization (2= 45.067, p= 0.000) of the respondents and their perception on usage of GMO crops. The study concluded that genetically modified maize varieties are gaining popularity among farmers, who also typically see GMOs favorably, particularly when it comes to safety, yield advantages, and food security. However, issues with information transparency, ethical ramifications, and economic dependency still exist. The study recommended that GMO developers should tailor GMO communication and policy interventions to demographic profiles, respecting age, religion, education, income, and social contexts which will significantly enhance public understanding, reduce resistance, and promote responsible adoption of GMO crops.

Key words: *GMO, Perception, Crop farmers, Usage.*

INTRODUCTION

Genetically Modified Organisms (GMOs) are living animals or plants whose genetic material has been altered using recombinant DNA technology or genetic engineering (Yasin and Mulugeta, 2015). However, genetically modified (GM) crops have their DNA modified through artificial methods, such as inserting a gene from a different plant. Genetically Modified creatures (GMOs) history began when China's National High-Tech program was launched in the middle of the 1980s. As of right now, about 200 distinct genetically modified crop types have been developed globally (Fernandez-Cornejo *et al*, 2014). According to Rosegrant *et al*., (2001) in Africa, benefits from biotechnology and GM crops are expected to be large, especially given stagnating economies and food production, decreasing per capital food production and an expected increase in the number of poor people over the foreseeable

future. To harness the possible advantages in agriculture, industry, healthcare services, and the environment, Nigeria has implemented a National Biotechnology Policy (National Biosafety Management Agency, 2018). This policy document is intended to grant the National Executive Organization the power to create the required legal document and process to direct the protocol's execution, based on reasonable scientific, economic, social, cultural and ethical considerations.

However, in comparison to other developing continents such as South America and Asia, the acceptance of genetically modified (GM) crop technology to tackle food security and poverty alleviation in Nigeria has progressed slowly. Issues persist regarding the possible health benefits and risks associated with consuming genetically modified crops. According to Goodman *et al.*, (2008), GM crops are believed to pose a greater risk of triggering allergic reactions because they may contain genes derived from allergens. However, health officials have not received any reports of this kind. As DNA mutations can lead to cancer, the consumption of genetically modified (GM) crops is believed to heighten the chances of developing the illness; however, there is insufficient evidence at present to back this claim (National Academies of Sciences, Engineering, and Medicine, 2016). While the probability is very minimal, concerns remain that the disease-resistant genes in food could transfer to human cells and make individuals resistant to treatments such as antibiotics. More research is needed to investigate the different health concerns linked to genetically modified crops.

Farmers are still hesitant to embrace this innovation, despite the Nigerian government's efforts to introduce and promote GMO products. Public concerns over genetically modified foods and commodities have also affected the development of GM crops in Nigeria. Around the world, there have been several disputes and (unfavorable) opinions from a variety of groups, including consumers, about the production, application, and marketing of genetically modified crops (Kikulwe *et al.,* 2011). These perspectives can be linked to various factors, including insufficient knowledge about the scientific foundations of gene modification technologies, the absence of recognized advantages of genetically modified organisms, religious, moral, or ethical beliefs, and difficulty in accurately defining what constitutes a genetically modified organism (Pino *et al.,* 2016). Although, farmers largely viewed GM maize favourably, especially regarding drought tolerance, food security, and yield improvements, but concerns about health risks and socio-economic implications also existed. This duality reflects a broader continental pattern as only eleven of the fifty-four African countries currently cultivate GM crops, owing to the wide range of opinions resulting from disparities in cultural, socioeconomic, and environmental factors (Gbadegesin *et al.*, 2022). Therefore, it is essential to investigate how the subject matter who happens to be farmers perceives the adoption of this technology. In light of this, this research described the socio-economic characteristics of the respondents in the study area; identify the GMO crops the respondents are awareness of; examine the perception of the respondents towards usage of GMO crops; as well as identify the problem facing usage of GMO crops.

Methodology

The study was carried out in Oriire Local Government area of Oyo State. A multi-stage sampling technique was employed in selecting respondents for this study. First stage involved a random selection of Three (3) villages in Oriire local government, which include Oolo, Tewure and Ajegunle. Second stage involve selection of 20 maize farmers each, from this selected villages, using simple random sampling, making 60 maize farmers to form the sample size for this study.

The dependent variable is the Perception of crop farmers towards usage of GMO crops, which was measured using some perceptional statements, and these perceptional statement was scored using 5 points Likert scale of Strongly agreed=4, Agreed=3, =2, Strongly disagree=2 Disagree=1 and Undecided= 0.

Result and Discussion

Socio-economic characteristics of the respondents

Data presented in Table 1 revealed the following information, 23.4% of the respondents were less or equal to 40 years of age, 18.4% were between the age of 41-50 years, 33.4% were between the age of 51-60 years, 18.4% were between the age of 61-70 years, while very few 6.8% of the respondents were 71 years and above. With the mean age of 53.08, this implies that majority of respondents are middle-aged or older, which might have an effect in the adoption of innovation or new practices, this is similar with the findings of Adeola and Ayoade, (2009) who reported a mean age of 54.4 years among farmers in Oyo State, Nigeria, and described the group as predominantly middle-aged and older, indicating potential challenges with youth involvement in farming and technology adoption.

Also, Table 1 shows that 53.3% of the

respondents were male, while 46.3% were female, 11.7% were widow, while majority 88.3%t were married, 70.0% were Muslim, 25.0% were Christian, while 5.0% were traditional worshippers. With respect to academic qualifications 23.3% completed primary school, 15.1% completed secondary school, 45.0% had completed tertiary education, while 16.6 further to post graduate education. With a mean of 12.57 years spent in school, this implies that respondents are literate, can understand official communication, and are likely capable of adopting modern technologies and engage in development initiatives.

With respect to household size, 45% had less or equal to 5 individuals in their household, 55.0% had 6 and above individuals in their household, with a mean of 5.57 individual, this implies that respondents has moderate household size, 93.3% of the respondents claimed to belong to one social organization or the other, all 100% of the respondents claimed to have access to extension agents, also, 100% claimed to be aware of GMO crops, all 100% of the respondents claimed to have a monthly contact with extension agent.

Table 1: Distribution of the respondents according to their socio-economic characteristics n =60

socio-economic characteristics	Frequency	Percentage	Mean
Age			
≤40	14	23.4	
41-50	11	18.4	53.08
51-60	20	33.4	
Sex			
Male	32	53.3	
Female	28		
Marital status			
Widow/widower	7	11.7	
Married	53	88.3	
Religion			
Islam	42	70.0	
Christian	15	25.0	
Traditional	3	5.0	
Academic qualification			
Primary school completed	14	23.3	
Secondary school completed	9	15.1	12.57
Tertiary education	27	45	
Post graduate	10	16.6	
Household size			
≤5	27	45	
6 and above	335	55	
Annual income (₦)			3246666.67
≤500,000	53	88.3	
500,0001 and above	7	11.7	
Social organization			
Yes	56	93.3	
Access to extension agent			
Yes	60	100	
Awareness of GMO			
Yes	60	100	
Frequency of extension visit			
Monthly	60	100	

Source: Field survey, 2025

GMO Crops awareness

Table 2 shows the distribution of the respondents according to GMO crops they were aware of. 35.0% of the respondents claimed they were aware of SAMMAZ 72T also known as (Tella 72T), 31.7% claimed they were aware of SAMMAZ 73T also known as (Tella 73T), 31.0% were of SAMMAZ74T which is also known as (Tella 74T), also, 31.7% of the respondents claimed they were aware of SAMMAZ 75T also known as (Tella 75T), 85.0% were aware of MON810 also known as (BT corn), 95.0% were aware of DKC80-77 locally known as (*Ijebu elefun*), while 96.7% were aware of POD-TECH Maize locally referred to as (*Oyinbo*). This implies that respondents in the study area were aware of different GMO varieties of maize.

Table 2: Distribution of the respondentsaccording to GMO crops awareness

GMOs Crops*	Frequency	Percentage
SAMMAZ 72T (Tella 72T)	39	65.0
SAMMAZ 73T (Tella 73T)	19	31.7
SAMMAZ74T (Tella 74T)	21	35.0
SAMMAZ 75T (Tella 75T)	19	31.7
MON810 (BT corn)	51	85.0
DKC80-77 (*Ijebu elefun*)	57	95.0
POD-TECH Maize (*Oyinbo*)	58	96.7

Source: Field survey, 2025 *Multiple responses

Perception of the respondents towards usage of GMO crops

Table 3 shows the distribution of the respondents according to their perception towards usage of GMO crops. Using Weighted Mean Score, the perception that GMOs as safe to consume ranked first with a WMS of 3.90, GMO are drought resistant ranked second with a WMS of 3.72, GMO address food insecurity ranked third with a WMS of 3.72, GMOs improved yields ranked fourth with a WMS of 3.65, GMO reduces the need to spray pesticides fifth with a WMS of 3.63, Eating genetically modified foods has caused an increase in cancer ranked sixth with a WMS of 2.15, GMO crops are harmful to livestock ranked seventh with a WMS of 2.15, African countries will become too dependent on multinational corporations that develop and sell GMO maize seed ranked eight with a WMS of 2.12, GMOs are unnatural and a threat to traditional farming ranked ninth with a WMS of 2.10, while GMO has no proper information about safety and environmental impact raked least in tenth with a WMS of 1.88. This implies respondents largely view GMO maize favorably, especially emphasizing its safety and practical benefits like drought tolerance, food security, and yield improvements, while some concerns about health risks and socio-economic implications exist, these are less prominent in the respondents' views, this corroborate the finding of Akinbo *et al*., (2018) reported that farmers in Nigeria acknowledged the safety and agronomic benefits of genetically modified maize, especially drought tolerance and yield enhancement, contributing to food security. And that of Abate *et al.*, (2017) who found that while some socio-economic and health concerns exist, they tend to be outweighed by perceived benefits among

farmers and consumers.

Table 3: Distribution of the respondents according to their perception towards usage of GMO crops

Statements *	WMS	Rank
GMOs as safe to consume	3.90	1st
GMO reduces the need to spray pesticides	3.63	5th
GMO are drought resistant	3.72	2th
GMO address food insecurity	3.72	3nd
GMOs improved yields	3.65	4th
Eating genetically modified foods has caused an increase in cancer.	2.15	9th
GMO crops are harmful to livestock	2.15	7th
GMOs are unnatural and a threat to traditional farming	2.10	9th
African countries will become too dependent on multinational corporations that develop and sell GMO maize seed	2.12	8th
GMO has no proper information about safety and environmental impact	1.88	10th

Source: Field survey, 2025.
***Multiple responses**

Problems facing the usage of GMO Crops

Table 4 shows the distribution of the respondents according to Problems facing the usage of GMO Crops. Public perception ranked first with a WMS of 1.93, Cultural and social concerns ranked second with a WMS of 1.90, Conflicting policies ranked third with a WMS of 1.88, Misinformation and myths ranked fourth with a WMS of 1.87, Limited access to GMO seeds ranked fifth with a WMS of 1.80, Regulatory challenges ranked sixth with a WMS of 1.65, while Limited research and development ranked least in seventh with a WMS of 1.48. This implies that Public perception, Cultural and social concerns and Conflicting policies were the top problems facing the usage of GMO crop in the study area, efforts to introduce or promote GMOs may face resistance primarily due to how the public perceives them, possibly due to fear, skepticism, or lack of awareness. Also, cultural values, traditions, and social norms strongly influence rejection of GMOs. And lastly, policy inconsistency or lack of harmonized regulations creates confusion or barriers in the adoption of GMOs. This is in line with Adebowale, (2025) in The World Financial Review article that "misleading narratives about GMOs, such as links to diseases and neocolonial exploitation erode trust in biotechnology in Africa, particularly Nigeria.

Table 4: Distribution of the respondents according to Problems facing the usage of GMO Crops

Problems *	WMS	Rank
Regulatory challenges	1.65	6th
Conflicting policies	1.88	3rd
Public perception	1.93	1st
Misinformation and myths	1.87	4th
Cultural and social concerns	1.90	2nd
Limited access to GMO seeds	1.80	5th
Limited research and development	1.48	7th

Source: Field survey, 2025.
***Multiple response**

Test of Hypothesis

Relationship between socio-economic characteristics of the respondents and their perception on usage of GMO crops.

Table 5 shows that there is an association between Age (x= 53.400, p= 0.001), Marital status (x= 35.267, p=0.000), Religion (x= 39.900, p= 0.000), Academic qualification (x= 38.033, p= 0.001), Secondary occupation (x= 107.167, p= 0.000), Household size (x=22.000, p= 0.001), Annual income (x= 24.000, p= 0.004), Social organization (x =45.067, p= 0.000) of the respondents and their perception on usage of GMO crops. This implies that perception of GMO crop use is shaped not just by information, but by who the individual is socially, economically, and culturally. Furthermore, all this variable has a chance to shape or determine the perception of farmers on GMO. This agrees with Obi-Egbedi *et al.,* (2020) surveyed on smallholder farmers in Oyo State who found age, years of education, and seed source to be significant predictors of GMO awareness. Also, Egbe *et al.*, (2019) in Kaduna who discovered that higher education (bachelor's and postgraduate) was significantly associated with greater GMO acceptance—~81.6% acceptance among postgraduates compared to lower education levels.

Table 5: Result of Hypothesis showing the relationship between socio-economic characteristics of the respondents and their perception on usage of GMO crops

Socio-economic characteristics	翩 [2]	df	p- value	Remark
Age	53.400	26	0.001	Significant
Sex	0.267	1	0.606	Not Significant
Marital status	35.267	1	0.000	Significant
Religion	39.900	2	0.000	Significant
Academic qualifications	38.033	16	0.001	Significant
Primary occupation	1.900	2	0.387	Not Significant
Secondary occupation	107.167	4	0.000	Significant
Household size	22.000	5	0.001	Significant
Annual income	24.000	9	0.004	Significant

Source: Computed data, 2025.

Conclusion and Recommendation

Based on the research findings, it can be concluded that Genetically modified maize varieties are gaining popularity among farmers, who also typically see GMOs favorably, particularly when it comes to safety, yield advantages, and food security. However, issues with information transparency, ethical ramifications, and economic dependency still exist.

It is therefore recommended that Extension agency of the state should provide training and support programs that emphasize the economic benefits of GMO adoption, such as improved yields and pest resistance. Also, GMO developers should tailor GMO communication and policy interventions to demographic profiles, respecting age, religion, education, income, and social contexts which will significantly enhance public understanding, reduce resistance, and promote responsible adoption of GMO crops.

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