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ADOPTION OF ORGANIC FARMING PRACTICES AMONG RURAL MAIZE FARMERS IN NIGER STATE, NIGERIA

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ABSTRACT

The study investigated adoption of organic practices among rural maize farmers in Niger state, Nigeria, with specific objectives of describing socioeconomic characteristics of the farmers, identifying farmers' sources of information on organic practices, examining adoption level of organic practices in maize production and identifying constraints limiting adoption of organic practices by the farmers. A multi-stage sampling procedure was used to select 222 maize farmers and data collected through structured questionnaire were analyzed using frequency counts, means and percentages. Results obtained shows that farmers in the study area were males (70.3%), mostly married (75.7%) with formal education (62.6%) at mean age and household size of 35.8 years and six (6) persons respectively. Also, farmers regularly acquire information about organic practices through extension agents (72.5%), relatives and neighbours (90.1%). Similarly, eight (8) out of the 15 practices identified were adopted. These include crop rotation (59.9%), mixed cropping (79.7%), mixed farming (73.0%), hoe/hand weeding (61.3%), slash and burn (54.1%), hoe/minimum tillage (66.2%), farm yard manure (53.2%) and crop residue incorporation (83.8%). Total adoption by the farmers was restricted by constraints such as; high costs of organic inputs ($\bar{X}=2.92$), Difficulty in accessing loans for organic crop production ($\bar{X}=2.86$) and low supply of manure ($\bar{X}=2.86$). To this end, adoption level of organic practices among rural maize farmers in Niger State can be said to be moderate thus; it was recommended that change agents should enlighten farmers on various organic methods of weed, pest and disease control through the major sources of information in the area.

Keywords: Source of information, Organic Farming practices, Adoption

INTRODUCTION

The mainstay of the Nigerian economy prior to the oil boom era was agriculture and even with the discovery and subsequent exploration of oil. Agriculture still accounts for over 38 percent of the non-oil foreign exchange earnings and employs about 70% of the active labour force of the Nigerian population (Oyesola *et al.*, 2011). However, attempt to meet the food demand of the continuously rising population of the country brought about expansion of farming area, as well as an increase in the use of agro-chemicals, the long-term effect of which leads to soil depletion and does not support sustainable crop production.

Organic farming is a form of agriculture which excludes the use of synthetic fertilisers, pesticides and plant growth regulators. The system also seeks to maintain the fertility demands of various crops to avoid excessive depletion of soil nutrients (Adesope, Oguzor and Ugwuja, 2012). Organic scientists and farmers in Africa, therefore deliberately integrates the age-long traditional organic system of farming with contemporary farming techniques to enable a holistic development of crop production system that would make use of the locally available resources, drawing from the pragmatic experiential knowledge of the farmers thereby making it highly relevant and acceptable to the majority of Africa.

The horrendous side effects of non-decomposable chemical fertiliser and pesticide applied by most inorganic farming practices over the years is evident in the contaminated water sources, vegetable crops and other edible plants. The bigger picture that rarely makes news however is that millions of people are still underfed and whether they get enough to eat or not, the food they eat has the capability to killing them. Yet, the picture painted for the future by agro-chemical and seed companies and governments is rosy and bright.

Surprisingly, despite these threats, Nigeria crop farmers are still very much in the system of producing crops inorganically. Nigeria appears to be 'lagging' in the adoption of organic farming practices, with very few farms or projects operating at an uncertified organic agricultural level (Oyesola *et al.*, 2011).

In view of the above, this research work seeks to assess the adoption level of organic technologies among rural maize farmers in Niger State, Nigeria. To this end, this study will attempt to achieve the following specific objectives:

- i. describe the socioeconomic characteristics of maize farmers in the study area;
- ii. determine the sources of information on organic practices in the area;



- iii. examine the adoption level of organic practices in maize production;
- iv. identify the constraints limiting the adoption of organic practices in maize production.

METHODOLOGY

This study was conducted in Lapai, Bosso and Kontagora Local Government Areas of Niger State, Nigeria. Niger State was created out of the former North Western State and became a fully autonomous State on 3rd February, 1976, with headquarter at Minna. Niger State is in the North-central part of Nigeria and lies in between longitude $3^{\circ} 30'$ and $7^{\circ} 20'$ East of the Greenwich Meridian and latitude $8^{\circ} 20'$ and $11^{\circ} 30'$ North of the equator. The State presently comprises of 25 Local Government Areas (LGAs) and it is made up of three major ethnic groups which are the Nupe, Gbagyi and Hausa. However the total inhabitants in the State are over 3,954,772 people (National Population Commission of Nigeria, 2016) from 2006 population census. But, going by the annual population growth rate of 2.5 percent in Nigeria (NPC, 2016), the population of Niger State was projected to be 5,556,200 (NPC, 2016) by the year 2016.

Multistage sampling technique was adopted to select sample for this study. The first stage involved random selection of one Local Government Area from each of the three (3) agricultural zones in the area. Second stage involved random selection of three (3) villages from each of the selected LGA. The third stage involved the use of 10% of the sample frame thus, a total of 222 respondents were selected as sample size from the 2,222 registered maize farmers in the selected villages in the study area.

Primary data were used for this study. Data collection was conducted through structured questionnaire complemented with an interview schedule and lasted between April and June, 2018. The data collected were analyzed using descriptive statistics involving mean, percentages and frequency distribution. In addition a 3-point Likert type of scale was used to measure the sources of information and constraints to adoption of organic farming practices among maize farmers thus, a reference mean of three (3) was derived ($3+2+1=3$) and used as decision rule: Regularly=(3), Occasionally =(2) and Never=(1) Severe Constraints (SC) =3, Not Severe Constraints (NSC) =2 and Not Constraint (NC) =1

RESULTS AND DISCUSSION

Socioeconomic characteristics of the farmers

The results in Table 1 reveals that majority (84.2%) of the respondents were between the ages of 21-50 years with an average age of 35.82 years.

This implies that the farmers are young and still in their productive age, thereby constituting readily available labour force for organic maize production. This agrees with the findings of Adesope *et al.* (2012), who reported that young farmers are mostly cosmopolitan in nature and therefore tend to recognize and adopt farm innovation with little bottleneck. Similarly, majority (70.3%) of the respondents were male while (29.7%) were female. The more involvement of male in maize farming may probably be due to the cultural and religious belief of the rural people (especially in Northern Nigeria) which tends to restrict women to household domestic chores. In most rural community, women are not usually allowed to own land and where women own land; they usually delegate its responsibility to their senior male child, brother or husband (FAO, 2001). This implies that the high involvement of male in maize production is connected to the role of male gender as the household head. This finding agrees with that of Solomon (2008), who reported that male gender dominated the crop farming enterprise in Northern Nigeria.

The result further reveals that majority (75.7%) of the respondents were married and this comes along with responsibilities to the family. Therefore, additional responsibilities attached to marriage especially provision of nutrition may have been the motivation for venturing into organic maize farming. This agrees with the findings of Oyesola *et al.* (2011) who observed that marital responsibility led farmers to expand their land cultivation so as to increase food security in the household. In the same vein, the result revealed that farmers had a fairly large household size with a mean value of six (6) members per household in the area. This has implication on the availability of family labour for farm work. The large number of household members in the study area may be due to the polygamous nature of the rural people who tend to recognize household population as a symbol of authority among farmers. Although, the larger the household size, the higher the demand for food by each person within the household. This result agrees with the findings of Marenya and Barrett (2007) who observed that as the household size increases, the likelihood of expanding cultivated farm land is expected to be high among rural crop farmers.

Table 1 further reveals that majority (62.6%) of the respondents had formal type of education involving attending primary, secondary and tertiary institutions while 37.4% had non-formal type of education related to skills acquisition and training. Given this level of literacy, it is expected that information on organic practices may be disseminated with ease among farmers and this could influence their decision to adopt organic practices. This finding agrees with Yengoh (2010)

who reported that personal characteristic especially, education influences adoption of new technology

among rural crop farmers in Nigeria.

Table 1: Socioeconomic characteristics of the farmers (n=222)

Variables	Frequency	Percentage (%)	Mean
Age (years)			
≤ 20	19	8.6	35.82
21-30	50	22.5	
31-40	88	39.6	
41-50	49	22.1	
≥ 51	16	7.2	
Gender			
Male	156	70.3	
Female	66	29.7	
Marital status			
Married	168	75.7	
Single	42	18.9	
Divorce	8	3.6	
Widow	4	1.8	
Household size			
5 and below	106	47.7	6.00
6-10people	91	41.0	
11-15people	24	10.8	
16 and above	1	0.5	
Formal education			
Non formal	83	37.4	
Primary	31	14.0	7
Secondary	60	27.0	
Tertiary	48	21.6	
Farming experience			
10years and below	87	39.2	15
11-20years	83	37.4	
21-30years	36	16.2	
31years and above	16	7.2	
Land ownership			
Self	154	69.4	
Otherwise	68	30.6	
Farm size (Ha)			
< 2	150	67.6	1.89
≥ 2	72	32.4	

Source: Field survey, 2018

Furthermore, the mean years of farming experience of the respondents is 15years as shown in Table 1. The number of years a farmer has spent in maize production is an indication of the practical knowledge acquired by the farmer in maize farming over the years. Therefore, the accumulated years of experience by the respondents may help them in accessing benefit of organic inputs and practices in maize production with relative ease. This agrees with the findings of Kassie *et al.* (2015) who stressed that farmers with long time farming experience easily access opportunities to quality agro-inputs.

The result also shows that land tenure is not a problem in the area as majority (69.4%) of the respondents owned the land they use for maize

farming however, the size of the farms are relatively small considering that majority (67.6%) had farm sizes less than 2.0 hectares at a mean value of 1.89 hectares per farmer. This implies that the respondents are small scale farmers operating at subsistence level of maize production thus, investing on organic practices such as mixed farming, crop rotation and agro forestry may limit space for maize production. This finding is supported by Kassie *et al.* (2013) who revealed that land ownership and farm size motivate rural farmers to improved farming practices in maize production.

Sources of information on organic farming practices



Sources of information of the respondents on organic practices were presented in Table 2. It was noted that most of the information sources provides farmers with useful information on organic farming but not on a regular basis; farmers in the area regularly receive information about organic farming practices through family and friends (\bar{X} =2.81), as well as extension agents (\bar{X} =2.59). The result shows that information spread faster via informal sources among the farmers compared to print media and other formal methods of

communication. This result is also tied to the fact that majority of the farmers had non formal type of education hence, farmers may only seek and accept innovations that has been tested and satisfied useful by friend, relatives and change agents. This finding is in agreement with Adesope *et al.* (2012) who stated that sources of information for farming activities among rural crop farmers is mostly through friends, relatives, neighbours and extension agents.

Table 2: Sources of Information on Organic Farming Practices

Sources of information	Regularly	Occasionally	Never	Mean	Rank
Family and Friends	200(90.1)	2(0.9)	20(9.0)	2.81*	1 st
Extension agent	161(72.5)	32(14.4)	29(13.1)	2.59*	2 nd
Television	7(3.2)	66(29.7)	149(67.1)	1.36	6 th
Radio	57(25.7)	71(32.0)	94(42.3)	1.83	3 rd
Cooperative society	46(20.7)	61(27.5)	115(51.8)	1.69	4 th
Workshops and seminars	18(8.1)	45(20.3)	159(71.6)	1.36	6 th
Print media	16(7.2)	62(27.9)	114(64.9)	1.42	5 th

*= Significant, Decision rule: $\bar{X} \geq 2$ = Regular source and $\bar{X} < 2$ = Occasional Source
Source: Field survey, 2018

Levels of adoption of organic farming practices among maize farmers

The result in Table 3 indicated that about 83.8% and 79.7% of the farmers adopted the practice of crop residues incorporation and mix cropping as the major organic farming practices respectively. Other practices adopted by the farmers include mix farming (73.0%), hand weeding (66.2%), flame weeding (61.3%), crop rotation (59.9%) zero/hoe tillage (54.1%), and farm yard manure (53.2%). From the findings it is

obvious that farmers adopted eight (8) out of fifteen (15) listed organic farming practices, giving an adoption rate of 53.33%. This indicates that level of adoption of organic farming practices is relatively moderate. This finding is in contrast with the result of Adesope *et al.* (2012) who reported that adoption of organic farming practices is very low (35.7%) in Owerri, as farmers adopted five (5) out of the fourteen listed organic farming practices in the area.

Table 3: Levels of Adoption of Organic Farming Practices among Maize Farmers

Organic practices	NA	AW	I	E	T	A	D	Rank
Crop rotation	23(10.4)	48(21.6)	6(2.7)	2(9)	6(2.7)	133(59.9)*	4(1.8)	6 th
Mixed cropping	4(1.8)	17(7.7)	11(5.0)	0(0)	13(5.9)	177(79.7)*	0(0)	2 nd
Mixed farming	11(5.0)	22(9.9)	4(1.8)	18(8.1)	0(0)	162(73.0)*	5(2.3)	3 rd
Slash-burn/flame weeding	15(6.8)	20(9.0)	14(6.3)	3(1.4)	29(13.1)	136(61.3)*	5(2.3)	5 th
Zero/hoe Tillage	6(2.7)	47(21.2)	18(8.1)	11(5.0)	20(9.0)	120(54.1)*	0(0)	7 th
Green manure	70(31.5)	70(31.5)	41(18.5)	28(12.6)	14(6.3)	0(0)	0(0)	14 th
Composting	56(25.2)	74(33.3)	62(27.9)	18(8.1)	12(5.4)	0(0)	0(0)	15 th
Hand picking of insects	57(25.7)	69(31.1)	46(20.7)	8(3.6)	8(3.6)	29(13.1)	6(2.7)	12 th
Organic pesticide	27(12.2)	66(29.7)	25(11.3)	14(6.3)	46(20.7)	42(18.9)	0(0)	11 th
Bio pest control	95(42.8)	86(38.7)	11(5.0)	12(5.4)	8(3.6)	10(4.5)	0(0)	13 th
Hoeing/hand weeding	11(5.0)	22(9.9)	6(2.7)	14(6.3)	13(5.9)	147(66.2)*	9(4.1)	4 th
Use of organic fertiliser	5(2.3)	38(17.1)	23(10.4)	0(0)	45(20.3)	106(47.7)	5(2.3)	9 th
Farm Yard Manure	0(0)	35(15.8)	20(9.0)	6(2.7)	43(19.4)	118(53.2)*	5(2.3)	8 th
Planting trees/hedges	0(0)	18(8.1)	15(6.8)	19(8.6)	58(26.1)	81(36.5)	31(14)	10 th
Residues incorporation	9(4.1)	27(12.2)	0(0)	0(0)	0(0)	186(83.8)*	0(0)	1 st

NA= Not Aware, A=Awareness, I= interest, E= Evaluation, T= Trial, A=Adoption, D=Discontinuance, *=Adopted practices. Decision rule: Adoption scores $\geq 50\%$ = High Adoption
Source: Field Survey, 2018

Constraints to adoption of organic farming practices among maize farmers

The result in Table 4 revealed that Farmers challenges to adoption of organic inputs in the

study area included; High costs of organic farm inputs (\bar{X} =2.92), Difficulty in accessing loans by organic farmers (\bar{X} =2.86), Low supply of livestock manure for fertiliser (\bar{X} =2.86) and Limited technical and financial support (\bar{X} =2.74) ranked among the top four (4) prominent constraint in the area. This implies that, inconsistency in maize farmers' adoption level for organic farming practices were mainly economic reasons which involve limited financial resources to adopt inputs such as bio pesticides, organic fertiliser, green manuring, composting and or planting of trees. These inputs and practices are considered

unaffordable to the ordinary rural farmer who produces maize at subsistence level of production. The situation is made worse by the limited technical and financial support from both the government and financial institutions which could have come in the form of loan or subsidy to organic inputs. This findings agreed with the result of Oyesola *et al.* (2011) who disclosed that he most important constraints perceived by the farmers in the adoption of organic farming practices were high cost of inputs, lack of inputs and raw materials, poor financial conditions and non-availability of loans in time for production exercise.

Table 4: Constraints to adoption of organic farming practices among maize farmers

Constraints to adoption of organic practices	Severe	Not severe	Not constraint	Mean	Rank
Weed pressure in organic farms	86(38.7)	10(4.5)	126(56.8)	1.82	13 th
High costs of organic farm inputs	209(94.1)	8(3.6)	5(2.3)	2.92*	1 st
Low supply of livestock manure for fertiliser	195(87.8)	22(9.9)	5(2.3)	2.86*	2 nd
Lack of policies for organic farming	93(41.9)	119(53.6)	10(4.5)	2.37*	11 th
Difficult nature of organic practices	172(77.5)	42(18.9)	8(3.6)	2.74*	5 th
Limited technical and financial support	167(75.2)	55(24.8)	0(0)	2.75*	4 th
High labour demand in organic farms	47(21.2)	175(78.8)	0(0)	2.21*	12 th
Opaque value chain information	158(71.2)	19(8.6)	45(20.3)	2.51*	9 th
Limited forums for farmers and buyers interaction	146(65.8)	34(15.3)	42(18.9)	2.47*	10 th
Poor market information	153(68.9)	64(28.8)	5(2.3)	2.67*	6 th
Lack of storage facilities	66(29.7)	48(21.6)	108(48.6)	1.81	14 th
Limited market for non-cash crops in rotation	56(25.2)	26(11.7)	140(63.1)	1.62	15 th
Difficulty in disease and pest management	160(72.1)	21(9.5)	41(18.5)	2.54*	8 th
Extension services not organic focused	157(70.7)	47(21.2)	18(8.1)	2.63*	7 th
Difficulty in accessing loans by organic farmers	202(91.0)	10(4.5)	10(4.5)	2.86*	2 nd

Key: *= Severe Constraints while, decision rule: $\bar{X} \geq 2$ = Severe and $\bar{X} < 2$ = Less Severe

Source: Field Survey, 2018

In this study, the primary production challenges to adopting organic farming practices by maize. Similarly, the result further revealed that maize farmers face the challenges of; difficult nature of organic farming practices (\bar{X} =2.74), poor market information (\bar{X} =2.67) and extension services not organic focused (\bar{X} =2.63) as well as difficulty in disease and pest management (\bar{X} =2.54). It is therefore obvious from the list of farmers' complain that information and orientation about organic practices is grossly inadequate as farmers lacks how to handle maize infested by diseases or pests under organic farming cultivation which they perceived to be a strenuous method of crop production. In the same vein, farmers are lacking knowledge of potential buyers for their produce should they commit more resources in production. This result is similar to the findings of Bwambale (2015) who reported that strenuous nature of organic farming practices, lack of market for organic produce; poor extension services and difficulty in disease and pest management have restricted crop farmers from adopting organic practices in their study area.

CONCLUSION AND RECOMMENDATIONS

From the findings, it is obvious that farmers in the study area were mainly small land holders in their productive age and with high level of knowledge on organic farming which could helped built their attitude towards adoption of organic farming practices in maize farming. To this end, farmers adopted eight (8) out of the 15 organic practices identified in the area. Therefore, adoption level of organic farming practices among rural maize farmers in Niger State can be said to be moderate as farmers were restricted by constraints such as; high cost of organic farm inputs and difficulty in accessing loans by farmers. it was therefore recommended that;

- i. Agricultural input suppliers' should provide farmers with inputs through friends, Family and extension agents
- ii. Periodic training of the farmers on organic farming practices through extension agents should be given optimum priority.
- iii. Financial institutions should make access to credit flexible and easy to rural farmers.



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