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ANALYSIS OF ORGANIC VEGETABLE FARMING IN NIGER STATE, NIGERIA

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ABSTRACT

The study analysed organic vegetable farming in Niger State. Data used for the study were obtained using questionnaire and structured interview schedule, administered to 100 randomly selected vegetable farmers. Descriptive statistics and inferential statistics were used for the analysis. Poisson regression model was used to determine the factors affecting adoption of organic fertilizer in vegetable farming. The study revealed that 94.1% of the respondents were between 21-40 years with the mean age of 37 years, larger proportion of the respondents (99.2%) were male and 80% were married. Majority (82.5%) of the respondents had formal education with the mean of 8 years, mean household size of 7 persons and mean farm size of 2.0875 hectares. Among the factors that significantly affect the adoption of organic fertilizer were gender, age, household size, education, income, farm size and farmers perception. Majority of the respondents had positive attitude towards the use of organic manure and strongly agreed that: Vegetable farming is more profitable using organic fertilizer, Vegetable production is cheaper using organic fertilizer, and using organic fertilizer helps improves the environment. The most important perceived severed constraints were: transportation of organic fertilizers is expensive, organic manure are scarce and have offensive odour. It is recommended that a frame work of activities be develop that are all encompassing to promote the use of organic fertilizer, not only for vegetable production but for other crops and efforts should be geared towards addressing most importantly marketing issues to motivate the producers to produce more by the government and all stalk holders charged with the responsibility of promoting organic agriculture.

Keywords: Analysis, Organic vegetable, Farming, Niger State

INTRODUCTION

Organic farming products started gaining the interest of many people when it was discovered that advantages of its products surpasses that of conventional/inorganic products. Organic agriculture is a process that develops a viable and sustainable agro ecosystem (IFOAM, 2000). The principle of organic cultivation is attracting farmer's world over due to its various advantages over modern agricultural practices. Essentially, it is a farming system which supports and strengthens biological processes without recourse to inorganic remedies such as Chemicals or genetically modified organisms, organic agriculture is productive and sustainable (Reganold *et al.*, 1993 and Mader *et al.*, 2002)

In Nigeria organic system of food production is in its nascent stage of operation (Abdullahi and Kutama, 2012) The number of organic farmers in the country is still relatively small compared to those of conventional method of farming practice. Few of the organization that are into organic farming in Nigeria are

- i. Dara /Euro bridge farms
- ii. Organic Agriculture Project In Tertiary Institution in Nigeria (OAPTIN)
- iii. Nigeria Organic Agriculture Network (NOAN)
- iv. Organic Farming Association of Nigeria

- v. World Wide Opportunities On Organic Farm (WWOOF)
- vi. Organic Fertilizers Association of Nigeria.

Organic system is an alternative to conventional method of farming which involves the use of organic inputs entirely; as the system depend solely on minimal, diverse planting and difficult management practices to enhance soil fertility and reduce pest pressure. Organic farming has not been fully realized because most farmers still indulge in inorganic farming practice hence the relevance to encourage organic farming. Organic farming is capable of providing solution ozone layer) resulting from continued method of conventional farming which encourage the use of pesticides, fertilizers, herbicides, irrigation water and use of continuous tillage system (Wiler and Kilcher, 2009). According to Hadriman (2004), nutritional value was an important factor that influences consumers' preferences in purchasing chemical free vegetable followed by desire, freshness, health effect and taste.

Organic farming is an alternative and suitable form of agriculture which is gradually gaining ground in many countries of the world as a result of the increase in demand for non-genetically modified food (healthy eating) and its positive impact on the environment and soil. Organic farming products have a higher returns compared to conventional farming products because it uses relatively cheap inputs such compost manure, farm yard manure, sludge, poultry manure, pig manure, cow dung, rabbit dung, urban waste, crop residue, and green manure. The use of relatively cheap inputs gives organic farming an edge over conventional farming as it more affordable, accessible, less stressful and easy to maintain. Also it is an integrated system of farming that strives for a high level of longevity to ensure adequate food supply for coming generations, it largely dependent on biological processes for the supply of nutrient and for protection of crops from pest and disease (Gossling *et al.*, 2006, Assis and Mohd, 2011, IFOAM 2000)

The importance of the adoption of organic farming by the farmer cannot be over emphasised, the adoption of new technologies is however being influenced by a number of factors like socioeconomic, mental and physical factors (Neupan et al. 2002; Rezvanfar et al. 2011; Rogers, 2003). Despite the advantages of organic farming practices, the practice of organic farming in the study area is still in its nascent stage as only few plots of land is been utilized for the purpose of organic vegetable farming. The objectives of this study includes : to describe the socio-economic characteristics of organic vegetable farmers, identify the types of vegetables produced using organic fertilizer, determine factors affecting the adoption of organic vegetable farming in the study area, determine farmers perception of the benefit of the use of organic fertilizer in vegetable production and to determine vegetable farmers perception of the constraints faced.

METHODOLOGY

The study was conducted in Chanchanga and Bosso Local Government Area of Niger State, Nigeria. The state is located between latitude $8^{\circ} 22' N$ and $11^{\circ} 30' N$, longitude $33^{\circ} N$ and $7^{\circ} 20' E$. Agriculture is the mainstay of the economy of the state as much as 80% of the population of the state directly or indirectly depends on agriculture. The major crops grown includes: rice, yam, cowpea and vegetables. Animals reared includes: cattle, sheep and goat.

Sampling procedure and sample size

Multistage sampling technique was adopted for this study. Bosso and Chanchanga Local Government Areas were purposely selected owing to large numbers of vegetable farmers concentrated in the area. The second stage involved the random selection of 3 extension cells

from 2 extension blocks from each Local Government Area making a total of 6 extension cells. 20 respondents were randomly selected from each extension cells, making a total of 120 respondents from the two local government areas

DATA COLLECTION AND DATA ANALYSIS

Primary data was used for this study, it was collected through the administration of questionnaires and structured interview schedule. Both descriptive and inferential statistics were used for the analysis. Poisson regression model was used to determine the factors affecting the adoption of organic farming in the study area.

Poisson regression model
 Implicit form $Y = f(X_1, X_2, X_3, \dots, X_{18})$.
 The functional form is expressed in the explicit form as

- $Y = b_0 + b_1x_1 + b_2x_2 + \dots + b_{18}x_{18} + U$
- Y= Adoption (index of adoption)
- Age of farmer. (Year) x_1
- Educational level (years in school) = x_2
- Farm size (ha) = x_3
- Family size (number of members) in the family = x_4
- Income level (#) = x_5
- Marital status = x_6
- Cooperatives = x_7
- Perception = x_8
- Complexity X_9
- Credit X_{10} .

For the perceptions 5-point rating scale were used: For the benefits strongly agreed (5points), Agreed (4points), Undecided (3points) Disagreed (2) and Strongly disagreed (1point). For the constraints: very serious (5 points), serious (4 points), not sure (3 points), not serious (2 points) and not very serious (1 point) the scores were weighed and weighted average found as used by (Odinwa *et al.*, 2011). The critical mean 3.0 derived from 5-point likert rating scale $(5+4+3+2+1/5)$ was used to describe organic farmers' perception of the benefits of organic vegetable farming. The benefit scores greater than or equal to critical mean of 3.0 depicts agreement with the statement, while The constraints scores greater than or equal to critical mean of 3.0 depicts serious constraint to the adoption of organic farming.

RESULT AND DISCUSSIONS

Table 1 shows the demographic and personal characteristic of the vegetable farmers. The results revealed that majority (86.8%) of the respondents were less than 31 years, with mean age of 38 years. This implies that majority of the vegetable farmers in the study area are still very young and can easily diversified to new areas of agricultural production practices. This is in line with the finding of Binod (2011), who reported that majority of his respondents were young. Most of the respondents (99.2%) were male and had mean household size of 7 people, also large proportion of them acquired more than primary education, with mean of 8 years and majority are small scale farmers with mean farm size of 2 hectares, this is true reflection of the characteristics of the vegetable farmers in the study area, because vegetables are usually produced on a small scale by the sides of the rivers and streams. The mean income of the vegetable farmers stand at N 86, 241.67 per annual, this may be attributed to the fact majority of the vegetable farmers are seasonal farmers because most of the rivers and the streams

usually dried up in the dry season. Vast majority (83.3%) had access to extension services while only 49.2% were members of cooperative societies.

Table 1: distribution of the respondents according to their socio-economic characteristics

Variables	Frequency	Percentage	Mean Age
Age			
Less than 21 years	55	48.5	
21-30	46	38.3	
31-40	12	10.0	38
41-50	5	4.2	
51 years and above	2	1.7	
Sex			
Male	119	99.2	
Female	1	0.8	
Household Size			
1-5	96	80.0	
6-10	16	13.3	7
11-15	5	4.5	
16-20	3	2.5	
Farm size			
0.01-1.00ha	51	42.5	
1.01-2	51	42.5	2
2.01-3.00ha	14	11.7	
3.01ha and above	4	3.3	
Educational level			
Primary education	45	37.5	
Secondary education	29	24.32	
Tertiary education	7	5.8	8
Adult/Quranic education	38	31.7	
No formal education	1	0.8	
Income (N)			
Less than 40, 000	1	0.8	
40, 000-80, 000	24	20.0	
80,001-120,000	59	49.2	
120,001-160,000	16	13.7	86241.67
160,001-200,000	17	14.2	
200,000 and above	3	2.5	
Access to extension			
Have access	100	83.3	
No access	20	16.7	
Cooperative membership			
Yes	59	49.2	
Not a member	61	50.8	

Source: Field Survey, 2016

The result in Table 2 shows that larger proportion of the vegetable farmers (90.8%) were in to leafy vegetable production, while half of them (50.0%) were also into sugar cane production, this practice is usual of vegetable farmers in the study to supplement the mega income from vegetable production in the off season. Majority (84.2%) of the vegetable farmers claimed that they use mainly organic manure, while majority (56.7%) used mainly poultry manure and 55.5% used household waste and cow dung, respectively.

Table 2: Distribution of vegetable farmers based on types of vegetable cultivated and types of organic manure used.

Variables	Frequency	Percentage
*Types of vegetables cultivated		
Bulb	36	
Leafy	109	30.0
Fruit	72	90.8
Others	40	60
*Other crops cultivated		
Maize	47	39.2
Yam	34	28.3
Cocoyam	9	7.5
Sugarcane	15	50.0
Other	60	12.5
Type of fertilizer used		
Organic	101	84.2
Inorganic	5	4.2
Both	14	11
*Types of organic manure used		
Farmyard manure	31	25.8
Poultry manure	68	56.7
Compost	26	21.7
Green manure	28	23.3
Pig waste	15	12.5
Cow dung	67	55.8
Rabbit dung	24	20.0
Household waste	67	55.8
Urban waste	53	44.2
Crop residue	18	15.0
Goat dung	21	17.5

Multiple response*

Source: Field Survey, 2016

The result in Table 3 shows the multiple regression analysis of adoption of organic manure in the production of vegetables with in dependent variables and relative contribution of each variable in raising the level of adoption. The fit of the model was satisfactory. About 80 percent of variation in adoption behaviour of the vegetable farmers was explained by the independent variable included in the model. The value of the R^2 (0.0801) and the significant Prob > $\chi^2 = 0.000$ suggested the adequate description of the data by the regression model and the desirability of proceeding further.

In this study the six most important factors affecting the adoption of organic manure in vegetable production were: gender, age, household size, income, farm size and vegetable farmers perception on the use organic manure. This finding is in agreement with the earlier findings of Binod (2011), Rezvanfar *et al.* (2011) and Assis and Mohd Ismail (2011) which shows that farm size, farmers perception and age are the major factors affecting the adoption of organic manure by vegetable farmers.

Table 3: Factors affecting the adoption of vegetable farming

Variables	Coefficient	z-value
Gender	.3524506	2.45**
Age	.0099877	2.44**
Household size	-0.228758	2.16**
Education	.009303	0.83
Income	-2.87	-1.92*
Farmsize	.0996097	2.16***
Credit	-.1511297	-1.63
Coop	.0545043	0.56
Perception.	.0197626	3.75***
Complexity	.3173047	-3.56

Number of observation = 120
 LR chi (10) = 39.93
 Prob > chi2 = 0.000
 Pseudo R2 = 0.0801

*significant at 10% level, **significant at 5% level, ***significant at 1% level.

Source: Field Survey, 2016

Table 4: Vegetable farmer's perception on the use organic fertilizers

Perception statements	Weighted score	Weighted mean	Remark
Vegetable farming is more profitable using organic fertilizer	519	4.35	**
Vegetable production is cheaper using organic fertilizer	444	3.70	**
Vegetable farming using organic fertilizer helps improves the environment	436	3.60	**
Vegetable farming using organic fertilizer is not difficult	381	3.10	**
Vegetables produced using organic fertilizers only profit the consumers	412	3.40	**
Vegetables produced using organic fertilizers are more expensive	322	2.60	*
Vegetable farming using organic fertilizer requires specialized skills	466	3.80	**
Vegetable farming using organic fertilizer helps improves the biological activities of the soil	428	3.56	**
Organic fertilizer pollute the environment	377	3.40	**
There is ready made market for vegetables produced using organic fertilizers	214	1.78	*
Vegetable farming using organic fertilizer is possible on a large scale	292	2.40	*
Vegetables produced using organic fertilizers are better than those produced using inorganic fertilizers health wise	525	4.38	**
Critical mean		40.07 (3.33)	**
	$\geq 3.0 =$ **	**	
	$< 3.0 =$ *		
** - Agreed			
* - Disagreed			

Source: Field Survey, 2016

Table 4 shows the perception of the respondents towards the use of organic fertilizer in vegetable production. Majority of the respondents have positive attitude towards the use of organic manure and strongly agreed that: Vegetable farming is more profitable using organic fertilizer, Vegetable production is cheaper using organic fertilizer and Vegetable farming using organic fertilizer helps improves the environment. etc. this is in line with findings of Assis and Mohd Ismail (2011), who affirmed among other benefits of using organic fertilizer that the use of organic fertilizer decreases production cost by reducing input purchase.

Table 5: Perception of the constraints faced by vegetable farmers in the utilization of organic fertilizers.

Constraints	Weighted score	Weighted mean	Remarks
Organic fertilizer is scarce	502	4.18	**
Organic fertilizer odor is offensive	459	3.83	**
Large quintiles are required to meet vegetable nutrient requirements	456	3.80	**
Nutrients in organic fertilizers are slowly released	412	3.40	**
Organic fertilizers preparation and application is very laborious	381	3.17	**
Organic fertilizers application is very strenuous	267	2.20	*
It is expensive to transport organic fertilizer	526	4.36	**
Critical mean		24.94 (3.56) **	**
	$\geq 3.0 =$ **		
	$< 3.0 =$ *		
** - Agreed			
* - Disagreed			

Source: Field Survey, 2016

The vegetable farmers perceived all the constraints under consideration as severe constraints in exception of the fact that organic fertilizer application is very strenuous. The most important perceived severe constraints were: It is expensive to transport organic fertilizer, Organic fertilizer is scarce, organic fertilizer odor is offensive, etc. this implies that vegetable farmers face many constraints in using organic manure and this may be the singular reason why the use of organic fertilizer is limited and its products have not gained the expected popularity in the country.

CONCLUSION AND RECOMMENDATIONS

- Larger proportions of the vegetable farmers in the study area were in to leafy vegetable production and also diversified into the production of other crops to supplement the mega income from vegetable production in the off season.
- The vegetable farmers use mainly organic manure and most importantly poultry manure, household waste and cow dung.
- Farmers perceived among other benefits that organic fertilizer decreases production cost by reducing input purchase
- There is no readymade market and special prices for vegetables produced using organic fertilizers

It is recommended that organizations charged with the responsibility of promoting the use of organic fertilizers and products in collaboration with the government should develop a framework of activities (policies) that are all encompassing to promote the use of organic fertilizer, not only for vegetable production but for other crops and address most importantly marketing issues to motivate the producers to produce more.

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