

Knowledge level of rural vegetable farmers on sustainable production in Enugu state, Nigeria

Nivel de conocimientos de los horticultores rurales sobre la producción sostenible en el estado de Enugu, Nigeria

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ABSTRACT

Sustainability is the new global targets for improving people's lives around the world. Most academics, researchers and practitioners apply the concept to connote improving and sustaining a healthy economic, ecological and social system for human development. This study assessed the knowledge level of rural vegetable farmers on sustainable production in Enugu State, Nigeria. Multi-stage sampling procedure was used in selecting 120 respondents for the study. Structured interview schedule was used for data collection and the data was analyzed using frequency, percentage, mean statistics analysis and Pearson correlation model. Results revealed that majority (95.8%) of the respondents made used personal experience as main source of information on sustainable vegetable production practices, 89.2% indicated obtaining information on sustainable vegetable production practices from relatives and neighbors, 80.0% indicated obtaining information on sustainable vegetable production practices from radio. Majority (92.5%) of the respondents have moderate knowledge of sustainable vegetable production. Result revealed that there is a very high significant positive correlation between the sustainability practices of the rural vegetable farmers and their knowledge level ($R=0.280$, $P=0.02$). Improved access to information on sustainable vegetable production through face-to-face extension teaching method and other media will advance the knowledge level and use of sustainable production practices by rural vegetable farmers.

Keywords: Environmental sustainability, Sustainable production, Vegetable production, Vegetable farmers.

RESUMEN

La sostenibilidad es el nuevo objetivo global para mejorar la vida de las personas en todo el mundo. La mayoría de los académicos, investigadores y profesionales aplican el concepto para connotar la mejora y el mantenimiento de un sistema económico, ecológico y social saludable para el desarrollo humano. Este estudio evaluó el nivel de conocimientos de los productores rurales de hortalizas sobre producción sostenible en el estado de Enugu, Nigeria. Se utilizó un procedimiento de muestreo polietápico para seleccionar a 120 encuestados. Se utilizó un programa de entrevistas estructurado para la recogida de datos, que se analizaron mediante el análisis de frecuencias, porcentajes, medias estadísticas y el modelo de correlación de Pearson. Los resultados revelaron que la mayoría (95,8%) de los encuestados utilizó la experiencia personal como principal fuente de información sobre prácticas sostenibles de producción de hortalizas, el 89,2% indicó haber obtenido información sobre prácticas sostenibles de producción de hortalizas de familiares y vecinos, el 80,0% indicó haber obtenido información sobre prácticas sostenibles de producción de hortalizas de la radio. La mayoría (92,5%) de los encuestados tienen un conocimiento moderado de la producción sostenible de hortalizas. Los resultados revelaron que existe una correlación positiva muy significativa entre las prácticas de sostenibilidad de los productores rurales de hortalizas y su nivel de conocimientos ($R=0,280$, $P=0,02$). Un mejor acceso a la información sobre la producción sostenible de hortalizas a través del método de enseñanza por extensión presencial y otros medios de comunicación mejorará el nivel de conocimientos y el uso de prácticas de producción sostenible por parte de los agricultores rurales de hortalizas.

Palabras clave: sostenibilidad medioambiental, producción sostenible, producción de hortalizas, productores de hortalizas.

INTRODUCTION

For the rural populace, vegetable farming is a major source of livelihood. Cultivation or production of indigenous vegetables is majorly domiciled in the rural areas and have become the concern of older, rural women (Ezeanya et. al., 2018). Vegetable farming in rural communities has provided a means of employment and sustainable livelihood for many of the rural populace (Yilangai, Pineau, Manu, and Kambai, 2015). Urban communities also largely depend on crops produced in the rural areas for food. Vegetable farming is one of the silent money making ventures in Nigeria. In a country made up of over 100 million people of different tribes and ethnicities, whose major common denominator is the use of vegetables in preparing their food, vegetable farming in Nigeria is indeed a very

profitable business (Agricdemy. (2017). For instance, about 1.8 million tons of fresh tomato are produced per year in Nigeria (Ugonna et. al., 2015).

The growth in vegetable production has increased and this was possible due to improved varieties, production and protection technologies through systematic research coupled with large scale farming (Deuri et. al., 2018). This is growth has come with consequent environmental degradation concerns which has necessitated serious interests on the sustainability of vegetable production. Environmental pollution especially soil and water pollution have intensified through increasing concentrations of synthetic pesticides beyond the recommended amount by manufacturers, increase in the rate of application of the synthetic pesticides throughout the growing season to effectively kill the most stubborn insect pests, and mixing of more than two synthetic pesticides for the purpose of increasing the spectrum of killing the most stubborn insect pests in the field (Mpumi, Machunda, Mtei and Ndakidemi, 2020).

Since most of the vegetables are eaten fresh or slightly cooked, there is cause for concern as public health will be adversely affected and education of farmers and consumers on food safety has to be intensified to avert a possible out- break (Cobbina, Kudadam, Kotochi and Akrong, 2013). Similarly, the World Health Organization (2019), stated that unsafe food creates a vicious cycle of disease and malnutrition, particularly affecting infants, young children, elderly and the sick. Tasrina Rc and Rowshon Afroz (2015), noted that dietary exposure to several heavy metals including nickel (Ni), cadmium (Cd), chromium (Cr), lead (Pb), arsenic (As), mercury (Hg), zinc (Zn) and copper (Cu) has been recognize as a risk to human health through the consumption of vegetable crops. Recently due to various anthropogenic activities such as mining, industrialization and agricultural activities like application of pesticides, fungicides and fertilizers, heavy metals are released into the soil, water and atmosphere (Sandeep, Vijayalatha and Anitha 2019). These heavy metals enter into the plant system through various physiological processes and affects the plant growth and development. The concentration of heavy metals in the environment varies due to various activities and it becomes toxic when it reaches above the permissible limits. These presence of high amounts of these elements has contributed to the increasing occurrence of heavy metals in the ecosystem through their direct absorption from contaminated soils. Consumption of vegetables grown on contaminated soils due to wastewater percolated can lead to serious detrimental health effects (Sandeep et al., 2019).

Fluted pumpkin (*Telfairia occidentalis*) and amaranth (*Amaranthus spp.*) are common leafy vegetables produced and consumed especially in Nigeria. These vegetables attract insect pests which are controlled by pesticides that may have adverse impacts on human health (Adeleye et. al., 2019). Consumption of amaranth

contaminated with alpha-HCH could pose a carcinogenic risk for adult consumers: thus, the consumption of vegetables could pose both non-carcinogenic and carcinogenic health risks to children and adults. In addition, smallholder farmers rely intensively on mixing more than two synthetic pesticides for the purpose of increasing the spectrum of killing the most stubborn insect pests in the field; thus intensifying the environmental pollution especially soil and water pollution (Mpumi et. al., 2020). It is important to understand how knowledgeable rural vegetable farmers are as to the environmental sustainability practices in vegetable production.

PURPOSE OF THE STUDY

The overall aim of the study was to assess the knowledge level of the rural vegetable farmers on sustainable production in Enugu State. Specifically, the study sought to:

1. Ascertain the sources of information on sustainable production among the vegetable farmers in the study area;
2. Determine the knowledge level of vegetable farmers on sustainable production;
3. Determine the relationship between knowledge level and use of sustainable production practices among the rural vegetable farmers.

MATERIALS AND METHODS

The study was carried out in Enugu State in southeastern Nigeria. Enugu state is located between latitudes 55° and 70° north of equator and longitudes 55° and 75° East of the Greenwich meridian with the land area of about 8,022,95km (Anugwa et. al., (2020). The population for the study constituted vegetable farmers in two villages in Enugu State. A multistage sampling procedure will be employed in selecting respondents. 120 respondents were purposively selected from two agricultural zones (Awgu and Nsukka) in Enugu state due to how prominent they are in vegetable production. Stage two involved the selection of two blocks from of the two Agricultural zones which include Aninri (Awgu) and Nsukka. In stage three (3), three circles were purposively selected from each block which include Ndeaboh, Nenwe, Oduma, (in Awgu Agricultural zone) Edem, Okpuje and Ibagwa ani (in Nsukka) given a total of six (6) circles. In stage four (4), two sub-circles were purposively selected from each circle which include Abacheku and Amaeze (both in Ndeaboh), Obeagu and obiafu (both in Nenwe), Obi and Ameke (both in Oduma), Edem – ani

and Akpa – Edem (in Edem), Isi- agu (in Ibagwa ani) and Ibagwa-aka, Ajuona and Amozu (in Okpuje) given a total of twelve (12) sub-circles. From each sub-circle, ten (10) vegetable farmer were selected purposefully giving a total of 120 respondents. Data were collected using structured interview schedule.

To obtain data on sources of information on sustainability among vegetable farmers, respondents were presented with list of options like television, telephone and mobile phone, extension agents, social network sites such as (Facebook, twitter, my space), relatives, neighbors/friends, internet, NGOs, personal experience, magazines, posters/bill board, exhibition, films/slide presentation, leaflets, radio, and newspaper. And they were asked to tick (Yes) or against (No) which of the options best suit their choice in the sources of information used on sustainability.

In order to obtain information on the relationship between knowledge level and use of sustainable production practices among the rural vegetable farmers, respondents were asked to indicate what they know about sustainable vegetable production. A correct answer was scored one (1) while an incorrect answer was scored zero (0). A composite score was calculated for each respondents by adding the number of the correct responses. Use of sustainable production practices was gotten by asking respondents to indicate the ones they employed in vegetable production. Spearman rho rank order correlation was used to determine the relationship between knowledge level and use of sustainable production practices. Data on objective one and two were presented with percentage and mean score.

RESULTS AND DISCUSSION

Sources of information on sustainable production among vegetable farmers in the study area

Table 1 reveals that majority (95.8%) of the respondents made use of their personal experience as one of the sources of getting information on sustainable vegetable production practices, 89.2% indicated obtaining information on sustainable vegetable production practices from relatives and neighbors, 80.0% indicated obtaining information on sustainable vegetable production practices from radio, 33.3% obtained information on sustainable vegetable production practices from extension agents, 32.8% obtained information on sustainable vegetable production practices from telephone and mobile phones, 9.2% obtained information on sustainable vegetable production practices from films/slide presentation, 8.3% obtained information on sustainable vegetable production practices from Social network sites such as Facebook, twitter, Myspace while only 5.0% of internet and newspaper were used by the respondents to obtain information on sustainable vegetable production practices. This shows that

personal experience is the most common sources of information used. This disagrees with the findings of Onyeabor, Umeh, and Ashiegbu (Onyeabor et. al., 2019) who stated that family members, relatives and friends were the main sources of informal support to farmers.

Table 1: Sources of information on sustainability among vegetable farmers

Sources of Information	Frequency	Percentages
Television	24	20.0
Radio	97	80.0
Telephone and mobile phones	39	32.8
Extension Agents	40	33.3
Social network sites such as Facebook, twitter, Myspace.	10	8.3
Relatives and Neighbors/ Friends	107	89.2
Internet	6	5.0
Newspaper	6	5.0
Personal experience	115	95.8
NGOs	4	3.3
Magazines	2	1.7
Posters/Bill board	5	4.2
Exhibition	1	0.8
Films/slide presentation	11	9.2
Leaflets	1	0.8
Agrochemical dealers	3	2.5
Children	1	0.8
Mother	2	1.7
Parents and school teachers	1	0.8

*Multiple responses

Knowledge of vegetable farmers on sustainability practices

Findings (Table 2) revealed that majority (97.5%) of the respondents indicated that allowing both male and female to participate in vegetable production is the right thing to do in vegetable production, 95% indicated that legalization/permission of females to own land can lead to more vegetable production and that funding vegetable farmers by the governmental organization can lead to more vegetable production, 95% indicated that funding vegetable farmers by the Governmental organization can lead more vegetable production, 92.5% indicated that planting improved varieties of vegetable seed results in high yield of vegetable crop, 91.7% indicated that excessive use of inorganic fertilizer can lead to poor yield of vegetable crop, 88.3% indicated that proper use of organic fertilizer can lead to a decrease in environmental pollution while 88.3% indicated that communication among vegetables farmers can help in solving problems related to vegetable production. This shows that majority of the respondents indicated that allowing both male and female to participate in vegetable production is the right thing to do in vegetable production. This implies that both sex were involved in vegetable production in the study area. This is in disagreement with the findings of Fischer et. al., (2018) who stated that vegetable cultivation is left for some rural women who are not given full access to land.

Table 2: Knowledge level of vegetable farmers on sustainability.

Sustainability	Frequency	Percentages
Allowing both male and female to participate in vegetable production is the right thing to do in vegetable production	117	97.5
Planting vegetables on the road side does not cause any health problem as a result of gas emission from car engine	10	8.3
Excessive use of inorganic fertilizer can lead to poor yield of vegetable crop	110	91.7
Storing vegetable crops for a very long time does not lead to its spoilage	5	4.4
Planting improved varieties of vegetable seed results in high yield of vegetable crop	111	92.5
Regulation of the quantity of pesticide used in the farm for vegetable production can cause more harm to consumers health	17	14.2
Legalization/permission of females to own land can lead to more vegetable production	114	95

Funding vegetable farmers by the Governmental organization can lead to more vegetable production	114	95
Communication among vegetables farmers can help in solving problems related to vegetable production	106	88.3
Monetary support from Non-Governmental Organizations (NGOs) like churches to vegetable farmers does not encourage more farmers to into vegetable production	26	21.7
Planting vegetables at the right time can increase vegetable crop yield	109	90.8
Late planting of vegetables can encourage crop pests and diseases	21	17.5
Immediate selling of vegetable crops after the application of chemicals sustainable vegetable practices can risk the health of the consumers	113	94.2
Proper use of organic fertilizer can lead to a decrease in environmental pollution	106	88.3
Use of selective herbicide to control weed in vegetable farm can lead to a high incident of weed infestation	3	2.5
early planting of vegetable does not reduce pest infestation	1	0.8
avoiding chemical from touching vegetable leaf can help to sustain them	1	0.8
proper farm record and accounting can improve vegetable farmers standard of living	1	0.8

Categorization of respondents on knowledge level

Results in Table 3 below shows that majority (92.5%) of the respondents have moderate knowledge of sustainable vegetable production while 5.8% had high knowledge of sustainable vegetable production and 1.7% had low knowledge of sustainable vegetable production. The result shows that the majority of the respondents had moderate knowledge of sustainable vegetable production practices as revealed by a moderate proportion (92.5%) of the respondents who had moderate knowledge compared 1.7% and 5.8% of respondents who had lesser and higher knowledge respectively. This agrees with the findings of Anugwa and et. al., (2020) who reported that majority of the vegetable farmers in Enugu state had moderate knowledge of sustainable practices. This implies that the vegetable produced in the area studied were safe and therefore will not result to any health problem.

Table 3: Categorization on knowledge level

Knowledge level	Frequency	Percentages
Low knowledge	2	1.7
Moderate knowledge	111	92.5
High knowledge	7	5.8

Relationship between knowledge level and use of sustainability production practices of rural vegetable farmers

Table 4 revealed that there is a significant positive correlation between the sustainability practices of the rural vegetable farmers and their knowledge level ($R=0.280$, $P= 0.02$). This means that as the knowledge level of the rural vegetable farmers increases; the more the sustainable production practices increases, and as their knowledge level decreases; the level of sustainable production practices decreases as well. This is in line with the findings of Ninh (2021) who stated that better educated farmers are adept at making production decisions, accessing relevant information, adopting new technologies and judging inputs. This implies that increasing the knowledge level of the rural vegetable farmers will result in greater yield of vegetable crop.

Table 4: Relationship between Sustainability Production Practices and Knowledge Level

		Knowledge of vegetable farmers	Sustainability practices
Knowledge of vegetable farmers	Pearson Correlation	1	0.280 **
	Sig. (2-tailed)		0.002
	N	120	120
Sustainability practices	Pearson Correlation	0.280 **	1
	Sig. (2-tailed)	0.002	
	N	120	120

** . Correlation is Significant at the 0.01 level (2-tailed).

CONCLUSIONS

Based on the findings of the study, it can be deduced that respondents only had a moderate knowledge on sustainable production practices in vegetable farming. There is a very high significant positive correlation between the sustainability practices of the rural vegetable farmers and their knowledge level. Rural vegetable farmers should be provided with proper information needed for sustainable production through various sources such as extension agents, television, radio, and among others through the help of both government and non governmental organizations such as cooperative societies. This will help them ensure vegetable production that is environmentally sustainable thereby assuring safety for the consumers.

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