Awareness of Biotechnology among Farmers in Lagelu Local Government of Oyo State, Nigeria

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ABSTRACT--- ***The improvements in biotechnology especially in the agricultural sector will not only help place Nigeria among the contributors but also help boost the economic growth of the country. The specific objectives are: (a) to examine the socio-economic characteristics of farmers in the study area (b) to ascertain the farmers' awareness in biotechnology in the study. (c) to examine the constraints to awareness of biotechnology. The study was carried out in Lagelu Local government of Oyo State. Random samplings were used to select 81 farmers for the study. The data was subjected to descriptive and inferential analysis. Ages of farmers were below 41years of age, and 67.9% of respondents were married. Majority of the respondents advances beyond secondary school education and most respondents were having less than 6 years of experience. About sixty percent of the farmers indicated that only their personal savings as source of capital for their farm business. Majority of respondents purchased their land for farming and most of the farmers were into livestock farming. Majority of respondents were aware of different biotechnology while some claimed not to be aware and respondents were aware of biotechnology through extension agents, 24.7% have adopted the biotechnology procedure for their agricultural program. All constraints listed were major problems, and conclude that there is still a lack of awareness of the biotechnology.***

Keywords--- Awareness, Biotechnology, Lagelu,

1. INTRODUCTION

Biotechnology is the use of microorganisms in industry and medicine for the production of antibiotics, hormones etc. which could be used for the improvement of agricultural products. Biotechnology can be defined as the use of living systems and organisms to develop or make useful products, or "any technological application that uses biological systems, living organisms or derivatives thereof, to make or modify products or processes for specific use" (UN Convention on Biological Diversity, 2003). Biotechnology is also defined by the American Chemical Society (2008) as the application of biological organisms, systems, or processes by various industries to learning about the science of life and the improvement of the value of materials and organisms such as pharmaceuticals, crops, and livestock.

Biotechnology is also the application of scientific and engineering principles to the processing of materials by biological agents to provide goods and services. From its inception, biotechnology has maintained a close relationship with community. Although biotechnology is associated with the development of drugs, and has been principally associated with food, addressing such issues as malnutrition and famine. The history of biotechnology begins with zymotechnology, which commenced with a focus on brewing techniques for beer. By World War I, zymotechnology would expand to tackle larger industrial issues, and the potential of industrial fermentation gave rise to biotechnology. However, both the single-cell protein and gasohol (blend of gasoline and alcohol) projects failed to progress due to varying issues including public resistance, a changing economic scene, and shifts in political power. According to Fernandez-Cornejo (2006), the fundamental contributions of the application of biotechnology to agriculture depend on the acknowledgement of its prospective possible benefits and risks. This will focus on the potential contributions of biotechnology to agriculture (plants and animals) taking into account the advantages as well as the disadvantages of the technology

The improvements in biotechnology especially in the agricultural sector will not only help place Nigeria among the contributors but also help boost the economic growth of the country. Agricultural biotechnology advancements have created a safe and sufficient food supply, grown in an environmentally responsible fashion, essential for humanity. Since their introduction, crops improved using biotechnology has been used safely, with benefits such as the reduction of pesticides use. The fact that Nigerians have not seen the benefits of biotechnology and all the innovations, it show the level of ignorance and awareness in the country. Biotechnology brings about the following:

- Increased yield in crop and livestock production
- Reduced chemical reagents use e.g. pesticides and medications
- Reduced vulnerability in crops and livestock to environmental stresses
- Reduced mortality rate
- Improved quality and quantity of crops and livestock produced

The above mentioned features are some of the key attributes of biotechnology, apart from the fact that it could also ensure profitability and job security for the farmers. It could also bring Nigeria back to the status as an agricultural heavy weight in the global arena.The specific objectives are: (a) to examine the socio-economic characteristics of farmers in the study area (b) to ascertain the farmers' awareness in biotechnology in the study. (c) to examine the constraints to awareness of biotechnology. The study was carried out in Lagelu Local government of Oyo State. Random samplings were used to select 81 farmers for the study. The data was subjected to descriptive and inferential analysis.

2. METHODOLOGY

Oyo state is an inland state of Nigeria, with Ibadan as its capital Oyo state is located in the south-west geopolitical zone of Nigeria, it lies between Longitude 2°40 E and 4°34 E; and between Latitude 7°05 N and 9°05 N. Oyo State was one of the three states carved out of the former Western state of Nigeria in 1976. Oyo State consists of 33 Local Government Areas (see figure 1). Lagelu is a government area in Oyo state, Nigeria. Its headquarters are in the town of Iyana Offa. Data for the study were collected through oral administration of the questionnaire by trained enumerators. Enumerators were recruited locally since they were familiar with the environment, especially the language and culture. Random samplings were used to select 81 farmers for the study. The data was subjected to descriptive and inferential analysis.

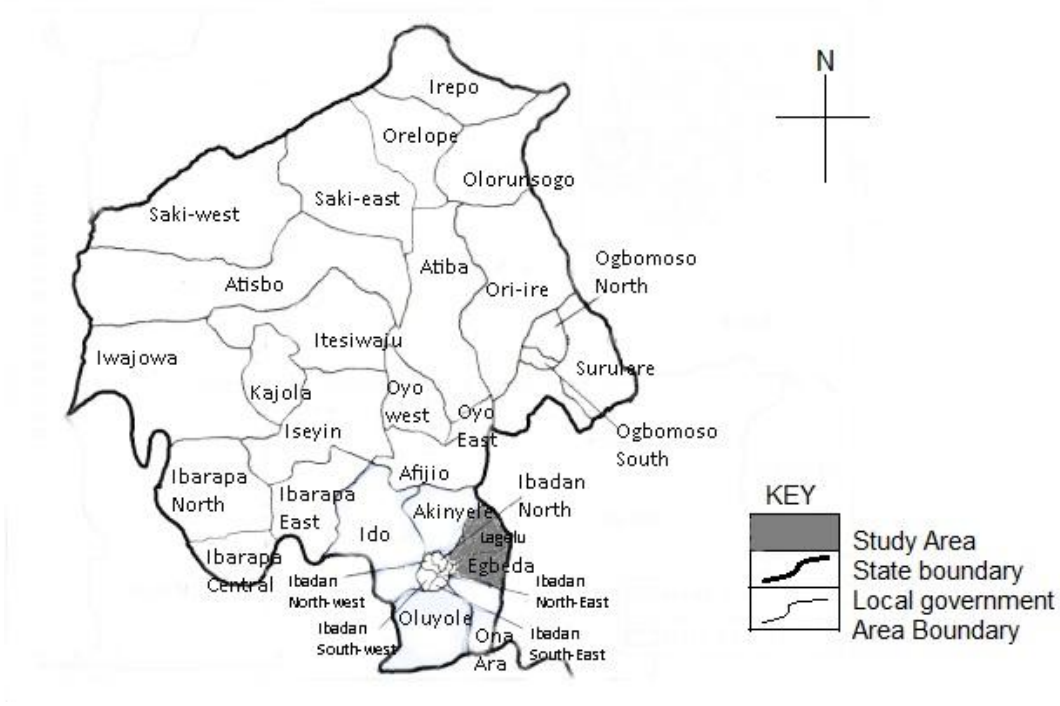

Figure 1: Map of Oyo State Showing the Local Government Areas

3. RESULTS AND DISCUSSION

Age is a very important demographic characteristic, with 35.8% of farmers below 41years of age. This indicates a poor supply of agile and able bodied work force involved in farming in the study area. This is in agreement with Adekoya and Oladele (2008) in a study on Improving Technology Perception through Information and Education: A case of Biotechnology in Nigeria found out that the age of the respondents which ranged from 19 years to 56 years with a mean and mode of 41 years which implies that most of the respondents were mature and will be in with decision making capacities in their various positions.

Table 1 shows that 67.9% of respondents were married, while 21% of respondents were single and only 11.1% of respondents were either widowed or divorced. This is due to the fact that the largest age group of those involved in agriculture was above 41 years. These imply that respondents were matured and may be involved in decision making for the community. Most of the respondents which are about 80.3% of farmers were Christians, while 18.5% of the respondents were Muslims. This will give a better understanding on if religion could be an impeding factor on the reason why the awareness of biotechnology is low. Since Nigeria is a country with diverse religions and religious beliefs, this could bring about reduction in advancements that could oppose their belief. Christianity and Islam are the most prominent religions in the region.

Majority (77.8%) of the respondents advances beyond secondary school education and while those who obtained secondary school certificate accounted for 19.7%. This is beneficial factor because it views the level of education the farmers have exposed to and if the exposure as led them to become familiar with biotechnology. Also Adekoya and

Oladele (2008) found that all the participants, apart from 14.8 percent, had educational qualification higher than secondary school thus implying that majority were able to understand what was discussed at the workshop.

Table 1: Sample demographics (N=81).

	Frequency(n)	Percentage
Gender		
Male	56	61.1
Female	25	30.9
Age (in years)		
Less than 25	3	3.8
26-40	25	31.7
41-50	24	30.4
>50	27	34.2
Marital status		
Single	17	21.0
Married	55	69.9
Divorced/widowed	9	11.1
Religion		
Christian	65	80.3
Muslim	15	18.5
Tradition	1	1.2
Education		
No education	2	2.5
Secondary	16	19.7
Tertiary	63	77.8
Type of farm production		
Crop	10	12.4
Livestock	51	63.0
Mixed farming	20	24.7
Other occupation		
Yes	36	45.6
No	43	54.4
Type of ownership of land		
Rent	8	10.0
Leased	7	8.8
Purchased	55	68.8
Inherited	10	12.5
Years of experience		
Under 6 years	22	27.2
6-10 years	30	37.0
11-15 years	21	25.9
Above 15 years	8	9.9
Source of capital		
Personal savings	48	59.3
Bank loan	1	1.2
Money lenders	1	1.2
Cooperatives	22	27.2
Personal savings and Bank loan	3	3.7
Personal savings and Cooperatives	6	7.4
Yearly income		
<250,000	5	8.3
250000-<500000	8	13.3
500000-<750000	12	20.0
750000-<1000000	8	13.3
1000000-<1250000	10	16.7
1250000-<1500000	1	1.7
>=1500000	16	26.7

Source: Field Survey, 2014

Also table 1 reveals that farmers with less than 6 years of experience amounts to 27.2%, and those with 6-10 years of experience account for 37.0% of the sample, while 11-15 years of experience amounts to 25.9%. Since a large percentage of respondents are of middle age and well educated, it is not shocking to find out the larger percent of respondents have 6 to 10 years of experience.

Also table 1 reveals that 59.3% of the farmers use only their personal savings as source of capital for their farm business, while 27.2% of farmers use cooperatives. 3.7% of farmers use both personal savings and bank loans as sources of capital. The reasons why respondents rely more on their personal saving is obviously due to the fact that it is much easily accessed and that one could yield all the profit and benefits of their business as well as not to build up liabilities but become his own boss. And those cooperatives are preferred due to their low interest rates to other sources of capital.

The table 1 shows that 67.9% of the respondents purchased their land for farming while 12.3% inherited their lands and 9.9% rented their lands this implies that 19.8% of the farmers don't have fully claimed possession of their lands since they got it through either rent or lease which is also 9.9%. A greater percentage of farmers purchased their lands this is likely because it is economical. the source of capital on why the respondents chose personal savings, the same goes for why land is purchased in the case that most people would rather make all the profit from a little piece of land they own than on a big land that could be taken from them at any given time. This creates in other words job security for the farmer.

The table 1 suggests those that have offered courses or taking up training to make them better efficient in the type of farm business they are involved with. It shows that 32.1% have offered a special course or training while 67.9% of farmers have no taken up any course or training. This aspect is very beneficial due to the fact that with special training or course there will be an avenue for the farmer to get familiar with biotechnology and its attributes.

Table 2: Distribution of Farmers by Types of Farming

Types of Farming	Frequency	Percentage
Crop	10	12.3
Livestock	51	63.0
Mixed farming	20	24.7
Total	81	100.0

Source: Field Survey, 2014

The table 2 shows that 12.3% of farmers were involved in crop production, 63% of farmers were involved in animal production and 24.7% were involved in mixed farming. Therefore, most of the farmers were into livestock farming and the smallest percentage were into crop production.

The table 3 shows that about 50.6% of farmers were aware of resistant breeds of either crops or livestock and 55.6% were aware of environmental-stress tolerance, which is the same as those aware of improved taste, texture, and appearance. 61.7% of farmers were aware of harsh weather tolerant breeds, 46.9% of farmers were aware of hybrids same as molecular makers and diagnostics, 54.3% of farmers were aware of highly productive breeds, 48.1% were aware of highly yielding breeds same as those aware of cross breeding and those aware of insect and pest resistance, 40.7% were aware of breeds with highly nutritional qualities, 35.8% were aware of novel substances same as those aware of delayed fruit ripening, 53.1% were aware of short growth maturation, 49.4% were aware of genetic modification, 65.4% were aware of artificial insemination, 60.5% were aware of vaccines, while 32.1% of farmers were aware of herbicide tolerance. Only tissue culture has 29.6% of farmers' awareness. This could be as a result of farmers' lack of interest in changing their system of farming; also most of the farmers were aging and have responsibilities like providing for their family. They have also just gotten used to their system of farming and were not willing to risk any changes, no matter how positive it might be. Adekoya and Oladele (2008) reported that most (83.2 percent) respondents have concerns about biotechnology with 62.1percent bothered about food safety, 11.6 percent with ethical concerns and 8.4 percent with concerns about cost and noted that all biotechnology really arose from the concept at hand on biotechnology for which some seem to take it as distorting natural creation which is bound to have consequences.

The table 4. shows that 24.7% of the respondents were aware of biotechnology through extension agents, 14.8% of farmers got aware through friends, 7.5% of farmers got aware through research institutions and other agencies (e.g. internet), 3.7% of farmers got aware through relations, 2.5% of farmers got aware through other agencies, while 1.2% of farmers got aware through extension agents and friends, same as those aware through friends, relations and extension agents, as well as those who got familiar though all the listed agencies.

Table 3: Distribution by awareness to biotechnological

Biotechnology	Frequency(n)	Percentage (%)
Resistance (i.e. to disease)		
Aware	41	57.7
Not aware	30	42.3
Environmental-stress tolerance		
Aware	45	62.5
Not aware	27	37.5
Harsh weather condition tolerance		
Aware	50	67.6
Not aware	24	32.4
Hybrids		
Aware	38	52.8
Not aware	34	47.2
High productivity (i.e. frequency)		
Aware	44	58.7
Not aware	31	41.3
High yielding (i.e. quantity)		
Aware	39	54.2
Not aware	33	45.8
High nutritional quality		
Aware	33	45.2
Not aware	40	54.8
Improved taste, texture, and appearance		
Aware	45	62.5
Not aware	27	37.5
Novel substances		
Aware	29	39.7
Not aware	44	60.3
Cross Breeding		
Aware	39	54.2
Not aware	33	45.8
Genetic modification		
Aware	40	54.8
Not aware	33	45.2
Short growth maturation		
Aware	44	59.5
Not aware	30	40.5
Artificial insemination		
Aware	53	73.6
Not aware	19	26.4
Molecular makers		
Aware	38	52.8
Not aware	34	47.2
Molecular diagnostics		
Aware	38	51.4
Not aware	36	48.6
Vaccines		
Aware	49	63.6
Not aware	28	36.4
Tissue culture		
Aware	24	35.3
Not aware	44	64.7
Insect/pest resistance		
Aware	39	56.5
Not aware	30	43.5
Herbicide tolerance		
Aware	26	37.7
Not aware	43	62.3

Delayed fruit ripening		
Aware	30	43.5
Not aware	39	56.5

Source: Field Survey, 2014

Table 4: Distribution of farmers' sources of information

	Frequency	Percentage
Extension agent	20	24.7
Friend	12	14.8
Relation	3	3.7
Research Institution	13	16
Other	2	2.5
Extension agent and friend	1	1.2
Friend and Relation	1	1.2
Research Institution and Other	6	7.5
All of the above	1	1.2
Total	59	72.8
Not Aware	22	27.2

Adoption is a crucial part of awareness because one cannot adopt a procedure without first getting familiar with it. From the table 5, 24.7% have adopted the biotechnology procedure for their agricultural program.

Table 5: Distribution of farmers by adoption of biotechnology

Adoption	Frequency	Percentage
Adopted	20	24.7
Not adopted	61	75.3
Total	81	100

Source: Field Survey, 2014

Table 6: Distribution of farmers by problems experienced/constraints

problems	Frequency	Percentage
Not readily available	6	30
Not environmental friendly	3	15
Difficult to sustain	8	40
Inadequate technical ability	12	60
Very costly	14	70
Negative side effects	2	10
Prone to diseases and pests	2	10
Lack of proper knowledge	12	60
Inadequate opportunities attaining required knowledge and skills	6	30
Financial constraints	13	65
Non-supportive policy environment	4	20
Poor public attributes and response	9	45
Lack of institutions of problem address	6	30

*Multiple Responses

The table 6: shows 20% say that the government and environmental policies don't support the adoption of biotechnology, 30% say that the practices are not readily available; there is a lack in the opportunities to learn how to make full use of the biotechnology they have adopted, as well as institutions to treat the problems that may occurs from the biotechnology

practices. Also, 60% of the farmers that adopted the biotechnology say that there is inadequate technical ability to enable them to make profit maximally, and lack of sound knowledge of biotechnology to make sure one does all that is needed to generate an expected outcome. 65% of the farmers indicated financial constraints while 70% of the farmers say that the adoption of the biotechnology is costly. All these constraints were the problems farmers were suffering from and little or no assistance from research institutions to aid them to solve these basic needs.

4. CONCLUSION AND RECOMMENDATIONS

The study showed that although there are few respondents from the study area, one could assess the awareness in the totality of Lagelu local government to biotechnology. The level of awareness is good in the case of artificial insemination, compare to other biotechnology such as tissue culture and herbicide tolerance. It shows that there is still a lack of awareness of the biotechnology which may have brought about a great reduction in the adoption of biotechnology.

Based on the findings of this study the following recommendations are hereby suggested:

- The government should offer financial support to research institutions to make relevant advancements in agro-biotechnology.
- There should be educational institutions, seminar, and conferences set up to better spread awareness of biotechnology.
- There should also be change/extension agents that can help in propagating the knowledge of biotechnology to the locals in the rural areas.
- There should be government policies set up to increase the adoption of biotechnology.

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