

**AWARENESS AND UTILIZATION OF THREE LEAF YAM (*Dioscorea dumetorum*) AMONG
SELECTED FARMERS' IN ORU WEST LOCAL GOVERNMENT AREA OF IMO STATE, NIGERIA.**

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Abstract

This study examined pattern of three-leaf yam awareness and constraints in its utilization among selected farmers in Oru West Local Government area of Imo State, Nigeria. Data were collected with structured questionnaire administered to 80 farmers that were purposively selected. Percentages, mean scores, and Chi –square and regression analyses were employed for data analysis. The findings revealed that the various forms of three-leaf yam utilized by the farmers included, by-products of three-leaf yam used as organic manure (\bar{x} =3.22), and its peels used to feed goats and sheep (\bar{x} =3.19). Farmers identified three-leaf yam as highly nutritious for the aged (\bar{x} =3.33) and all the respondents (100%) utilized three-leaf yam by boiling. The sources of awareness were through communication in the market (72.2%), and friends and family (70.9%). Major constraints to the use of three-leaf yam included long cooking period (\bar{x} =3.40); its bitter taste (\bar{x} =3.38); low shelf life (\bar{x} =3.24) and poor knowledge of its nutritive value (\bar{x} =3.01). There were no significant relationship in the awareness and utilization of three-leaf yam among the farmers. Conclusively, the farmers were aware of the importance of three-leaf yam, but strive to increase its cultivation, utilization and its acceptance as staple food. Trained agricultural extension agents should be posted to the rural communities to educate households on the value of three-leaf yam.

Keywords: Three-leaf yam, Awareness of three-leaf yam, Utilization, Food security, Nutrition

Introduction

Yam is one of the most highly regarded food products, closely integrated into the social, cultural, economic and religious aspects of life. The ritual, ceremony and superstition on yam cultivation and its use in West Africa is an indication of the antiquity of yam use. There are various species of yam, among which is the three-leaf yam which is grown in Nigeria. Among the edible and cultivated species are: Water yam (*Dioscorea alata*), white yam (*Dioscorea rotundata*), yellow guinea yam (*Dioscorea cayensis*), Ariel yam (*Dioscorea bulbifera*), Chinese yam (*Dioscorea esculentus*) and three-leaf yam (*Dioscorea dumetorum*) which are of more nutritional importance for human consumption (Egbonu, *et al*, 2014).

Three-leaf yam (*Dioscorea dumetorum*) is a wildy cultivated variety and recognized by different ethnic groups in Nigeria as Ona (cultivated variety) or Ewu (wild variety) in Igbo language, Esuru in Yoruba language and Kosanrogo in Hausa language (Adelekan, *et al*, 2013). Three-leaf yam is a tuber crop which is identified by its cluster form, its anti-clockwise twining trifoliate shaped leave; and its bitter taste. It grows mainly in the wild though some are cultivated. Three-leaf yam comes in different colours ranging from yellow, white and off-white. According to Fasaanu, *et al*, (2013), it is easy to differentiate cultivated three-leaf yam from wild variety of three-leaf yam. The wild variety of three-leaf yam has a lot of spines in the aerial part of the plant than the cultivated variety; both cultivars possess the same characteristics such as colour, cluster form, trifoliate leaf shape and nutritional status. Three-leaf yam is highly digestible and has more nutritional value than any other species of yam. Its protein content is about 11.4%, crude fiber is 2.03%, energy and carbohydrate is 361.90kcal/100g and 77.5%, respectively, vitamins and minerals (Alozie *et al*, 2009; Polycarp, *et al*, 2012).

Many researchers (Emodi, *et al*, 2009; Emodi and Dimelu, 2012; Emodi, *et al*, 2014) have encouraged and promoted the importance of crops such as soyabean, rice, basil, cocoyam, with less attention attached to three-leaf yam and its nutritional importance. The high demand for staple such as cassava and its produce such as Garri, sweet potatoes, white yam has accounted for the high demand of these crops leaving some crops such as three-leaf yam underutilized. This has resulted to farmers' lost of interest in cultivation of three-leaf yam in their farms. This attitude of farmers towards other species of crops is leading to three-leaf yam extinction; in no time will be forgotten crops for the younger generation. Utilization of three-leaf yam should be encouraged as one diet rich in protein, carbohydrate, vitamins and minerals. The ban associated with three-leaf yam consumption is the post-harvest hardening, low shelf live if not utilized immediately. There is the issue of low binding capacity of the flour which attracts consumers to other roots and tuber crops such as cassava flour, Garri, white yam flour, rice flour and corn flour. However, the accessibility of three-leaf yam produce would encourage increased consumption of this nutritious root tuber crop in the study area. The study therefore sought to identify the various forms

of three-leaf yam utilization among selected farmers; determine the level of awareness of three-leaf yam among rural households; ascertain the channels of communication in utilization of three-leaf yam and constraints to the utilization of three-leaf yam by rural households.

Methodology

This study was conducted in Oru West Local Government Area (LGA) of Imo State, Nigeria. Oru LGA is one of the 27 Local Government Areas in Imo State. Oru West is located at the northern part of the state; bounded with the southern part of Anambra state. Oru West is located on Latitude 5°37'N and Longitude 6°57'E. Its estimated population is about 117,492 and has an area of 93km³ (NPC, 2006). Agriculture is known to be the primary occupation and income generating activity of the people of Oru West LGA. The people are engaged in other occupations such as trading, carpentry and teaching. All farmers' households' in the study area formed the study population. Eight (8) communities were selected from Ten (Aji, Ibi-Asoegbe, Ubulu, Ozara, Eleh, Nempi, Mgbidi, Ohakpu, Otulu and Amaofuo) communities that made up Oru West LGA. In each of the eight (8) communities, eight (8) households' were randomly selected. In each of the eight (8) households', Ten (10) respondents were selected based on their ability to contribute and take decisions as farmers and in

households' issues. A total of eighty (80) farmers were selected for the study. Seventy nine respondents who correctly filled their copies of questionnaire were used for the study. Mean scores and regression analysis were employed for data analysis. A four-point Likert's type scale with options: Very High (4); High (3); Low (2) and Very Low (1) were applied for analysis and the cut-off point was 2.50.

Results and Discussion

Socio- economic characteristics of the farmers

Table 1 shows that majority (75.9%) of the respondents were female, married (67.1%) with (69.6%) household size of 7-9 persons, (51.9%) attended primary education and mean age of 47.5 years. This implies that females are major contributors to agriculture, food security and economic development in the study area. Most of their households' tend to distribute farm labour within the household than hiring outside farm labour. They are of middle active age. This infers that level of education does not determine the strength involved in carrying out farm activities. Also (100%) of the respondents had farm size of 1-3 hectares and grow mostly cassava (77.2%). This shows that they are subsistence, small scale farmers; whose farm produce are mainly consumed by their families, except for excess which are exchanged with goods which they do not produce; for want of income.

Table 1: Distribution of respondents' according to personal and Socio- economic characteristics

Socio-economic	Variables	Frequency(n=79)	Percentages (100%)
Sex	Male	19	24.1
	Female	60	75.9
Age	30-35	1	1.4
	36-40	6	7.6
	41-45	28	36.3
	46-50	40	49.6
	51 and above	4	5.1
Primary occupation	Trading	21	26.6
	Farming	41	51.7
	Civil servant	4	5.2
	Teaching	3	3.8
	Farm labourer	10	12.7
Educational level	No formal education	11	13.9
	Primary education	41	51.9
	Secondary education	13	16.5
	Tertiary education	14	17.7
Marital status	Single	6	7.6
	Married	53	67.1
	Divorced	20	25.3
Household size	1-3 persons	6	7.6
	4-6 persons	7	8.9
	7-9 persons	55	69.6
	10 and above persons	11	13.9
Farm size	1-3 hectare	79	100.0
	4-6	-	-
	7-9	-	-
	10 and above	-	-
Crops mostly grown	Yam	18	22.8
	Cassava	61	77.2

Source: Field Survey, 2015

Regression model showing the relationship between the socio-economic characteristics and three-leaf yam utilization among rural households'

The result from Table 2 shows that semi log have the highest (r^2) none of the variables are significant at 5% which implies that the independent variables does not affect the rate of utilization of three-leaf yam. Age and household size shows a positive coefficient which implies that increase in household size and age increase the rate of utilization of three-leaf yam. Age gave a coefficient of 0.003, which shows that as the age of the respondent increases, the rate of utilization of three-leaf yam increases. This implies that as the age increases the level of awareness and utilization also increases because older people utilize three-leaf yam because of their health and for treatment of diabetes. This is in agreement with Dike *et al.* (2012) that three-leaf yam is a source of food for aged parents and adults in the treatment of diabetics. Marital status of the respondents gave a coefficient of -0.010 which implies that a unit increase in the marital status will lead to decrease in the rate of utilization of three-leaf yam. In the other way, a unit decrease in the marital status will also lead to an increase in

the utilization of three-leaf yam. Educational level of the farmer gave a coefficient of -0.021 signifying that a unit increase on the level of education of the farmers will lead to a decrease in the utilization of three-leaf yam. As well as educational level decreases the rate of utilization increases. The implication of this finding is that, household with better educational level will have a greater level of awareness and utilization of three-leaf yam.

Primary occupation shows a coefficient of -0.019 that a unit increase in the primary occupation (farming) will lead to a decrease in the utilization of three-leaf yam in other way, a unit decrease in the primary occupation an increase in utilization of three-leaf yam. The implication of this is that, household size with higher primary education will utilize more of three-leaf yam. Household size shows 0.01 signifying as the household size increases the level of utilization of three leaf yam increases. The implication of this result is that, an increase in the household, increase the utilization of three-leaf yam. The coefficient of determination (R^2) is 0.347 implying that the relationship between the dependent and independent variables is about 34%.

Table 2: Regression model showing the relationship between the socio-economic characteristics and three-leaf yam utilization among rural households'

Variables	Linear model			Semi-log model			Double-log model		
	Coefficient	std error	t-value	coefficient	std error	t-value	coefficient	std error	t-value
Age	0.003	0.024	0.126	0.003	0.017	0.154*	0.020	0.052	0.389
Marital status.	-0.012	0.021	-0.586	-0.010	0.015	-0.685	-0.027	0.038	-0.714
Sex	-0.003	0.037	-0.081	-0.004	0.026	-0.139	-0.002	0.044	-0.052
Educ. Level	-0.028	0.015	-1.872	-0.021	0.011	-1.976	-0.045	0.028	-1.609
Occupation	-0.0025	0.013	-1.938	-0.019	0.009	-2.065	-0.041	0.025	-1.660
Household Size	0.008	0.028	0.267	0.006	0.020	0.301*	0.015	0.044	0.348
R2	0.327			0.347			0.312		

Source: Field survey, 2015

Levels of awareness of three-leaf yam

Table 3 shows that three-leaf yam was rated highest as being nutritious especially for the aged (\bar{x} =3.33) while three-leaf yam used as complement for infant (\bar{x} =2.58) ranked second. This implies that the respondents are aware that the bitter taste of three-leaf yam contains some nutritional components for replacement and repair of body tissues, especially in the case of diabetic patient and also

good as a complement for infants. In support, Dike *et al.* (2012) opined that three-leaf yam is a source of food for the aged, in the treatment and repair of body tissues for the diabetics. While Alozie *et al.* (2009) state that the amount of protein in three-leaf yam makes it an alternative to cereal in human nutrition and also a raw material for production of weaning formula for infant

Table 3: Levels of awareness of three-leaf yam benefits

Variables	VA	A	SA	NA	Mean	Remark
Three-leaf yam is highly nutritious especially for the aged	52(65.8)	11(13.9)	6(7.6)	10(12.7)	3.33	High
It's a source of plant protein	6(7.6)	32(40.5)	12(15.2)	29(36.7)	2.19	Low
It's a substitute for animal protein for rural farmers		15(19.0)	28(35.4)	39(45.6)	1.73	Low
I use it in suppurating (ripening discharge) boils and wounds		16(20.3)	24(30.4)	39(49.4)	1.71	Low
I use three-leaf yam as complement for infant	9(11.4)	41(51.9)	16(20.3)	13(16.5)	2.58	High
I use three-leaf yam to reduce the quantity of carbohydrate food and weight loss	1(1.3)	13(16.5)	9(11.4)	56(70.9)	1.48	Low
Three-leaf yam does not contain bad fat(cholesterol)	1(1.3)	14(17.7)	7(8.9)	57(72.3)	1.48	Low
Three-leaf yam digest easily in the stomach.	4(5.1)	41(59.1)	15(19.0)	19(24.1)	2.38	Low
Three-leaf yam is used for patient recovering from illness	1(1.3)	39(49.4)	20(20.5)	19(24.1)	2.28	Low

Source: Field survey, 2015

Forms of three-leaf yam utilization among selected household farmers

Entries in Table 4 show that the most acceptable forms of utilizing three-leaf yam by rural households' were: by using the by-product of three-leaf yam as a source of organic manure ($\bar{x}=3.22$), by boiling and eaten with pepper soup ($\bar{x}=2.84$), using the peels from three-leaf yam to feed domestic goats and

sheep ($\bar{x}=3.19$) and combining three-leaf yam and beans as porridge ($\bar{x}=2.55$). This implies that there are various forms in which three-leaf yam can be utilized. In support, Afoakwa and Sefah- Dede (2001) confirmed that three-leaf yam is boiled and eaten like other common yam.

Table 4: Various forms of three-leaf yam utilized among selected household farmers

Variables	Mean	Remark
I use three-leaf yam as fufu with soup	1.24	Low
I use three-leaf yam to thicken my soup	1.33	Low
I roast three-leaf yam as meal	1.47	Low
I make three-leaf yam into chips as family meal	1.44	Low
I eat pounded three-leaf yam with pepper soup	1.24	Low
The by-product of three-leaf yam is a good source of organic manure	3.22	High
The peels from three-leaf yam is used to feed domestic goats and sheep	3.19	High
Three-leaf yam is mixed with cocoyam, cassava as fufu	1.95	Low
By boiling and eaten with pepper soup	2.84	High
Combining three-leaf yam and beans as porridge	2.55	High

Sources: Field survey, 2015 Mean (x) \geq 2.50

Relationship between awareness and utilization of three-leaf yam by farmers

H₀: There is no significant difference between the level of awareness and utilization of three-leaf yam in the area of study. The analysis between the awareness and utilization of three-leaf yam as represented by Table 5 shows that, there is a positive and non-significant relationship ($r=0.715$; $p>0.05$) between awareness and utilization of three-leaf yam

by farmers. This relationship infers that the level of awareness of three-leaf yam is not proportional to the utilization of three-leaf yam by farmers. The implication of this is that, as the level of three-leaf yam awareness decreases the utilization of three-leaf yam will also decrease. Therefore, the null hypothesis is accepted while the alternative (H_A) is rejected.

Table 5: Chi –square analysis on the relationship between awareness and utilization of three-leaf yam by farmers

	Value	Df	Asymp.sig(2 sided)
Pearson chi square	0.358	3	0.715

Source: Field survey, 201

Channel of communication in utilization of three-leaf yam among farmers

Table 6 shows that majority (72%) of the respondents' channel of communication was through the market. This implies that it is not out of place to

learn about three-leaf yam in the market, since it is where purchases are made. About 70.9% of them were through friends and family members, while 39.2% and 21.5% were through radio giggles and health centers and health workers, respectively.

Table 6: Channels of communication on three-leaf yam among selected farmers

Variables	Frequency(n=79)	Percentage (100%)
In the market	57	72.2
Through family members	56	70.9
Radio programme giggle	31	39.2
Through health centers and health workers.	17	21.5
Local government agencies programmes	14	17.7
Through community women programme	10	12.7
Farm teaching on the importance of three-leaf yam	10	12.7
Extension agents teaching on yam production	9	11.4
Extension workers home visits	9	11.4
Through church teachings	6	7.6
During new yam festival in my village	4	5.1
I attended workshop on three-leaf yam production	2	2.5

Source: Field Survey, 2015

* Multiple Response

Constraints to three-leaf yam utilization

Entries in Table 7 show that the major constraints to the use of three-leaf yam included long cooking period (\bar{x} =3.40); it has a bitter taste (\bar{x} =3.38); low shelf life (\bar{x} =3.24) and poor knowledge of its

nutritive value (\bar{x} =3.01). This implies that price is not a constraint neither does availability of the product, but awareness of the knowledge of its nutritional content, Food is eaten because it is going to do you good.

Table 7: Constraints to the use/utilization of three-leaf yam

Constraints	Mean Score	Remarks
I do not know the yam	2.05	NAC
It is forbidden to eat the yam	1.98	NAC
It has low shelf life	3.24	AC
Not readily available in the market	17	NAC
Poor knowledge of its nutritive value	3.01	AC
It has a bitter taste	3.38	AC
It takes time to cook	3.40	AC
I do not like the colour of the yam	9	NAC
It cannot be eaten without oil or salt like the real yam	1.80	NAC
The price of three-leaf yam is very costly	2.02	NAC

*NAC=Not A Constraint, AC= A Constraint

Source: Field Survey, 2015

Conclusion

Three-leaf yam is a bitter yam with less shelf live after harvesting; and requires long cooking to be edible. Rural farmers are aware of its nutritious and medicinal value especially for the aged, and therefore been used as a complements for infants.

Three-leaf yam was mostly utilized by boiling and eating with pepper soup, the by-product used as a good source of organic manure and the peels used to feed domestic goats and sheep. However, if the farmers are very much aware of the nutritional

components of three-leaf yam, it will encourage and motivate them to cultivate more of this crop.

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