European Journal of Experimental Biology
ISSN: 2248-9215

Open access Research Article

Perception towards Genetically Modified Organisms (GMOS) of Regulatory and Service Providers in Selected National Regional States of Ethiopia

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ABSTRACT

The introduction of GMOs into the world's market started since 1990's, which has led to one of the most controversial issues that exist until today. And yet more than 75 countries import, grow and conduct research on GMOs. In August 2015, the Ethiopian government accepted the use of GMOs for research and commercial purposes by putting clear directives in each case. This descriptive research was conducted to obtain scientific information on the perception towards GMOs of regulatory bodies and service providers by administering questionnaires to randomly selected 405 respondents drawn from five regional states (Amhara, Afar, Benshangul Gumuz, Somali and Southern nations nationalities and peoples) and two city administrations (Addis Ababa city administration and Dire Dawa city council). The result shows that the perception towards the GMO of majority of the regulators and service providers was negative. It was found that 50.9% of respondents, even those who have sufficient information about GMOs, thought GMOs are dangerous for the environment and the society. This study recommends the awareness towards GMO for public and regulatory body should be increased by the government through promotion, establish voluntary GM food labeling system and increase the media coverage about GM.

Keywords: Perception; Information; Regulatory; Service providers

INTRODUCTION

The commercial development of Genetically Modified (GM) crops began in 1996 with GM corn. The overall concept behind GM food is changing of the traits of genes in animals and plants in a way that results more production, to create drought, cold, salt and insect resistance crops and forest trees. This has enabled GM food to become an emerging market segment and most popular in the food product development. Consequently, the planting of GM crops in the world has been increasing over the years, from 134 million hectares in 2009 to 170.3 million hectares in 2012. But commercialization of GM foods still remains a highly controversial and debatable issue among today's global food consumers. In other words, consumer attitude toward GM foods differs from one country to another. For example, consumers in Europe Union (EU) and Japan have a more negative attitude compared to consumers in the United States of America (USA), where the population willingly accepts GM products. In this regard, Ethiopia has officially announced the biosafety proclamation on 9th of Sept. 2009 (No. 655/2009) with an aim "to protect human and animal health, biological diversity and in general, the environment, local communities and the country at large preventing or at least managing down to levels of insignificance the adverse effects of modified organisms"[1]. Moreover, the Ethiopian government has entered into a commitment to be an active venture in the biotechnology industry by 2025 to make Ethiopia a middle income country by solving the food insecurity by improving for a long time that bans GMO as a food and research *via* the Biosafety proclamation No.655/2009 that highly opposed the

Received:	22-July-2020	**Manuscript No:**	EJEBAU-21-5279
Editor assigned:	27-July-2020	**PreQC No:**	EJEBAU-21-5279 (PQ)
Reviewed:	10-August-2020	**QC No:**	EJEBAU-21-5279
Revised:	03-August-2022	**QI No.**	EJEBAU-21-5279
		Manuscript No:	EJEBAU-21-5279 (R)
Published:	31-August-2022	**DOI:**	10.36648/2248 -9215.12.6.145

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Citation Admas A (2022) Perception towards Genetically Modified Organisms (GMOS) of Regulatory and Service Providers in Selected National Regional States of Ethiopia. Eur Exp Bio.12:145.

use of modern biotechnology for producing transgenic plant/animals. Ethiopia has also lately authorized the cultivation of biotech crops by granting two landmark approvals for environmental release of Bt cotton and research trials on biotech maize. However, as done in different countries, scientific information on the perception of the public towards GMOs in Ethiopia is not available. Therefore, the objective of this paper is to understand the perception (including attitude and awareness), towards GMOs of government employees serving as regulators and service providers in different sectors (environment, agriculture, education, industry) in the different national regional states of Ethiopia [2].

MATERIALS AND METHODS

This study employed a descriptive survey technique to obtain both qualitative and quantitative information. The required data was collected by administering questionnaires to 405 (male=387 and female=87) randomly selected individuals (regulators and service providers) working as permanent government employees in selected national regional states (Amhara, Afar, Benshangul Gumuz, Somali, Southern Nations Nationalities and People) and two city administrations (Addis Ababa and Dire Dawa). The questionnaires of this survey consisted of two parts. The first part seeks to obtain personal information of the respondents. The second part of the questionnaire was designed to obtain information on the perception (including attitude and awareness) towards GMOs of individuals who filled out the questionnaires. The data collected for the study was analyzed using Microsoft excel [3].

RESULTS AND DISCUSSION

In this study, the first part of the survey questions asked the respondents to give information on gender, age, living address (Region), educational status, marital status and occupation. The second part of the survey questions were designed to obtain information on each respondent's information, awareness and perception on GMOs. Out of 405 respondents who volunteered to fill out the questionnaires, male and female respondents represented 78.5% and 21.5%, respectively. One of the most important questions included in the survey was: "Do you support or oppose GM food?" The percentages of respondents that supported, opposed or were neutral were 33.3%, 33.8% and 33.9% respectively. Therefore, it can be concluded that a dominant proportion (67%) of the respondents were cautious about GMOs. In agreement with this result, 36% and 30% of respondents have medium and high concern about GMOs, respectively. Moreover, 11.6% of respondents always asked whether the food item they buy in a supermarket was GMO free or not, while relatively high (36.8%) proportion of respondents raised this question sometimes. In relation to this, respondents were also requested to indicate their interest on GMOs. The results obtained showed that 34.6% of respondents want to see GMOs banned from Ethiopia, while 27.6% want to see GMOs grown for some non-food crops. All of these replies obtained from the respondents suggested that a significant proportion of respondents were very much concerned about the potential risks of GMOs to the society and the environment.

It appears that the possible reasons for the respondents' cautious perception towards GMOs are as follows; 50.8% of the respondents replied that GMOs have side effects, 36.5% respondents replied GMOs are dangerous as a food and 50.9% respondents answered GMOs are dangerous to the environment and society. The survey also assessed whether or not respondents have enough information on GMOs by asking the question; have you ever heard about genetically modified crops and animals? The percentage of respondents who replied they have not at all heard, heard sometimes, and heard repeatedly were 18.8%, 64.9% and 16.25%, respectively. This indicated that high proportion of the respondents have some knowledge about GMOs. But it is difficult to conclude that the generally negative attitude towards GMOs is based on thorough understanding of the principles of GM technology [4].

Moreover, the perception towards GMOs of the respondents was investigated by examining the perception towards GMOs with six research variables including gender, age class, region, educational status and occupation. The results of this correlation are shown in **Table 1**.

Table 1: Back ground information of the respondants.

Variable	Category	Total	
		Number	%
Gender	M	318	0.785
	F	87	0.215
Age	15-24	50	0.123
	25-34	209	0.516
	35-44	81	0.2
	45-54	50	0.123
	55-64	15	0.037
	65 and above	0	0
Regions	Ahmra	53	0.128
	Afar	56	0.133
	Benshngul Gumze	48	0.118
	DireDewa	63	0.155
	Ethiopian Somali	29	0.0719
	Southern	104	0.255
	AddisAbaba	56	0.138
Education status	Diploma	15	0.088
	Degree	270	0.666
	Post gratuate	120	0.296
Martial status	Marrid	236	0.582
	Divorced	10	0.024
	single	159	0.392
Ocupation	Agriculture	126	0.31
	Education	89	0.22
	Environment and Forestry	73	0.18
	Trade and industry	57	0.14
	others	60	0.15

It is known that the government of Ethiopia has allowed restricted use of GMOs for research and commercial purpose since August, 2015. However, the findings of this survey showed that 18.8% of the respondents did not hear at all about GMOs before this study. Moreover, employees working in environmental regulatory agencies were not interested to see biotech crops in Ethiopia even though they have repeatedly heard about GMOs. In Malaysia, a survey was conducted by to determine the acceptance level of the consumers towards GM food. The data obtained from 1227 respondents showed that 56% of them had negative perception and were totally reluctant towards GM food and hence would avoid purchasing GM food. On the other hand, the study conducted by on 640 Kenyan consumers showed that 68% of the respondents attitude toward GM food was positive, they accepted and were willing to buy GM maize at the same price as their favorite maize brand. This showed that Kenyan consumers' acceptance level towards GM food was high **(Table 2)** [5].

Table 2: Information on GMO.

Have you ever heard about genetically modified crops and animals?	Not at all	76	0.188
	sometimes	263	0.649
	repeatedly	66	0.1625
How do you describe GMO (plants or animals)?	Have side effect	206	0.508
	No side effect	89	0.22
	It is better than the organic one	57	0.14
	indifferent	53	0.13

The results obtained in this study revealed that the respondents have generally a negative attitude towards GMO and believe GMOs need to be banned. The main justifications given by respondents for the banning of GM food is that GM food shall have risks on the environment and the society. This statement suggests that more focus should be given to biotechnology research and increase the awareness level of the society by providing reliable information to the society so as to boost their confidence in GM food. Until enough evidences are gathered to make people believe that GMOs could be safe, it is suggested that voluntary GM food labeling system is introduced in Ethiopia. This gives consumers the chance to choose based on enough awareness level. This can also enable the consumers to differentiate the foods into GM and non-GM foods. The voluntary GM labeling system should be imposed on suppliers so that the companies who work with imported GM ingredients need to inform whether the particular product contain GM ingredients or not. This can definitely help the consumers who want to avoid consuming GM foods **(Table 3)** [6-15].

Table 3: Awareness and perception on GMOs of respondents.

What is your perception about GMO?	Safe with no problem as food or	190	0.469
	Dangerous as food or clothing	148	0.365
	I have no idea	67	0.165
How much is your concern about GMO?	Very low	96	0.237
	Medium	146	0.36
	High	125	0.309
What is your interest on genetically modified organism?	Indifferent	38	0.094
	To see widely grown in Ethiopia	118	0.211

CONCLUSION

The use of GMO for research and commercial purpose has been given permission in Ethiopia since August, 2015. Moreover, companies such as DuPont and Monsanto control 90% GM foods in the United Stated, they supplied the soybeans and the corn seeds to the whole world. Despite these known facts, the findings of this study has shown that that the awareness level of regulators and service providers towards GMO concept was below expectation since 18% reported that they have not heard at all about GMOs. It can be speculated that a higher proportion of the Ethiopian public also lacks awareness on GMOs. This clearly shows that there is a need to increase the awareness and understanding about GMOs in Ethiopian regulatory and service providing institutions. The study also showed that environment regulatory bodies were not interested to see biotech crops in Ethiopia even though they repeatedly heard about GMOs.

ACKNOWLEDGEMENT

I would like to thank Ethopian environment and forestry research Institute for funding this work. I would also like to thank Dr. Alemayehu Esayas, Director of Environmental Laboratory at EEFRI, for reviewing and editing the draft manuscript. Finally, I need to say thank you to Tesfa Belay, Biruk Tsehay and Azal Amare (Biotechnlogy Department student, Debre Birhan University), for their support in data collection in this study.

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