THE LEVEL OF KNOWLEDGE AND PERCEPTION OF ORGANIC FARMING TECHNOLOGIES BY RICE FARMERS IN BENUE STATE, NIGERIA

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ABSTRACT

The study analyzed the level of knowledge and perception of organic farming technologies by rice farmers in Benue State, Nigeria.Purposive and multistage sampling techniques were used to select 135 rice farmers. The data for the study were collected through the use of questionnaire and were analyzed using both descriptive and inferential statistics. The result showed that farmers had high knowledge on crop rotation ($\overline{X}$=2.67), shifting cultivation ($\overline{X}$ = 2.39), the use of kitchen, plant and animal wastes ($\overline{X}$ = 2.37) and green manure and minimum tillage ($\overline{X}$ = 2.21). Rice farmers displayed positive perception on the statements that, cost of transporting organic fertilizers to the farm is high ($\overline{X}$ = 3.79), organic fertilizers help in controlling erosion ($\overline{X}$ = 3.47) and organic fertilizers are healthier than conventional fertilizers ($\overline{X}$ = 3.36). About (97.6 % of rice farmers obtained organic fertilizers from their home/farm wastes and 97.0 % of these rice farmers used their neighbours' home/farm wastes as source of organic fertilizers. The regression analysis of the effect of organic farming technology usage on the yield of rice showed that F (0.458) was not significant. The paper concluded that the level of knowledge rice farmers on organic farming technology was high. Hence, it recommended that farmers should be encouraged to use waste from their kitchen, plant and animals.

KEY WORDS: Knowledge, Perception, Adoption and Rice

INTRODUCTION

Rice (*Oryza Sativa L*) belongs to the grass family poaceae, genus Oryza and tribe Oryzaea. Globally, rice ranks third after wheat and maize in terms of production, but in terms of importance as a crop, rice provides more calories per hectare than any other cereal crop (Selbut 2003). Rice is the most important healthy staple food for about half of the world's population. It is a major staple food for millions of people in West Africa and the fastest growing commodity in Nigeria's food basket (Atande, 2003). Over the years, rice has become the most popular staple food consumed in Nigeria (Gateway, 2005). Rice is also a very important diet of the estimated 140 million Nigerians and is consumed in various forms, but the most popular form is the grain (Selbut, 2003). Rice has many species that are distributed all over the world. The most important species include *Oryza sativa*, *O. Globerrimasteud*, *O. perennismoench*, and *O. nivara Sharma*.

Rice (*Oryzaglobberrimasteud*) has been cultivated in Nigeria for the past 3,500 years (Selbut, 2003). According to Jones (1995), the major rice type currently grown in Nigeria is the Asian rice, *Oryza sativa*. The exact zone of its domestication remains uncertain, although it could certainly be South East Asia (Selbut, 2003). Jones (1995) suggested that it may have been domesticated twice, once in India and in China. Its route of entry into Nigeria could be through Portuguese traders or through the Oases and the Trans-Saharan trade. The main production ecologies in Nigeria are rain fed lowland, rain fed upland, irrigated lowland, deepwater/floating and mangrove swamp. Nigeria is one of the

many countries of the world with suitable ecologies for different rice varieties. At the continental level, the country contributes 5 percent of rice land area, but it has a potential land area of between 4.6-4.9 million hectares for rice production (West Africa Rice Development Association (WARDA), 2002).

Rice production occurs in all agro-ecological zones of the country. However, domestic supply has not been able to keep pace with demand because rice production is primarily in the hands of resource-poor farmers with average farm size of 1-2 hectares who rely mainly on the traditional practice of cultivation, processing and storage (Daramola, 2005).

The objective of the study were;
  i.   Assess the level of knowledge and perception of organic farming technologies by rice farmers in the study area
  ii. Ascertain the various sources of organic farming technologies available to rice farmers in the study area

HYPOTHESIS

H_{o1}: Organic farming technology usage does not have any significant effect on the yields of rice in the study area.

METHODOLOGY

The study area for this research is Benue State, Nigeria. The state is located in the middle belt region of Nigeria, which is the transition zone from the Northern and Southern ecologies, between longitude 6° 31' E and 10° E and between latitudes 6° 30'N and 8°10'N (BNARDA, 2005). The state shares boundaries with five states; Nasarawa to the North, Taraba to the East, Cross River to the South East, Enugu to the South West and Kogi to the West. The southern part of the state is also bounded by the Republic of Cameroun. The population of the study consists of all rice farmers in Benue State. Purposive and multistage random sampling techniques was used to select 135 rice farmers Data were collected by using a structured questionnaire and analyzed using both descriptive and inferential statistics such as standard deviation, mean and linear regression.

MODEL SPECIFICATION

 Linear Regression Model
$Y = b_0 + b_1X_1b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}X_{10}$
Where   Y= Yield (Kg)
bs= coefficients of explanatory changes in Y caused by changes in the independent variables.
X_1 = Animal droppings (kg)
X_2 = Poultry litter (kg)
X_3 = Rice husk (kg)
X_4 = Groundnut shells (kg)
X_5 = Rice bran (kg)
X_6 = Compost manure (kg)
X_7 = Manufactured organic fertilizer (kg)
X_8 = Green manure
X_9 = Crop rotation
X_{10} = Bush fallowing

RESULT AND DISCUSSIONS

Knowledge of Organic Farming Technology Usage among the Rice Farmers
 Result on the level of knowledge of the organic farming technology usage among the rice farmers was presented in Table 1. The result shows that most of the respondents have high knowledge of

organic farming technologies and usage. The result showed that the farmers had high knowledge crop rotation ($\overline{X}$=2.67), shifting cultivation ($\overline{X}$ = 2.39), the use of kitchen, plant and animal wastes ($\overline{X}$ = 2.37), green manure and minimum tillage ($\overline{X}$ = 2.21), incorporation of crop residue into the soil ($\overline{X}$ = 2.20) and mulching ($\overline{X}$ = 2.00). The standard deviations for knowledge of organic farming technology usage were all less than 1. This shows uniformity as regards to responses of respondents on their knowledge of organic fertilizers.

The implication is that the farmers have good knowledge of organic fertilizers and the knowledge could influence them towards a favourable perception of organic farming. This result agrees with Oyesola and Obabire (2011) who observed that farmers in Ekiti State have a high knowledge of organic farming.

Table 1: Mean Distribution of Rice Farmers Based on Knowledge of Organic Farming Technology Usage (n=135)

Operation	Mean	Std. Deviation
Use of kitchen, plant and animal wastes	2.37**	0.728
Crop rotation	2.67**	0.517
Composting	1.24*	0.507
Mulching	2.00**	0.678
Green maturing	2.21**	0.622
Cover cropping	1.95*	0.659
Incorporation of crop residue into the soil	2.20**	0.678
Minimum tillage	2.21**	0.651
Identification of organic fertilizers	1.94*	0.675
Shifting cultivation	2.39**	0.680

**=High knowledge   *=Low knowledge

Rice Farmers' Perception on the Use of Organic Farming Technologies
The result of analysis on the rice farmers' perception of organic farming technologies was presented in Table 2. The results revealed that most of the respondents have a positive perception towards organic farming technologies with mean scores either equal to or above 3. The result showed that most of the rice farmers displayed positive perception on the statements that, cost of transporting organic fertilizers to the farm is high ($\overline{X}$ = 3.79), organic fertilizers help in controlling erosion ($\overline{X}$ = 3.47), organic fertilizers are healthier than conventional fertilizers ($\overline{X}$ = 3.36), crop rotation helps in increasing soil fertility ($\overline{X}$ = 4.19), and minimum tillage reduces soil erosion and improves soil structures ($\overline{X}$ = 3.85).

The positive perception of respondents on organic fertilizers implies that organic fertilizers adoption has potentials in the study area if farmers are encouraged and motivated through adequate training. The result is supported by the findings of Oyesola and Obabire (2011) who concluded that farmers have favourable perception towards organic farming.

Table 2: Mean Distribution of the Rice Farmers' Perception on Organic Farming Technologies (n=135)

Statement	Mean	Std. deviation
Organic fertilizers have offensive smell	1.67*	0.730
Lack of information on organic fertilizers may affect their usage	1.61*	0.652
Preparation of organic fertilizers is labour intensive	1.92*	0.625
Cost of transporting organic fertilizers to the farm is high	3.79**	0.984
Organic fertilizers encourage high level of pests and weed infestation	2.85*	1.081

Organic fertilizers help in controlling erosion effect	3.47**	1.058
Organic fertilizer is healthier than conventional fertilizer	3.36**	0.979
Crop rotation helps in increasing soil fertility	4.19**	0.631
Minimum tillage reduces soil erosion and improves soil structure	3.85**	0.990

** = positive perception   * = negative perception

SOURCES OF ORGANIC FARMING TECHNOLOGIES AVAILABLE TO RICE FARMERS
The result of analysis on the sources of organic fertilizers to rice farmers in the study area was presented in Table 3. The result showed that majority (97.6 %) of the respondents' obtained organic fertilizers from their home/farm wastes. Also, 97.0 % of the rice farmers used their neighbours' home/farm wastes as source of organic fertilizers. This is because many of the livestock farmers do not apply organic manure and collecting the refuse creates a space for them. This shows that farmers in the study area use plant and animal wastes as organic fertilizers. The findings agrees with Alimi*et al.* (2006) who observed that organic fertilizers are generally made from plant and animal by-products and natural minerals that may originate from the farm itself.

Table 3: Sources of Organic Fertilizers for the Rice Farmers (n= 135)

Source	Frequency*	Percentage(%)
Market/Dealers	42	31.1
Extension agents	4	3.0
My Home/Farm wastes	131	97.0
Neighbours'-home/ Farm Waste	131	97.0

*Multiple responses

Effect of Organic Farming Technology Usage on Yield of Rice in Benue State
The result of the regression analysis of the effect of organic farming technology usage on the yield of rice in the study area was presented in Table 3. The result showed that F (0.458) was not significant. This means that organic fertilizer usage does not increase the yield of rice in the area. R^2 value of 0.036 shows that only 3.6 % of the variation in the yield of rice was explained by the changes in the use of organic farming technologies by the rice farmers. All the variations do not have any significant effect on the yield of the rice farmers. These include animal droppings (t= - 0.293, p= 0.770), poultry litter (t= - 0.305, p= 0.761), rice husk (t= - 0.651, p=0.516), groundnut shell (t = - 1.248, p=0.215), crop bran (t= 0.857, p= 0.393), compost (t= -0.280, p=0.780), manufactured organic fertilizers (t= - 0.367, p=0.714), green manure (t= o.047, p=0.962), crop rotation (t=o.442, p=0.659) and bush fallowing (t=1.453, p=0.149).

Animal droppings do not have any significant effect on the yield of rice. This could be as a result of the use of fresh and undecomposed droppings with a resultant heat emmission when incorporated into the soil or due to low quantity used and burying of the droppings beyond the reach of plant roots. Poultry litter also had no significant effect on the yield of rice. This could be due to the quantity used and surface application without coverage which may lead to washing away of the nutrients meant for the plants.

Rice husk, groundnut shell and crop bran did not significantly affected the yield of rice. This could be due to difficulty in gathering these materials and a resultant low quantity usage. Compost do not have any significant effect on the yield of rice. This could be due to the inability of the farmers to prepare compost which may result to low quantity use or due to untimely application. Manufactured organic fertilizers also showed no significant effect on the yield of rice. This could be due to non-availability of manufactured non-availability of manufactured organic fertilizers and also due to lack of funds to purchase it where available. Green manure was also found to have no significant effect on the yield of rice. This could be due to the nature of land preparation before planting rice where the (green manure)

plants are cleared and burnt before tillage to plant rice. Crop rotation did not have any significant effect on the yield of rice. This may be as a result of the farmers' inability to observe the sequence involved in crop rotation. Bush fallowing did not also have any significant effect on the yield of rice. These findings are contrary to agronomist's expectation that these practices should increase yield. The result also disagrees with Akongwubel*et al*. (2012), Hsieh and Hsieh (1990), who reported that poultry litter, crop bran, rice straw, corn stalk, rice husk, green manure, and compost improves soil physical and biological properties as well as crop yield.

Table 3: Regression Analysis of the Effect of Organic Farming Technology Usage on the Yield of Rice   (n= 135)

Independent variable	B	Std error	T	Sig
Constant	6.882	0.720	9.565	0.000
Animal dropping	-0.009	0.030	-0.293	0.770
Poultry litters	0.010	0.032	0.305	0.761
Rice husk	-0.010	0.016	-0.651	0.516
Groundnut shells	-0.029	0.024	-1.248	0.215
Crop bran	0.014	0.017	0.857	0.393
Compost manure	-0.006	0.021	-0.280	0.780
Manufactured organic fertilizers	-0.008	0.021	-0.367	0.714
Green manure use	0.017	0.366	0.047	0.962
Crop rotation	0.238	0.539	0.442	0.659
Bush fallowing	0.387	0.266	1.453	0.149

$R^2 = 0.036$

$\bar{R}^2 = 0.042$

$F = 0.458$

$Prob > F = 0.914$

CONCLUSION AND RECOMMENDATIONS

The study concluded thatthe level of knowledge rice farmer on organic farming technologywas high and most of these rice farmers displayed positive perception onthe use of organic farming technologies. The concluded that majority (97.6 %) of the rice farmers' obtained organic fertilizers from their home/farm wastes.

Based on the findings of the study, the following recommendation were made:

i.   There is need for rice farmer's to practice crop rotation in other to increase their soil fertility, farmers need minimum tillage in other to prevent soil erosion.

ii. Farmers should be encourage to use waste from their kitchen, plant and animals and extension agent should place more emphasis on the use crop rotation and shifting cultivation as organic farming technology.

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