

FACTORS INFLUENCING ADOPTION OF IMPROVED ONION PRODUCTION PRACTICE IN ALIERO AND YAURI LOCAL GOVERNMENT AREAS, KEBBI STATE, NIGERIA

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Abstract

This study analyzed the factors influencing adoption of recommended onion production practices by farmers in Aliero and Yauri Local Government Areas (LGAs), Kebbi State, Nigeria. A multi-stage sampling procedure was used to select 160 farmers for the study. The results on the factors influencing adoption of improved onion production practice indicated that results related to socio-demographic variables depicted that there is a statistically significant difference in age ($t = -2.3652$) and education ($t = 2.1534$). The result shows that age had a negative significance, implying that increase in age tend to result in less adoption of improved onion production practice. Farm size ($t = 2.7634$) and access to credit ($t = 3.1206$) were the significant variables in adoption of improved onion production practices while access to irrigation facilities is found to be not significant. Farm size ($t = 2.7634$) was positive and significantly related to the adoption of improved onion production practices. The result also revealed that access to credit ($t = 3.1206$) had a positive influence on adoption of improved onion production practices. Among the three institutional variables considered in this study, two were found to be significantly different in adoption of onion production practices. These include participation in cooperative society ($t = 2.0281$) and access to market information ($t = 3.0424$). The study therefore recommends engagement of maximum audience analysis to address some of the factors influencing adoption.

Keywords: Onion, onion farmers, improved onion production practice

INTRODUCTION

Onion (*Allium cepa L.*) belongs to the family Alliaceae, genus *allium*. Onion is a product to Asia and Middle East, and it is only second to Tomatoes among vegetables in world trade (Grema, 2015). The world leading producers of onion are United States of America, China, Russia and Japan. Other important producing countries include: Turkey, Spain, Brazil, Italy and Egypt (Abbot, 2006). The crop is grown primarily for its bulb while the immature ones are used as flavoring and seasoning due to its composite aromatic volatile substances (allyl propyl disulphide). Onion and its wastes are also used as livestock feeds. The leaves are highly relished by camels. The plant is used by traditional folk as medicine (Sulemba, 2015). Since introducing the production of onion in Nigeria, it has been an important commercial vegetable in the northern parts of the country where the bulk of onion is grown during dry season in lowland “Fadama” as well as other irrigable area. The production of onion is of great importance (such as source of income, food and livestock feed, etc) particularly in Kebbi State, which has suitable condition for the cultivation of the crop.

Onion grown mostly in Kano, Kaduna, Jigawa, Sokoto, Plateau, Bauchi and Kebbi States. Aliero LGA in Kebbi State, Nigeria, can lay claim as its home in Nigeria. In Aliero, onion is produced in such large quantities and most of the people in Aliero and its environs, including Maiyama and Gwandu, both in Kebbi State, are onion farmers. The people of the land make a livelihood out of it and meet their needs with it. Hence, Aliero is described as the *Land of Onion*. The people of Aliero pride themselves as the largest onion farming community in West Africa, not just because they get high patronage from other onion traders in the Southern, Eastern and other Northern parts of Nigeria, but also because they export their commodity to neighboring countries such as Benin Republic, Niger, Cameroon and Ghana (Yahaya et al, 2021).

The production of Onion in Kebbi state has generated job opportunities for many people in the area. These include craftsmen and weavers who produce onion production equipment such as rake, watering cans, knives, jute bags, and baskets among others (Illo et al 2016). The production of onion in the area also provides employment opportunities to others that are not engaged directly in dry season farming. Hired laborers are cheaply used during land preparation, transplanting, weeding and harvesting. It also provide jobs for local transporters who convey Onion from the farm gate to the market and then to various parts of Nigeria; and to the retailer who sells onion in rural markets. Onion producing farmers have double opportunities of engaging in both rain fed and irrigable crops production (such as tomatoes, pepper, maize etc).

Objectives of the Study

The broad objective of this study was to analyze the adoption of recommended onion production practices by farmers in Aliero and Yauri Local Government Areas of Kebbi State. The specific objectives were to:

1. describe the socio-economic characteristics of the onion farmers in the study area;
 2. determine the onion farmers’ preferences in adoption of improved onion production practice in the study area;
- ❖ analyze the factors influencing adoption of improved onion production practice by the farmers.

Justification of the Study

Onion (*Allium cepa*L.) is an important vegetable crop grown by farmers in northern Nigeria. This was attested to by Ayodele (1996) who reported that in Nigeria, commercial onion production is mainly in the north. Sokoto and Kebbi States are important onion producing States where many farmers grow onion in the Fadama under irrigation during the dry season. Onion production is therefore a major source of income to farmers in the area. The study intended to look at the factors influencing adoption of recommended onion production practices in Aliero and Yauri Local Government Areas of Kebbi State. The identification and understanding of these factors certainly provided valuable and significant information for policy formulation. The findings of this study would help policy makers in designing policies that will include interest of onion farmers with respect to how to improve their yield, income and level of living. Furthermore, the research will serve as a basis for further researches by the private and public institutions.

The research will be useful for the development of a new thesis, thus increasing the literature in the field of study thereby adding to the existing body of knowledge. Moreover, the study was a useful source of teaching material in the agricultural faculties and other educational institutions. The outcome of the research work would provide information and guidance to Inter-Governmental Organizations (INGOs) agencies, Non-Governmental Organisations (NGOs) and development partners wishing to sponsor intervention programmes that will improve the yield, income and standards of living of farmers engaged in onion production. The findings of this research work will provide the respondents with knowledge of the reasons for low adoption of the recommended practices, as well as the constraints encountered in the adoption of recommended onion production practices and this would help the respondents in adjusting their onion production which will result in improving their productivity income and level of living in the study area.

METHODOLOGY

Study Area

Aliero is a Local Government Area in Kebbi State, northwestern Nigeria. Aliero is located in the southeast of Kebbi State on longitude 12°16'42"N and latitude 4°27'6"E. The name Aliero was originally from two prominent Fulani scholars Ali and Yero. The town is the headquarters of Aliero Local Government Area. Most of the people in Aliero LGA are agrarian, with emphasis on vegetation, especially onion. The town has the largest onion market in northwest Nigeria and is a major producer of onions in Nigeria.

Yauri is a Local Government Area in Kebbi State, northwestern Nigeria. It is the location of the Yauri Emirate, one of the smallest historical emirates in Northern Nigeria. In 1972, the population of the division was about 112,000 people inhabiting a land area of about 3,380 square kilometers and scattered over six major districts. Yauri's ethnic groups include the Shangawa, (literally, the people of Shanga), the Gungawa, (literally, the people of the islands; also known as the Geshe), the Dukawa, Kamberi, Hausa people, Nupe, Yorubawa and Kanuri. Hausa people constitute the governing class of Yauri. The Reshe people consider Birnin Yauri to be their ancient city. Today, Hausa language is the main language spoken by people of Yauri. The rainy

season is usually between June and October, however, rain sometimes starts in April or May. During the rainy season most farmers favor harvesting their crops, planting crops and repairing the farms. Festivals and commemoration dominates the rainy season calendar. Harmattan is the other season (*Blench & Roger, 2012*).

Data Collection

This study was designed to determine the factors influencing adoption of recommended onion production practices in Aliero and Yauri Local Government Areas (LGAs) of Kebbi State, Nigeria. A multi - stage sampling procedure will be used. The target population of the study is onion producers in Aliero and Yauri LGAs of Kebbi State, Nigeria, therefore, first a purposive sampling procedure will be used in selecting 4 (four) villages from each of the LGAs known to be intensively involved in onion production. From these villages, a list of all onion farmers will be compiled with the help of the Extension workers in charge of the LGAs and the village heads of the selected villages. Random sampling technique will be used to select twenty (20) onion farmers from each of the villages, to obtain a total of a 160 farmers, which will serve as sample size of the study area.

Data Analysis

Frequency distribution, means and Probit regression mode was employed to analyze the data for the study. Descriptive statistics was used to analyze the socio-economic characteristics of the respondents. To analyze the factors influencing adoption of improved onion production practices by the farmers, the Probit regression model was employed.

It is specified in the implicit form as follows: $Y = a + b_1x_1 + b_2x_2 + b_3x_3 + \dots + b_n(x_n) + e$
-----(1)

Where; Y= adoption level (dummy variable, adopted 1; otherwise 0)

a = constant

X1= Age (years)

X2 = Farming experience (years)

X3 = Education (years)

X4 = Family size (number)

X5 = Farm size (hectares)

X4 = Access to irrigation facilities (access 1; non-access 0)

X6 = Access to credit (access 1; non-access 0)

X7 = Access to market information (access 1; non-access 0)

X8 = Extension visits (participated 1; none 0)

X9 = Participation in cooperative society (participated 1; none 0)

RESULTS AND DISCUSSION

Socio-economic Characteristics of the Farmers

These are personal features of the resource users which have direct or indirect relation with onion farmers. The major demographic characteristics that are considered in this study include age, sex, marital status, educational attainment and years of experience in onion farmers. Results

from Table 1 shows that males dominated the onion farming. This domination is attributable to the religious and cultural background of the respondents in that women are actively involved in the domestic activities of the house hold, while the males takes part in other farming activities such as processing, threshing, packaging and marketing of the farm produce. The analysis shows that majority (49.4) of the farmers in the study area fall within the age bracket of 37 – 45 years of age, while 77.9% of the respondents are married. This shows that majority of the respondents are within the active productive age. Age is assumed to be a serious factor in adoption of new innovation.

Results in table 1 also indicated that substantial percentage of the respondents (40.6%) had completed secondary level education. There are adequate findings such as Olaitan (1996) and Toby (1997), suggesting that education can improve productivity of rural households. It is evident that education promotes the efficiency of resource use at the farm level. Majority of the respondent (45.0%) have household size that ranges from 11-20 members, with the maximum of 72 persons and minimum of 14. Household size is simply used as a measure of labor availability and also enhances farm labor participation. Large households are expected to encourage adoption of innovation as it relaxes the labor constraint required during the introduction of new practices. The implication of this findings is that more family labor for vegetable production would be readily available since relatively large household size is an obvious advantage in terms of labor supply.

Experience is gained with age, considering the major occupation of the respondents. The length of time spent in farming can be linked with the age of the farmers. Results revealed that Experience is gained with age, considering the major occupation of the respondents which is farming, the length of time in farming can be linked with the age of the farmers. Results revealed that 35.0% of the respondents had been in farming for 11 - 20 years. The size of the farm cultivated is a function of population pressure, family size and financial background of the farmers. One major characteristics of the farmers was fragmented land holdings. Results in Table 1 depicts that majority of the onion farmers (41.9%) had 0.5 – 1.0 hectares of farmland. It then implies that all the respondents were small scale farmers. Findings indicated that 85.0% of the respondents did not have access to credit while 15.0% had. Credit is an important factor that is needed to acquire or develop farm enterprise. Its availability could determine the extent of adoption of improved farming practices and enhancement of production capacity.

Table 1: Distribution of Respondents according to Socioeconomic Characteristics (n= 160)

Characteristics	Frequency	Percentage	Cumulative %
Sex			
Male	146	91.2	91.2
Female	14	8.8	100.0
Age			
19-27	11	6.9	6.9
28-36	24	15.0	21.9
37-45	79	49.4	71.3
46-54	13	8.1	79.4
55-63	25	15.6	95.0
64-72	8	5.0	100.0
Marital status			
Married	96	60.0	60.0
Single	29	18.1	68.1
Divorced	21	13.1	91.2
Widowed	14	8.8	100.0
Educational attainment			
Islamic education	59	36.9	36.9
Completed primary	18	11.2	48.1
Completed secondary	65	40.6	88.7
Tertiary education	18	11.3	100.0
Family size			
1-10	22	13.8	13.8
11-20	72	45.0	58.8
21-30	14	8.8	67.6
31-40	18	11.3	78.9
41-50	20	12.5	79.4
> 50	14	8.9	100.0
Farming experience (Years)			
1 – 10	28	17.5	17.5
11 – 20	62	38.8	56.3
21 – 30	48	30.0	86.3
31 – 40	22	13.7	100.0
Farm size (hectares)			
0.5 – 1.0	67	41.9	41.9
1.1 – 1.5	56	35.0	76.9
1.6 – 2.0	37	23.1	100.0
Access to credit			
Yes	24	15.0	15.0
No	136	85.0	100.0

Source: Field survey

Onion Farmers' Preferences in Adoption of Improved Onion Production Practice in the Study Area (n= 160)

Among the improved production practices, well drained loam-sandy soil was indicated in table 2 as the most preferred requirement site required by majority (83.8%) of the respondents in site selection while 65% indicated fertile soil. The results further indicated that red careole was the most preferred variety onion seed being planted by majority of the farmers because it matures within 120 – 160 days, produces medium bulbs weighing 1009rams and had the yield potential of 18 – 25 t/ha. Raised seedbed was found to be the most preferred land preparation method compared to flat seedbed (79.4%) and sunken seedbed (63.1%). Discussion with the respondents indicated that sunken seedbed is most preferred because it appears to work better than flat and raised seedbeds in the study area. The onion farmers reported that significantly wider spacing (20cm by 10cm) produced higher size of plant height, leaf length and number of leaves. The respondent added that the bulb length, diameter and weight increased with wider planting spacing.

Surface irrigation is a system in which water is applied and distributed over the soil surface by gravity was the most preferred practice adopted by majority (81.9%) of respondents. Ammonium sulphate (85.6%) and ammonium nitrate (74.4%) are the most widely applied nitrogen-based fertilizer applied by majority of the onion farmers, at the rate of one cup per twenty feet of row. The results of the study indicated that integrated weed management was the most applied weed management practice by majority (82.5%) of the respondent. Manual harvesting and fresh blown storage methods were found to be the most preferred practices by 92.5% and 77.5% respectively.

Table 2: Distribution of respondents according farmers' preferences in adoption of improved onion production practice in the study area (n= 160)

Improved production practice	Frequency	Percentage
Site selection		
Fertile	104	65.0
Well drained	134	83.8
Improved seeds		
Red creole	117	73.1
White creole	64	40.0
Land preparation		
Flat seedbed	127	79.4
Sunken seedbed	101	63.1
Raisedseedbed	132	82.5
Planting spacing		
20cm by 10cm	121	75.6
15cm by 10cm	114	71.2
10cm by 10cm	102	63.8
Irrigation and water management		
Surface	131	81.9
Drip	91	56.9
Sprinkler	32	20.0
Furrow	86	53.8
Fertilizer application (time/rate)		
Ammonium sulphate	137	85.6
Ammonium nitrate	119	74.4
Weeding		
Chemical	99	61.9
Mechanical	111	69.4
Integrated	132	82.5
Chemical application		
Boom	114	71.3
Air-assisted	121	75.7
Harvesting		
Manually	148	92.5
Mechanically	17	10.6
Storage procedure		
Fresh blown	124	77.5
Air conditioned cold	11	6.9
Controlled atmosphere	36	22.5

*Multiple responses

Determinants of adoption of Improved Onion Production Practices in the Study area using Probit regression

Table 3 shows the result of the Probit analysis on the factors influencing women farmers' decision on adoption of improved vegetable production practices. The pseudo R² was 0.6142,

which implies that all the variables included the model were able to explain 61% of the probability of the onion decision to adopt or not to adopt improved vegetable production practices. The result of the analysis revealed a good fit of the model as indicated by highly significant chi-square test statistics (22.4174***) at 1% level of significance and the percentage of the variables correctly classified.

Results related to socio-demographic variables are presented in the top section of Table 2. From the results, it's depicted that there is a statistically significant difference in age ($t = -2.3652$) and education ($t = 2.1534$). The result shows that age had a negative significance, implying that increase in age tend to results in less adoption of improved onion production practices. This shows that as the farmers grow older, there is an increase in risk aversion and a decreased interest in long-term investment in the farm. The result of the study is consistent with that of Makate et al. (2017) who documented a positive effect of education on adoption of multiple climate smart agricultural innovations in Southern Africa. In general, however, investment in education is essential for development and would encourage farmers to adopt appropriate technologies and practices (Winters and Mafoli 2011).

According to the results depicted in table 2, a statistically significant difference was observed on two (2) out of three (3) economic variables. Farm size ($t = 2.7634$) and access to credit ($t = 3.1206$) were the significant variables in adoption of improved onion production practices while access to irrigation facilities is found to be not significant. Farm size ($t = 2.7634$) was positive and significantly related to the adoption of improved onion production practices. The implication is that improved onion production practices should target farmers with many numbers of plots since they have the potential of adopting the practices. Farmers with many plots are likely to adopt a new practice as they can afford to devote part of their land to try new practice fully, unlike those with few plots. The positive influence of farm size on adoption may be attributed to economics of scale effects or the ability to bear the risks associated with the adoption of new practices. Outcomes of focused group discussion with the respondents revealed that farm households who owned large number of livestock and operated a relatively large plot of land, had a better chance of adoption of improved agricultural technology due to the fact that such households are better-off in taking risks associated with new technologies and practices.

The result also revealed that access to credit ($t = 3.1206$) had a positive influence on adoption of improved onion production practices. The result reveals that farmers who had access to credit were more likely to accept the practice relative to those without access to credit. Credit to farmers enables them to purchase the inputs that are required in the production process hence, its influence on farmers' adoption of improved vegetable production practice. The result confirms the finding of (Nwaru, 2005), which stated that access to credit promotes the adoption of risky practices through relaxation of the liquidity constraint as well as through the boosting of household risk bearing ability.

Among the three institutional variables considered in this study, two were found to be significantly different in adoption of onion production practices. These include Participation in cooperative society ($t = 2.0281$) and access to market information ($t = 3.0424$). Participation in cooperative society was positive and significantly related to adoption of the improved onion production practices. The implication of the result is that an increase in the attendance to cooperative activities led to increase in the adoption of the practices. The result agrees with the

apriori expectation that extension services and participation in cooperative society expose households to benefits inherent in new practices, thereby enhancing the adoption. It has also been observed that farm households with greater market information access had a significantly higher rate of adoption of improved onion production practices in the study area. Market access has been identified as one of the important elements in enhancing agricultural technology adoption and improved household income.

Table: Factors influencing adoption of Improved Onion Production Practices in the Study area using Probit regression

Variable	Coefficient	Standard error	t-value	Remark
Constant	6.14362	3.8673	2.4386	*
Demographic variables				
Age (years)	0.87634	0.0579	-2.3652	*
Farming experience (years)	0.0124	0.0087	1.0032	
Education (years)	-0.1543	0.7328	2.1534	*
Family size (number)	1.0536	0.0321	0.0118	
Economic variables				
Farm size (ha)	1.0067	0.8192	2.7634	*
Access to irrigation facilities	1.0632	0.2328	0.0987	
Access to credit	1.8753	0.3642	3.1206	*
Institutional variables				
Access to market information	0.0864	0.0150	3.0424	*
Extension visits	0.0543	0.0241	0.1425	
Participation in cooperative society	0.0341	0.0446	2.0281	*
Chi ² (X ²)	22.4174***			
Pseudo R ²	0.6142			
Log likelihood	213.8792			

CONCLUSION

The study analyzed factors influencing adoption of improved onion production practices in Aliero and Yauri Local Government Areas, Kebbi State, Nigeria. The result of the study indicated a sequence of agricultural practice adoption approach. The farmers did not adopt the practices as a package but rather adopted a single component or suitable practices. The study further indicates that the variables (age, farm size, education, access to market information and credit access) used for the analysis were significantly related to adoption of the practice. In order to improve the efficiency and use of these practices among the farmers in the study area, it is recommended that agricultural extension department may bind their staff for regular visits to fields. Agricultural extension agents may coordinate the dissemination of the practices using result demonstration methods on controlled plots so as to encourage farmers to continue with the practices. Access to credit is also necessary to encourage more onion farmers to purchase all the input necessary for their activities. Formation of cooperatives should also be encouraged to address the constraints of small farm size faced by the farmers.

REFERENCES

- Abbot J. C and Makeham J.P. (2006). *Agricultural Economics and Marketing in the Tropics Marketing Efficiency ITA: Longman* pp152.
- Ayodele, V.I. (1996). "Onion *Allium cepa* L and *Allium cepa* L.Var Aggregation Production in Ibadan, South West Nigeria, Prospects and Limitations. Paper presented at the 11th Annual conference of the Horticultural society of Nigeria, Ogun State University, Ayo-Iwoye, 1-14 April. In: S.D. Dogonodaji, K .M Baba and I .Mohammed. Profitability and resource use efficiency in dry season Onion production in Sokoto and Kebbi states, Nigeria. *International Journal of Agriculture and Rural Development*9 (1).
- Blench & Roger (2012). *"The Kainji languages of northwestern and central Nigeria"* (PDF). Cambridge: Kay Williamson Educational Foundation.
- Grema, I. J., Gashua, A.G. Makinta A.A (2015) Marketing Analysis of onion in Bade and Geidam Local Government Areas of Yobe State, Nigeria. *IOSR Journal of Applied Physics* 7 (1) Pp 73-78.
- Ilo A. I., Kaka, Y., Hassan U., Umar S. and Bamidele, A. A. (2016) Marketing of Onion in Aliero Central Market, Aliero Local Government Area of Kebbi State. *IOSR Journal of Humanities and Social Science. Volume 21, Issue 1 Pp 42-49*
- Makate C, Wang R, Makate M, Mango N. (2017). Impact of drought tolerant maize adoption on maize productivity, sales and consumption in rural Zimbabwe. *Agrekon*. 2017; 56 (1): 67–81. <https://doi.org/10.1080/03031853.2017.1283241>.
- Nwaru, J. C. (2005). *Determinant of farm and off-farm incomes and savings of food crop farmers in Imo State. Implications for poverty alleviation. The Nigerian Agricultural Journal*, 36, 26-42.
- Sulumbe, I.M, Shettima, B. G. and John, T. B. (2015) an Analysis of the Marketing of Onion in Monguno Local Government Area of Borno State, Nigeria. *Journal of Marketing and Consumer Research* 15 (1) Pp
- Winters P, Mafoli A, Salazar L. (2011). Introduction to the special feature: evaluating the impact of agricultural projects in developing countries. *J Agric Econ*. 2011; 62(2):393–402.
- Yahaya K, Abdullahi A.G and Umar M (2021) Evaluation of Onion Value Chain actors in Kebbi State, Nigeria: A Case Study of Producers and Retailers. *Asian Journal of agricultural extension, economics and sociology* 39 (2) Pp 12-22

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