

Perception of University Lecturers Towards Consumption of Genetically Modified Foods in Nigeria and Botswana

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Summary

A comparison of university lecturers' perception towards consumption of genetically modified foods in Nigeria and Botswana was conducted in 2007. Simple random sampling technique was used to select 100 lecturers out of 685 from five faculties of agriculture in south western Nigeria and 47 from 67 in Botswana College of Agriculture (BCA). Data were collected through structured questionnaire on demographic characteristics and perception on consumption of genetically modified (GM) foods containing 15 statements that cut across situations in Nigeria and Botswana; and analyzed using means and standard deviation. Mann Whitney U test was used to compare the perception of lecturers in the two countries.

The results showed that majority were males (77 and 57 percent respectively), with 51 percent of the lecturers in Botswana between the 51–60 years and 59 percent between 41–50 years in Nigeria. The percentage of lecturers in Botswana that are MSc degree holders (45 percent) was higher than those from Nigeria. Lecturers from BCA agreed and were positively disposed to 12, while lecturers from south western universities in Nigeria agreed and are positively disposed to five out of the 15 statements on the rating scale. It is important to note that four of the statements were perceived positively by lectures from both countries. Also, significant difference existed in their perception ($Z = -6.65$, $p < 0.05$); with higher mean rank for Botswana (108.02) than for Nigeria (58.01). This further confirms that Botswana lecturers are more favorably disposed to genetically modified foods than Nigeria lecturers.

Key words

consumption, perception, genetically modified foods, Nigeria, Botswana

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Received: May 9, 2008 | Accepted: October 6, 2008



Introduction

As the world population reached six billion at the end of the last century, several major advancements in crop improvement and breeding technologies such as the Green Revolution propelled a dramatic increase of food productivity. Although the world food productivity has improved significantly, an alarming portion of world population is still at the verge of starvation. According to the latest FAO statistics, there are 815 million undernourished people in the world. Among them, 777 million live in developing countries (FAO, 2001). Presently, food insecurity problem is actually closely related to issues of distribution, unequal access and poverty. Biotechnology is by all means the most controversial agricultural technology innovation due to the uncertainty and concerns raised by its bio-safety and environmental impacts. The rise of modern biotechnologies and life science bring many surprises, change the paradigms of the society and revolutionize our daily lives. Against many exciting successful examples of biotechnology, it is important that all technologies, bio and non-bio, are to serve the ultimate objective of improving the overall welfare of human beings and the environment. Human manipulation of the cellular structure of plants and animals has contributed significantly to the well-being of human societies for decades. Pharmaceuticals produced via genetic engineering have been widely accepted and acclaimed throughout the world.

While a large majority of the world's population has embraced genetically modified (GM) pharmaceuticals and vaccines, a significant portion of the world's population has expressed reservations about the creation of agricultural food and fiber products using genetic engineering technologies. Application of agro-biotechnology should focus on providing stable food supply and improving food quality. By genetically improving drought resistance of crops, people will have better access to food. Another example is that the rapid expansion of the production of New Rice for Africa (NERICA) often refers to as "golden rice" improves the nutrition of the poor in Africa (AgBio, 2003). On the other hand, many people believe that biotechnology will bring irreversible damages to the world. This voice of opposition comes mostly from environmental, consumer and religious groups. To these groups of people, the risk posed by biotechnology outweighs the benefit. Insufficient information and lack of confidence in the public sector's ability to properly regulate biotechnology further complicates the situation. The use of genetically modified organisms (GMOs) as food and in food products is becoming more and more widespread (Braun, 2002).

Since the release of the first genetically modified (GM) crop into the marketplace in the 1990's, there has been continuing debate over the acceptability of such products. Genetically modified organisms (GMOs) manufactured through bio-engineering have raised economic, ethical, moral and environmental issues. The socioeconomic effect that GMOs have on agriculture in both developed and developing countries is great. Marketing of GMO derived food products places a responsibility on each contributing side such as researchers,

academics, research organizations, policy makers, legal authorities, private companies, farmers and last but not least the consumers. Several surveys have been conducted to determine public perception of GMOs in the USA, Europe and elsewhere. However, very few surveys have been conducted to study, how GMOs are perceived in developing countries. Studies in developed countries suggest that acceptance of GM crops and food products are influenced by awareness and knowledge of the technology and confidence in food system and regulatory bodies (Napier et al., 2004).

Abdullahi et al. (2007) reported that Jamaican consumer were fairly knowledgeable of the technology and overwhelmingly supported mandatory labeling of GM products. Safety of GM crops and food products remains a major concern for the consumer and the perception of the prospects for genetic engineering to improve the quality of life represents a major factor in a consumer's decision to purchase GM products. Bishop et al. (2001) noted that in Turkey about 10% of the respondents believed that by consuming genetically modified food products one's genes can also change and 23.7% thought that GM foods are "extremely risky". The findings showed that 65.3% of the Turkish consumers do not find the information on the food package convincing, and 80% of the respondents want to have labeling on the GM foods. Gahukar (2004) reported that findings from the analysis of the safety of Indian foods from genetically modified crops revealed that perceived risk associated with the production and consumption of GE plants and animals was the best predictor of ethical orientations toward GE products.

Genetically modified foods have received some discussions in government, education and industries circles, but often the concern about the seriousness of the risks are downplayed due to narrow perceptions by the public. Botswana is on the fringe of debates taking place in other countries on the labeling of genetically modified foods. This is not yet a debatable issue in the country although GM foods are already being sold in the retail stores and supermarket. The country has committed itself to the protocol of the Convention on Biodiversity (PC-BD) for which a National Bio-safety Framework (NBF) has been drawn and is basically waiting to be passed by the parliament. Under this framework, it is expected that countries exporting foods or organisms that have been genetically modified will have to warn the receiving country in advance and to let the country know the ingredients used in the modification process.

Botswana depends more on imported agricultural products and continuous supply of new technologies to increase its food resources in southern Africa. It is hoped that these new technologies would help Botswana increase her level of production hence food security. At the moment the government of Botswana has no regulations regarding the use of GM food products. However, lack of public awareness on GM products has resulted in many people believing that these products pose threat to human health. Botswana is a Middle Income country with the necessary infrastructure and man-

power capacity to undertake research into all products that enter the country to ascertain their safety, toxicity or harmful effects. Majority of this manpower in agriculture comes from Botswana College of Agriculture (BCA), hence the need to study the perception of BCA lecturers on GM foods.

There are no regulations yet on the use of GMO's in Nigeria, although it is seriously being considered due to the proclaimed advantage of securing food security through biotechnology. It is therefore necessary to study the perception of GMO's by University lecturers in order to assist in agricultural policy formulation on the use of GMO's in Nigeria. The general objective of the study is to compare the perception of university lecturers towards consumption of genetically modified foods in Nigeria and Botswana.

Methodology

The study was carried out in Nigeria and Botswana. The southwestern zone of Nigeria study area lies between Latitude 5⁰ and 9⁰ North and longitude 2⁰ and 8⁰ East. It is bounded by the Atlantic Ocean in the south, Kwara state in the North and republic of Benin in the west. It has a land area of 114.24 squares kilometers. Botswana is located on latitude 24⁰45' South and longitude 25⁰55' East with a land area of 582,00 squares kilometers at the south of the Equator and dissected by the Tropic of Capricorn, Botswana is in both the eastern and southern hemisphere. This landlocked country is positioned in southern Africa, and bordered by the countries of Namibia, Zambia, Zimbabwe and South Africa. The south western zone has the highest concentration of universities in Nigeria, while Botswana College of Agriculture (BCA) is the only citadel of learning in agriculture in that country.

The population of the study were lecturers from nine universities with faculties of agriculture in south western Nigeria and Botswana College of Agriculture. Five of these universi-

ties in south western Nigeria were randomly selected, and 100 lecturers out of 685 in the Universities were used as sample. From 67 BCA lecturers, 47 were randomly selected.

Data used for this study were collected through structured questionnaire on their demographic characteristics and their perception on consumption of GM foods. A 3-point Likert-type scale of agree (3), undecided (2) and disagree (1) containing 15 statements concerning food quality, safety, labeling, risk and consumers' rights that cut across the situations in Nigeria and Botswana. Data were subjected to analysis on the Statistical Packages for Social Sciences (SPSS) version 15, using means and standard deviation while, Mann Whitney U test was used to compare the perception of lecturer in the two countries.

Results and discussion

The percentage distribution of lecturers in Botswana College of Agriculture and universities in south western Nigeria on selected demographic characteristics as presented in Table 1 showed that majority were males (77 and 57 percent respectively), however with higher proportion of males in Botswana than Nigeria. While majority of the lecturers in Botswana (51 percent) were between the 51-60 years age bracket, those between 41 -50 were the majority in Nigeria (59 percent). There is a similar distribution in the proportion of lecturers along marital status categories. Similarly, the percentage of lecturers in Botswana that were Masters degree holders (45 percent) was higher than that of Nigeria although those with Doctoral degree still predominated in the two countries. Conversely, while majority of lectures in Botswana have worked for 10 to 20 years (45 percent), majority had worked for 21 to 30 years in Nigeria (59 percent). The various categories that lecturers belong in the selected demographic characteristics will predispose them to certain perception on genetically modified foods.

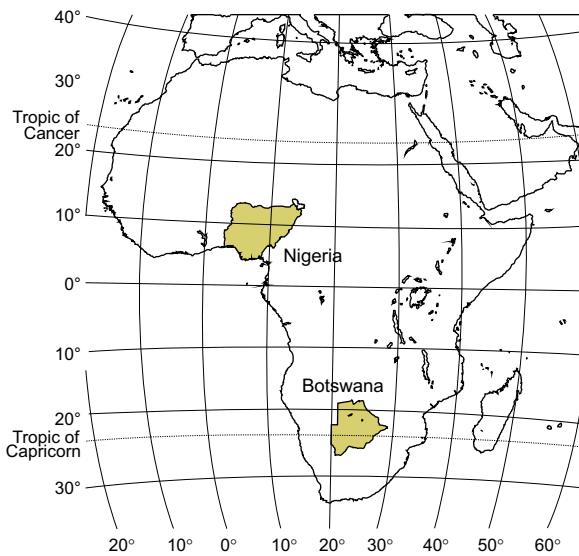


Figure 1. Map of Africa showing the study countries

Table 1. Percentage distribution of respondents based on selected demographic characteristics

Variables	Botswana (n = 47)	Nigeria (n = 100)
Gender		
Female	23	43
Male	77	57
Age		
30 -40	13	10
41-50	10	59
51-60	51	21
Above 60	26	10
Marital status		
Single	40	37
Married	60	63
Educational level		
Masters degree	45	30
Doctoral Degree	55	70
Working experience		
Less than 10 years	13	20
10 -20	45	15
21 - 30	19	59
Above 30	23	6

Table 2. Perception towards consumption of genetically modified foods in Botswana and Nigeria

Perception statements	Botswana (n = 47)		Nigeria (n = 100)	
	Mean	SD	Mean	SD
GM foods have more quality protein	2.29	1.32	1.88	0.90
It is wise not to impose additional inspection or labeling burdens on GM foods currently in the market	1.43	1.09	1.86	0.75
Labeling of GM foods is in the interest of consumer's right to know.	2.91	1.34	1.83	0.91
Impose mandatory comprehensive labeling for all GM Foods in a manner that would require market segregation	2.89	0.96	2.08	0.87
GM crops adapt to soil with poor fertility.	1.99	1.32	1.75	0.90
They are resistance to pest and diseases	2.44	1.12	1.79	1.05
GM products remain fresh longer	2.32	0.82	1.96	0.94
They have fast growth rate	2.62	0.91	1.76	0.87
It is ethically acceptable to genetically modify plants.	2.58	1.15	2.11	0.89
GM foods with possible allergy risk should be fully labeled.	2.22	1.37	1.71	0.91
Genetic modification and Gene-transfer contribute to loss of biodiversity.	2.49	1.37	2.17	0.77
It increases the prosperity gap between the rich and the poor.	2.69	1.10	2.12	0.98
It is profitable to use GM technology	2.73	1.04	1.87	0.91
It increase product yield.	1.99	1.35	2.36	0.80
Potential health risk	2.00	1.40	1.79	0.93

Table 3. Mann-Whitney test showing differences in perception among lecturers on GMO in Botswana and Nigeria

Groups	N	Mean Rank	Sum of Ranks	Mann-Whitney U	Wilcoxon W	Z	p
Botswana	47	108.02	5077.00	751.00	5801.00	-6.65	0.00
Nigeria	100	58.01	5801.00				
Total	147						

Table 2 presents the perception of lecturers on genetically modified food in Botswana and Nigeria. Their perception was measured on a rating scale of 1 to 3 points with agree awarded 3 points; undecided 2 points and disagree 1 point. A mean score of 2 and above was used to denote agreement with the perception statements and a mean score below 2 denoted disagreement with the statements. Lecturers from BCA agreed and were positively disposed to 12 out of the 15 statements on the rating scale. Out of the 15 items the statement "Impose mandatory comprehensive labeling for all GM Foods in a manner that would require market segregation" was ranked first with the highest mean of 2.73 showing that majority of the respondents agreed with the labeling of genetically modified foods. This was followed by the statement "it is profitable to use GM technology", which was ranked second with a mean of 2.73.

However, lecturers from south western universities in Nigeria agreed and were positively disposed to five out of the 15 statements on the rating scale. Out of the 15 items the statement "it is profitable to use GM technology" was ranked first with the highest mean of 2.36 showing that majority of the respondents agreed with the use of genetically modified foods. This was followed by the statement "GM technology increases the prosperity gap between the rich and the poor" which was ranked second with a mean of 2.12.

It is important to note that there were only four of the statements that were perceived positively by lectures from both countries. These are "Impose mandatory comprehensive labeling for all GM Foods in a manner that would require market segregation" (Botswana_{mean} 2.89; Nigeria_{mean}

2.08); It is ethically acceptable to genetically modify plants (Botswana_{mean} 2.58; Nigeria_{mean} 2.11); Genetic modification and Gene-transfer contribute to loss of biodiversity (Botswana_{mean} 2.49; Nigeria_{mean} 2.17) and It increases the prosperity gap between the rich and the poor (Botswana_{mean} 2.69; Nigeria_{mean} 2.12). This has shown some congruence in the perception of lecturers in both countries and may be generally acceptable as issues that predominated the discussions on GM in the two countries.

On the other hand, while lecturer in Botswana disagreed with the statement that "GM technology increases product yield"; Nigeria's lecturers agreed with the statement (Botswana_{mean} 1.99; Nigeria_{mean} 2.36). This may be due to the fact that most production activities take place outside Botswana and that the statement is one of the most proclaimed benefit of the technology in Nigeria.

In Table 3, significant differences in the perception of lecturers in Botswana and Nigeria on genetically modified foods were determined. The result showed that a significant difference existed in their perception ($Z = -6.65, p < 0.05$); with higher mean rank for Botswana (108.02) than Nigeria (58.01). This further confirms that Botswana lecturers are more favorably disposed to genetically modified foods than Nigeria lecturers. This may be attributed to the influence of the South Africa agriculture on Botswana and to the fact that farming is still at the subsistence level handled by small scale farmers in Nigeria.

Conclusion

The paper has clearly shown that genetically modified food is gaining more prominence and perception is improving about the technology. The paper reported that majority of the issues raised about the use of genetically modified food are favorable to university lecturers in Botswana while few were acceptable to lecturers in Nigeria. The paper has also shown that most of the favorable issues cut across the two countries. However, the positive perception about genetically modified food is higher in Botswana than Nigeria - a fact that may be associated with the influence of South Africa's agricultural policy and practice on Botswana.

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acs74_09