Competency Improvement Needs of Farmers in Melon (*Citrullus colocynthis)* Production for Sustainable Agriculture in North Central, Nigeria

[1]Ochani Nicodemus Agbulu., [1]James Towo Aguma and [*1]Amonjenu Anthony

Department of Vocational Agriculture and Technology Education, Federal University of Agriculture, Makurdi Benue State, Nigeria

Abstract

This study was carried out to determine competency improvement needs of Farmers in Melon Production for sustainable agriculture in North Central, Nigeria. Three objectives guided the study while three research questions were answered and one null hypothesis was formulated and tested at 0.05 level of significance. Survey research design was adopted for the study. The population of the study was 1,256,168 consisting of 1,254,818 registered farmers and 1,350 agricultural extension agents in North Central, Nigeria. The sample for the study was 708 consisting of 400 registered melon farmers and 308 agricultural extension agents. Taro Yamane formula was used to determine the sample size for the study. The instrument used for data collection was a 25-items structured questionnaire developed by the researchers from literature reviewed for the study. The questionnaire items were grouped into three sub-groups, each of the items in all the sub-groups had response categories of needed and performance. The instrument was face and content validated by five experts. Cronbach Alpha method of estimating reliability was used to determine the internal consistency of the competency items and reliability coefficients obtained were 0.80 and 0.75 for needed and performance categories respectively. The data collected were analyzed using weighted mean and Improvement Needs Index (INI) to answer the research questions and students't-test was used to test the null hypothesis. The findings showed that melon farmers needed competency improvement in 7 items for pre-planting of melon, 7 items for planting of melon and 11 items for harvesting of melon fruits. It was recommended that agricultural extension agents should utilize the identified competency improvement needs in melon production to train melon farmers in order to improve in melon production, the identified competency improvement needs should be utilized by skill acquisition centers to train melon farmers and those who may be interested in melon production and policy makers in education should ensure that the teachers of agriculture in secondary schools and schools of agriculture should use the identified competency needs to train their students on step-by-step activities in melon production among others.

Keywords: Melon, Production, Farmer, Competency and Sustainable Agriculture

Introduction

Melon, (*Citrullus colocynthis*) is among the most popular African indigenous vegetable crops produced in Nigeria on a large scale. It originated from Western Kalahari and region of Namibia and Botswana, where it is still found in the wild diversity of forms together with citrullus species (Amali, Kortse and Vange (2013). Melon is a crop that is deliberately grown by farmers with the intention of harvesting the gourds when they are matured. Melon fruits are globular or oval. The skin can be smooth or rough. It is either green or streaked with white patches. Melon crop is of two major types, one whose flesh is sweet and sometimes red, and it is called water melon, while the second one is which is the focus of this study is grown in gourds which are mainly cultivated for their seeds called tsoma melon whose flesh is neither sweet nor edible (Maggs-Kolling, Madsen and Christiansen, 2000).

Nutritionally, melon seed contains food nutrients such as protein, fat and oil, carbohydrate, vitamins, amino acids and minerals (Funmibadejo, 2015). Melon has been an important indigenous African oil seed consumed in Nigeria because it is use in making soup (Achebe, 2013).

Medically, melon seeds are used to reduce cholesterol in the body. Also due to the high potassium content, which acts as a vasodilator, melon may be used to reduce blood pressure and lowered chances of developing coronary heart disease and stroke. The seeds can be used to treat tuberculosis when pulverized (Funmibadejo, 2015). Melon crop is good for mixed farming system and its spreading nature covers the   ground, as such suppresses weed growth on farm thereby cutting down the cost of the production (Bello and Makanju, 2011).

Production in the view of Olukosi and Ogungbile (2015) is the process of combining various material inputs and immaterial inputs in order to make something for consumption. Production in this context involves the successful management of agronomic practices for growing melon. These agronomic practices are planning, pre-planting, planting, weeding, fertilizer application, harvesting and processing which are all carried out by the farmers

A farmer is a person engaged in agriculture, raising livestock for food and raw materials for industries. This usually applies to people who do some combination of raising field crops, orchards, vineyards, poultry, or other livestock (Dyer, 2007). To be efficient in production of melon seeds to ensure for food security and sustainability in agricultural production, these farmers may need competency improvement in all the production processes of melon.

Competency, according to Abu (2008) is a standardized requirement for an individual to properly perform specific job. It compasses a combination of knowledge, skills and attitude to improve performance. The author further explained that improvement is the process of a thing moving from a lesser state to a state considered to be better usually through some action intended to bring about that better state than before. Competency improvement in the view of Ukonze and Olaitan (2010) entails the process of making melon farmers acquire those competencies in which they are deficient in melon production through retraining for sustainable agriculture.

Sustainable agriculture, according to Gold (2009), means an integrated system of plant and animal production practices having a site-specific application that will last over the long term.To determine the competency improvement needs of farmers, there must be need assessment. Watkins, West and Visser (2012) stated that need assessments can help to improve the quality of programme decisions, thus leading to improvements in performance and the accomplishment of desire results. In the context of this study, need assessment is the process of determining the difference between the level of competency possessed by the farmers and their expected competency in melon production by the analyses of data collected from melon farmers and agricultural extension agents. The result obtained is the need gap value which indicates that melon farmers need competency improvement in melon production in North Central Nigeria.

When the improvement needs of melon farmers are determined through assessment and retrained in managing agronomic practices in melon production, there will be increase in the quantity of melon produce and supply to the market. It is against this background that this study intends to determine competency that needs improvement in melon production for sustainable agriculture in north central Nigeria.

Statement of the problem

Melon production in North Central Nigeria has been on decrease over the years. This is evident in the increasing demand and short supply of melon seeds and melon products. The increase in demand does match with the production and supply. According to Oyediran, Omoare and Ajagbe (2016), the percentage of melon yield declines in Nigeria from 103.26% in 2007 to 92.98% in 2008. The melon farmers are constrained by many problems including those of poor access to modern inputs and credit, poor infrastructure, inadequate access to markets, land and environmental degradation, and inadequate research and extension services and scanty empirical studies of factors that impede melon productivity. The reason for the shortfall in melon production is partly due to the fact that most melon farmers produce melon at subsistence level using traditional farming methods, intercropping system and ineffective utilization of modern farming techniques. These practices result to decrease in yields and low income to melon farmers. It is in light of this background that the researchers have set out to find what areas of competencies melon farmers need improvements for sustainable agricultural production in North Central Nigeria.

Objectives of the study

The main objective of the study was to determine the competency improvement needs of farmers in melon production for sustainable agriculture in north Central, Nigeria Specifically, the study sought to determine competency improvement needs of melon farmers in:

1. pre-planting operations of melon;
2. planting operations of melon; and
3. harvesting of melon fruits

Research questions

The following research questions were raised and answered by the study.

1. What are the competency improvement needs of farmers in pre-planting operations for melon production?
2. What are the competency improvement needs of farmers in planting operations for melon production?
3. What are the competency improvement needs of farmers for harvesting of melon fruits?

Statement of Hypothesis

The following null hypotheses were formulated and tested at 0.05 level of significance
1. There is no statistical significant difference in the mean ratings of melon farmers and agricultural extension agents on the competency improvement needs of melon farmers in pre-planting operations of melon production in north central, Nigeria.
2. There is no statistical significant difference in the mean ratings of melon farmers and agricultural extension agents on the competency improvement needs of melon farmers in planting operations of melon production in north central, Nigeria.
3. There is no statistical significant difference in the mean ratings of melon farmers and agricultural extension agents on the competency improvement needs of melon farmers in harvesting of melon fruits.

Methodology

The study adopted survey research design. The area of the study is north central Nigeria, which consists six states; Benue, Kogi, Kwara, Niger, Nasarawa, Platea and Federal Capital Territory Abuja. The population of the study was 1,256,168 consisting of 1,254,818 registered farmers and 1,350 extension agents in North Central, Nigeria. The sample of this study was 708 consisting of 400 registered farmers and 308 extension agents. Taro Yamane formula was used to determine the sample size for the study. The sampling technique employed for sample selection was multistage sampling technique. At the first stage, purposive sampling technique was adopted to select five states in north central Nigeria. Based on the number of sampled registered farmers and extension agents, proportionate stratified random sampling technique was used to determine the sample of each stratum (state). This was done by computing the estimate of the overall strata (states).

The instrument used for data collection was a structured questionnaire titled" Improvement Needs of Farmers in Melon Production Questionnaire (INFMPQ).The questionnaire consists of twenty five (25) structured competency items. The questionnaire has two parts. Part A was used to collect information on the personal data of the respondents. Part B was organized into three sub-groups on competency improvement needs of farmers in melon production. The sub-groups are: competency items for pre-planting (7 items), competency items in planting operation (7 items) and competency items for harvesting melon fruits (11 items). Each section had response categories of needed and performance. The needed category had four-point response options likewise the performance category had four-point response options. The instrument of the study was validated by five experts, three from Vocational Agriculture and Technology Education Department and two from crop production Department of the University of Agriculture Makurdi, Nigeria. A trial testing was done to determine the reliability of the instrument by using thirty copies of the Improvement Needs of Farmers in Melon Production Questionnaire (INFMPQ) on thirty (30) respondents in Kaduna State who were not part of the population to be used for the study. The data collected from the trial testing of the instrument were analyzed using Cronbach Alpha reliability methodo determine the internal consistency of the INFMPQ items. The analysis yielded a reliability index of 0.80 and 0.75 for needed and performance categories of the questionnaire respectively.

The researchers administered the instrument to the melon farmers and agricultural extension agents involved in the study areas. The researcher engaged five (5) research assistants in the administration of the instrument to the melon farmers and agricultural extension agents in North Central, Nigeria.The data collected from the respondents were analyzed using Improvement Needs Index (INI) and weighted mean to answer research questions while t-test was used to test the null hypotheses at 0.05 levels of significance. To determine the performance gap and competency

improvement needs of melon farmers, the following steps were taken by using weighted mean.

1. The weighted mean (Xn) of each item under the needed category was calculated.
2. The weighted mean (Xp) of each item under the performance category was calculated.
3, The difference between the two weighted means from each items of needed and performance categories (Xn-Xp) was calculated to obtain the need gap value (NG)

i.   Where the difference is zero (O) there is no need for competency improvement on that item because the level of need for that item is equal to the level at which the melon farmers will perform that particular competency item.

ii.   Where the difference is negative (-) for any item, there is no need for competency improvement on that item because the level of need for that item is lower than the level at which the melon farmers could perform the competency item.

iii.   Where the difference is positive (+) for any item, there is need for competency improvement because the level at which that item is needed is higher than the level at which the melon farmers will perform the competency item.

The decision rule for rejection or otherwise of hypotheses was based on the p-value and alpha value. A hypothesis of no significant difference was not rejected for any cluster of item whose p-value is equal to or greater than alpha value of 0.05 ($P \geq 0.05$) while it was rejected for any cluster of item whose p-value is less than alpha value of 0.05 ($P < 0.05$).

RESULTS

The results of the study were obtained from the research questions answered and hypotheses tested through data collected and analyzed.

The data for answering research questions and testing hypotheses are presented in Tables 1 to 6 as follows:

Research Question 1

What are the competency improvement needs of farmers in pre-planting operations of melon production?

Table 1. Performance Gap Analysis of Mean Ratings of Respondents on Competency Improvement Needs of Farmers in Pre-planting Operations of Melon Production (N= 708: n_1 =400 Melon Farmers; n_2 = 308 Agricultural Extension Agents)

SN	Competency items in pre-planting operation.	$\bar{X}_n$	$\bar{X}_p$	PG $\overline{(Xn - Xp)}$	Remark
1	Select a suitable site for melon production in terms of soil fertility, climatic factors and market demand.	3.97	3.4	0.57	IN
2	Clear the trees, grass on land manually or mechanically and level the surface for easy plotting.	3.97	3.33	0..64	IN
3	Map out the land into plots to create roads and parts.	3.8	1.64	2.16	IN
4	Plough the soil to incorporate the remains of cleared vegetation.	3.84	1.68	2.16	IN
5	Spread organic matter to increase soil nutrient.	3.93	2.08	1.85	IN
6	Harrow to pulverize soil and incorporate organic manure into the soil.	3.83	1.97	1.86	IN
7	Make ridges of about 20 meters long, 1 meter wide and 3cm high.	3.98	3.21	O.77	IN

$\bar{X}$n= Mean of Needed (Extension agents), $\bar{X}$p = Mean of Performance (Farmers), PG = Performance gap, N = Number of respondents, IN = Improvement Needed.

The data in Table 1 revealed that the performance gap (PG) values of all the seven (7) items ranged from 0.57 – 2.16 and were positive. This indicated that melon farmers needed improvement in all the seven competency items in pre-planting operations of melon production.

Research Question 2

What are the competency improvement needs of farmers in planting operations of melon production?

Table 2. Performance Gap Analysis of Mean Ratings of Respondents on Competency Improvement Needs of Farmers in Planting Operations of Melon Production (N= 708: n_1 =400 Melon Farmers; n_2 = 308 Agricultural Extension Agents)

SN	Competency items in planting operation.	$\bar{X}_n$	$\bar{X}_p$	PG $(\bar{X}n - \bar{X}p)$	Remark
8	Identify suitable period for planting April and May months.	3.95	3.02	0.93	IN
9	Test the seeds for viability for planting.	3.9	2.69	1.21	IN
10	Soak melon seeds in the solution rodent's killer for three minutes.	3.89	2.79	1.1	IN
11	Planting on the ridges, measure out spacing 1.5 meters between the rows.	3.92	3.06	0.86	IN
12	Sowing 2 -3 seeds per hole cover the seeds with soil and press slightly.	3.97	3.46	0.51	IN
13	Check for germination 5 days after planting and supply missing stands.	3.96	2.71	1.25	IN
14	Thin out a stand more than two melon seedlings.	3.96	1.55	2.41	IN

$\bar{X}_n$= Mean of Needed (Extension agents), $\bar{X}_p$ = Mean of Performance (Farmers), PG = Performance gap, N = Number of respondents, IN = Improvement Needed.

The data presented in Table 2 revealed that the performance gap values of all the seven (7) competency items ranged from 0.51 to 2.41 and were positive. This indicated that melon farmers needed improvement in all the listed planting operations of melon production.

Research Question 3

What are the competency improvement needs of farmers in harvesting operations of melon fruits

Table 3. Performance Gap Analysis of Mean Ratings of Respondents on Competency Improvement Needs of Farmers in Harvesting of Melon Fruits (N= 708: n_1 =400 Melon Farmers; n_2 = 308 Agricultural Extension Agents)

SN	Competency items in harvesting operations.	$\bar{X}_n$	$\bar{X}_p$	PG $(\bar{X}n - \bar{X}p)$	Remark
15	Harvest matured melon gourds using hands to cut the melon head.	3.93	3.21	0.72	IN
16	Use wheel barrow, head-pan or basket for carrying melon gourds to gather in heaps.	3.97	2.49	1.48	IN
17	Use cutlass or pestle to break the melon gourds into half.	3.98	3.36	0.62	IN
18	Allow broken gourds for 5 days to ferment.	3.72	3.3	0.42	IN
19	Apply appropriate chemical to speed fermentation.	3.81	2.84	0.97	IN
20	Expose broken gourds to rain and sun for 5 days to ferment.	3.99	3.21	0.78	IN
21	Remove seeds from the fermented flesh into a container.	3.99	3.45	0.54	IN
22	Use water to wash off the melon seeds.	3.79	3.0	0.79	IN
23	Use mat or tarpaulin to dry the seeds for 2-3 days in the sun.	3.96	3.35	0.61	IN
24	Collect melon seeds into container.	3.95	3.29	0.66	IN
25	Put melon seeds into bags.	3.93	3.28	0.65	IN

$\bar{X}_n$= Mean of Needed (Extension agents), $\bar{X}_p$ = Mean of Performance (Farmers), PG = Performance gap, N = Number of respondents, IN = Improvement Needed.

The data presented in Table 3 revealed the performance gap values of all the eleven competency items ranged from 0.42 to 1.48 and were positive. This indicated that melon farmers need improvement in harvesting of melon fruits.

Testing of Hypothesis

Hypothesis

HO_1: There is no statistical significant difference in the mean ratings of melon farmers and agricultural extension agents on the competency improvement needs of melon farmers in pre-planting operation of melon production in north central, Nigeria.

Table 4. t-test Analysis of the Mean Ratings of the Responses of Melon Farmers and Agricultural Extension Agents on Competency Improvement Needs of Melon Farmers in pre-planting Operations of Melon Production in North Central, Nigeria

Status	N	Mean	Std. Deviation	Std. Error Mean	Df	t-cal	Sig.	Remark
Melon farmers	400	3.69026	.19582	.01116				
					706	112.556	.000	S, R
Extension Agents	308	2.6375	.37268	.01863				

N= Number of respondents, Std = Standard deviation, df = degree of freedom, t-cal = t-calculated, Sig. = P-value; $P < 0.05$, S = significant, R = rejected.

Table 4 revealed a p-value of .000 which was less than the alpha value of 0.05. This indicates that there was statistical significant difference between the mean ratings of the responses of melon farmers and agricultural extension agents on competency improvement needs of melon farmers in pre-planting operations of melon production in north central, Nigeria. Therefore, hypothesis of no significant difference for the two groups of respondents on competency improvement needs of melon farmers in pre-planting operations of melon production in north central, Nigeria was rejected.

HO_2: There is no statistical significant difference in the mean ratings of melon farmers and agricultural extension agents on the competency improvement needs of melon farmers in planting operation of melon production in north central, Nigeria.

Table 5. t-test Analysis of the Mean Ratings of the Responses of Melon Farmers and Agricultural Extension Agents on Competency Improvement Needs of Melon Farmers in Planting Operations of Melon Production in North Central, Nigeria

Status	N	Mean	Std. Deviation	Std. Error Mean	Df	t-cal	Sig.	Remark
Melon farmers	400	3.6311	.56112	.041200				
					706	-1.45	.090	NS, NR
Extension Agents	308	3.8332	.38123	.087211				

N= Number of respondents, Std = Standard deviation, df = degree of freedom, t-cal = t-calculated, Sig. = P-value; $P > 0.05$, NS = Not significant, NR = Not rejected.

Table 5 revealed a p-value of .090 which was greater than the alpha value of .05. This indicates that there was no statistical significant difference between the mean ratings of the responses of melon farmers and agricultural extension agents on competency improvement needs of melon farmers in planting operations of melon production in north central, Nigeria. Therefore, hypothesis of no significant difference for the two groups of respondents on competency improvement needs of melon farmers in planting operations of melon production in north central, Nigeria was no rejected.

HO₃: There is no statistical significant difference in the mean ratings of melon farmers and agricultural extension agents on the competency improvement needs of melon farmers in harvesting of melon fruits in north central, Nigeria.

Table 6: t-test Analysis of the Mean Ratings of the Responses of Melon Farmers and Agricultural Extension Agents on Competency Improvement Needs of Melon Farmers in Harvesting of Melon Fruits in North Central, Nigeria

Status	N	Mean	Std. Deviation	Std. Error Mean	Df	t-cal	Sig.	Remark
Melon farmers	400	3.2706	.22912	.03062				
					706	-1.00	.318	NS, NR
Extension Agents	308	3.3077	.24452	.01859				

N= Number of respondents, Std = Standard deviation, df = degree of freedom, t-cal = t-calculated, Sig. = P-value; P > 0.05, NS = Not significant, NR = Not rejected.

Table 5 revealed a p-value of .318 which was greater than the alpha value of .05. This indicates that there was no statistical significant difference between the mean ratings of the responses of melon farmers and agricultural extension agents on competency improvement needs of melon farmers in harvesting of melon fruits in north central, Nigeria. Therefore, hypothesis of no significant difference for the two groups of respondents on competency improvement needs of melon farmers in harvesting of melon fruits in north central, Nigeria was no rejected.

Discussion of the findings

In Table 1, the result of the data analyzed revealed that melon farmers needed improvement in 7 competency items in pre-planting operations of melon production. The competency items where melon farmers needed improvement include: Select a suitable site for melon production in terms of soil fertility, climatic factors and market demand, Clear the trees, grass on land manually or mechanically and level the surface for easy plotting, Map out the land into plots to create roads and parts, Plough the soil to incorporate the remains of cleared vegetation, Spread organic matter to increase soil nutrient, Harrow to pulverize soil and incorporate organic manure into the soil and Make ridges of about 20 meters long, 1 meter wide and 3cm high. However, the finding from the corresponding hypothesis on Table 4 revealed that there was statistical significant difference between the mean ratings of the responses of melon farmers and agricultural extension agents on competency improvement needs of melon farmers in pre-planting operations of melon production in north central, Nigeria. This implies that mean ratings of agricultural extension agents was higher than their counterpart (melon farmers).The results of this study is in consonance with the findings of Ezeokeh (1998) in a study carried out on competencies needed and possessed by rice farmers in Abia state, where it was found out that rice farmers needed capacity building in 10 competencies in pre-planting operations.

Findings on competency items in planting operations in Table 2 indicated that melon farmers needed improvement in 7 competency items. The competency items include Identify suitable period for planting April and May months, Test the seeds for viability for planting, Soak melon seeds in the solution rodent's killer for three minutes, Planting on the ridges, measure out spacing 1.5 meters between the rows, Sowing 2 -3 seeds per hole cover the seeds with soil and press slightly, Check for germination 5 days after planting and supply missing stands and Thin out a stand more than two melon seedlings. The findings from Table 2 was further supported by findings from hypothesis two on Table 5 which revealed there was no statistical significant difference between the mean ratings of the responses of melon farmers and agricultural extension agents on competency improvement needs of melon farmers in planting operations of melon production in north central, Nigeria. The findings were in conformity with the findings of Omeje and Asogwa (2013) in a study carried out on resource management skill improvement needs of Women Farmers in melon production for poverty reduction in Enugu state, Nigeria, where it was found out that women farmers needed improvement in 6 skill items in planting operations. The findings of the scholars cited helped to add validity to the findings of this study.

From Table 3, the result of the data analyzed revealed that melon farmers needed improvement in 11 competency items for harvesting of melon fruits. The result of the corresponding hypothesis tested in Table 6 further revealed that there was no statistical significant difference between the mean ratings of the responses of melon farmers and agricultural extension agents on competency improvement needs of melon farmers in harvesting of melon fruits in north central, Nigeria. The result of this study is in line with the findings of Mariah (2013) in a study conducted on egusi melon production, where some competencies needed improvement were identified in harvesting melon gourds as thus:

harvested fruits are horizontally cut into two or three parts and are left to decompose until the seeds are free of the fruits, seeds are collected, washed thoroughly and sun dried.

Conclusion

This study determined competency improvement needs of farmers in melon production for sustainable agriculture in North Central, Nigeria and concluded that melon farmers in north central Nigeria needs competency improvement in pre-planting operations, planting operations and harvesting of melon fruits. Determining the competency improvement needs of melon farmers in north central, Nigeria will bring to the fore, those agronomic practices that melon farmers need improvement and when their competencies are improved upon, this will bring about the desired increase in melon and its products.

Recommendations

Based on the findings of the study, the following recommendations were made:
1.   The identified competency improvement needs should be utilized by skill acquisition centers to train melon farmers and those who may be interested in melon production to sustain agriculture.
2.   The agricultural extension agents should utilize the identified competency improvement needs in melon production to train melon farmers in order to improve in melon production through adopting modern farming technologies.
3.   Policy makers in education should ensure that the teachers of agriculture in secondary schools and schools of agriculture should use the identified competency needs to train their students on step-by-step activities in melon production.

References

Abu M. (2008). *Competency improvement needs of farmers in soil conversation in Kogi state* (Unpublished masters Thesis). Department of Vocational Teacher Education, University of Nsukka, Nigeria.

Amali, E.P., Kortse, P.A. and Vange, T. (2013). The quality of egusi melon (*citrullusLanatus, matsum and Nakai*) seeds derived from fruits harvested at different growth stages and at different positions on the mother plants. *International Journal of Scientific and Research Publications,* 3(4), 2250-3153.

Bello, E.I. and Makanju, T. (2011).Performance evaluation of egusi melon seed- oil biodiesel. *International Journal of Agricultural Research,* 2(5), 27-38.

Dyer, C. (2007). A Suffolk farmers in the fifteenth century. *Agricultural History Review* ,55(1),1-22.

Ezeokeh, N.U. (1998). *Competencies needed and possessed by rice farmers in Abia state.* (Unpublished MEd Thesis). Department of Vocational Teachers Education, University of Nigeria, Nsukka.

Funmi, B. (2015). *National benefits of egusi*. Retrieved from https:// Funmibadejo word press comitog/nutritional benefits of Egusi melon on 20th July, 2016.

Gold, M. (2009). *What is Sustainable Agriculture?* LAS Vegas:United States Department of Agriculture, Alternative Farming Systems Information Center. Pp. 34.

Maggs-Kolling, G.L., Madsen, S., and Christiansen, J.L. (2000). A phonetic analysis of morphological varieties in *Citrullus Lanatus* in Namibia. *Genetic Resources and Crop Evaluation, 1 vol 3.*

Mariah, A. (2013). Egusi melon (Citrulluslanatus) crop Malaysian new oil every source: production processing and prospects. *International Journal of Agriculture Innovations and Research,* 2(1), 21-30.

Olukosi, J.O. and Ogungbile A.O. (2015).*Introduction to agricultural production economics: Principles and Applications*. Zaria: Agitab Publishers Ltd. Pp78-90.

Omeje, N.M. and Asogwa, V.C. (2013) Resource management skill improvement needs of women farmers in melon production for poverty reduction in Enugu State, Nigeria. *International Journal of Agriculture Innovations and Research,* 2(1) 81-89.

Oyediran, W.O., Omoare, A.M. and Ajagbe, B.O. (2016). Factors affecting sustainability of melon (egusi) production in rural farming households of south-west, Nigeria. *American Journal of Agricultural Research, AJAP* 1(1), 45-53.

Ukonze, J.A. and Olaitan, S.O. (2010). Competency improvement needs of women in agriculture in processing cocoyam flour and chips for food security in south eastern Nigeria. *Journal of Technical Education*, 1(1), 149-157.

Watkins, R., West, M.M. and Visser, G. (2012). A guide to assessing needs: Tools for collecting information, making decisions and achieving development results. Washington, D.C: World Bank Bulletin