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ANALYSIS OF THE ADOPTION OF MILLET PRODUCTION MANAGEMENT PRACTICES AMONG FARMERS OF FUNAKAYE LOCAL GOVERNMENT AREA, GOMBE STATE, NIGERIA

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ABSTRACT

This study analyzed the Adoption of Millet Production Management Practices among farmers of Funakaye Local Government Area, Gombe State, Nigeria. A multi stage sampling technique was employed to select a total of 48 millet farmers, from the list of millet farming households. Structured questionnaire and interview schedule were used in the data collection. The data were analyzed using descriptive statistics (frequencies, percentages and ranking) and multiple regression models. Results shows that slightly above half (51.1%) of the respondents practiced the use of inorganic fertilizers, another 97.9% and 85.1% of the respondents adopted post-harvest handling and crop rotation practices, respectively. The findings further revealed that majority (70.2%) of millet farmers did not use improved millet varieties and (74.5 %) also did not use pest and disease management practices. Pest and diseases management practices were found to be positive and significant variable at 5% significance, showing that correct management would elicit yield of 984.893kg of millet. Adoption of inorganic fertilizers was also significant variable but negative at 5% significance. The study concludes that pest and diseases management practices, adoption of fertilizers (organic and inorganic) were the important production management practices influencing adoption among millet farmers. Adoption of improved management practice can be improved by the increase access to farmers of extension officers from Agricultural Development projects (ADPs), Research Institutes, Non-Governmental Organisations (NGOs) and Local Government Areas (LGAs)

Keywords: Management Practices; Adoption; Millet; Production

INTRODUCTION

Pearl millet (*pennisetum glaucum* L) R.Br. is a drought tolerant crop that serves as an alternative to other grain crops and ranks second only to sorghum in terms of production (FOASTAT, 2013). It was reported that an estimate of over five million hectares were grown to Millet in the Sahel and savannah regions of Nigeria (Baba, Umar and Adam, 2010). Furthermore, this crop constitutes the principal source of energy, protein, vitamins, and minerals to millions in the region. The severe environment exhibits unique difficulties in improving millet yields and crop improvement research could only partially help increase

drought and heat tolerance over four-fifths of the potential yield increases from overcoming these drawback (ICRISAT, 2009).

Subsistence agriculture practiced by majority of the small holder farmers have resulted in high yield gaps and amongst other constraints added to the difficulties for sustainable farming and incomes (NAERLS, 2014). Therefore, to increase millet productivity, there is the need to understand the level of adoption of improved management practices of farmers in the study area. The adoption of improved management practices such as use of recommended quantities of fertilizers, agricultural seed technology, and high yielding varieties (HYV), could lead to significant increase in agricultural productivity thus, stimulate the advancement from low productivity subsistence agriculture to a high productivity agro-industrial economy (World Bank, 2013). Shirama, Umar and Garba (2017) observed that adoption of improved agricultural practices; credit facilities and good marketing have the potentials to contribute to economic growth and poverty alleviation among smallholder farmers. Similarly, Auta, Ariyo and Akpoko (2012) opined that adopting innovations would help rural farmers in their farming practices by enhancing their incomes and improve their living standards.

Millet productivity is low given the reliance on traditional, low-input production practices coupled with low or lack of extension advices in most parts of the study area (NAERLS, 2014). It is assumed that increased yield in millet could be achieved by adoption of appropriate and efficient management practices to maximize production. Therefore, there is a need for empirical data on the use of millet production management practices among farmers. It is based on this premise that this study found it necessary to analyze the adoption of millet production management practices in the study area. It's in view of the above that this study tends to determine the management practices influencing millet production; determine the relationship between adoption of millet and production management practices; and identify the constraints affecting the adoption of millet production management practices in the study area.

MATERIALS AND METHODS

The Study Area

The study was conducted in Funakaye Local Government Area of Gombe State, Nigeria. The area is Located within Sudan Savannah agro-ecological region of Nigeria; the area lies between longitude 11°10´E to 11°17´E and between latitude 10°17´N to10°23´N at an altitude of 240 m above sea level. The temperature of the area ranges between 24^0 C- 48^0C mean annual rainfall of the area is 760-1100 mm, the two distinct seasons of rainy and dry seasons range from (May-October) rainy season and dry season (November-April). The people are predominantly subsistence farmers producing crops such as millet, sorghum, beans, groundnut, sesame and rice. They also rear animals such as cattle, sheep, goat and chicken (Gombe State Diary, 2012). Population for the study include all millet farming households in Funakaye.

Sampling Technique

Sample selection was by multi-stage ramdom sampling. The first stage involves a purposive selection of Funakaye Local Government area based on the predominance of millet

production in the Local Government Area. In the second stage, four wards were randomly selected out of twelve wards in the area (Ashaka Gari, Jalingo, Baddam and Bajoga). In the third stage, twelve millet farming households were chosen using simple random sampling from the list of millet farmers of Gombe State Agricultural Development Project. A total of 48 millet farming households served as sample for the study.

Data Collection and Analysis

Primary data were used for the study, which was generated through the use of structured questionnaire, which cover, socioeconomic characteristics of millet farmers, and millet production management practices. Data collected were analysed using both descriptive (such as frequencies, percentages, means, ranking) and inferential (multiple regression) statistics.

Model Specification

$Y= a+b1x1+ b2x2 + b3x3 + \ldots\ldots\ldots\ldots\ldots\ldots\ldots b12x12 + U$

Where:
Y=Adoption of millet variety in the area Kg (dependent variable)
X1= Seed technology
X2= Recommend practice
X3= Use of inorganic fertilizers
X4= Timely operations
X5= Pest and diseases management X6= Mono croppingX7= Farm planning and records
X8= Post-harvest handling
X9= Crop rotation
X10=Quantity of inorganic fertilizers used (kg)
X11=Quantity of organic manure used (kg)
X12=Quantity of Seed used (kg)
a= constant
b1 –b12 = Regression Coefficient
U= Error term

RESULTS AND DISCUSSION

Socioeconomics Characteristics of Millet Farmers

Findings in Table 1 showed the socio-economic characteristics of millet farmers. The results indicated that the mean age of respondents was 47.2. This implies that respondents in the study area are in their active phase in farming activities. Majority (95.8%) of the respondents were male with only few (4.2%) as females. The findings agree with Onuk (2008) who reported that males constitute the majority in rice production because females are mostly involved in domestic work.

Marital status of the millet farmers revealed that more than half (52.1%) of the respondents were monogamously married and 41.7% were polygamously married respectively. This could be attributed to the culture of the people in the area, Similarly, the

educational level revealed that (54.1%) of the respondents had one form of formal education or the other. Those who had Qur'anic education constitute 35.4%. Odorukwe *et al*. (2006) reported that educational attainment of farmers had a positive and significant relation with the adoption of innovations and use of improved agricultural technologies and extension packages.

The study further revealed that majority (79.2%) of the millet farmers were members of a cooperative societies. This could be an indication that some of the farmers had higher social status measured by their level of associations. It is expected that membership of associations could afford farmers the opportunity to share information on improved technologies. The findings corroborated with Auta *et al.* (2012) who asserted that groups' membership of farmers could increase their access to productive resources such as farm inputs and improved technologies.

Table 1: Distribution of respondents based on socio-economic characteristics (n=48)

Variables	Frequency	Percentage	Mean
Age (years)			
21-30	20	41.7	
31-40	9	18.8	47.2
41-50	12	25.0	
51-60	6	12.5	
61 and above	1	2.1	
Sex			
Female	2	4.2	
Male	46	95.8	
Marital Status			
Married Monogamous	25	52.1	
Married Polygamous	20	41.7	
Single	2	4.2	
Widowed	1	2.1	
Educational Level			
Primary	4	8.3	
Secondary	16	33.3	
Tertiary	6	12.5	
Qur'anic	17	35.4	
Adult	4	8.3	
Membership of Association			
Non-members	10	20.8	
Members	38	79.2	
Access to Credit			
No Access	40	83.3	
Access	8	16.7	
Farm Size (ha)			
0.5-1.4	9	18.8	1.81
1.5-2.4	39	81.2	

Source: Field survey, 2017

The findings showed that majority (83.3%) of the respondents had no access to credits. The availability and accessibility of credit could largely determine the extent of production capacity of a farmer. The finding agrees with Adam *et al.* (2017) who reported that majority of rural farmers sourced capital for farming businesses through personal savings. The study further revealed that mean farm size of the respondents was 1.81hectares. The findings are in agreement with findings of Bashir *et al.* (2013) who revealed in their study the average farm size was 2.5 hectares, the minimum was 0.5, and the maximum was 4.0 hectares in the study area.

Use of Millet Production Management Practices

Table 2 presents distribution of respondents based on the use of recommended millet production management practices. The results show that the most commonly recommended practices adopted by the respondents in the study area are: post harvest handling 97% crop rotation 85%, timely operations 63.8%. These are closely followed by recommended practices 57% and use of inorganic fertilizer. The least adopted recommended practices in the study area incude improve seed technology 29%, pest and disease management 25%, monocropping 14% and farm planning and records keeping 2.1% respectively.

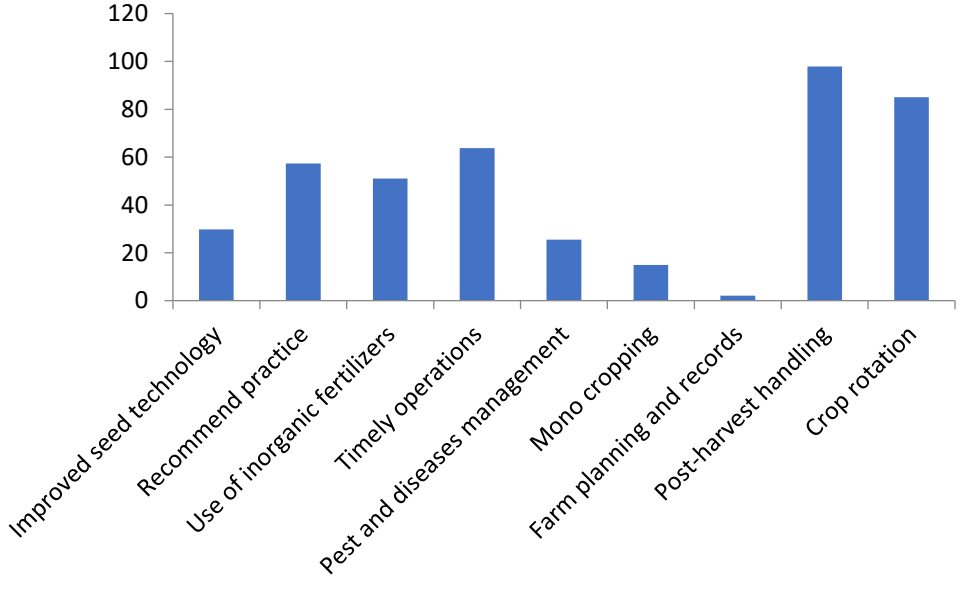

Figure 1: Distribution of respondents based on the use of recommended millet production management practices (n=48)

Test of Relationship between Farmer Output and Adoption of Millet Management Practices

Table 2 presents the regression analysis results of Adoption of millet and the use of recommended practices in Funakaye Local Government Area. Estimates from the study

indicated coefficients of determination was 0.418, implying that the specified variables in the model explain the variation in adoption of millet production management practices up to 41.8% in the study area

The findings indicated that, pest and diseases management coefficient (984.893) was the only positive and significant variable at 5% significance, showing that it is the most important variable among the ones adopted in the study area. The positive coefficient suggests that increase in the adoption of efficient pest and disease management would increase millet output. Specifically, it indicates that holding other variables constant, a 5% increase in correct management of pest and diseases would elicit yield of 984.893kg of millet. This is expected, as studies such as Maiangwa, (2006) and Vihi, *et al* (2017) revealed that correct management of recommended practices had significant influence on crops yield and agro-forestry. The result further revealed that use of inorganic fertilizers with a coefficient (-1146.724) was also significant variable, but negative at 5% significance, implying that the lack of its usage by the farmers would results in reduction of 1146.724kg of millet yield. Other significant variables at 10% significance were quantities of inorganic fertilizers (2.287) used and organic manure (0.059) used. Equally, holding other variables constant, a 10% rise in use of both inorganic fertilizers and organic manure would lead to growth of millet yield by 2.287kg and 0.059kg respectively. This agrees with the findings of Goni *et al*. (2007).

Table 2: Regression estimates of the analysis of millet adoption and selected production management practices

Production management practices	Coefficients	Std. Error-values	t-values	Significant level
(Constant)	1423.545	645.722	2.205	0.034
Improved Seedtechnology	-427.608	450.954	-0.948	0.350
Recommend practice	20.654	391.271	.053	0.958
Useof inorganic fertilizers	-1146.724	439.054	-2.612	0.013**
Timelyoperations	52.656	412.667	0.128	0.899
Pest and diseases management	984.893	485.291	2.029	0.050**
Monocropping	-293.082	531.311	-0.552	0.585
Farmplanning and records	-1155.588	1351.614	-0.855	0.399
Post-harvest handling	-30.242	1326.717	-0.023	0.982
Croprotation	-893.135	593.532	-1.505	0.142
Quantity of inorganic fertilizers used	2.287	1.276	1.792	0.082*
Quantity of organic manure used	0.059	.034	1.738	0.091*
Quantity of Seed used	4.062	3.828	1.061	0.296
R^2	0.418			

Source: Field survey, 2017** Significant level at 5% * Significant level at 10%

Constraints Affecting Adoption of Millet Production

Table 3 presents the constraints affecting adoption of millet production management practices in order of importance. Multiple responses were realised hence constraint were ranked based on frequencies. The findings indicated lack of finance as the most important

constraints associated with adoption of millet production management practices.. This was followed by lack of certified pests and diseases management and technical skills, ranked (2nd) and high cost of improved technologies ranked(3rd). Inadequate extension agents to guide millet farmers was ranked (4th). The results were not surprising for it exhibits the current trend in the extension system, reflecting non access to credits sources, non-performance due to inadequate funding of extension activities. Lack of extension agents could limit millet farmers' access to improved management and technical skills to curtail pests and diseases influxes.

Table 3: Constraints affecting adoption of millet production management practices

Variables	Frequency*	Rank
Lack of finance/fund	38	1
Lack of certified pests and diseases management skill	30	2
High cost of improved technology	28	3
Inadequate extension agents to guide millet farmers	22	4
High cost of inorganic fertilizer	21	5
Lack of information	18	6
Unfavourable Climate	08	7

Source: Field survey, 2017 *multiple response

CONCLUSION

The study concluded that the millet farmers in the study area were mostly men and married, majority were between the productive average ages of 21-30 years, and most had one form of education or the other. Furthermore, the study unveils pest and diseases management practices, use of inorganic fertilizers and quantities of organic fertilizers were important production management practices influencing adoption of millet by the farmers. Inadequacy of funds/capital, lack of certified pests and diseases management skill, high cost of improved technology and inadequate extension agents were the serious constraints affecting adoption of millet production management practices. Adoption of improved management practice can be improved by increasing the ratio of farmers and extension officers accross ADPs, Research Instititutes and NGOs.

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