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Adoption of Improved Farm Technologies on Maize Production in Shaki Agricultural Zone of Oyo State, Nigeria

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Abstract – **The study assessed the adoption of improved farm technologies on maize production in Shaki Agricultural Zone of Oyo State. A total of ninety (90) respondents were interviewed through the administration of pre-tested structured interview schedule. Data collected were analyzed with inferential statistics like frequency counts and percentages, while chi-square and Kendall coefficient of concordance was use to test the stated hypothesis. Various improved technologies adopted by maize farmers were evaluated and ranked based on the null hypothesis that there is no significant difference in farmers ranking of the importance of the different improved technologies in relation to profitability. The findings show that most of the maize farmers were yet to adopt fully all the improved technologies introduced in maize production, and that effect of extension service were not adequately felt by the maize farmers. Factor like shortage of cash, source of information, high cost of the technologies, low level of education and shortage of land limit the adoption of technologies. There is need to provide adequate information and training to farmers in order to increase returns on investment in maize production due to the facts that maize is the only grain crop that is use for many purposes like feed for livestock, food for man, raw materials for agro-allied industries, breweries many others base on country, region and tribes. The farmers' are also use to local maize production which has became part of the crops produced, before the introduction of hybrid maize. Therefore it will be more expedient to adopt cost saving technologies by farmers in order to increase their net income to improve their standard of living and be food secure.**

Keywords – **Adoption, Hybrid Maize, Livestock, Raw Materials, Shaki, Oyo.**

I. INTRODUCTION

Maize is one of the main cereal crop consumed in Nigeria. It is originated from a direct domestication of a Mexican annual stress known as Zea mays [1] (It is estimated that the annual per capital consumption of maize in Nigeria is 110kg(Central Bank of Nigeria[2] National maize consumption is estimated to be three million tons (3m tons) per year[2] Maize contributes 60% of dietary calories to Nigerian consumers[3] (Nathaniel, et al 2009). The cereal also contributes more than 50% of utilizable protein while beans contribute only 38% [4]

Maize is widely cultivated throughout the South, North, West East and middle belt of Nigeria[5] .It is the desire of most countries to be self sufficient especially in food availability and consumption[1]. The importance of maize production to Nigerians economy is already well known and therefore it would not need to be overemphasized. Maize is greatly needed in Nigeria as feed for livestock, and food for man. The crop is widely consumed across all geographical regions and as well provide income and source of raw material for agro allied industries [6] .from economy point of view, maize makes significant contribution in terms of employment and income to various set of people. Over the years the production pattern of maize has been fluctuating due to government intervention and the environmental factors under which production takes place.

This fluctuation in maize production has had serious implications not only in the farmers' incomes but also on the ability to use the available farm technologies effectively. It is therefore necessary to examine the level of adoption of farm technologies available in maize production so as to be able to evolve policies that would help not only in sustaining an increasing trend in the maize production but also ensuring stability in the farmers' incomes through an effective adoption of the improved farm technologies required in the production [7]. reported that Western Nigeria generally produced about 50% of maize consumed. In guinea savannah of the country farmers' prefer maize cultivation to sorghum due to its streak resistant varieties [8] asserted that recent achievements of the breeders in the development of superior maize varieties with higher yield potential and resistant to insect pests and diseases has played a major role in increase of maize production in the country.

This study assessed the adoption of improved farm technologies on maize production. The objectives of the study are to describe socio-economic characteristics of the respondents, identify the improved farm technologies, introduced and investigate the factors that influence the adoption of improved farm technologies in maize production and to identify factors limiting the adoption of improved farm technologies. It was hypothesized that there is no significant difference in farmers ranking of improved farm technologies adopted in maize production in relation to productivity.

II. METHODOLOGY

The study was conducted in Shaki Agricultural Zone of Oyo State, Nigeria. The area comprises of nine (9) Local Government Areas. These include Irepo, Itesiwaju, Olorunsogo, Iwajowa, Kajola, Oorelope, Shaki East, Shaki West, and Atisbo, out of which three local governments

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areas namely Atisbo, Itesiwaju and Kajola were randomly selected for the study. A multistage sampling technique was used to sample maize farmers in the study area. Purposive sampling technique was used to select three (3) local government areas out of nine (9) because of large number of maize farmers and it is rural based of these areas. In each selected local Government Areas three (3) communities were randomly selected making a total of nine (9) communities selected for the study. Also ten (10) maize farmers' were randomly sampled from each of the selected communities from Atisbo, Itesiwaju and Kajola. In all, ninety (90) respondents were selected for the study. The selected maize growers (farmers) were interviewed with a set of structured interview schedule. The data collected include information about age of the respondents, education level, marital status, religion, social organization, farm size, the years of farming experience, technologies adopted and factors limiting the adoption of improved technologies were all part of the questions asked.

The variables of the study are categorized into dependent and independent variables. The dependent variable was operationalized with adoption scores on improved technologies introduced to maize farmers. Data collected were subjected to both descriptive and inferential statistics in the data analysis. The descriptive statistics used were frequency counts, percentages and tables they were used to summarize the data collected for the study, while Kendall coefficient of concordance (W) and chi-square was used to determine farmers ranking of the adoption of the improved technologies introduced to maize farmers.

III. Results and Discussion

(A) Socio –economic characteristics.

Table 1 shows that about 47.0% of the respondent were between the age group of 41-50 years, 25.6% were above 51 years of age, while 14.4% and 13.3% of the respondents were fell between the age category of 31-40 and 21-30 years respectively. This implies that majority (74.4%) of the respondents were at their active age of between 21-50 years, this enable them to adopt maize production technologies because activities involved in maize production is very tedious [4](Ojo, 2004). Further in table 1 75.6% of the respondents were male, 24.4% were female, this indicates that majority of the farmers that are cultivating maize were male, 62.2% had low level of education. This assists the respondent to read and understand the instruction guiding the use and application of the technologies. Also about 60.0% of the respondents were Muslim. This implies that majority of the respondents would consume part of the maize produced especially during their fasting period. However, 52.2% and 26.7% of the respondents had contact with extension officers ones in a month and twice in a month respectively. This indicates that low rates of extension officers contacts with farmers may hinder adoption of these technologies. This conforms to[3] Nathaniel et el (2009) who reported that low rates of extension service with farmers may constrain the use and cultivated farm size of between 1-5 hectares. This indicates that low rates of extension officers contacts with farmers may hindered adoption of these techniques, conform with [3] Nathaniel et al (2009) who reported that low rates of extension service with farmers may constrain the use of introduced improved technologies in maize production. While 76.6% cultivated farm size of between 1-5 hectares. This shows that in the area farming were dominated by small – scale farmers. It has been shown that small farm size is capable of keeping productivity low [1] (Oluwatosin, 2008) while 83.3% of the respondents had more than 6 years of farming experience. This reveals that the respondents were experienced farmers and 94.4% were member of farmers cooperative society. This indicates that respondent would have access to improved technologies required in maize production at avoidable price.

Table 1: Socio-economic characteristics of the respondents

Variables	Frequency	Percentage
Age		
21-30	12	13.3
31-40	13	14.4
41-50	42	46.7
51 and above	23	25.6
Total	**90**	**100.0**
Sex		
Male	68	75.6
Female	22	24.4
Total	**90**	**100.0**
Educational level		
No formal education	34	37.8
Primary education	27	30.0
Junior secondary school	22	24.4
Senior secondary school	05	5.6
Tertiary education	02	2.2
Total	**90**	**100.0**
Religion		
Christianity	28	31.1
Islamic	53	58.9
Traditional	09	10.0
Total	**90**	**100.0**
Farm size (hectare)		
1-5	69	76.6
6-10	16	17.8
11 and above	05	5.6
Total	**90**	**100.0**
Farming experience (in years)		
1-5	15	16.7
6-10	34	37.7
11 and above	41	45.6
Total	**90**	**100.0**
Contact with extension agents		
Regularly	05	5.6
Twice in a month	31	34.4
Not at all	0	2.2
Three times in a month	03	3.3
Once in a month	49	54.4
Total	**90**	**100.0**

Source: Field survey 2013

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(B)Technologies Adopted

Table 2 shows that majority 95.6%, 94.4%, 93.3%, 92.2% and 91.1% of the respondents adopted improved maize varities, planting time, method and spacing, seed depth, harvesting and storage, fertilizer type, timing and method of application respectively.82.2% adopted land preparation,76.6% pest and disease control while 63.3% adopted weed control method. This indicates that maize farmers were of the opinion to sustain their production in large quantity in other to increase their income.

Table 2: Distribution of respondents by technologies adopted

Technologies*	Frequency	Percentage
Improved maize variety	86	95.6
Fertilizer type timing and method of application	82	91.1
Planting time, method and spacing	85	94.4
Seed depth	84	93.3
Land preparation	74	82.2
Harvesting and storage	83	92.2
Weed control (herbicides)	57	63.3
Pest and diseases control	69	76.7

Source: Field Survey, 2013
* Multiple responses

(C) Factors influencing adoption of improved technologies in maize production

Table 3 reveals that factors considered by maize farmers that influenced the adoption of improved technologies in maize production as; ease to apply, instruction is simple to understand, practicable and divisibility (100.0%) respectively. Also length of the growing season, ease management practices (98.9%) respectively influence the adoption, availability of improved maize varieties(96.7%) such are Western yellow, NS-1 yellow, NS-5 (white), TZPB (white), TZB (white), DMR-E-SR-Y, DMR-E-SR-W and DMR-L-SR-Y9 further the factors that influence the adoption of technologies. This implies that most of the available maize varieties were adopted in different rates by maize farmers in the study area, while 95.9% indicated that the technologies encourage continuous cropping 86.7% indicated high yield per hectare. This indicates that maize would be available in the study area all year round/ all of the time.

Table 3: Distribution of respondents by factors influencing adoption of improved technologies in maize production

Factors*	Frequency	Percentage
Length of the growing season	89	98.9
High yield per hectare	78	86.7
Availability of improved maize varieties	87	96.7
Encourage continuous cropping	86	95.9
Ease management practices	89	98.9
Instruction is simple to understand	90	100.0
Practice able and divisibility	90	100.0
Ease to apply	90	100.0

Source: Field Survey, 2013
* Multiple responses

(D) Limiting factors

Table 4 reveals that majority of the maize famers were faced with number of limiting factors. These include pest and disease infestation (97.8%), unavailability of modern farm equipments (90.0%) such as tractor, plough, etc. The use of outdated farm implements (74.4%) such as land hoes and cutlasses were reported. Much work cannot be done with these implement because plenty energy is required. Majority (93.3%) of the farmers said that fertilizer, improved seeds and pesticides were in short supply and that their prices were beyond the reach of the farmers. Also land tenural arrangement in most of the study area discouraged large scale production of maize. In some places, land is owned by the communities and farmers have no claim to the land. Some of the respondents who were non- indigenes passed through the indigenes before they could get land for farming in maize production in the study area. However, some of the farmers were forced to carry out their farming operations in maize production on a small scale due to inadequate credit facilities assistance from government, apart from loan obtained from agricultural cooperative societies which farmers were financial member.

Table 4: Distribution of respondents by limiting factors

Factors*	Frequency	Percentage
Land tenure arrangement	79	87.8
Unavailability of modern farm equipment	81	90.0
Use of outdated farm implements	67	74.4
Short supply of inputs	84	93.3
Cost of the technologies	83	58.9
Pest and diseases infestation	88	97.8
Bad roads	67	52.2
Inadequate farm labour	69	76.7

Source: Field Survey, 2013
* Multiple responses

(E) Result of Kendall coefficient of concordance (W) test and chi-square

Kendall coefficient of concordance test result shown in table 5 was used to test the hypothesis that stated there is no significant difference in farmers ranking of improved farm technologies adopted in relation to productivity. In comparing the result of test of the hypothesis of the study (Suing Kendall coefficient of concordance) and Chi-square obtained.$X^2t = 16.92$ $X^2C = 454.37$. The calculated value is found to be greater than that of the table value. Therefore null hypothesis is rejected, that there is no significant difference in farmers ranking of improved farm technologies adopted in relation to productivity. The result indicates that there is significance difference in farmers ranking of the adoption of improved farm technologies in relation to productivity with W = 0.745 and confirmed with chi-square value of X^2 = 454.37 at 0.00 level of significant. The implication of the ranking is that improved maize is rated as the most important input to

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maize production pest and disease control, planting time method and spacing, fertilizer type, timing and method of application, land preparation and weed control. This implies that technologies are important to the farmers but level of importance was difference.

Table 5: Results of Kendall coefficient of concordance (W) test

Variable	Technologies ever used Mean rank	Remark
X_1 Improved maize varieties	6.35	1
X_2 Planting time, method and spacing	6.29	2
X_3 Planting time, method and spacing	6.29	2
X_4 Weed control use of (selective herbicides)	4.51	6
X_5 Land preparation	5.60	3
X_6 Seed depth	3.48	7
X_7 pest and diseases control methods	5.24	5
X_8 Harvesting and storage	2.16	8

Source: Data analysis 2013

The Kendall (W) = 0.745 with x^2 = 454.37 at 0.00 level of significance

IV. Conclusion and Recommendation

This study was designed to examine the adoption of improve farm technologies on maize production in Shaki Agricultural zone of Oyo State Nigeria. Findings of the study showed that majority (46.7%) of the maize farmers fell between age group of 41-50 years. It was observed that majority (75.5%) of the famers were male, and (62.2%) of the respondents were educated. It was found out that 76.6% of the respondents were small scale farmers and76.6% cultivating 1-5 hectares of land, 83.3% of the farmers had more than 5 years of farming experience. Moreover, the farmers had various factors influencing their adoption of improved technologies and there are limiting factors that hindered full adoption of the technologies. Therefore, the issue of land tenure system should be addressed in order to encourage large scale production of maize. Government should provide agricultural subsidies to maize farmers by purchasing more of the necessary agricultural inputs such as fertilizer pesticides etc and sell them to farmers directly at lower prices. In order to adopt any introduced technologies fully ministry of agriculture and other agricultural agencies such as ADP should intensify efforts to train maize farmers how to use the technologies effectively.

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