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WILL FARMERS BUY AND APPLY AFLATOXIN BIOLOGICAL CONTROL AGENT? : A WILLINGNESS-TO-PAY (WTP) APPROACH IN NORTHERN NIGERIA

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Introduction

Aflatoxin is among the most carcinogenic substances known in nature produced by the ubiquitous fungus, Aspergillus flavus. It is a highly toxic and is capable of colonizing and contaminating major staples like maize and groundnut at the pre-harvest, harvest and post-harvest stages of the crops rendering them unsafe for consumption. In 2004, Kenya recorded the largest aflatoxicosis occurrence in the last 20 years with 317 cases and 125 death due to consumption of contaminated maize diets with high aflatoxin levels (Lewis *et al,* 2005). A bio-control mitigating product was developed and registered under the name "AflasafeTM" in Nigeria to effectively control aflatoxin infestation of crops on the field through to storage. This was with the intent to improve public health, augment farmers' income, and enhance food safety and security. However, according to Wu and Khlangwiset (2010), a new technology to farmers always comes with new cost implication; against this backdrop, this study examined the assessment of farmers' willingness to pay for aflatoxin bio-control agent (Aflasafe) in Kaduna and Kano States of Nigeria among maize and groundnut farmers employing Contingent Valuation Methodology (CVM).

Figure 1: Aflatoxin infected maize

This study was carried out to answer the following research questions in the study areas: (i) Are farmers willing to pay for Aflasafe - the bio-control technology? (ii) What are the factors that influence farmers' willingness to pay (WTP) for aflatoxin bio-control? (iii) Identify constraints to farmers' WTP for Aflasafe.

Table 1: Willingness to pay (WTP) values for Aflasafe by different groups of maize & groundnut's farmers (Naira/10kg)

VARIABLE	MEAN_WTP	DIFFERENCE
POOLED		
Contact	1983.74±634.1	1147.56***(16.80)
Non-Contact	836.18±863.24	
STATES		
Kano	1242.86±1035.4	323.67***(3.8)
Kaduna	1566.54±834.3	
STATES & FARMERS' TYPES		
KANO		
Contact	1952.1±641.22	1418.49***(14.5)
Non-Contact	533.61±852.84	
KADUNA		
Contact	2013.39±628.35	893.70***(10.10)
Non-Contact	1119.69±774.81	
FARMERS' TYPES		
CONTACT		
Kano	1952±641.22	61.29(0.757)
Kaduna	2013.39±628.35	
NON-CONTACT		
Kano	533.61±852.84	586.07***(5.629)
Kaduna	1119.69±774.81	

Source: Data analysis, 2015; NB: Means with corresponding SDs; numbers in brackets are the t-values; * 1%, ** 5%, * 10% level of significance of t-test**

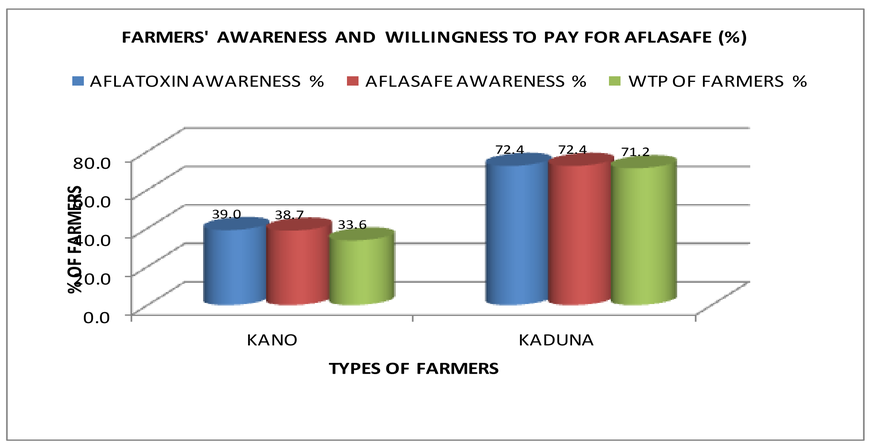

Fig ure2: Non-Contact Farmers' awareness level of Aflasafe and their willingness to pay for it

Materials and Methods

A multi-stage sampling technique was adopted for this study. The first stage involved purposive selection of five Local Government Areas (LGAs) in Kano State and two LGAs in Kaduna State where there is high concentration of maize and groundnut farmers who utilized Aflasafe as input in their farm production. The selected LGAs in Kano were exposed to aflatoxin and Aflasafe, 1 year before the survey, while the selected LGAs in Kaduna had 3 years exposure to aflatoxin and Aflasafe before the survey was conducted. The second stage involved purposive selection of 10 farming communities spread across the LGAs identified in both study area. The third stage involved purposive selection of 119 and 127 contact farmers respectively from Kano and Kaduna states, and random selection of 119 and 127 non-contact farmers respectively from Kano and Kaduna states using a sampling proportion of 6% in each farming communities identified. A total of 492 questionnaires were successfully completed and used for analysis. Contact farmers were those who had awareness about aflatoxin, received and used Aflasafe before the survey while, Non-Contacts farmers have not used Aflasafe before, but may be aware. The data used for the study were primary data and collected from the farmers through the use of both oral interviews and structured questionnaires to elicit data about farmers' sources of information about aflatoxin and Aflasafe and their willingness to pay (WTP) among others.

Results and Discussion

The level of awareness of aflatoxin and Aflasafe are shown in Figure 2. Unlike Non-Contact farmers, all Contact farmers were fully made aware of aflatoxin and the bio control agent - Aflasafe. Different prices that farmers were willing to pay are represented by Figure 3. A significant proportion of the Contact farmers in Kano (67.2%) and Kaduna (71.7%) states had a willingness to pay value ≥ N1500 which is the minimum price limit which 'Aflasafe' - the bio-control product could be sold. In case of Non-Contact farmers, few (16.8%) in Kano state and (29.2%) in Kaduna states were willing to pay for Aflasafe above the minimum price limit of ≥ N1500. Comparison on mean WTP between Contact and Non-Contact farmers is shown in Figure 4. The mean WTP estimate for Aflasafe in Kano and Kaduna States among the average Contact farmers was found to be N1,952.1 and N2,013.4, respectively, and these values were statistically the same. N533.6 and N1119.7 were the mean willingness to pay estimate for Aflasafe offered by an average Non-Contact farmers in Kano and Kaduna states respectively. It can be inferred that the Non-Contact farmers were ready to pay for Aflasafe, but on the average were not willing to pay the minimum price of N1,500, but something lower.. This could be attributed to inadequate or lack of information about the negative impacts of aflatoxin and the bio-control mitigating product capability to control aflatoxin. In modeling WTP using Logit model, seven of the independent variables were positively significant, these included ecological location/state of the farmers, with farmers in Kaduna state more willing to pay for Aflasafe (P<0.01); contact with agricultural extension agent (P<0.05); and contact with the producer of Aflasafe (P<0.01) among others, increased the likelihood of willingness to pay for Aflasafe.. Based on descriptive statistics and econometric parameters, Contact farmers in Kaduna were more informed hence, more willing to pay for the technology. Majority (76.1% and 43.3%) of the Non-Contact farmers in Kano and Kaduna states respectively identified lack of information about the negative impacts of aflatoxin and the importance of use and effectiveness of Aflasafe as the major constraint. Cost of the technology which was general to all the farmers was identified as an important constraint and respondents were of the opinion that it is on a high side.

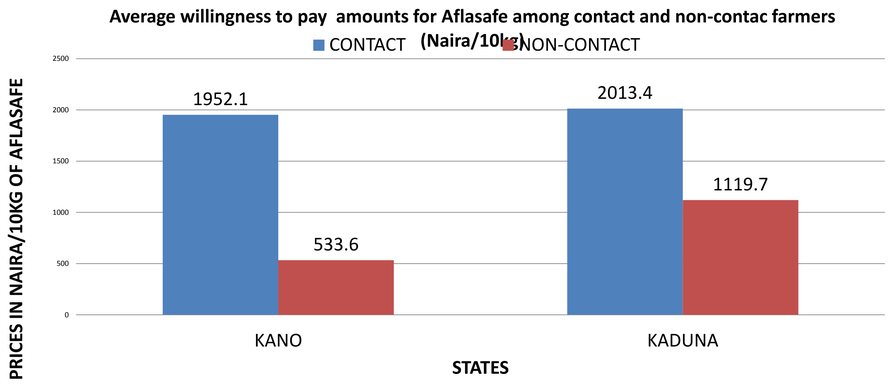

Figure 3: Prices farmers are willing to pay for Aflasafe

Table 2: Determinants of Willingness to Pay (WTP) for Aflasafe in the study area

Explanatory Variables	Coefficient	Standard error	Z-value	P > /Z /
STATE (Kaduna=1, Kano=0)	3.892	1.103	3.53	0.000***
MSTATUS(Married=1, Otherwise=0)	1.378	0.945	1.46	0.142
EDU (Educated=1, Otherwise=0)	1.43	0.598	2.39	0.017**
ASSOC(Member of asociation=1, Otherwise=0	-0.396	-0.624	0.63	-0.526
FEXPERIENCE (Farm experience in years)	0.062	0.029	2.17	0.030**
HAPERSON (Hectare/family size)	0.843	0.439	1.92	0.055*
CREDITYN (Credit access=1, Otherwise=0)	0.694	0.617	1.12	0.261
TEXPENDIT (Total expenditure in Naira)	0.000	0.000	1.99	0.046**
EXTCONT(Contact with extension agent=1, Otherwise=0)	3.227	1.283	2.52	0.012***
SEX (Male=1, Female=0)	1.372	2.507	0.55	0.584
CONTACT(Contact with Aflasafe producer =1, Otherwise=0)	8.478	1.281	6.62	0.000***
CONSTANT	-15.492	-3.885	-3.95	0.00
LOGLIKELIHOOD	-58.75			
CHI-SQUARE	438.43			
SIGNIFICANCE VALUE	0.00			
PSEUDO R^2	0.79			

Source: Data analysis, 2015; NB: * 1%, ** 5%, * 10% level of significance**

Conclusions

The main conclusion of this study is that information and awareness creation are critical for use of Aflasafe. Contact with information about aflatoxin and Aflasafe enhances farmers' awareness and WTP. This knowledge, positively influence the farmers' purchase decision and translates into higher willingness to pay by the informed farmers. The study then suggests dissemination of information about aflatoxin and the relevance of Aflasafe to farmers Adoption of Aflasafe by farmers will guarantee quality grains that enhance food safety and security. Development of markets that reward growers of aflatoxin free maize with premium prices for their product will further increase adoption of aflatoxin combating technologies such as Aflasafe.

References

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