Influence of Selected Information Sources on Knowledge and Skills in Prevention of Aflatoxin Contamination among Smallholder Maize Farmers in Kitui West Sub-County, Kenya

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Abstract: Aflatoxins are poisonous substances produced by certain kinds of fungi that are found naturally all over the world. The contamination is a worldwide problem where outbreaks of acute aflatoxins in Kenya occurred in 2004 and 2006, which caused deaths of about 200 people. The Kenyan Government has made efforts to reduce aflatoxin contamination on maize by creating awareness among farmers through extension officers, but despite this, the aflatoxin problem seems to persist. This study aimed at determining the influence of selected information sources on knowledge and skills in prevention of aflatoxin contamination in maize among smallholder farmers in Kitui West Sub- County, Kenya. The study employed a cross-sectional survey design. Proportionate clustered random sampling was used to select respondents from every ward in order to ensure reasonable representation of the population. Data was collected using four instruments namely; Researcher administered questionnaire for farmers, questionnaire for extension officers, a check list and focus group discussion guide. Validity was established by seeking opinion from peers and a panel of experts from the Department of Agricultural Education and Extension Egerton University in order to evaluate adequacy of the tool. To ensure reliability, a pilot testing was done and internal consistency calculated using Cronbach's alpha coefficient which was found to be 0.897. The collected data was managed with computer program Statistical Package for Social Science (SPSS Version 21.0). Multiple regression and ANOVA were used to determine the influence of public and private extension agents, other farmers and ICT on knowledge and skills used to prevent aflatoxin. The findings from the study indicate that public extension agent ($F = 0.691$, $P = 0.771$) and private extension agents ($F = 0.562$, $P = 0.822$) do not have significant influence while other farmers ($F = 1.435$, $P = 0.147$) and ICT ($F = 1.587$, $P = 0.092$) have significant influence. The study therefore concludes that farmers are mostly influenced by on other farmers and ICT in obtaining knowledge and skills in prevention of aflatoxin. The study recommends to the County government to initiate programs which encourage farmers to embrace the demand driven extension service as well as involving of local media especially radio and television to increase passing of information to the farmers.

Key Words: Aflatoxin, ICT, Information Source**,** Other farmers, Post-Harvest Practices, Private Extensions agents, Public Extension agents, Pre-Harvest Practices

INTRODUCTION

In the world, maize remains as one of the major food crops produced and used as human food and livestock feed (Listman & Ordonez, 2019). Agriculture sector is the second largest contributor to Kenya's gross domestic product (GDP) after service sector and fundamentally it drives the country's economy, as about 75% of Kenyans earn all or part of their income from the sector (Lokuruka, 2020). However, all over the world aflatoxins which contaminate maize during pre- and post-harvest periods pose a serious threat to humans and livestock (World Health Organization, 2018).

Major outbreaks have been seen in Taiwan, India and Malaysia (Herriman, 2016). In Africa, especially Sub-Saharan Africa which has ideal conditions that encourage aflatoxins, the contaminations have been reported in a number of countries (Falade, 2018). In East Africa countries aflatoxin was reported in countries like Uganda where crops like maize, sorghum, peanuts, sesame, cassava and sunflower were affected by aflatoxin (Omara, et al., 2020). It was reported that 3700 cases of cancer were associated with aflatoxin exposure in Uganda (Lukwago et al., 2019). Aflatoxins have become a threat to food security in Kenya where in 2010, about 2.3 million bags of maize was declared unfit for human and livestock consumption (FA0, 2014). In 2014, 14,500 tonnes of maize were found to be unfit for consumption as they were infected with aflatoxin (Omondi, 2019).

Aflatoxins are types of mycotoxins produced by *Aspergillus* species of fungi such as *A. flavus* and *A. parasiticus* (World Health Organization, 2018). They are contaminants of foods intended for people or animals as a result of fungal contamination (Kumar et al, 2016). The most common foods implicated are cereals like maize, wheat and rice, oilseeds like peanuts and sunflower (Herriman, 2016). Aflatoxin contamination in maize occurs above safe levels in many African countries where in Kenya the safety levels are 10 Ppb (FAO, 2011).

The Kenyan Government has equipped the extension officers on aflatoxin contamination (FAO, 2017). It is the responsibility of Agricultural Extension Officers to provide the information on aflatoxin to the farmers (Asian Development Bank -ADB, 2014). Apart from extension agents farmers also receive information from various other sources, especially mass media such as radio, TV, and newspapers (Srivastava, 2018). According to findings by Walker (2013), 60 percent of farmers in Makueni indicated that they heard about aflatoxins from the extension officers, while 67 percent of those in North Rift and 50 percent in Meru reported receiving their information from the media.

Farmers have received information on aflatoxin contamination as inherited knowledge, from agriculture extension workers, radio/TV and from friends (Wanjiku et al., 2021). Inherited knowledge in this case means practices or knowledge that are perpetuated within the household from one generation to the next. Knowledge sharing forums are convened to promote the exchange of local agricultural information among farmers, using participatory peer-to-peer education and learning (Agim & Chioma, 2020).

Good agronomic practices reduce aflatoxin contamination in the field (IITA, 2017). The farmers who know about aflatoxins say it's due to high humidity, temperature and rainfall as well as poor soils, poor storage practices, drought stress, contaminated seeds, and delayed harvesting (Udomkun et al., 2018). For example, the cause and proliferation of aflatoxin in Uganda was largely due to poor pre- and post-harvest practices, poor government legislation, lack of awareness and low level of education of farmers (Omara et al, 2020).

Farmers need to integrate variety selection, good agronomic practices, timely planting, weeding and irrigation since these influence contaminations of maize (Biswas et al., 2015). During harvesting, throwing maize on the ground as they remove the cobs from the husks exposes the maize cobs to fungal spores in the soil and increases the risk of aflatoxin contamination (Mureithi et al., 2010). Post-harvest strategies begin before harvest and further drying is necessary until the crop is put in store (Turner et al., 2009). Threshing, shelling and winnowing should be done carefully to avoid damaged grains (Kimani, 2018). Farmers should avoid beating the crop with

sticks which result in grain damage, eventually leading to mould development unless the grain is to be used quickly and not stored (RATIN, 2021).

A previous study on causes of aflatoxin conducted in Kitui County shows that poor agronomic practices contribute much to attack of maize by aflatoxin. (Nyakundi, 2014). A study by Wanjiku (2010) identifies environmental factors and poor post-harvest practices as key issues encouraging aflatoxin contamination. However few studies if any, on the influence of selected information sources on knowledge and skills in prevention of aflatoxin contamination in maize among smallholder farmers in Kitui West Sub- County, Kenya. This explains why this study looked at the influence of selected information sources on knowledge and skills in prevention of aflatoxin contamination in maize among smallholder farmers in Kitui West Sub- County, Kenya. It is clear then that, despite the fact that farmers have the knowledge and skills about aflatoxin, the presence of aflatoxin contaminated maize indicates that there exist other underlying issues causing spread of aflatoxins. This is a gap this study tries to identify in Kitui West Sub County.

METHODOLOGY

The study employed a cross-sectional survey design. Cross-sectional studies are usually relatively inexpensive and allow researchers to collect a great deal of information quite quickly (Wang & Zhenshun, 2020). The study was carried out in Kitui West Sub County, which is an expansive Sub County in Kitui County with an area of 667 square kilometers of which 554 square kilometers being agriculturally potential and 113 square kilometers being uninhabited/ arable land. (Kitui West SCAO, 2019). The area was selected because despite of producing good maize harvest, it has faced a challenge of aflatoxin attack raising a lot of concern from the government.

The population of Kitui West Sub County is 141,334 people while the number of farm households is 19,970 (KNBS, 2017). The target population for this study was the smallholder maize farmers in the 19,970 farm households in Kitui West Sub County. The target population was in these wards includes: Mutonguni, Kauwi, Matinyani and Kwamutonga-Kithumula.. The accessible population was the small holder farmers who practice maize production from the target population which are 16,745 small scale maize farmers (Kitui West SCAO, 2019). For focus group discussion, the accessible population will be at least ten members of community-based groups from every ward. The target population involved small holder farmers who mostly cultivate less than two hectares of land. They produce food for their household and a little for the local market due to the poor resources available to them, especially capital. Proportionate clustered random sampling was used. In this method the probability of selecting samples is proportional to its population size (Skinner, 2016). This allows a larger cluster to have a greater probability of selection of more farmers than a smaller cluster. Each ward was considered as a cluster where samples were picked according to its size of population that was used in this study, because they differ in agro-ecological characteristics as well as accessibility. The researcher used a formula adopted by Cochran 1963 to determine the sample size at 0.07 level of significance which was 202. The Sampling frame was established using information from the Sub County Agricultural Office in collaboration with the ward administrator. Proportionate clustered random sampling was the most appropriate method to select respondents from every ward in order to ensure reasonable representation of population. For every ward, a random sampling was done to obtain the farmers for the researcher to administer questionnaire and have the observation guide filled. Purposive sampling was done to farmers who are in community based groups for a focus group discussion.

Data was obtained by use of four instruments. These are; a questionnaire for smallholder farmers, questionnaire for extension officers, check list and focus group discussion guide. Validity is the extent to which the results really measure what they are supposed to measure (Middleton, 2020). Only when a questionnaire is reliable, then validity is ensured (Bolasinwa, 2015). To ensure validity of the questionnaire an expert judgement was required. To ensure the instruments accurately measure the variables of study, the instruments

were discussed with the supervisors. For this study, validity was established by seeking opinion from peers, ward extension officers and a panel of experts from the Department of Agricultural Education and Extension at Egerton University. Reliability is the degree to which research instrument produces stable and consistent results (Adhikari, 2018). A reliable questionnaire is one that would give the same results if used repeatedly with the same group (Morrison, 2021). To ensure reliability, pilot testing for the study was done at Kaewa location, Machakos County. Cronbach's alpha was be used to compute a reliability coefficient of the questionnaire. For the instrument, the calculated alpha coefficient was 0.897 which indicates a good level of reliability.The researcher obtained a letter of approval from the Board of Post Graduate Studies of Egerton University and a research permit from the National Commission for Science Technology and Innovation (NACOSTI) to conduct research in the study area. The researcher then visited the County Director of Education office, County Commissioner's office, County office and the Sub County agriculture office to get the authorization for a research within the county. The smallholder maize farmers were met in their respective farms after making appointments through the respective Ward administrator and extension officer. The researcher administered questionnaires to the small holder maize farmers. A check list was used to collect information on the activities the farmers are doing on pre- and post-harvest practices which may contribute to aflatoxin contamination. Lastly, focus group discussions was conducted with community based groups, to discuss on various sources of information about aflatoxin contamination and what they are doing to prevent it. To ensure proper ethics are met the researcher followed the data collection tools and ensured confidentiality to the farmers is guaranteed. It was also assured by providing authorization provided by the university, National Commission for Science Technology and Innovation and by the Sub- County Agriculture office. After data collection, the data was coded and entered in a computer and data managed with Statistical Package for Social Science (SPSS) computer program (SPSS Version 21.0). Instruments providing quantitative data were analysed using descriptive statistics namely; frequencies and percentages while instrument providing qualitative data were analysed using content analysis. The hypothesis was tested using multiple regression analysis and ANOVA.. Results are presented by use of graphs, tables, cross tabulations and pie charts.

RESULTS AND DISCUSSION

Respondents' Source of Knowledge and Skills on Aflatoxin Prevention

Information sources are various means by which information is passed to create awareness, increase the knowledge of the user, to reduce his level of uncertainty or reduce the varieties of choices available to the users of information. For information to be effective, it must be accurate, timely and relevant. Sources of information about agriculture activities are: radio, television, extension workers, cooperative societies, friends and colleagues, newspapers and magazines, books/leaflets, phones, libraries and institutes (Adio et al., 2016). Table 1 shows respondents' information source on aflatoxin

Table 1: Sources of Information about Aflatoxin

Source of Information	Frequency	Percentage
Public Extension Officer	96	46
Private Extension Officers, (NGOs, CBOs FBOs, Agrovets)	90	44
Other Farmers	150	74
ICT (Radio/TV/mobile phones/Internet)	155	77

This is attributed to the popularity of the local radio stations which have influenced the locals it the type of information they receive and the actions they take on daily lives. Radio and mobile phones are common in most households probably because the two are portable and easy to operate with basic education level. These findings also agree with Ogola (2015) who says that majority of farmers (91%)

use fellow farmers as a channel of acquiring agricultural information. Fellow farmers get information from many sources including their own experiences and inherited information (Wanjiku et al., 2021).

Findings on Influence of Selected Sources of Information on the Knowledge and Skills

Factors influencing the knowledge and skills used in the prevention of aflatoxin contamination were determined using four main variables namely; Public extension agents, private extension agents (NGOs CBOs FBOs Agrovets), other farmers and ICT (Radio, TV, mobile phones, Internet).

Findings on Influence of Public Extension agents on the Knowledge and Skills used in the Prevention of Aflatoxin Contamination

The first objective sought to determine the influence of public extension agents on the knowledge and skills used in the prevention of aflatoxin contamination in maize among smallholder farmers in Kitui West Sub County. Respondents were presented with 13 different knowledge and skills statements on a Likert scale of 1-5 ranging from Strongly agree (SA)-1, Agree(A)-2, Undecided(U)-3, Disagree(D)-4 and Strongly Disagree (SD)-5 in response to their level of agreement with the influence of public extension agent. Table 2 presents a summary of the results.

Table2: Influence of Public Extension on Knowledge and Skills used in Prevention of Aflatoxin

Knowledge and Skill	Percentage Responses				
	SA	A	U	D	SD
Early land planting	12	33	15	38	1
Maize variety	8	42	10	39	2
Timely planting and weeding	13	36	8	37	7
Crop rotation	10	33	11	39	7
Timely harvesting	12	38	9	36	5
Drying maize before storage	14	38	8	36	4
Drying maize on canvas	12	38	7	40	3
Deep land cultivation	12	31	14	40	4
Testing of moisture	11	30	14	42	4
Identify affected maize	16	36	7	36	4
Sorting maize	13	40	8	34	4
Discarding affected maize	13	39	8	34	5
Correct fertilizer	8	27	8	49	7

Table 2 shows that out of the 13 knowledge and skills farmers acquired, the public extension agent does not have a significant influence. According to findings by Masango et al., (2016) farmers at times do not understand the agricultural extension policy especially the principle of demand driven services. Most farmers do not demand such services because they did not know what they are supposed to do when in need of extension services. He also says that this is further compounded by the lack of county government structures at the group village and village levels through which farmers could express their demands. The extension officers also cover wide area and most farmers were not able to access its services (Masango et al., 2016).

Findings on Influence of Private Extension Agents (NGOs, CBOs, FBOs Agrovet) on the Knowledge and Skills used in the Prevention of Aflatoxin Contamination

The second objective sought to determine the influence of private extension agents on the knowledge and skills used in the prevention of aflatoxin contamination in maize among smallholder farmers in Kitui West Sub County. Respondents were presented with 13 different knowledge and skills statements on a Likert scale of 1-5 ranging from Strongly agree (SA)-1, Agree(A)-2, Undecided(U)-3,

Disagree(D)-4 and Strongly Disagree (SD)-5 in response to their level of agreement with the influence of private extension agent. Table 3 presents a summary of the results.

Table 3: Influence of Private Extension (NGOs, CBOs, FBOs, Agrovet) on Knowledge and Skills used in Prevention of Aflatoxin

Knowledge and Skill	Percentage Responses				
	SA	A	U	D	SD
Early land planting	9	45	17	28	2
Maize variety	14	48	11	26	2
Timely planting and weeding	10	52	9	26	4
Crop rotation	10	24	17	41	7
Timely harvesting	7	44	10	35	4
Drying maize before storage	8	48	13	29	2
Drying maize on canvas	6	41	16	32	4
Deep land cultivation	5	38	24	28	5
Testing of moisture	3	35	21	35	7
Identify affected maize	11	46	9	26	8
Sorting maize	8	48	8	28	6
Discarding affected maize	11	39	10	34	6
Correct fertilizer	5	29	10	47	9

Table 3 shows that out of the 13 knowledge and skills farmers acquired, the private extension agent does not have significant influence. The private extension has limited influence on practices which do not directly benefit farmers but to benefit their interests and this is because their dealings are commercial in nature. The farmers get advice provided by agrovets and firms which sell maize seeds as well as stockists who buy dry maize grains from them. According to Berthe (2015) private advisory services are essential and provide essential services for their clients, however poor farmers are not likely to access the services from the private sector who, if they are not subsidized with significant levels from public funds, will only serve better off farmers (Berthe, 2015).

Findings on Influence Other Farmers on the Knowledge and Skills used in the Prevention of Aflatoxin Contamination

The third objective sought to determine the influence of other farmers on the knowledge and skills used in the prevention of aflatoxin contamination in maize among smallholder farmers in Kitui West Sub County. Respondents were presented with 13 different knowledge and skills statements on a Likert scale of 1-5 ranging from Strongly agree (SA)-1, Agree(A)-2, Undecided(U)-3, Disagree(D)-4 and Strongly Disagree (SD)-5 in response to their level of agreement with the influence of other farmers. Table 4 presents a summary of the results.

Table 4: Influence of Other Farmers on Knowledge and Skills used in Prevention of Aflatoxin

Knowledge and Skill	Percentage Responses				
	SA	A	U	D	SD
Early land planting	13	61	12	12	1
Maize variety	16	64	8	11	1
Timely planting and weeding	17	60	11	10	2
Crop rotation	14	35	16	28	6
Timely harvesting	18	59	8	13	2
Drying maize before storage	15	66	7	10	1
Drying maize on canvas	14	50	10	24	2
Deep land cultivation	15	50	20	13	3
Testing of moisture	9	41	18	26	6
Identify affected maize	17	57	10	12	4
Sorting maize	18	65	6	8	2
Discarding affected maize	16	34	10	34	5
Correct fertilizer	8	42	9	36	5

Table 4 shows that out of the 13 knowledge and skills farmers acquired, the respondents receive a lot of influence from other farmers in most of the skills and knowledge used to prevent aflatoxins..

Findings by Wanjiku et al. (2021) reported that majority of farmers received information about aflatoxin as inherited information, Radio/TV and friends. The inherited information is practices or knowledge that are perpetuated within the household from one generation to the next while friends refer to other farmers. Farmer to farmer or lead farmer extension approach seems to be effective way of passing information about aflatoxin. According to a study by Khalia et al., (2015), it was reported that lead farmers use community meetings to disseminate information, also on farm visits and demonstration. This results to identifying of the problems together, calling for assistance among farmers, facilitating meetings and reporting progress and linking with experts in serious cases.

Findings on Influence ICT on Knowledge and Skills used in Prevention of Aflatoxin

The fourth objective sought to determine the influence of ICT on the knowledge and skills used in the prevention of aflatoxin contamination in maize among smallholder farmers in Kitui West Sub County. Respondents were presented with 13 different knowledge and skills statements on a Likert scale of 1-5 ranging from Strongly agree (SA)-1, Agree(A)-2, Undecided(U)-3, Disagree(D)-4 and Strongly Disagree (SD)-5 in response to their level of agreement with the influence of ICT. Table 5 presents a summary of the results.

Table 5: Influence of ICT of Knowledge and Skills of Prevention of Aflatoxin

Knowledge and Skill	Percentage of Responses				
	SA	A	U	D	SD
Early land planting	12	49	12	27	1
Maize variety	21	43	10	24	3
Timely weeding and weeding	14	44	10	25	6
Crop rotation	8	26	20	37	8
Timely harvesting	12	47	11	25	5
Drying maize before storage	16	45	11	21	6
Drying maize on canvas	12	35	12	33	8
Deep land cultivation	7	38	20	31	4
Testing of moisture	9	28	19	37	7
Identify affected maize	17	47	8	26	2
Sorting maize	11	54	8	21	5
Discarding affected maize	25	40	14	17	7
Correct fertilizer	13	30	15	37	5

Table 5 shows that out of the 13 knowledge and skills respondents acquired, the respondents received a lot of influence from ICT in most of the skills and knowledge used to prevent aflatoxins.

Most of the small-scale farmers trust the local vernacular stations and the information passed through them. The high rate of obtaining information from vernacular stations is because majority cannot understand information on the labels written in Kiswahili and English language. Therefore, the oral nature of radio and broadcasting vernacular language enables them to understand properly and be able to apply (Mwangangi, 2015). According to these findings on farm inputs information need, radio was leading as the source with 90.3% of the respondents while 14.8% got information from TV as 7.4% obtained information from magazines and newspapers.

4.5 Test for hypothesis

Tests of hypotheses were carried out to establish whether there was influence of the independent variables (Public extension agent, Private extension agents, Other Farmers and ICT) on the dependent variable (knowledge and skills on aflatoxin prevention).

Test for the Hypothesis One

Hypothesis One stated that "There is no statistically significant influence of public extension agents on the knowledge and skills used in the prevention of aflatoxin contamination in maize among smallholder farmers in Kitui West Sub County". This was to determine the significance influence of public extension officers on individual pre-harvest and post-harvest practices. Multiple regression analysis was used to study the hypothesis. The results are as shown in table 6.

Table 6: ***ANOVA Table Summary of Knowledge and Skills on Aflatoxin Prevention by Public Extension***

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.710	13	.055	.691	.771[b]
	Residual	14.860	188	.079		
	Total	15.569	201			

a. Dependent Variable: knowledge and skills on aflatoxin prevention

N=188; df= 13; f=0.691; r^2=0.046; p= 0.711

The F value for the degrees of freedom (df, 13,188) was 0.691, The P value was 0.771 (thus the F value is below the critical F value of 0.771), these values also suggest that there is no reason to reject the null hypothesis. The findings revealed that public extension did not have a statistically significant influence on knowledge and skills to prevent aflatoxin. The study thus accepted the null hypothesis. Findings by Muthoni (2018) found out that only 20% of extension personnel claim to provide information to farmers while only 12% are available to sort farmers issues, the problem being difficult to traverse the areas allocated due too high large farmer population, as well as very low extension: farmer ratio resulting into a demand driven service through common interest groups.

Test for the Hypothesis Two

Hypothesis Two stated that "There is no statistically significant influence of private extension agents (NGOs, CBOs, FBOs Agrovet) on the knowledge and skills used in the prevention of aflatoxin contamination in maize among smallholder farmers in Kitui West Sub County". This hypothesis was tested using multiple linear regression. The results are as shown in table 7.

Table 7: ANOVA Table Summary of Knowledge and Skills on Aflatoxin Prevention by Private Extension Agents (NGOs CBOs, FBOs, Agrovet)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	.582	13	.045	.562	.882[b]
	Residual	14.987	188	.080		
	Total	15.569	201			

a. Dependent Variable: knowledge and skills on aflatoxin prevention

N=188; df= 13; f=0.562; r^2=0.037; p= 0.882

The F value for the degrees of freedom (df, 13,188) was 0.562, The P value was 0.882 (thus the F value is below the critical F value of 0.882). The findings revealed that private extension agents did not have a statistically significant influence on knowledge and skills to prevent aflatoxin. The study thus accepted the null hypothesis which states there is no statistically significant influence of private

extension agents on the knowledge and skills used in the prevention of aflatoxin contamination in maize among smallholder farmers in Kitui West Sub County.

Most of the private extension officers and agrovets are financially oriented and basing on the fact that most of the rural farmers are low-income earners then it becomes difficult for them to get consultation. Many private sector individuals and companies are considered to be very exploitative in their dealings with smallholder farmers. This is supported by research whose findings note that although the private extension officers and firms have strengths like potential to develop farmer client loyalty, improved response to needs, improved production, mobilized house expertise on crops and livestock, they have weaknesses like high costs of service provision and the fee for service is rarely a viable approach to cost recovery for the small-scale farmers (USAID, 2019). Due to this the farmers tend to avoid them in their agricultural activities.

Test for the Hypothesis Three

Hypothesis Three stated that "There is no statistically significant influence of other farmers on the knowledge and skills used in the prevention of aflatoxin contamination in maize among smallholder farmers in Kitui West Sub County". Multiple linear regression was used study the hypothesis and the results are as shown in table 8,

Table 8: ANOVA Table Summary of Knowledge and Skills on Aflatoxin Prevention by Other Farmers

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.405	13	.108	1.435	.147[b]
	Residual	14.164	188	.075		
	Total	15.569	201			

a. Dependent Variable: knowledge and skills on aflatoxin prevention

N=188; df= 13; f=1.435; r^2=0.090; p= 0.147

From the ANOVA table it is clear that the regression equation is significant with F = 1.435 and P = 0.147 This model then explains that other farmers have a significant influence on the knowledge and skills used in the prevention of aflatoxin. The study therefore rejected the null hypothesis and accepted the alternative hypothesis that "There is statistically significant influence of other farmers on the knowledge and skills used in the prevention of aflatoxin contamination in maize among smallholder farmers in Kitui West Sub County" This agrees with findings by Ogola (2015) who says that majority of farmers (91%) use fellow farmers as a channel of acquiring agricultural information.

Test for the Hypothesis Four

The fourth hypothesis stated, "There is no statistically significant influence of ICT on the knowledge and skills used in the prevention of aflatoxin contamination in maize among smallholder farmers in Kitui West Sub County. This hypothesis was tested using multiple linear regression by running the model in the SPSS and the results are as shown in table 9.

Table 9: ANOVA Table Summary of Knowledge and Skills on Aflatoxin Prevention by ICT.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.540	13	.118	1.587	.092[b]

Residual	14.029	188	.075
Total	15.569	201	

a. Dependent Variable: knowledge and skills on aflatoxin prevention
N=188; df= 13; f=1.587; r^2=0.090; p= 0.092

The multiple regression model produced R^2 =0.99, F (1.587), df =13, p =0.092 this indicates that, the regression model statistically significantly predicts the outcome variable (i.e., it is a good fit for the data). Therefore, the regression model can be used to make predictions about the value of the independent variable. This implies that ICT has significant influence on farmers knowledge.

The study findings are supported by BBC report (2018)- which established that radio leads in overall media consumption followed by the mobile phone, television, newspapers and the internet in Kenya. Further, the study found out that in Kenya, there was a weekly hour-long radio program on (Kenya Broadcasting Corporation) KBC Radio *Taifa* called *Mali Shambani* featuring agricultural news and responding to a wide range of topics, including market prices and trends, farming techniques, weather and seasonal issues, financing opportunities, inputs, land use, and quality standards.

CONCLUSION

The findings of this study led to the following conclusions: -

(i) Public extension agents do not significantly influence knowledge and skills used in the prevention of aflatoxin contamination in maize among smallholder farmers in Kitui West Sub County.

(ii) Private extension officers (NGO's, CBO's, FBO's Agrovet) do not have significant influence on the knowledge and skills for aflatoxin prevention among smallholder farmers in Kitui West Sub County.

(iii) Other farmers have a lot of influence on where farmers obtain knowledge and skills used in the prevention of aflatoxin contamination in maize among smallholder farmers in Kitui West Sub County. However, this shows that there is a big gap on the source of knowledge about aflatoxin prevention since public extension officers are supposed to experts on source of correct knowledge on aflatoxin prevention.

(iv) ICTs, especially (Radio, TV, mobile phones, Internet) have a significant influence on knowledge and skills used in the prevention of aflatoxin contamination in maize among smallholder farmers in Kitui West Sub County.

RECOMMENDATION

On basis of the results and conclusions from the study the following recommendations are given:

(i) The County government of Kitui should initiate programs to encourage farmers to embrace the demand driven extension service which requires them request for services depending on the needs of the farmers since the extension officers have the expert knowledge about aflatoxin prevention.

(ii) The County government and private firms should use the local media especially radio and television to increase passing of information to the farmers which seems to be very influential source in decision on activities they do in their farms.

(iii) The National government should encourage farmers to form farmer groups and actively involve extension officers to improve sharing of information on agricultural production.

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