EVALUATION OF FARMERS' LEVEL OF KNOWLEDGE AND ADOPTION LEVELS OF IMPROVED ONION PRODUCTION PRACTICES IN IGABI LOCAL GOVERNMENT AREA OF KADUNA STATE, NIGERIA

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Abstract

The study evaluated farmers' knowledge on improved onion production practices in Igabi Local Government Area of Kaduna State. The specific objectives of the study were to identify and describe improved onion production technics available to the farmers; their level of knowledge; determine the factors influencing the package adoption; examine the farmers' level of knowledge and identify the constraints to onion production. Multi-stage sampling procedure was used to purposively select Igabi LGA, three districts of Igabi, Rigachukun and Rigasa and three villages from each district due to high activities of onion production. Primary data were collected using a structured questionnaire. The data were subjected to descriptive statistic and regression analysis. The result showed a mean age of 45.87years, 78.6% were male, 85% were married, and 97.1% had farming as their primary occupation. The mean household size was 7 persons per household and 32.1 % of the onion farmers had non-formal education with 9 years mean farming experience on average farm sizes of 0.72ha. The results also showed that 67.1% and 47.9% of the respondents had >60% knowledge on planting date, soil type and plant spacing, while >80% had low level of Fertilizer rates. Regression analysis showed that level of education and access to finance were positive and significant in explaining adoption at P>5% . Major problems militating against improved onion production were pest and disease attack 32.2%, and inadequate storage facilities 21.4%. It was concluded that levels of knowledge of the farmers on improved onion production practice was low attributable partly to the relatively low level of education and inadequate extension services. More so, use mass media for educating farmers on improved onion production practices should be emphasized. Few farmers use some improved practices out of many years of production experience. It is recommended that adequate trainings be organised for the onion growers to upgrade their production practices, while cooperatives should organise mass literacy campaigns.

INTRODUCTION

Onion (Allium cepa L) is a vegetable crop belonging to the family Liliaceae (Alabi and Adebayo, 2008) that is grown almost all over the world. Researchers suggest onions were first grown in Iran and West Pakistan (National Onion Association, 2021).

Onion is grown mainly for its bulb as a very unique vegetable considering its ease of cultivation, widespread uses when processed and excellent health and financial benefits. Both the green leaves and bulbs can be eaten raw, cooked in soups and salads (Thompson and Kelly, 2016). FAO (20008), reported the mean yield of onion in the world averages 17.27 t/ha; the world highest onion production per unit area is obtained from the Korea republic (67.25t/ha), followed by USA (53.91 t/ha), Spain (52.06 t/ha) and Japan (47.55 t/ha). In Nigeria, onion is grown mostly in Kano, Kaduna, Jigawa, Sokoto, Plateau, Bauchi and Kebbi States (Ayodele 2015). According to the FAO 2015 statistical report on highest onion producing countries, Nigeria with 621,000 tons annual production ranked 24th in the world and 4th in Africa behind Egypt, Algeria and Morocco.

In Nigeria, there is an all year round demand of onion, which has made onion farming a constant stream of recurrent revenue. The high demand of onions in

Nigeria stems from its use as an indispensable food condiment for both the rich and the poor. Onion is a key ingredient for almost every Nigerian food. Aside the use of fresh onions as a food ingredient, it can also be processed to make onion paste, dehydrated onion flakes, onion powder, onion oil, onion vinegar, onion sauce, pickled onion, onion wine, beverages and more. Onions can be used as an ingredient in the industrial process of manufacturing moth repellants. Onions provide the body with numerous health benefits since it contains vitamin B (Thiamine, Riboflavin, Niacin, Pantothenic acid, Vitamin B6, Folate) Vitamin C, minerals (Calcium, Iron, Magnesium, Manganese, Phosphorus, Potassium, Zinc) and Raw onion contain about 89% water, 4% sugar, 1% protein, 2% fiber, and 0.1% fat. It also serves as a medicinal herb in many communities and is claimed to minimize high blood pressure and other heart diseases due to its favourable action on the elasticity of blood vessels. As early as the sixth century B.C., a medical treatise, the Charaka Sanhita, celebrates the onion as medicine, a diuretic, good for digestion, the heart, the eyes and the joints (Megan, 2019).

As an item of world trade, onion ranks second in importance after tomatoes among vegetables (Sani and Jaliya, 2010). The northern part of Kaduna State is noted as one of the leading onion producing areas. In Igabi local government area onion production is a major source of income to farmers. A reconnaissance survey showed that about 65% of the farmers were engaged in its production and can obtain yield of 20-25 tonnes per hectare if good management practices are observed s (Indorama Fertilizer, 2015).

Although onion has been grown in Nigeria for a long time, the growth and yield of Onion are still low compared to other regions of the world. One of the reasons for low yield is because improved production practices based on research findings have not been made available to the generality of farmers (Falodun et al., 2015) or have not been adopted by them. However, recommended onion production practices in Nigeria are being presented to farmers in many production areas. Farmers only need to follow farm practices to enhance their productivity and to produce more on the same field area. Adopters of improved technologies increase their production. Ayodele, (2015) reported that one of the major problems militating against farmers' production is inadequate knowledge of improved production practices. The inadequate knowledge on improved production practices may be linked to inadequate access to information. As a proverbial saying expresses, farmer cannot adopt (know or trust) what they have not heard of, and how can they hear? Unless someone tells them and unless someone (agent of Change) is sent to them, they will not know. The broad objective of this study focused on assessing farmers' knowledge and level of adoption of improved onion production in Igabi Local Government Area of Kaduna State.**Methodology**

The study was conducted in Igabi Local Government Area (LGA), the largest in Kaduna State, occupying approximately 3,727 square kilometres, with an estimated population of 667,676 as at 2020. It is located between longitudes 6^{o} 57”E to 7^{o} 47”E, and latitudes 10^{o} 05”N to 10^{o} 55”N and on an altitude of 592m above sea level. It receives an annual average rainfall of 1272 mm; temperature ranges 16-34 0^{c}. The LGA shares boundaries with Kaduna North, Kaduna South, Zaria, Kajuru, Kauru, and Birnin-Gwari Local Government areas. The LGA is constituted into three, traditional Districts (Rigasa, Rigachukun and Igabi) which are complemented by 322 villages. Agriculture is the major occupation of the people where crops such as maize, guinea corn; beans, cassava, onions, sugarcane, tomatoes, cowpea, rice and pepper are grown in substantially large quantities. Also, animals such as cows, goat and sheep and horses are reared. Trade also blossoms in Igabi LGA with the area hosting several markets such as the Rigasa and the Gadangaya markets.

A multi - stage sampling procedure was used to select the farmers that make up the sample size used for this study. In the first stage Igabi Local Government area was purposively selected out of 23 local government areas in the State due to preponderance of onion farmers in the area. Secondly, three villages from each district were also purposively selected based on the high level of onion production. Random sampling technique was used in selecting 10% of onion farmers from the sampling frame of 1403 farmers compiled during the reconnaissance survey in Igabi Local Government. Thus a sample size of 140 sample onion farmers that was used for this study. The primary data used for this study were collected using structured questionnaire while secondary data were collected from Agricultural Development Project (ADP) offices and the LGA records.

Descriptive statistics such as mean, frequency, percentages were used to summarise the socio-economics characteristics of the farmers using:

Mean = (∑×/n) …… ……(1)

Where:

∑ = summation sign

X= individual observation

n= total observations

Percentage (%) = $^{x}/_{n}$ × 100…… (2)

Where:

X= individual observation

n= total observations.

Regression analysis was used to assess the relationship and factors influencing adoption The logit regression model was specified thus:

Y=Adoption of onion production

Yi= farmers who adopted improved production =1

Yi= farmers with who did not adopt= 0

$\ln (P/1-P) = \beta 0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 + X_6$ (3)Xi = Socio economic characteristics of the farmers:

X_1 = Age (years)

X_2= Educational Status (years)

X_3 = Farming experience (years)

X_4 = Source of income (Sale of Produce)

X_5 = number of cooperatives (number of cooperative a farmer belongs to at the time of study)

X_6= Contact with extension agents. (Yes= 1 or No = 0)

In the first instance, a list of activities/procedures (Innovations) was prepared by discussing with experts in onion production, agricultural extension agents and referring to the onion production package of practices as developed by National Agricultural Extension and Research liaison Services (NAERLS). Items on a structured questionnaire were framed to covered full range of cultivation practices beginning from variety selection to the appropriate time of harvesting up to curing to obtain the responses (affirmation or otherwise) from the growers.

The farmers' levels of knowledge on the improved production practices were measured using the modified index. The item analysis was carried out in terms of two indices viz., item difficulty index and item discrimination index. The index of item discrimination provides information on how well an item discriminates well informed respondents from poorly informed. Whereas item difficulty index indicates the extent to which an item was difficult.

Difficulty index (P)

The selected items (18 items for onion) were administered to 140 respondents with two point continuum response for each statement. The scores allotted were one (1) for correct response and zero (0) for incorrect response. After computing the total score obtained for each of the 140 respondents on items, they were arranged in order from highest to lowest. Based on which the

140 respondents were then divided into five equal groups. These groups were labelled as G1, G2, G3, G4, and G5 with 28 respondents in each group. For the purpose of item analysis, the middle group G3 was eliminated keeping only four extreme groups with high and low scores. The index of 'Item Difficulty' was worked out as the percentage of the respondents answering an item correctly. The items with 'p' values ranging from 30.0 to 70.0 were considered for the final selection of the knowledge test. For each item the correct answer was calculated to get the Difficulty Index.

$$\text{Difficulty Index} = \frac{\text{Total number of correct answers}}{\text{Total number of respondents}}$$

Discrimination Index (E 1/3):

S1, S2 and S4, S5 are the frequencies of correct answers in the groups G1, G2, G4 and G5 respectively. 'N' is the total member of respondents of the sample selected for the item analysis that is 140. The Discrimination Index varies from 0 to 1. The items with discrimination index ranging from 0.30 to 0.70 were selected for the final test. This shows whether the items actually distinguished a well-informed person from one who is inadequately informed about the subject matter. This is the second criterion for item selection i.e., by the item Discrimination Index indicated by 'E 1/3' was calculated with the formula:

$$\text{Discrimination Index} = \frac{(S1 + S2) - (S5 + S6)}{N/3}$$

(or)

$$D = \frac{R_U - R_1}{N}$$

Where,

D: Discrimination Index;

Ru : Frequency of correct answers in high knowledge group;

R1: Frequency of correct answers in low knowledge group and N: Total number of respondents in taken sample for item analysis.

An attempt was made to understand the adoption gaps on various aspects of improved onion production practices by computing the number of farmers who adopted each of the recommended practices and classified either as Full, Partial or No Adoption. The operational meaning of Knowledge in this study is a body of understood information about onion cultivation practices possessed by an individual (respondent).

Results and discussion.

The socioeconomic characteristics of the onion farmers are shown in Table 1 and discussed in this first part. The results show that majority (97.1%) of the respondents were full time farmers The age distribution of the respondents in Table 1 revealed a mean age of 45.87years, Age is also assumed to be a determinant of adoption of new technology. It is asserted that older farmers are assumed to have gained knowledge and experience over time and therefore stand a better chance to evaluate technology information than younger farmers (Mignouna et al, 2011; Kariyasa and Dewi 2011). On the contrary age can have a negative adoption as explained by Mauceri et al. (2005) and Adesina & Zinnah (1993) who opined that as farmers grow older, there is an increase in tendency to be risk averse. Whereas, the younger farmers are typically less risk-averse and are more willing to try new technologies. It is said that younger farmers are innovative and are more likely to adopt new technology because they have more

access to current information than older farmers. Nevertheless, older farmers may have the advantage of more experience and resource that would allow them more possibilities for trying a new technology.

Sex differential between household heads is a very important explanatory variable in studying factors of adoption. In this study, majority (78.6%) of the onion farmers were male while female were 21.4%. Agriculture as is practiced in most developing countries is laborious and hence is dominated by the male gender. Due to many socio-cultural values and norms, male have freedom of mobility and participation in different extension programs and consequently have greater access to information and therefore, are more likely to adopt onion package, (Taha 2007). Numerous adoption studies have come up with results showing a household headed by a female negatively influences technology adoption decision. According to Anyanwu, (2003) male farmers are able to withstand and endure certain challenges of life with time more than female.

The marital status of respondents as presented in Table 1 revealed that majority of the farmers were married (85.7%), while 14.3% were either single, widow/widower, divorced or were separated. The large population of married farmers suggests that the farmer is likely to have access to family labour in his/her operations. More so, household size revealed a mean of 7 persons and most (46.4%) of the farmers had 6-10 members in their household. It is thought that higher family labour availability tend to increase the probability to adopt agricultural technology especially if it is demand the use of more labour as is experienced in onion production.

The educational level of the respondents in Table shows that most of them (32.1%) only had non-formal (mostly Koranic) education and 31.4% had only primary education while 16.5% had tertiary education. It is expected that educated household head can make better decision to adopt improved onion varieties than non-educated ones. Level of education enhances awareness, analytical skills, problem solving and decision making, which may likely increase the probability of Adoption

Farmers with higher experience appear to have often full information and better knowledge and are able to evaluate the advantages of the technology. The farming experiences of respondents' presented in Table.1 shows an average experience of 9years and most (30.7%) of the respondents had between 11-15 years of experience, while 1.4% had above 20 years of experience. It is generally expected that productivity increases with years of experience. As farmers gain experience yearly, they master the techniques of production and avoid previous mistakes.

The result of land acquisition and farm sizes (Table 1) shows, majority (67.1%) of the farmers inherited their farms while others (7.1%). were held as communal land. Mode of land acquisition greatly influences farm sizes as well as the scale of production. Onion production was dominated by small-holder farmers with a mean farm size 0.72 hectares showing about 49.3% holding between 01-0.5 hectares. Farm size plays a critical role in adoption process of a new technology. Farm size can affect and in turn be affected by the other factors influencing adoption (Lavison 2013). Some technologies are termed as scale-dependant because of the great importance of farm size in their adoption (Bonabana- Wabbi 2002). Many studies have reported a positive relation between farm size and adoption of agricultural technology (Uaiene et al., 2009; Mignouna et al, 2011). Farmers with large farm size are likely to adopt a new technology because they can afford to devote part of their land to try new technology unlike those with less farm size (Uaiene et al., 2009). Some studies have shown a negative influence of farm size on adoption of new agricultural technology. Small farm size

may provide an incentive to adopt a technology especially in the case of an input-intensive innovation such as a labour-intensive or land-saving technology. Farmers with small land may adopt land-saving technologies such as greenhouse technology, zero grazing among others as an alternative to increased agricultural production (Yaron, Dinar and Voet, 1992;). Other studies have reported insignificant or neutral relationship with adoption. Yishak (2005) reported that farm size exerts a positive influence on adoption of improved technologies. Contrary to this study, Taha (2007) reported that land holding was not significant in adoption of improved onion technology package respectively. Some studies have however shown a positive influence of farm size on adoption decision (Melesse, 2018).Table 1 also shows that majority (64.29%) of the respondents did not belong to any cooperative society, while the remaining (35.71%) belonged to one or more cooperative societies. Membership of cooperative societies is believed to enhance the sharing of information on improved technologies through interactions as well as easing inputs acquisition and handling constraints faced by decision makers (Effiong and Onuekwusi, 2007). The outcome of this study evidently shows that less percentage of the respondents stood to gain some benefit from collective actions of cooperatives.

Access to extension services has also been found to be a key aspect in technology adoption. Farmers are usually informed about the existence as well as the effective use(s) and benefit(s) of new technology through extension agents. Many authors have reported a positive relationship between access to extension services and technology adoption. Exposing farmers to information based upon innovation-diffusion theory is expected to stimulate adoption (Uaiene *et al.,* 2009). The distribution of respondents according to the sources of access to extension service presented in figure 1 shows that most farmers (35%) access extension information from television programs, agricultural office constituted (24.3%), friends and relatives offered 10.7% while others (5.7%) obtained their information from Non-governmental agencies. It was found that about 24.3% farmers did not have regular sources. Frequent extension contact is positively related to the adoption decision of farmers. Tesfaye et al. 2001 and Habtemariam, (2004), in their study reported that the availability of reliable information sources will enhance communication process and had significant associations with adoption of improved technologies. This shows that most farmers in the study area didn't have adequate contact with extension agents which are reflected in the level of adoption of the improved production practices.

Table 1: Socioeconomic Characteristics of onion Farmers

Variable	Categories	Frequency	Percentage	Mean
	18-28	14	10	
	29-38	18	12.86	
Age (years)	39-48	49	35.00	**45.87**
	49-58	38	27.14	
	59-68	21	15	
Sex	Male	110	78.6	
	Female	30	21.4	
	Single	5	4.2	
Marital Status	Married	120	85	
	Widow/widower	9	6.4	

	Divorced/Separated	6	4.4	
	Farming	136	97.1	
Main Occupation	Business	2	1.4	
	Civil Servant	2	1.4	
	1-5	51	36.4	
	6-10	65	46.4	
Household Size	11-15	22	15.7	**7**
	16-20	1	0.7	
	20 and above	1	0.7	
	Non-Formal	45	32.1	
Highest Educational Level	Primary	44	31.4	
	Secondary	28	20.0	
	ND/NCE	12	8.6	
	HND/B.SC	11	7.9	
	1-5	41	29.29	
	6-10	43	30.71	
Farming Experience	11-15	45	32.14	**9**
(years)	16-20	10	7.10	
	21 and above	2	1.40	
	Inheritance	94	67.1	
Land Tenure System	Purchase	13	9.3	
	Lease/rent	23	16.4	
	Communal	10	7.1	
	0.1-0.5	69	**49.29**	
	0.6-1.0	48	34.29	
Farm Size(Ha)	1.1-1.5	11	7.86	**0.72**
	1.6-2.0	9	6.43	
	2.1 and above	3	2.13	
Membership of	Member	50	35.71	
Association	Non-member	90	64.29	

Source: Field Survey data, 2019

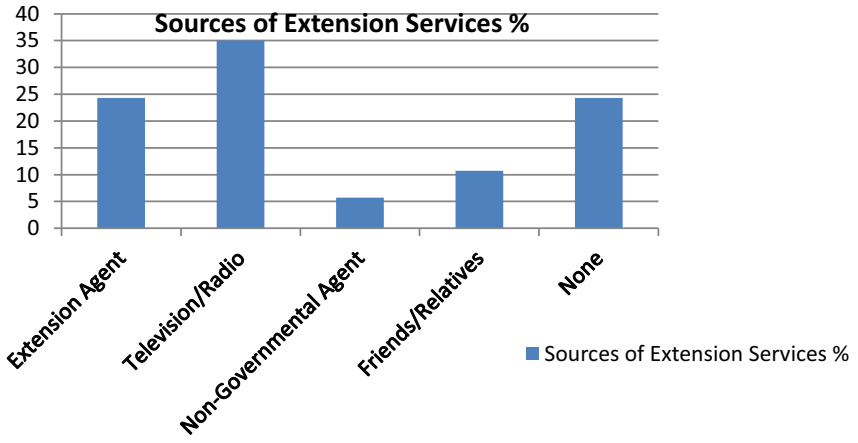

Figure: 1 Sources of extension services

Source: Field Survey data, 2019

Knowledge levels of respondents' on improve practices

Table2 reveals that 38% had medium level of knowledge about recommended onion production technologies followed by high (32%) and low level (30%) of knowledge. This trend might be attributable to low level of education as about 62% of them had primary school certificate or Quranic as their highest level of education and when analysis of access to extension contact, 35% of then learnt improved methods through television or Radios. These factors might have contributed more for possession of medium level of knowledge of onion cultivation practices. These findings confirmed the results of a similar study conducted by Kumari *et al,* (2019)

Overall knowledge of respondents with respect to production t echnology of Onion (N=140)

S/No.	Knowledge Levels	Criteria	Respondents	
			Frequency	Percentage
1	Low	Less than 5.25	42	30
2	Medium	Between 5.25- 6.7	53	38
3	High	More than 6.7	45	32
		Total	140	100

Mean 6.7; SD1.252

Level of Adoption of Improved Onion production practices

The level of adoption by the respondents in the study area is presented in Table 2. The study revealed that onion farmers in the study area adopted about 50% of the recommended improved practices fully. The highest percentages of adoption rates (86.4%) were on transplanting rates and hand weeding while about 71% of the farmers adopted the correct fertilizer type but did not adopted the correct N. P. K. rates. Kumar et al, (2007) asserted that the key factors in the successful growing of onions are planting at the right time, fertilizer application and keeping the weeds down. These thus suggest that the farmers have taken the right step to improving onion production. It was also observed that 65.7% of the onion farmers had adopted the 10-15cm spacing, 62.9% adopted appropriate seedbed preparation while 62.8% adopted the right planting date. other practices fully adopted included, correct soil type selection (57.9%), observing the best harvest period which was practiced by 55% of the farmers while selection of right temperature for onion production was observed by 50.7% farmers. Less than 10% levels of adoptions were observed in the area of correct fertilizer rates and use of modern storage structures while herbicides use recorded 10.7%; use of recommended varieties was adopted by 22.1% farmers and post-harvest treatment was practiced by 27.9% farmers.

A key determinant of the adoption of a new technology is the net gain to the farmer from adoption, inclusive of all costs of using the new technology (Foster and Rosenzweig, 2010). The cost of adopting agricultural technology has been found to be a constraint to technology adoption. For instance, the elimination of subsidies on prices of seed and fertilizers since the 1990s due to the World Bank-sponsored structural adjustment programs in sub-Saharan Africa has widened this constraint (Muzari et al., 2013). Previous studies on determinants of technology adoption have also reported high cost of technology as a hindrance to adoption. The study done by Makokha et al. (2001) on determinants of fertilizer and manure use in maize production in Kiambu county, Kenya reported high cost of labour and other inputs, unavailability of demanded packages and untimely delivery as the main constraints to fertilizer adoption. Cost of hired labour was also reported by

Ouma et al. (2002) as one among other factors constraining adoption of fertilizer and hybrid seed in Embu county Kenya. Wekesa et al. (2003) when analysing determinants of adoption of improved maize variety in coastal lowlands of Kenya found high cost and unavailability of seeds as one of factors responsible for low rate of adoption.

Table 2. Distribution of the onion according to the farmers' knowledge and adoption level of Recommended Production Practices N=140

S/No.	Practices	Knowledge levels						Adoption Levels					
		High		**Medium**		**Lowest**		**Full**		**Partial**		**No Adoption**	
		Freq.	**%**	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**
1	Planting Date	94	67.1	30	21.4	16	11.4	88	62.8	40	28.6	12	8.6
2	Recommended Varieties	31	22.1	88	62.9	21	15	31	22.1	88	62.9	21	15
3	Soil type (well drained medium textured)	87	62.1	28	20	25	17.9	81	57.9	28	20	21	15
4	Temperature (15-25^{0}c)	46	32.9	13	9.3	81	57.9	71	50.7	46	32.9	23	16.4
5	Well tilled nursery seedbed	55	39.3	31	22.1	26	18.6	88	62.9	41	29.2	11	7.9
6	Transplanting date (6-8weeks after sowing)	64	45.7	39	27.9	37	26.4	121	86.4	16	11.4	3	2.2
7	Spacing (10-15cm)	95	67.9	21	15	24	17.1	92	65.7	26	18.6	22	15.7
8	Fertilizer Type (	67	47.9	40	28.6	33	23.6	100	71.4	20	14.3	20	14.3
9	Fertilizer Rates: 65kg N/ha	11	7.9	12	8.6	117	83.6	9	6.4	7	5	124	88.6
10	:40kg P/ha	6	4.3	9	6.4	125	89.3	5	3.6	5	3.6	130	92.9
11	:45kg K/ha	6	4.3	9	6.4	125	89.3	4	2.9	4	2.9	132	94.3
12	Hand weeding	95	67.9	17	12.1	28	20	121	86.4	19	13.6	0	0
13	Herbicide use	32	22.9	41	29.3	67	47.9	15	10.7	11	7.9	114	81.4
14	Pest Control Measures	39	27.9	38	27.1	63	45	63	45	63	45	14	10
15	Diseases Control Measures	56	40	17	12.1	67	47.9	40	28.6	25	17.9	75	53.6
16	Best Harvest Period	84	60	33	23.6	23	16.4	77	55	27	19.3	5	3.6
17	Post-harvest Treatment	39	27.9	16	11.4	85	60.7	39	27.9	16	11.4	85	60.7
18	Modern Storage structure	23	16.4	12	8.6	105	75	14	5	9	6.4	117	83.6

Source: Field Survey data, 2019

Factors Influencing Adoption on Production Practices

The factors influencing adoption of improved onion production practices as presented in Table 3. Several studies have indicated that the adoption of improved varieties are affected by many factors such as farm size, age, family size, education, availability of credit, access to information etc (Dereje 2006).which revealed that the coefficients of the farmer's level of education and source of finance positively influenced adoption of onion production which was significant at 5per cent level of probability. This implies that a unit increase in their level of education will lead to increase in the chance of adoption of improved onion production. Education creates a favourable mental attitude for the acceptance of new practices. Various studies confirmed that it has a significant positive influence on adoption of technologies (Melesse, 2018). This may be due to the fact that education has the power to change the knowledge, skill and attitude of farmers. Adoption is expected to correlate positively as education (Dereje, 2006).

Access to finance showed significantly positive coefficient at 5% level of probability. This implies that access to credit enables in the farmers to adopt the technology. Access to credit has been reported to stimulate technology adoption (Mohamed & Temu, 2008). It is believed that access to credit promotes the adoption of risky technologies through relaxation of the liquidity constraint as well as through the boosting of household's-risk bearing ability (Simtowe & Zeller, 2006). There is therefore need for policy makers to improve current smallholder credit systems to ensure that wider spectrums of smallholders are able to have access to credit (Muzari et al., 2013).

Table 22: Logit regression of factors influencing adoption of improved production practices

Variables	Coefficient	Standard Error	t Value
Age	0.088	0.141	0.391
Level of education	0.012	0.091	0.018**
Years of experience	0.176	0.199	0.782
Farmer's membership of association	0.191	0.386	0.244
Access to extension	0.298	0.239	0.552
Access to finance	0.039	0.243	0.026**

Source: Field Survey, 2019 **: Significant at 5% NS: Not significant

Constraints to Onion Production

The result of Table 4 shows the constraints affecting onion production and their ranks according to order of importance. The three most important constraints were inadequate capital (32%), inadequate fertilizers (28.6%) and inadequate storage facilities (21.4%)

Table 4: Constraint to adoption of improved onion production

	Frequency	Percentage
Inadequate capital	45	32. 2
Inadequate fertilizer	40	28.6
Inadequate Storage Facility	30	21.4
Pest and disease attack	15	10.7
Inadequate market information	10	7.1
Total	**140**	**100.0**

Source: field survey, 2019

Conclusion

It was observed that levels of knowledge of the farmers on improved onion production practice were low attributable partly to the relatively low level of education and inadequate extension services. Dissemination of improved onion production practices via mass media has also been minimal. Nevertheless, some farmers have learnt some improved practices out of many years of production experience.

Recommendation

Based on these findings, it is suggested that adequate trainings be organised for the onion growers to provide the update information about these practices. The problem of low level of education can be enhanced through adult education and mass literacy campaigns.

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