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Home Current Archives About ▾

Home / Archives / Vol 12 (2019)

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Articles

Seed quality affects postharvest characteristics of tomato fruits (*Solanum lycopersicum*)

H.M. Bortey, E Adu-Kwarteng, A Aidoo Snr

986-996



Single and mixed starter culture fermentation of Oso (fermented seeds of *Cathormion altissimum*)

A.A. Jolaoso, T.O.S. Popoola, A.M. Omemu

997-1006



Evaluation of *Phytophthora colocasiae* resistance in Taro (*Colocasia esculenta*) using leaf disc bioassay

J Adomako

1007-1014



Microbial load on hatching eggs from farmhouse to cold room

J.A. Hamidu, F.A. Ndzibah, W.M. Allotey, E Eghan, C Kpemlie, J.O. Darko

1015-1023



Logistic analysis of factors and perception of smallholder rubber farmers to intercrop: a case study involving rubber and plantain intercropping system in



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526 African Journals

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- [Browse Alphabetically](#)
- [Browse By Country](#)

Ghana

E.N. Tetteh, K Twum-Ampofo, A Abunyewa, P.P. Acheampong, I Nunoo, J.N. Berchie, B.M. Dzomeku, A.E. Adjei, F Frimpong, V Logah, C MeLenya, S Yeboah, P Oteng-Darko, L.D. Acheampong, H Tuffour

 PDF

Growth and yield performance of melon (*Citrullus colocynthis* (L.) Schrad as influenced by organic manures

M.J. Ayeni, S Arowosegbe, O.E. Olofintuyi 1040-1049

 PDF

Genetic diversity of bambara groundnut accessions from Burkina Faso using random amplified polymorphic DNA markers

M.N. Konate, H Nandkangre, A Ouoba, S.F. Zida, M Ouedraogo, N Sawadogo, S Nadembega, A.K. Congo, M Sawadogo 1050-1059

 PDF

Effect of RTIMP's commercialisation of cassava on household food security in the Cape Coast Metropolis in the central region of Ghana

K.G. Otchere, K Ohene-Yankyera, A Banunle, E.K. Bediako 1060-1073

 PDF

Farmers' knowledge of the cultivation, economic and nutritional value of radish crop in Iseyin Local Government Area of Oyo State

S.A. Tijani 1074-1084

 PDF

Promoting best business practices among smallholder farmers in Ghana: the case of MiDA training for FBOs in Hohoe District in the Volta Region

S.G. Boakye, K Osei, M.B. Mochiah, J.N. Berchie 1085-1095

 PDF

Phytotoxic effects of aqueous extracts of apple of sodom (*Calotropis procera* W.T) on seed germination of *Ischaemum afrum* (J.F.Gmel.) dandy using probit analysis


A.B. Dafaallah, M.A. Hasabelgabo 1096-1105

 PDF

Effects of conventional food processing methods on the mineral and anti-nutrient composition of sunflower (*Helianthus annuus*) Seeds

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-  [Benin](#) (1)
-  [Botswana](#) (3)
-  [Burkina Faso](#) (3)
-  [Cameroon](#) (8)
-  [Congo, Republic](#) (1)
-  [Côte d'Ivoire](#) (4)
-  [Egypt, Arab Rep.](#) (14)
-  [Eritrea](#) (1)
-  [Eswatini](#) (3)
-  [Ethiopia](#) (30)
-  [Ghana](#) (27)
-  [Kenya](#) (29)
-  [Lesotho](#) (1)
-  [Libya](#) (2)
-  [Madagascar](#) (1)
-  [Malawi](#) (4)
-  [Mauritius](#) (3)
-  [Mozambique](#) (1)
-  [Nigeria](#) (222)
-  [Rwanda](#) (7)
-  [Senegal](#) (6)
-  [Sierra Leone](#) (1)
-  [South Africa](#) (96)
- [South Sudan](#) (1)
-  [Sudan](#) (3)
-  [Tanzania](#) (19)
-  [Togo](#) (1)
-  [Tunisia](#) (2)
-  [Uganda](#) (12)
-  [Zambia](#) (2)
-  [Zimbabwe](#) (12)

S.A. Adesina

1106-1119



Growth, reproduction and survival of quail in savannah ecological zone of Ghana

T.K. Aikins, O.K. Omane, Z.A. Imoro

1120-1132



Analysis of food security status of farmers in Ovia North-East Local Government Area, Edo State, Nigeria

J Ahmadu, O.T. Okoror

1133-1145



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Farmers' Knowledge of the Cultivation, Economic and Nutritional Value of Radish Crop in Iseyin Local Government Area of Oyo State

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Abstract

Fruits and vegetables are important as essential building blocks of any diet. They are loaded with vitamins and minerals. Although, many fruits and vegetables are cultivated, there are yet several others (exotic) with nutritional and economic potentials which farmers' attention has not been drawn to. Meanwhile, farmers in Iseyin Local Government Area (LGA) of Oyo state have commenced cultivation of radish crop. Therefore, the study assessed rural farmers' knowledge on the nutritional and economic value of radish (*Raphanus sativus* L. Family: Brassicaceae) crop in Iseyin LGA of Oyo state in order to boost production and consumption of this vegetable among Nigerians for healthy living. A total of 105 respondents were sampled through the Snowball Technique. Data collected through interview schedule were analyzed using both descriptive (frequencies, percentages) and inferential statistics (Chi-square and PPMC). Findings revealed that the average age of respondents was 47 years, 76.2% were male, 98.1% were married and 94.3% had at least one level of formal education. Household size of the majority (81.0%) and farming experience (92.4%) ranged between 6-8 persons and 20-25 years, respectively. Of all the sampled respondents, 87.6% cultivated Daikon or Japanese radish. Most respondents' source of information was mainly through friends (96.2%). Result further showed that 66.7% and 85.7% of the respondents had favourable perception and average knowledge on radish crop, respectively. Respondents' level of education ($\chi^2 = 89.638, p \leq 0.05$), sources of information ($r = 0.658, p \leq 0.05$), perception ($r = 0.645, p \leq 0.05$) were significantly related to knowledge on the nutritional and economic value of radish crop. Knowledge level on the nutritional and economic value of radish crop cultivation was average among 85.7% of the respondents. Thus, there is need for government, through her extension agency to provide more awareness on the nutritional and economic values of radish crop to cultivators and general public at large.

Key words: Radish crop, Nutrition, Economic value, Knowledge

Connaissance Des Agriculteurs Sur La Cultivation, De La Valeur Economique et Nutritionnelle De La Culture Du Radis Dans La Zone De Gouvernement Local D'iseyin De L'état D'oyo

Résumé

Les fruits et les légumes sont des éléments de base essentiels de tout régime alimentaire. Ils sont chargés de vitamines et de minéraux. Bien que de nombreux fruits et légumes soient cultivés, il en

existe plusieurs autres (exotiques) présentant un potentiel nutritionnel et économique qui n'a pas attiré l'attention des agriculteurs. Dans le même temps, les agriculteurs de la région du gouvernement local d'Iseyin, dans l'État d'Oyo, ont commencé à cultiver des radis. Par conséquent, l'étude a évalué les connaissances des agriculteurs ruraux sur la valeur nutritionnelle et économique du radis (*La famille de Raphanus sativus L.: Brassicacées*) dans la région du gouvernement local d'Iseyin, dans l'État d'Oyo, afin de stimuler la production et la consommation de ce légume chez les Nigériens pour une vie saine. Au total, 105 répondants ont été échantillonnés au moyen de la technique de "Snowball". Les données recueillies dans le cadre des entretiens ont été analysées à l'aide de statistiques descriptives (fréquences, pourcentages) et inférentielles (chi carré et PPMC). Les résultats ont révélé que les répondants avaient en moyenne 47 ans, 76,2% étaient des hommes, 98,1% étaient mariés et 94,3% avaient au moins un niveau de formation officiel. La taille de ménage de la majorité (81,0%) et l'expérience de l'agriculture (92,4%) allaient de 6 à 8 personnes à 20 à 25 ans, respectivement. Sur l'ensemble des répondants de l'échantillon, 87,6% cultivaient le radis qu'on appelle "Daikon" ou "Japanese". La plupart des sources d'information des répondants étaient principalement par des amis (96,2%). Les résultats ont également montré que 66,7% et 85,7% des répondants avaient respectivement une perception favorable et une connaissance moyenne des cultures de radis. Le niveau d'éducation des répondants ($\chi^2 = 89,638, p \leq 0,05$), sources d'information ($r = 0,658, p \leq 0,05$), la perception ($r = 0,645, p \leq 0,05$) étaient significativement liées aux connaissances sur la valeur nutritionnelle et économique de récolte de radis. Le niveau de connaissance sur la valeur nutritive et économique de la culture de radis était en moyenne parmi 85,7% des répondants. Par conséquent, il est nécessaire que le gouvernement, par l'intermédiaire de son agence de vulgarisation, sensibilise davantage les cultivateurs et le grand public aux valeurs nutritionnelles et économiques des cultures de radis.

Mots clés: culture de radis, nutrition, valeur économique, connaissance

Introduction

Agriculture (including hunting, forestry and fishery) contributes to Gross Domestic Product (GDP) of the Nigerian economy and also contributes in no small means to improving food security in the country, as the Nigerian soil and climate is suitable for cultivating different kinds of food crops such as grains, legumes, tubers and vegetables (Yakubu and Akanegbu 2015, FMARD 2018). Crops for long have been the source of food for mankind. Many crops are cultivated by man but there are yet several other crops which despite their high nutritional and economic value, little or no attention is given to them. Essentially, there are so many tropical crops that are of high economic value in other parts of the world which are not known locally. Radish (*Raphanus sativus L.*

Family: *Brassicaceae*) is an example of a root and leafy vegetable food crop grown in the country and world at large. World production of radish roots is estimated at 7 million tonnes per year, which is about 2% of the total world production of vegetables (Rashid, Hafiz, Salik and Farhad, 2015; Kopta and Pokluda, 2013)." The vegetable ranks high in importance in China, Japan, Korea, as well as in Yemen (Schippers, 2004; Kopta and Pokluda, 2013).

In Nigeria, radish is grown in Iseyin local government area of Oyo state. Its potential for generating employment is an added advantage to improving the economic conditions of the people of the area. Moreover, it is a highly nutritive crop that is low in calories, high in Vitamin C, folate and

potassium. It also contains sulphurous compounds like sulphuraphane, which has anti-cancerous properties and it is an expectorant (Crisp 1995, Shona Botes 2011, Schippers 2004).

More so, its roots, leaves, sprouts, seed pods and seeds are edible. The leaves can be used in recipes like potato soup or as a sautéed side dish, and are also found to benefit homemade juices, with some recipes requiring it in fruit-based mixtures. The seed pods can be cooked as soups, while the seed serves as a source of oil which has promise as a source of biofuel (<http://en.wikipedia.org/wiki/Radish>). Medicinally, radish serves as a traditional medicine for treating coughs, cancer, whooping cough, gastric discomfort, liver disorders, constipation, dyspepsia, gall-bladder disorders, arthritis, gallstones and kidney stones (Adams, 2008).

Despite all the benefit accrued from radish crop, its use in the daily life of the people is very low, probably due to limited information and research on the nutritional importance of the crop. More-so, since the crop is highly cultivated in Iseyin local government, it is unclear if farmers have adequate knowledge on the cultivation, economic and nutritional values of the crop. Hence it becomes necessary to assess farmers' knowledge on the cultivation, nutritional and economic importance of radish crop. The specific objectives were to:

1. identify the personal characteristics of radish crop farmers in the study area;
2. examine the respondents' sources of information on radish production;
3. determine the respondents' perception on radish crop

Methodology

The study was carried out in Iseyin Local Government Area (LGA) of Oyo State. Iseyin

is one of the 33 LGAs in Oyo State. The area is located between latitude 7°58'0.012"N and longitude 3°36'0.000"E. It is approximately 100 kilometers north of Ibadan the state capital and has an estimated population of 346,300 (NPC and NBS, 2015). The population of the study comprised all radish crop farmers in Iseyin LGA of Oyo state. There are many registered exotic vegetable growers but not all of them cultivate radish. Thus, snowball sampling technique was used to select a total of 105 respondents out of the many registered exotic vegetable growers in the study area. Data was collected using both qualitative (Focus Group Discussion - FGD) and quantitative method (structured interview schedule). Source of information was measured on a two point scale of Yes and No and were assigned scores of 1 and 2, respectively. Respondents were asked to indicate their perception on radish crop on Likert-scale of Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree, with scores of 5, 4, 3, 2, 1 assigned respectively for positive statements and the score reversed for negative statements. The mean score was determined and used to categorise respondents' perception into favourable and unfavourable. Knowledge on radish cultivation (e.g. radish can be intercropped with other crops, can be cultivated through vegetative propagation, matured radish can be identified by large leaves above the ground, have a very flexible and aggressive growth habit; require well drained soil with consistent moisture etc) economic value (e.g. radish does not require much labour cost, cultivated mainly for sale., there is a standard unit of measurement for the sale of radish, two trucks of radish can be gotten from 1ha of land after harvesting., radish can be sold in trucks etc) and nutritive value (e.g. It is used in the treatment of coughs, radish consists of mineral elements like calcium, vitamins B6 that are good for strong bones and body immunity system

respectively, radish leaves when mixed with other greens like spinach are used in soups, radish can be consumed as appetizer etc) was measured on a two-point scale of correct answer and wrong answer, with scores of 1 and 0 respectively assigned. The mean score was generated and used to categorise respondents' knowledge into high and low.

Results and Discussion

Personal characteristics of respondents

As shown in Table 1, a larger proportion (67.6%) of the respondents fell within the age group of 41-50 years, suggesting that most of the radish farmers in the study are middle aged. This corroborates Ekong (2003), who reported that most farmers in Nigeria are within the middle age bracket. It has been observed that age is a major determinant of farmers' involvement in farming activities (Zhang and Flick, 2001). Findings also reveal that there were more male (76.2%) radish farmers relative to females (23.8%) in the study area which, according to FAO (2001), is due to the fact that women are more involved in off-farm activities than men. It was also revealed that the majority (98.1%) of the respondents were married, with a household size (81.0%) of 6 - 8 persons. Ofoku et al (2009) asserted that married individuals are more involved in agricultural activities. It suggests that their large household size can serve as a source of family labour (Tijani et al, 2012). Table 1 indicates that 94.3% had a level of formal education, while 92.4% had 20 - 25 years of experience in cultivation of radish. Their education and experience can serve as advantage for sourcing information that may help them gain more knowledge on the economic importance of radish crop. Additionally, out of the varieties of radish cultivated in the study area, Daikon (Japanese radish) was the most cultivated (87.6%), which is consequent on the availability of seeds of other varieties of the crop.

Sources of information on cultivation of radish

Table 2 shows that friends (96.2%) and model farmers (96.2%) were equally the two most paramount sources of information on radish cultivation available to the respondents. Information from marketers (57.1%) and farmers' associations (44.8%) was also vital to them. This finding agrees with Olaitan (2010), who observed that a primal source of information in rural areas is that of interpersonal communication which takes place on a daily basis among families, relatives and friends. Radio, which is considered as the most important source of agricultural information in rural areas however provided information on radish for only 2.9%, while extension agents were not utilized as a source of information. It follows that despite several benefits of the crop, there is little awareness about the crop which may be as a result of less research on it. Hence, less or no extension services and radio programme.

Perception on nutritional and economic values of radish

Result in Table 3 shows that 66.7% of the respondents had favourable perception towards the nutritional and economic values of radish. This level of positive disposition towards the crop is quite encouraging and can serve as a medium for policy makers to formulate policy that can promote the inherent benefits of the crop for its eventual embracement by society. Additionally, the fact that some respondents (33.3%) showed unfavourable perception towards the nutritional and economic value of radish however suggests the need for more enlightenment on the nutritional and economic benefits derivable from radish crop.

Table 1: Distribution of respondents by socio-economic characteristics

Variable	Frequency	Percentage	Mean	SD
Age				
21-30	3	2.9	47 years	±5.20
31-40	4	3.8		
41-50	71	67.6		
51-60	27	25.7		
Sex				
Male	80	76.2		
Female	25	23.8		
Marital status				
Single	2	1.9		
Married	103	98.1		
Educational level				
No formal educational	6	5.7		
Vocational	12	11.4		
Primary	40	38.1		
Secondary	34	32.4		
Tertiary	13	12.4		
Household size				
3-5 members	18	17.1	6 members	±0.87
6-8 members	85	81.0		
>8 members	02	1.9		

Source: Field survey, 2014

Table 2: Distribution of respondents by sources of information on cultivation of radish

Source of information	Yes	%	No	%
Posters	06	5.7		
Friends	97	92.4	22 years	±3.20
Extension agents	02	1.9		
Model farmers	62	59.1		
Radio	41	39.0		
Newspapers	2	1.9		
Merchants	01	0		
Market	02	1.9		
Associations	92	87.6		

Source: Field survey, 2014

Table 3: Distribution of respondents by level of perception on nutritional and economic value of radish

Perception	Frequency	Percentage	Minimum Score	Maximum Score	Mean Score
Favourable (23-35)	70	66.7	23	44	36.0
Unfavourable (36-44)	35	33.3			

Knowledge on the cultivation, nutritional and economic value of radish

Using thirty-one knowledge items of cultivation, economic and nutritional value of radish crop, table 4a shows that respondents had some level of understanding of radish crop. This is further explained as 95.2% of the respondents reported that it takes 40-70 days to harvest radish, 93.3% affirmed that radish is a good cover crop group that suppresses weed growth, 92.4% posited that radish can be cultivated through vegetative propagation, 91.4% were aware that radishes have a very flexible and aggressive growth habit, while 60.7% were not aware that residues of radish crops can reduce the survival of plant parasitic nematodes.

Furthermore, 97.1% opined that radish crop is a good source of income, 93.3% indicated that radish crops were mostly cultivated for sales, 90.5% were aware that radish can be sold both locally and internationally. This is an indication that farmers in the study area recognize the fact that radish crop can be a major source of income in meeting their day to day needs. However, 66.7%, of the respondents were not aware that the oil obtained from radish can be purchased by pharmaceutical industry, 57.1% were also not aware of a standard unit of measurement for the sale of radish. This suggests that farmers in the study area do not have adequate understanding of the marketing potentials of radish crop.

Table 4a also revealed that 93.3% opined that radish crop can be used in the treatment of

coughs, 92.4% posited that radish can be consumed as appetizer, 92.4 % were of the opinion that when radish is eaten with carrots, cucumber and lettuce it supplies minerals to the body. On the other hand majority (95.2%) of the respondents were not aware that radish contains anti-oxidant which fights against many ailments in the body, 93.3% declined that radish serves as good detoxifier, 86.7% and 85.7% attested wrongly to the statement that the leaf of radish contains Vitamin C content and radish leaves when mixed with other greens like spinach are used in soups, respectively. This suggests that farmers in the study area are not too conversant with the nutritional benefits of radish crop.

Categorisation of respondents' knowledge on cultivation, economic and nutritional value of radish

Table 4b shows a variation in respondents' knowledge across the three components. Knowledge on cultivation of radish crop was found to be high (55.3%), knowledge on the economic importance of radish stood at average (51.4%) while knowledge on nutritional value of radish crop was found to be low (50.5%) among respondents. The plausible reason for the high level of knowledge on the cultivation of radish crop could be attributed to the day to day activities carried out by farmers on their respective farms and as a result, they may likely get acquainted to the agronomic practices involved in radish cultivation. With respect to the economic importance of radish, the result obtained is an indication that farmers do not

Table 4a: Knowledge of respondents on cultivation, economic and nutritional value of radish

Knowledge Statements	Yes	No
	%	%
Cultivation		
1. Radish is a good cover crop that suppresses weed	93.3	6.7
2. Residues of radish crops reduce the survival of plant parasitic nematodes.	40.0	60.0
3. Radish can be intercropped with other crops.	92.4	7.6
4. Radish can be cultivated through vegetative propagation	90.5	9.5
5. Matured radish can be identified by large leaves above the ground	91.4	8.6
6. Radishes have a very flexible and aggressive growth habit	70.5	29.5
7. Radishes require well drained soil with consistent moisture	81.9	18.1
8. Radish seeds are planted directly into the soil during cultivation.	94.3	5.7
9. It takes 40-70 days to harvest radishes	95.2	4.8
10. Radishes have no serious disease problems	55.2	44.8
11. Radish is usually planted on ridges to facilitate good root production	84.8	15.2
Economic		
1. Radish can be sold both locally and internationally	90.5	9.6
2. Radish crop is a good source of income	97.1	2.9
3. Cultivation of radish crop does not require much labour cost	79.0	21.0
4. Radish is cultivated mainly for sale.	93.3	6.7
5. There is a standard unit of measurement for the sale of radish.	42.9	57.1
6. Two trucks of radish can be gotten from 1ha of land after harvesting.	64.8	35.2
7. Radish can be sold in trucks in large quantities	75.2	24.8
8. The oil obtained from radish can be purchased by pharmaceutical industry	33.3	66.7
9. Radish can be sold in small quantities in baskets.	90.5	9.5
10. Radish can also be sold in bags.	93.3	6.7
Nutritional value		
1. It is used in the treatment of coughs	93.3	6.7
2. Radish consists of mineral elements like calcium, vitamins B6 that are good for strong bones and body immunity system respectively.	31.4	68.6
3. Radish leaves when mixed with other greens like spinach are used in soups.	14.3	85.7
4. Radish can be consumed as appetizer	92.4	7.6
5. The leaf of radish contains Vitamin C content.	13.3	86.7
6. Radish contains anti-oxidant which fights against many ailments in the body	4.8	95.2
7. When radish is eaten with carrots, cucumber and lettuce it supplies minerals to the body	92.4	7.6
8. Juice from radish cures inflammation and burning sensations during urination	21.9	78.1
9. Radish serves as good detoxifier	6.7	93.3
10. Both the leaves and the root are edible	90.5	9.5

Table 4b: Categorisation of respondents' knowledge based on cultivation, economic and nutritional value of radish

Knowledge on Cultivation of radish	Freq	%	Mean	Standard Deviation	Minimum Value	Maximum Value
Low (1-5.7)	10	9.5				
Average (5.8-9.7)	37	35.2	7.7	1.9	1	1.1
High (9.8-11)	58	55.3				

Knowledge on Economic importance of radish	Freq	%	Mean	Standard Deviation	Minimum Value	Maximum Value
Low (1-5.7)	24	22.9	7.3	1.5	1	10
Average (5.8-8.7)	54	51.4				
High (8.8-10)	27	25.7				

Knowledge on Nutritional value of radish	Freq	%	Mean	Standard Deviation	Minimum Value	Maximum Value
Low (0-4.1)	53	50.5	5.8	1.6	0	9
Average (4.2-7.3)	41	39.0				
High (7.4-9.0)	11	10.5				

Table 4c: Overall knowledge of respondents on the cultivation, economic and nutritional value of radish crop

Knowledge level	Frequency	%	Mean	Standard Deviation
Low	10	9.5		
Average	90	85.7	25.0	±5.4
High	05	4.8		

Table 5: Chi-square test showing relationship between respondents' sex, level of education and knowledge on nutritional and economic importance of radish crop

Variable	χ^2 -value	Df	p-value
Sex	1.794	1	0.408
Level of Education	89.638	4	0.000

Source: Field survey, 2014

Table 6: Correlation between respondents' information sources, perception and knowledge on the nutritional and economic value of radish crop

Variable	r-value	p-value
Sources of information	0.658	0.000
Perception	0.645	0.000

Source: Field survey, 2014

have adequate knowledge on economic benefits of radish crop which made them to patronize only mile 12 in Lagos state to dispose off their produce. The low level of respondents' knowledge on the nutritive value of radish suggests that farmers in the study area do not have better understanding of the nutritional potentials of radish crop.

Overall knowledge of respondents on cultivation, economic and nutritional value of radish

On the overall, the knowledge level of the respondents' as shown in Table 4c indicates that while the majority (85.7%) had average knowledge on the cultivation, economic and nutritional value of radish, 9.5% and 4.8% had low and high knowledge on the crop respectively. Focused Group Discussion (FGD) results confirmed respondents' knowledge with the following responses:

Radish is planted throughout the year. It is planted year in year out, there is no season for it. The capacity of the farmer determines the quantity and the season it is planted. (FGD)

It takes about 40- 50 days before radish is harvested on the farm. Harvesting is done by pulling. After harvesting, the radishes are washed with a soft sponge and clean water to make it look beautiful and fresh in the sight of the consumers in the market. (FGD)

“With our experiences, in terms of taste radish is known to be peppery. It has a lot of nutritional value which are important to our systems. Concerning the economic value, we make a lot of profits all the year round”. (FGD)

“Also, radish is consumed by animals like goat and sheep when not properly packed in sacks for transportation. They eat the leaves and the fruit. It is known to be highly

nutritious to their body”. (FGD)

It follows that in as much as a preponderance number of the respondents who cultivate radish are only averagely knowledgeable about the crop, there is a need for more enlightenment on its nutritional, economic and general cultivation among farmers in the study area.

Relationship between respondents' socio-economic characteristics and knowledge on the nutritional and economic value of radish crop

Table 5 shows that there was a significant relationship between respondents' level of education and knowledge on the economic importance of radish crop ($\chi^2 = 89.638$, $p \leq 0.05$), while other characteristics were insignificant. This implies that a farmer's education level influences his or her knowledge on the economic importance of radish crop. It can be said that the higher the level of education of a radish farmer, he or she is expected to possess a higher knowledge level on the economic importance of the crop and vice versa. This result gives a reflection of why some sources of information were not utilised by the respondents, which could be consequent on their level of education.

Relationship between respondents' sources of information and knowledge on nutritional and economic value of radish crop

Table 6 shows that there was a significant relationship between respondents' sources of information and knowledge on nutritional and economic value of radish crop ($r = 0.658$, $p \leq 0.05$). This implies that the sources of information available to the farmers have an influence on their knowledge on the nutritional and economic value of the crop. This is explainable from the point that a farmer's knowledge on radish hinges on how well he or she is informed about the crop

based on the availability and accessibility of information sources. It is expected that the higher the quality of information from the various sources, the more knowledgeable the farmer will become and otherwise. It is also seen in Table 6 that a significant relationship existed between respondents' perception and knowledge on the nutritional and economic value of radish crop. This suggests that respondents' knowledge on the nutritional and economic value of radish can predict whether they will be favourably disposed or otherwise towards it.

Conclusion and recommendations

The farmers were mostly male, married and of middle age. The variety of radish cultivated by most of them was Daikon or Japanese radish. They accessed information on the crop via interpersonal means such as friends and model farmers. Knowledge on the nutritional, economic and cultivation of radish crop among farmers was on the average, and they had favourable perception towards the crop. Level of education, sources of information and perception of the respondents were significantly related to their knowledge on the nutritional and economic value of radish crop. The favourable disposition towards radish crop among farmers further portends its prospect if adequate measures are put in place. Hence, the study recommends the need for government, through her extension agency to provide more awareness on the nutritional and economic value of the crop.

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