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**PRODUCTION NEED GAPS OF HOUSEHOLDS IN PEPPER
PRODUCTION FOR ALLEVIATION OF POVERTY IN CROSS RIVER
STATE**

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Abstract

It is a reality that pepper production has potentials for increasing the income levels of households in Cross River State thereby alleviating their poverty level but the overdependence of external supply of the produce may not be unconnected with the competencies of these households. This study identified the production need gaps of households in pepper production for alleviation of poverty in Cross River State. Four research questions guided the study. The survey research design was adopted for the study. The sample for the study was 438, pepper farmers registered with the Cross River Agricultural Development Programme. A 33-Competency Item Questionnaire (CIQ) for identifying production gaps where households require improvement in pepper production for alleviation of poverty was used for the study and validated by three experts in Departments of Vocational Education and Crop Science, University of Calabar. The reliability of the instrument was determined through Cronbach Alpha method and a coefficient of 0.76 was obtained. Data collected was analyzed using Improvement Needed Index (INI) to answer the research questions. The study found out that households in Cross River State, Nigeria needed improvement in 11 competencies in pre-planting, 6 competencies in planting, 8 competencies in post planting and 8 competencies in marketing operations of pepper production to alleviate

their poverty. It was concluded that households generally needed improvement in pepper production to enhance its production and alleviate their poverty. The study recommends that the identified skills be integrated into the extension outreach programme for training of households to ensure greater output of pepper in the study area.

Introduction

Pepper (*Capsicum* spp) refers to a species of flowering plants which belong to the nightshade family native to tropical America. Pepper which are fleshy, spicy and sometimes pungent are perennials which are also sometimes grown as annuals and can perform well on almost all soil types in most parts of the world. Kim et al, (2014) and Idowu-agida et al, (2010) describe pepper as an important widely grown spice crop that is extensively used in foods in the world. Pepper is ranked third amongst the world's very important vegetable crops, following onion and tomato (Peet, 2006) and seen as the initial spice used by human beings (Hill, et al, 2013). Besides, Purseglove, et al (1981) reported that pepper originated from Mexico and Bolivia in Latin America and constitutes an essential component of the diet of man since 7500BC. Data on pepper production over the years reveals that output has been high. The Food and Agricultural organization FAO statistics (2003) approximates the world output of peppers in 2001 at 21.3 million tons obtained from a cultivated area of 1.6 million ha (average yield 13.4 t/ha). The organization also shows that China is the largest producer of pepper with 10 million tonnes, preceded by Mexico (1.9 million tonnes) and Turkey (1.5 million tonnes). Adesina et al (2014) reported that pepper production in Africa is calculated at one million tonne. The authors explained that Nigeria produces (715,000 tonnes from 90,000 ha) and Ghana (270,000 tonnes from 75,000 ha) as largest producers in Sub-saharan Africa.

Many varieties of pepper are cultivated. Bosland and Votava (2000) stated that about 22 wild and five domesticated species are cultivated. According to the authors, the five domesticated cultivars are *C. Chinenses.*, *C. baccatum* L., *C. pubescens* R, *C. annum* L., and *C. frutescens* L. The authors explained that *Capsicum* cultivars are divided into several groups based on features such as fruit characteristics from the perspectives of colour, shape, intended use, pungency, size and flavour. Lin, et al (2013) submit that in spite of the differences in features of the crop, most varieties of *Capsicum* grown in large quantities in the world are of the *C. annum* L species. There are an estimated 1,600 different varieties of pepper (*Capsicum annum*) throughout the world (Delelegn, 2011). Some varieties include Anaheim chili, caribbean red pepper, cayenne pepper, Hannero hot peppers, Poblano/ancho, Thai hot peppers plants among others (Gardenersnet, 2015). The cultivars usually cultivated in Nigeria are; Cayenne pepper or red pepper-Sombo (*C. frutescens*) bird peppers-atawere (*C. frutescens*), Tatase (*C. annum*), Nsukka yellow pepper (*C. annum*) and Atarodo (*C. annum*), and also

Pepper according to Medcrave (2018) is propagated from seedlings directly to the soil or transplanted from nursery after five to six weeks of tender care in hotbeds or green houses. The author explains that it belongs to the berry fruit variety and the plant grows rapidly and it becomes woody as it matures producing foliage of alternately arranged leaves. The author further explained that peppers produce a single flower with five petals from about the 20th week of cultivation with simple brightly coloured fruits, which come in a variety of shapes commonly described as bell-shaped, slender fingerlike, circular to furrowed shapes.

The nutritional and culinary value of pepper is recognized across almost cultures and regions of the world. As Arnason (2019) notes, peppers, especially the bell peppers which are often known as sweet peppers are incredibly nutritious as one cup of (149 grams) of chopped red pepper contains nine (9g) of carbs, 3g of which are fibre. Also, peppers are known to be

rich in vitamins C, A, E and B5, with a significantly high content of potassium, magnesium, iron, calcium and phosphorus. In terms of improving the taste of food, pepper is said to be at the top of the table, especially the black variety (piperinigrum) because of its ability to enhance dietary iron absorption. Arnason (2019) stated that eating uncooked bell peppers together with iron rich foods such as spinach or meat may help increase iron concentration of the body. To Dipeolu and Akinbode (2007), pepper is a very rich high in vitamins E and A with a greater content of vitamin C which prevents flu-colds as compared to other vegetables. Similarly, Bernster (2009), submits that pepper contains a good quantity of pro vitamins B, and A with citrin; B2 (riboflavin), B2 (riboflavin), B1 (thiamine); in addition to vitamins, making the crop a valid source of therapy for cancer. Furthermore, Abel (2009) averred that the crop enhances the movement of gastric juice and saliva; relieves cramps, improves complexion and soothes gout as well as raises body temperature. To Bosland and Votava (2000), pepper is majorly cultivated for its pungency and good store of alkaloid and capsoicinoid that makes it an essential ingredient in the composition of spice used in food worldwide. The authors also explained that pepper supplies assortment of needs, like increasing the consumption of stored grains and dull diets.

Apart from its nutritional value of pepper as a spice in several continental and local meals, the crop is known to have other enormous medicinal uses including the treatment of certain kinds of ulcers, anaemia, eye defects and can help in the improvement of blood circulation. Howard, et. al. (2000), reveal that because peppers contain antioxidants, their consumption may reduce inflammation associated with cancer and may indeed reduce the risk of cancer. Also, Singletary (2010) reveals that pepper may contain anti-depressant, anti-ageing and anti-inflammatory properties, and may also play a role in enhancing digestive tract health. Little wonder then, it can be found on many tables and counter tops across the world since it is also a good source of natural colours. The widespread use of pepper in households in Nigeria indicates that it is an important agricultural produce with high economic value. In fact, Udegbe et. al. (2012) reveals the economic value chain of pepper production as the producer, assembler, wholesaler, retailer and finally the consumer. This chain represents a viable economic enterprise in the production, storage and distribution of pepper.

Production according to Eyiye, (2001) is the making of something or the rendering of any service, which satisfies a human want. Pepper production as used in this study entails all the processes geared towards ensuring that pepper fruits are obtained from land clearing to post harvest handling by households in Cross River State. These processes could be grouped into pre-planting, planting, post planting and marketing operations. Pre-planting operations includes such activities as site selection, clearing and land preparation. Planting operations on the other hand addresses activities such as actual planting of the stems, weeding, supplying, pest and disease control among others. Similarly, post planting operations covers activities like harvesting and post harvesting processing of cassava while marketing operations are activities that ensure that pepper is favourably marketed at a profit to alleviate the poverty level of households in the study area. Although many households in the State cultivate pepper in their gardens, there is a significant number of registered commercial pepper farmers with the Agricultural development Programme of the State. These registered pepper farmers who are male and female have enough experience and could provide valid information on perceived performance of competencies in pepper production.

In recent times the supply of pepper across the southern part of the country has declined remarkably due to several disruptions in the production and distribution channels making it necessary for residents in Cross River State to depend mostly on local production which seems inadequate to feed the large demand by households. This situation has however

created a production (supply) gap that if it were to be filled could create a valuable income stream for the producers. The implication of this scenario is that given the necessary competencies and resources, pepper cultivation would have emerged as a huge revenue earner for household and a great lever for alleviating rural poverty among these farmers in the State.

Statement of the problem

Over the years, like it has been stated elsewhere, there has been an over-dependence on pepper supply from other parts of the country into Cross River State, due to low output of the crop in the State. In spite of the known nutritional, health and economic benefits of the crop, coupled with the fact that this spice is used widely and daily in almost every household in the State, not forgetting also that it grows fairly well on all soil types in all parts of the State. Abubakar (2015) and Adigun (2001) observed that the production of pepper in Nigeria is on decline such that Nigeria imports pepper to make up for the low production. The estimated yield of 9t/ha obtained on the farmers field is low compared with the estimated yields of 15t/ha obtained in developed countries or those obtained from research field in Nigeria (Extension bulletin no.206 in Ugwu, 2016).

However, cursory survey has revealed that the farmers themselves complain about the low yield of pepper, which they wonder whether it may be due to soil quality or some other supernatural curse, like the anger of the gods. Agricultural experts have also pondered over this problem of low yield, hence low supply and tend to ascribe the situation to a number of determinants including the competencies of the farmers in pepper production. The combined problems of dwindling external supply, and the low output levels of the local farmers has created a situation that is approaching a crisis level in the pepper food chain. This study is therefore designed to identify production need gaps of households in pepper production for alleviation of poverty in the State.

Purpose of the study

The major purpose of the study was to identify production need gaps of households in pepper production for alleviation of poverty in Cross River State. Specially therefore, the sought to identify the:

1. production need gaps of households in pre-planting operations of pepper for alleviation of poverty in Cross River State?
2. planting need gaps of households in planting operations of pepper for alleviation of poverty in Cross River State
3. post planting need gaps of household in post planting operations of pepper for alleviation of poverty in Cross River State
4. marketing need gas of households in marketing of pepper for alleviation of poverty in Cross River State.

Methodology

Cross River State is the locale for this study, which was guided by four research questions. The design used for the study was descriptive survey. The descriptive survey design studies group of people or items by collecting and analysing data from a few people or items considered to be representative of the entire group. The population for the study was 876 registered pepper farmers obtained from the Extension Division of Cross River Agricultural

Development Programme (CRADP). Four hundred and thirty eight (438) pepper farmers representing 50% sample size was involved in the study. The choice of 50% sample is in agreement with the statement of Boll and Gall in Okeme, Alawa and Akwagiobe (2014) that when a defined population is less than a thousand, 50% could be used for reduction of sampling error. The sample for the study was obtained through stratified random sampling technique based on the three agro-ecological zones, that is, southern, central and northern zones of the State.

The researchers developed a 33-Competency Item Questionnaire (CIQ) was used identify production gaps where households require improvement in pepper production for alleviation of poverty was used for the study. The questionnaire had two groups, that is, level of requirement and performance. A 4 point response scale of Very Highly Required, Highly Required, Moderately Required and Not Required with numerical values of 4, 3, 2 and 1 respectively measured the requirement category while the performance category used a response scale of High performance, Average performance, Low performance and No performance with corresponding scores of 4, 3, 2 and 1 respectively. The level of requirement category was responded to by experts in the department of Crop Science in the University of Calabar while the farmers responded to the performance category.

The validity of the instrument was done by three experts. One from the Department of Vocational Education (Agricultural Education Unit) and two from Department of Crop Science, University of Calabar. The reliability of the instrument was ascertained using Cronbach Alpha method with an alpha value of 0.76 obtained. The researchers administered 438 copies of the questionnaire were administered on the respondents with the help of three hired and trained research assistants and 418 copies representing 95% return rate was retrieved for analysis.

The data collected was coded and analyzed using weighted mean and Improvement Needed Index (INI) developed by Olaitan and Ndomi (2000) to answer the research questions. The weighted mean required of each skill item was represented by ($\bar{X} R$) while the weighted mean performance of respondents for each item was represented by ($\bar{X} P$). The difference between the two means that is ($\bar{X} R - \bar{X} P$) was determined to indicate Performance Gap (PG) which could yield a zero (0), negative or positive value.

- a) A difference of zero (0) indicates that there is no need for improvement because the level at which teachers of agriculture were performing in teaching the item is equal to the level that is required.
- b) A negative (-) difference implies that there is no need for improvement because the level at which teachers of agriculture were performing in teaching the item is more than what is required.
- c) A positive (+) PG indicates that there is need for improvement because the level at which teachers of agriculture were performing in teaching the item is lower than what is required.

Results

The presentation of results was guided by the objectives of the study.

Research question One

What are the production need gaps of households in pre-planting operations of pepper for alleviation of poverty in Cross River State?

The data is presented in Table 1

TABLE 1 Performance Gap Analysis of the mean ratings of the perceived competencies of households in pre-planting operations of pepper for alleviation of poverty in Cross River State (N=418)

S/N	Item Statements	$\bar{X} R$	$\bar{X} P$	PG	Rmks
1	Draw a plan for pepper production enterprise	3.41	2.06	1.35	IN
2	Select a site for pepper production enterprise	3.03	2.95	0.08	“
3	Clear the land with appropriate tools	2.97	3.04	-0.07	INN
4	Select a section of the farm land for nursery production	3.12	3.12	0.00	INN
5	Select a good and high yielding variety of pepper for planting	3.56	2.63	0.93	“
6	Apply organic manure to the soil	3.10	2.90	0.20	“
7	Drill seeds into nursery in seed boxes or trays at a spacing of 5cm by 5cm	3.18	2.06	1.12	“
8	Provide a shade for the nursery	3.22	3.34	-0.12	INN
9	Supply water to the seedlings morning and evening	3.09	3.02	0.07	IN
10	Weed the nursery regularly	3.41	3.38	0.03	IN
11	Prepare ridges or beds for pepper cultivation	3.11	2.98	0.13	IN

Key:

$\bar{X} R$ = Mean of Competencies Required; $\bar{X} P$ = Mean of pepper farmers' performance in the Competencies; PG = Performance Gap; IN = Improvement Needed; INN = Improvement Not Needed and N = Number of respondents.

Data on Table 1 presents that the performance gap (PG) of households (pepper farmers) for nine (9) out of eleven (11) pre-planting operations competency items ranged from 0.03 to 1.35 and are positive. This indicates that the pepper farmers needed improvement in the nine competencies isolated for the study. The PG value for item four was zero (0) indicating that farmers do not need improvement in selecting a section of the farm plot for nursery preparation for pepper. Furthermore, the result shows that the PG for items three and eight are -0.07 and -0.12 respectively and are negative. This implies that there is no need for improvement because the level at which farmers are performing the skill items, that is, clearing of the farm land and provision of shade for raising of pepper in the nursery. Since pepper farmers did not need improvement in only three out of eleven competencies included for the study, they therefore needed improvement in pre-planting operations of pepper for reduction of poverty in the State.

Research question two

What are the production need gaps of households in planting operations of pepper for alleviation of poverty in Cross River State?

The data presented in Table 2

TABLE 2 Performance Gap Analysis of the mean ratings of the perceived competencies of households in planting operations of pepper for alleviation of poverty in Cross River State (N=418)

S/N	Item Statements	\bar{X}_R	\bar{X}_P	PG	Rmks
1	Transplant pepper seedlings at 10-15cm height with a ball of earth around April and May using a hand trowel	3.44	2.1	1.3	IN
2	Plant seedlings at a spacing of 60cm x 60cm on the beds or ridges	3.38	2.2	1.1	“
3	Cover the seedling stands with light soil	3.18	3.1	0.0	“
4	Apply organic manure to the pepper seedlings transplanted	3.42	2.7	0.7	“
5	Apply appropriate mulching materials to the seedlings to conserve moisture	3.16	3.0	0.1	“
6	Keep records of activities in the farm	3.51	1.9	1.5	“

Data on Table 2 shows that the performance gap (PG) of households (pepper farmers) for six (6) planting operations competency items ranged from 0.02 to 1.53 and are positive. This indicates that the pepper farmers needed improvement in the six planting operations competencies of pepper for alleviation of poverty in the State.

Research question three

What are the production need gaps of households in post-planting operations of pepper for alleviation of poverty in Cross River State?

The data presented in Table 3

TABLE 3 Performance Gap Analysis of the mean ratings of the perceived competencies of households in post-planting operations of pepper for alleviation of poverty in Cross River State (N=418)

S/N	Item Statements	\bar{X}_R	\bar{X}_P	PG	Rmks
1	Replace all seedlings that could not withstand transplanting shocks	3.38	3.11	0.27	IN
2	Weed the farm regularly with hoe, cutlass or selective herbicide	3.46	3.10	0.36	“

3	Apply Ammonium sulphate fertilizer at the rate of 100kg per hectare	3.62	2.84	0.78	“
4	Check pepper stands regularly for pests and diseases attack	3.21	1.90	1.31	“
5	Treat pepper with appropriate pesticides when identified	3.48	1.82	1.66	“
6	Pick the first harvest of pepper beginning from 2-3months after transplanting	3.47	3.08	0.39	“
7	Prepare pepper for sale fresh or dry to recommendations	3.23	3.10	0.13	“
8	Keep adequate records of pepper harvested and sold at all times	3.52	2.02	1.50	“

Data on Table 3 shows that the performance gap (PG) of households (pepper farmers) for the eight (8) post-planting operations competency items ranged from 0.27 to 1.66 and are positive. This indicates that the pepper farmers needed improvement in the eight post-planting operations competencies of pepper for alleviation of poverty in the State.

Research question four

What are the production need gaps of households in marketing operations of pepper for alleviation of poverty in Cross River State?

The data is presented in Table 4

TABLE 4 Performance Gap Analysis of the mean ratings of the perceived competencies of households in marketing operations of pepper for alleviation of poverty in Cross River State (N=418)

S/N	Item Statements	\bar{X}_R	\bar{X}_P	PG	Rmks
1	Identify market for sale of pepper	3.31	2.54	0.77	IN
2	Advertise pepper to buyers using available media	3.42	1.90	1.52	“
3	Sort pepper fruits for sale into grades	3.28	3.22	0.06	“
4	Fix prices for the pepper fruits based on grades	3.19	2.68	0.51	“
5	Sale pepper to buyers at fixed prices	3.53	3.62	-0.09	INN
6	Keep records of sales and other marketing activities	3.29	2.11	1.18	IN
7	Prepare a profit and loss account for the enterprise	3.34	1.85	1.49	IN
8	Expand pepper production enterprise based on profit.	3.48	2.66	0.82	IN

Table 4 shows that the performance gap (PG) of households (pepper farmers) for seven (7) out of eight (8) marketing operations competency items ranged from 0.77 to 1.52 and are positive. This indicates that the pepper farmers needed improvement in the seven competencies isolated for the study. However, the PG value for item five was (-0.09) indicating that farmers do not need improvement in selling peppers to farmers based on fixed prices. Since pepper farmers did not need improvement in only one out of eight competencies included for the study, they therefore needed improvement in marketing operations of pepper for reduction of poverty in the State.

Discussion of findings

The findings of this study indicated that households (pepper farmers) in Cross River State, Nigeria needed improvement in pre-planting, planting, post planting and marketing operations in pepper production to alleviate their poverty. This finding agrees with Alawa, Abanyam and Okeme (2010) who found out that teachers of agriculture in secondary schools in Cross River State, Nigeria needed improvement in nursery, pre-planting, planting and post planting operations of afforestation to be effective in teaching the students. The finding also agrees with Dibio (2008) who revealed research evidence that teachers of agriculture required requisite skills in pre-planting operations, planting operations, processing and storage of yam for improving the teaching of yam production in secondary schools in Enugu State, Nigeria. The result partially agrees with Wembley (2008) who identified the pre-planting skills of melon as selection of suitable site, clearing of the land, tillage, conduction of soil tests for soil quality, acquisition of seeds for planting, pre-treatment of seeds before planting among others. The findings also conforms with Olaitan, Amusa and Nwobu (2009) who conducted a study on competency improvement needs of farmers in cocoyam production in Ekiti State, Nigeria and found out that farmers needed improvement in planting operations such as selection of appropriate planting materials, spacing, replacement of cocoyam stands that refused to germinate among others. The finding further agrees with Akwagiobe, Alawa, Okeme and Udie (2021) who identified that youths required education and training on pre-planting skills, planting skills and post-planting skills in cassava production to enhance food security in northern agro-ecological zone of Cross River State, Nigeria.

The gaps in performance of actual tasks in pepper production by farmers definitely are responsible for the shortfall in pepper production in the study area and not necessarily the climatic conditions. If these gaps are handled through training, overall improvement could be recorded in pepper production to meet supply targets and alleviation of farmers' poverty.

Conclusion and recommendations

Pepper remains an important spice in the human diet but its supply to meet the demands of the households in Cross River State remains quite questionable. In spite of efforts made by middlemen to ensure that the produce is circulated in the country, household needs of pepper are hardly met. Considering the rich and fertile soils available in Nigeria for pepper production, there is need to ensure that more households are involved in its production to alleviate the poverty level of the farmers. The competency improvement needs of households in the perspectives of pre-planting, planting, post-planting and marketing operations. It is hoped that if the identified production gaps in pepper production are filled, the poverty level of households in the study area could be alleviated.

The study therefore recommends that the identified competencies be integrated as content into the extension outreach programme for training of farmers to enhance the production of pepper and alleviation of their poverty.

References

- Abel, S. (2009). Effect of intragastric capsaicin on gastric ulcer and protacyclin-induced cytoprotection in rats. 25 (5): <http://www.iibismedical.com/>.
- Abubakar, S. (2015). Nigeria imports vegetables. Accessed from (http://www.fepsannigeria.com/index.php?option=com_content&view=article&id=216:nigeria-imports-vegetables-&catid=57:frontpage) on 17th July, 2021.

- Adesina J. M., Sanni K. O., Afolabi L. A. & Eleduma A. (2014). Effect of Variable Rate of Poultry Manure on the Growth and Yield of Pepper (*Capsicum annum*) in South Western Nigeria..Availableonline at <http://www.sciencepub.net/academia>.
- Adigun, J.A. (2001).Influence of intra-row spacing and chemical weed control on the growth and yield of chilli pepper (*Capsicum frutescens* L.) in the Nigerian Northern Guinea Savannah. *Nigerian Journal of Horticultural Science* 5, 67-73.
- Akwagiobe, C. U., Alawa, D. A., Okeme, I. & Udie, E. A. (2021). Educational requirements of youths in cassava production for enhancing food security in northern agro-ecological zone of Cross River State, Nigeria. A Paper Presented at the 5th annual conference of agricultural education teachers association of Nigeria, Federal College of Education, Obudu; June 2nd -5th
- Alawa, D. A, Abanyam, V. A. & Okeme, I. (2010). Competency improvement needs of teachers of agriculture for teaching afforestation to students in Cross River State, Nigeria. *Nigerian Vocational Journal*, 15(1), 96-105
- Arnason, A. (2019). Bell peppers 101: Nutrition facts and health benefit. Retrieved from www.healthline.com on 22-06-2021.
- bases. Retrieved from <http://www.fao.org> on 25th August, 2021.
- Bernster, I.E. (2009). Effects of Tropically Applied Capsaicin on moderate and severe psoriasis: Herb/nutrient affecting drug toxicity. *Vulgans* 25(5). 1213-1221
- Boseland, P.W. & E. J. Votava (2000). *Pepper: Vegetable and spice Capsicum*, New York: CABI Publishing.
- Delelegn, S. (2011). Evaluation of Elite Hot Pepper Varieties (*Capsicum* Species) for Growth, dry pod yield and quality under Jimma Condition, South West Ethiopia. M.Sc. Thesis Jimma University College of Agriculture and Veterinary Medicine.
- Dibio, E. O (2008) Requisite Skills Required by Teachers of Agriculture for Improving the Teaching of Yam to Secondary School Students in Enugu State. Unpublished Master's Thesis, Department of Vocational Teacher Education, University of Nigeria, Nsukka.
- Dipeolu A.O. & Akinbode S.O. (2007). Technical, economic and allocative efficiencies of pepper production in South-West Nigeria: A stochastic frontier approach. *Journal of Economics and Rural Development*, 17(1), 24-33.
- Eyiye, D.O. (2001). *Economics made easy*. Benin City: Doe-Sun.
- FAOSTAT (2013). Food and agricultural organization of the United Nations Statistical data
- Gardenersnet (2015). The varieties of pepper. Retrieved from www.gardenersnet.com on the 20th of August 2021.
- Hill, T.A., Ashrafi H, Reyes-Chin Wo S., Yao J., & Stoeffel (2013). Characterization of *Capsicum annum* diversity and population structure based on parallel polymorphism discovery with a 30k Unigene Pepper Genechip. *PLoS ONE*: 8 (2); e562000.doi:10.1371/journal.pone.0056200.

- Howard, L. R; TalCoH S. T., Brenes, C. H & Villalon, B. (2000). Changes in phytochemical and antioxidant activity of elected pepper cultivars (*capsicum* spp) as influenced by maturity. *Journal of Agricultural and Food Chemistry*. 48 (1), 1713-1720.
- Idowu-Agida, O.O., Nwaguma, E.I & Adeoye, I.B. (2010). Cost implication of wet and dry season pepper production in Ibadan, South Western Nigeria. *Agricultural and Biology Journal of North America* ISSN print: 21st-7517 ISSN online 2151-75210 210 sciences <http://www.scihub.org/abjma>.
- Johnson, E. M. (2018) Pepper (*Capsicum* Spp). A global plant. Retrieved from www.medcraveonline.com on 22-06-2021.
- Kim, S., Park M., & Kim Y. (2014). Genome sequence of the hot pepper provides insight into the evolution of pungency in *Capsicum* species. *Nature Genetics*, 46, 270-278.
- Lin S., Chou Y, Shieh H., Ebert AW., Kumar S., Mavlyanova R., Rouamba A., Tenkouano A, Afari-Sefa V and Gniffke P.A. (2013). Pepper (*Capsicum* spp.) Germplasm Dissemination by AVRDC – The World Vegetable Center: an Overview and Introspection. *Chronica horticultrae*, 53 (3), 274-283
- Okeme, I., Alawa, D. A. & Akwagiobe, C. U. (2014). Entrepreneurial skills required by secondary school graduates for economic success in cocoa production in Ikom Local Government of Cross River State, Nigeria. *Journal of Education and Practice; International Institute for Science, Technology & Education*; 5 (16), 174-183.
- Olaitan S. O. & Ndomi, B.M (2000). *Vocametrics*. Imo State: Cape Publishers International Limited.
- Olaitan, S. O., Alawa, D. A. & Ekong, E. (2010). Competency Improvement Needs of Farmers for enhancing the use of Soil Nutrients in Cross River State. *Nigerian Vocational Journal*, 13(2), 107-116
- Olaitan, S.O, Amusa, T.A & Nwobu V.I (2009). Quality assurance of instructors in teaching cocoyam production to students in schools of agriculture in Southern Nigeria. A Paper Presented at the 17th Annual Conference of Nigerian Vocational Association, Faculty of Education, University of Nigeria, Nsukka 22-25th
- Peet, M. (2006). Sustainable practices for vegetable production in South Carolina crop new profile pepper. North Carolina State University, USA.
- Purseglove J.W., E. G. Brown, C.I., Green and Robbins S.R.I. (1981). *Spices*. Vol.1. New York: Longman Inc.
- Singletary, K. (2010) Black Pepper: Overview of health benefits. *Nutrition Today*, 45(1), 43 – 46.
- Udegbe, S. I., Udegbe, M. I., Olumoko, T. A. & Hassan R. A. (2012). Marketing of pepper in the Metropolitan region of LAGOS state, Nigeria. *Australian Journal of Business and Management Research*, 2 (1), 27 – 36.

Ugwu, C. S. (2016). Linkage among actors in yellow pepper (*Capsicum annum*) innovation system in Nsukka agricultural zone, Enugu State. A M. Sc. thesis submitted to the Department of Agricultural Extension, Faculty of Agriculture, University of Nigeria, Nsukka