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Note From the Editor-in-Chief

The outburst of information superhighway has sharpened the knowledge society, especially in the area of research, considering the critical role of research in the academic world. It has therefore become imperative for professionals in the academic world to adapt to the ICT bound environment with innovativeness in research, including the quality of research blue-print; its visibility and above all, the appropriateness of issues raised in addressing the problems in today's contemporary global society.

The International Journal of Vocational Education (IJOVED), an annual publication of the Department of Vocational Education publishes issue-based research in Technical and Vocational Education and Training (TVET) and general education. This edition is unique, its quality and content leave no one in doubt, and purposes to build in the minds of would-be readers across academic disciplines and organisations factual knowledge that would further develop the academic community. I strongly recommend this publication to academic libraries within and outside vocational education.

Assoc. Professor Isaac Okeme
Editor-in-Chief

Editor s Note

This edition of International Journal of Vocational Education (IJOVED), Volume 11, No. 1, November 2021 is unique, drawing contributions across institutions and across disciplines as well as across border. Of course, we are in an era where globalisation and digitalisation combine to ease research activities. Faculty members are therefore on advantage for collaborative research.

This Journal addresses concerns in Technical and Vocational Education and Training (TVET) and other related disciplines in line with the demands of the 21st Century, home-grown demands of Nigeria's economy, institutional goals and individual aspirations in an era of global competitiveness. It is pertinent to draw the attention of our esteemed authors that they take responsibility of all rules and considerations pertaining to publication of this magnitude. Creative Commons copyright licenses and tools apply, thereby creating a balance in the traditional 'all right reserved" that copyright law creates, which is why all authors completed and returned the Creative Common open access license form.

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Dr. E. E. Okon
Production Editor

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CONVERSION OF FOOD WASTE INTO COMPOST FOR HOME GARDENING AND REDUCTION OF GLOBAL WARMING ON HOUSEHOLD IN YAKURR LOCAL GOVERNMENT AREA OF CROSS RIVER STATE, NIGERIA

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Abstract

This study dwelt on conversion of food waste into compost for home gardening and reduction of global warming on household in Yakurr local government area of Cross River State, Nigeria. Correlational research design was adopted for the study. Two research questions were drawn from the two purposes that guided the study. The population consists of 8800 households. A sample size of 440 heads of households (both male and female) was used as 5% of the entire population. A questionnaire was used as an instrument for data collection. These research questions were analyzed using means and standard deviation response rating. The findings upon (30) construct items found out that households often have uncertain or unable to decide attitudes towards food waste prevention between good intentions to reduce food waste and personal participation preferences regarding food waste composting. Base on the findings, it was recommended among others that the findings will offer some guide to both individuals and communities to undertake a self-check of the various methods of composting for home gardening as it would benefit the soil and the environment at large positively. This action when done, will foster reduce food waste management, bring about proper waste disposal practices and eventually minimize

Keywords: Food, household, home, gardening, waste, global warming

Introduction

The need for reduction of global warming necessitates the conversion of food waste into compost for home gardening, the explosion of population and increment of urbanization with changing lifestyles is viewed to creating more and more wastes, which adds pressure to the already overloaded solid waste transportation system and landfill sites. According to (Oyedele, 2009), food waste are leftovers arising from human, animal or plant activities that are discarded as useless and not having any consumer value. In the same valuable proposition (Festus and Omoboye, 2015), stated that food wastes are both raw and cooked food materials or substances that are either spoiled, rejected or no longer required for their original purpose. However, in the contributions of (Iwara, 2023) proposed that food waste is any consumable material that lacks its proposed utility or a food substance that has been

relinquished. The food waste from homes when used for home gardening provides essential plant nutrients that support the cultivation and raising of food crops that have benefits to mankind. The increasing demand for quality soil by man for the cultivation of food crops such as maize, yam and cassava expose food waste compost fertility level of the soil and predispose ecological problems of varying complexities among which is Improper food waste disposal.

Improper food waste disposal in the view of (Remigios, 2010), are the practices of household's dumping and disposal of waste in streams, rivers and drains. In Nigeria and Yakurr Local Government Area in particular commonly practice open dumping where waste is dumped in uncontrolled landfills which are also referred to as dumpsites (Ogwueleka, 2009). These open dumping sites are often not approved by government and could last for many years. Usually, the dumps are without regulation or standards that provide environmental protection. (Ojo, 2014) added that open dumpsites do not usually have liners, fences, leachate control systems, compactors or soil cover. Open dumpsites are cheap to manage and operate, and are generally sited on vacant open plots of land, gully erosion sites. For instance, in Cross River State, they exist one open dumpsite in the state capital. Conversely when households receive limited waste collection services from waste management authorities waste might be dumped in the community itself (Nnaji 2015). However, households in Yakurr Local Government Area in Cross River State often dump waste within their communities in a manner most convenient to them, and in the locations not good enough because of less-provision of waste collection services. The disposal of food waste into these channels is termed to be improper and is unsanitary methods of food waste disposal channels (Ojo, 2014). This practice by households which produces an unpleasant odour, and creates a breeding ground for pests and diseases can be reduced through the adoption of a home composting ground.

According to (Sridhar, 2013), Composting has been practiced in Nigeria on a limited basis for so many years. The author further stated that the practice is still largely neglected. Composting can be undertaken at centralized facilities or at home or community level. Composting is a process in which food waste materials are subjected to natural decomposition, facilitated by microbial activities under aerobic or anaerobic conditions (Adekunle, 2011). These food wastes contain valuable resources in the form of nitrogen, phosphorus, potassium and microorganisms that play an important role in biogeochemical cycles. Converting these valuable resources into useful compost for home gardening is best than dumping on landfills (Hammed, 2011). Odon and Guobadia (2011) and Taiwo (2010) stated that composting should be encouraged by government authorities because of its benefits to the country and the public at large. Some of the benefits of home composting include being cheaper than other industrialized methods. (Akinbile, 2012) observed that composting is the most viable waste disposal option for households because it is sustainable and environmentally friendly, and it uses limited land compared to land filling. More so, (Iwara, 2023) opined that composting through food waste resources in households and their use to replenish the soil for home gardening has given room for a paradigm shift in the role of fertilization services to the users. However, there is a need to create awareness of these food waste resources to achieve the aim of its provision. Thus, Composting reduces global warming by decreasing pollution as well as carbon emissions by as much as 82% compared to landfill dumping (Farrell and Jones, 2009).

Food waste in the context of improper disposal and global warming is the disposal of food in a way that has negative consequences for the environment. Which is primarily caused by lack of households composting awareness/community involvement? According to (Muralikrishna and Manickam, 2017) Without an effective and efficient waste disposal program, the waste generated from various human activities, both industrial and domestic, can result in health hazards and have a negative impact on the environment. Furthermore, (Marianne & Fred Sandford, 2015) also proposed that improper food waste disposal does not just contaminate the soil and the local water supply, but it can also pollute the air. According to Khylle and Tumala, (2015) opined that improper waste disposal is one of the biggest environmental issues in the world and in Yakurr Local Government Area in particular. It causes problems that affect not only the environment but also the health and life of the people. These problems may be resolved or it will remain problem to the society in the next years. A decree in Yakurr approved by the Office of Paramount ruler and Obol lopon of Ugep and the council of chiefs, was created in response to the rapidly growing rate of garbage problems in the metropolis caused by improper waste disposal.

An inefficient municipal solid waste management system may create serious negative environmental impacts like infectious diseases, land and water pollution, obstruction of drains and loss of biodiversity. Furthermore, (Marianne and Fred Sandford, 2015) also proposed that improper hazardous waste disposal doesn't just contaminate soil and the local water supply, but it can also pollute the air. It also produces lethal gases such as carbon monoxide and methane gas. Excessive breeding of rodents and vermin like rats, cockroaches, mosquitoes, and flies are the direct health effects caused by improper disposal as those vermin transmit diseases like leptospirosis, lassa fever and salmonellosis from rats; malaria from mosquitoes, shigellosis and diarrheal diseases from flies. Indirect health effects, on the other hand, include the contamination of water and soil from leachate known to be a very harmful liquid mixture of chemicals that forms as water flows from a contaminated area.

Waste disposal issue in Yakurr is of negative impact due to improper food waste disposal. Insufficient funding and lack of food waste management planning have been observed, that the collected general waste including food waste is being transported in an open body tractor trolley, it is worth mentioning that in some areas of Yakurr, waste is being dumped on the ground which is totally unhygienic. In adequate masonry bins in the Yakurr are also of great concern for the solid waste management authorities who are saddled with the responsibility of managing waste to cop the improper waste disposal negative environmental impacts. Impact of Improper waste disposal practices on environment is resulting from the following:

1. Dispersed solid waste from the illegal open dumps often blocks the drains and sewers, ultimately these blockages are creating flooding and unhygienic conditions in the city.
2. Flies breeding are directly linked with open solid waste dumps (Nisar, 2010).
3. Proportion of food waste in open dumps and waste drains are providing an attractive shelter for rats. This rat's spread disease, damaging electrical cables and other materials in the study area.

4. The open burning of collected solid waste causing air pollution issues (Ali, 2010).
5. Open dumps on the roadside and heavily sized solid waste storage containers are also creating traffic blockage in the study area (Akhtar, 2010).
6. Open body trucks are being used for the collection of solid wastes in Yakurr without covers. This practice is totally unhygienic.
7. During rainy seasons, produced leachate from the open dumped sites is causing serious pollution to water bodies in Yakurr.
8. Liquids and fumes, escaping from deposits of chemical wastes are creating fatal or other serious effects to the community (Ejaz, 2010).

Most adequately, another way to reduce waste disposal negative environmental impact is composting, where in waste can be put in compost pit, will decompose, and eventually turn into valuable use. Food waste can be composed. Sridhar (2013) stated that Composting has been practiced in Nigeria on a limited basis, the practice is still largely neglected. Composting can be undertaken at centralized facilities or at home or community level. Composting is a process in which food waste materials are subjected to natural decomposition, facilitated by microbial activities under aerobic or anaerobic conditions (Adekunle, 2009). These food wastes contain valuable resources in the form of nitrogen, phosphorus, potassium and microorganisms that play an important role in biogeochemical cycles, converting these valuable resources into useful compost for home gardening is best than dumping on landfills (Hammed, 2011). Odon & Guobadia (2011) and Taiwo (2011) stated that composting should be encouraged by government authorities because of its benefits to the country and the public at large. Some of the benefits of home composting include being cheaper than other industrialized methods. (Akinbile, 2012) stated composting is the most viable waste disposal option for households because it is sustainable and environmentally friendly, and it uses limited land compared to landfilling. However, Odon & Guobadia, (2011) added that government should encourage and support individuals, communities and private organizations to initiate home or community composting to enable increased food production. Thus, household members composting awareness reduces global warming by decreasing pollution as well as carbon emissions by as much as 82% compared to a landfill (Farrell and Jones, 2009).

Food waste composting sensitization in market squares and political gathering initiatives are possible and could be viewed as starting points to change people's attitudes towards the current massive food waste on dumpsites, Gustavsso, Cenderberg and Sonesson (2011). Also, Karim, Rusli, Biak and Idris (2013) proposed that the level of consistency between environmental attitudes and behaviour is affected by a person's knowledge and awareness, public verbal commitment and his or her sense of responsibility. Therefore, Campaigns as stated above are best aimed at influencing household member's to practice proper food waste disposal or better still adopt composting for home gardening to reduce global warming by knowledge of composting processes.

Composting is the natural process of recycling organic products, such as food waste and scraps into a valuable fertilizer that can enrich soil and plants. It involves biological decomposition under controlled conditions through container, compost pile and compost heaps. Container is of choice to some homes while others adopt compost heaps. There are a few holes drilled into the container's lid to let air into the compost since bacteria need

oxygen to continue respiring in aerobic systems. Additionally, when the products are closed the bin will protect the compost from the elements and keep the temperature stable within. It also keeps out unpleasant odour and keeps away other animals from interrupting the process. To adapt and maximise the input substrate, the compost mixtures should be blended (Aldaco, 2020). The input mixtures are allowed to decay and are only opened once every two weeks to stir and let the gas out to avoid the container from blowing up (Abdullah, 2021) and ventilation to enhance the composting process' aeration (Hamid, 2019). This enables aerobic biological breakdown and modification as a result of the rotting Aldaco, et al., 2020). The container can be put in a warm location because warm temperatures will enable the compost's microbes to function more effectively, when the compost is dry, brown and crumbly it's ready to use.

Objectives of the study

1. Find the relationship between improper food waste disposal and reduction of global warming on household in Yakurr local government area of Cross River State, Nigeria.
2. Ascertain the extent to which composting can determine the perceived reduction of global warming on household in Yakurr local government area of Cross River State, Nigeria.

Research questions

1. What is the relationship between improper food waste disposal and reduction of global warming on household in Yakurr local government area of Cross River State, Nigeria?
2. To what extent does food waste composting determine the perceived reduction of global warming on household in Yakurr local government area of Cross River State, Nigeria?

Research methods

The correlation research design was adopted for this study, Asim, Idaka and Eni (2017) proposed that correlation design seeks to establish a relationship or association between two or more variables. The study was carried out in Cross River State. The population for this study consists of (8800). A sample size of 5% was used as the population of the study, as suggested by Boll & Gall in Uzoagulu (2011) that in determining the sample size of a population for a study a population of 5000 and above uses 5%. Therefore, 440 heads of households (both male and female) in Yakurr Local Government Area of Cross River State represent 5% of the 8800 from the entire population of the study.

A - 30 item questionnaires were distributed to the heads of households on market days within the period when there are observed to be regular to ensure spot filling of the questionnaire to avoid delays, misplacement and enhance quick return. Cronbach's Alpha was used to analyze the internal consistency of the items in the questionnaire, .83 reliability coefficients was obtained. However, a total of 440 copies of questionnaire were administered to the study subject selected through convenience sampling technique to ensure an adequate representation of the different elements of the study population. Therefore, heads of households who were not present at the time of visit were equally not included in the study. According to Polit and Beck, (2006) as well as Burns and Grove,

(2001) stated that convenience sampling uses readily available respondents in a study. However, only 435 copies were validly completed and useful for this study. The data were organized in a table according to research questions. Mean (x) and Standard deviation (SD) statistical analysis scores were used in analyzing the data generated from the questionnaires. The mean was interpreted in line with the four (4) points scale ranging from Strongly Agree, Agree, Disagree, and Strongly Disagree with corresponding scores of 4, 3, 2 and 1 on each item response respectively. For decision making, the lowest limit of high degree response category of 2.50 was used as the cut-off point. Any item with a mean response of 2.50 and above was accepted as an influencing factor. Analysis of the administration of copies of the questionnaire was done in the manner presented in Table 1, where a total of 440 copies were administered on heads of households.

Table 1: Distribution of Questionnaires

Questionnaire Distributed		**Questionnaire returned**		**Questionnaire returned**
Frequency	%	Frequency	%	Frequency %
440	100	435	98	52

A total of 440 copies of questionnaire were administered to the study subject selected trough convenience sampling to ensure an adequate representation of the different elements of the study population. However, only 435 were validly completed and useful for this study.

Results

Research question one

What is the relationship between improper food waste disposal and reduction of global warming on household in Yakurr local government area of Cross River State, Nigeria?

Table 2: Mean and standard deviation scores Analysis from the responses of heads of households on the relationship between improper food waste disposal and reduction of global warming on household in Yakurr local government area of Cross River State, Nigeria. N=435

1. Adopt any disposal process to reduce global warming	259	43	42	91	3.08	1.23	HE
2. Very regular practice of the processes very	126	134	98	77	2.71	1.06	HE
3. Fruits generate more waste than others	255	46	42	92	3.06	1.23	HE
4. Humans are severely abusing the environment	255	44	44	92	3.06	1.23	HE
5. Household member cooking error create food waste	172	51	80	132	2.60	1.28	HE
6. Opportunities to efficiently manage your food waste	257	44	43	91	3.07	1.23	HE
7. Think household member's effort has a role to play in reducing food waste	170	58	125	87	2.70	1.18	HE
8. Recycling infrastructures are Available in my area	169	69	105	92	2.72	1.18	HE
9. Do you believe proper food waste disposal is important	259	43	44	89	3.08	1.22	HE
10. Drainage channels are proper to empty in waste	254	43	45	93	3.05	1.24	HE
11. Do your children engage in proper food waste disposal	259	52	36	88	3.10	1.21	HE
12. My food leftovers are properly managed	124	148	96	67	2.75	1.03	HE
13. Proper food waste disposal is the sole responsibility of government	257	43	43	92	3.06	1.23	HE

S/N	Item statement	SA	A	D	SD	$\bar{X}$	SD	Decision

Data in Table 2 showed that the 15 improper food waste disposal items had their mean ranged from 2.60 to 3.10 set as a criterion for high extent. This indicated that their mean was above the cut-off point of 2.50. The observation implies that all the items were significant to the extent at which heads of households dispose food waste. The highest mean score of 3.10 is for "Do your children engage in proper food waste disposal" while the lowest mean response score of 2.60 is for "Does household member cooking error create food waste". Thor, the highest and lowest mean response scores appear to be influencing factors. The standard deviation ranged from 1.03 to 1.28 indicating that respondents were not too far from the mean and close to one another in their responses.

Research question two

To what extent does food waste composting determine the perceived reduction of global warming on household in Yakurr local government area of Cross River State, Nigeria?

Table 3: Mean and standard deviation scores Analysis from the responses of heads of households on the extent to which food waste composting determine the perceived reduction of global warming on household in Yakurr local government area of Cross River State, Nigeria. N=435

S/N	Item statement	SA	A	D	SD	$\bar{X}$	SD	Decision
1.	Would your community approve of your engagement in composting	51	231	48	105	2.52	0.98	HE
2.	Would you copy your neighbour if they engage in composting	173	58	122	82	2.74	1.16	HE
3.	Have you used any compost that has been produced	170	74	105	86	2.75	1.16	HE
4.	Do you know how to recycle	256	43	43	93	3.06	1.24	HE
5.	Is food waste recycling easy	255	43	44	93	3.05	1.24	HE
6.	Are you interested in reducing food waste by composting	281	43	32	79	3.20	1.18	HE
7.	Food wastes could be transformed to Wealth	137	133	102	63	2.79	1.04	HE
8.	Composting is an important aspect of food waste management	253	47	45	90	3.06	1.22	HE
9.	Food waste is not harmful to the environment as it is biodegradable	251	45	46	93	3.04	1.24	HE
10.	Do you have access to a garden or Allotment	185	54	75	121	2.69	1.27	HE
11.	Composting takes up a lot of time	256	42	44	93	3.05	1.24	HE
12.	Are composting methods effective in reducing food waste hazard	190	93	132	74	2.79	1.17	HE
13.	Composting is not worthwhile unless there is a lot of waste	191	52	115	77	2.82	1.17	HE
14.	Compost bins attract a lot of flies and vermin	257	44	45	89	3.07	1.22	HE
15.	Composting requires a lot of space	69	229	43	94	2.62	0.99	HE

Note: = Mean; SD= Standard Deviation; SA= Strongly Agree; A= Agree; D= Disagree; SD= Strongly Disagree; HE= High Extent; LE= Low Extent

Table 3 shows the extent to which heads of households in Yakurr participate in composting for home gardening which could help to determine the perceived reduction of global warming. The results showed that the 15 item mean ratings of 2.52 to 3.20 were set as criterion for "high extent". With corresponding standard deviations of 0.98 and 1.27 respectively, the mean values were above the cut-off point of 2.50. The observation implies that all the items were significant to the extent at which heads of households participate in composting for home gardening. The highest mean score of 3.20 is for "Would your community approve of your engagement in composting" while the lowest mean response score of 2.52 is for "Are you interested in reducing food waste by composting". Thor, the highest and lowest mean response scores appear to be influencing factors. The standard deviation ranged from 1.03 to 1.28 indicating that respondents were not too far from the mean and close to one another in their responses. The mean ratings of the responses of heads of households showed the extent of participation in composting for home gardening which could help to reduce air pollution and other environmental hazard as well as global warming by so doing help to enhance the adding of nutrients to the soil texture.

Discussion of results

The result of the study showed the extent to which heads of households dispose waste within their environment which creates serious negative environmental impacts like infectious diseases, land and water pollution, and obstruction of drains and loss of biodiversity. The result of this study is in conformity with the findings of Ejaz, Akhtar, Nisar and Ali Naeem, (2010) a case study of Rawalpindi City" on improper food waste disposal which discussed and highlighted some main causes of improper waste disposal. The result of this study agrees with the submission of Andre and Santos (2017) food waste perceptions, decisions, and Actions: The case of Guatemala City which revealed that heads of household perceptions of food waste disposal vary has great impact on economic, environmental and social dimension; as well as their awareness to proper disposal practices.

The findings of the study showed the extent of heads of household participation in composting for home gardening in the mean responses in Yakurr Local Government Area on food waste composting and reduction of global warming. The finding further reveals that heads of households could enhance their knowledge of food waste composting and adoption for home gardening. The implication of this finding is that it helped to answer the research question of the study, revealing the awareness levels and participation of heads of household towards composting. The present study is in conformity with the study of Gary, Mohd, Kavitha and Sravutt (2019) which revealed that municipal food waste compost can improve fertility of red earth soil and recommended the use of natural fermentation method to address the global environment issue caused by food waste.

Conclusion

Heads of households in Cross River State at present do not immensely participate in converting food waste into compost for home gardening, because they feel it is space and time consuming. This is due to lack of awareness and interest that they should be involved in composting to prevent global warming such as soil erosion, carbon emission and pollution. Irrespective of their perceptions, conversion of food waste is an effective environmental sanitation and appropriate resource recovery strategy as this is economically beneficial to large- and small-scale farmers especially those who are

involved in home gardening. Compost manure produced from food waste or organic wastes at any level is a measure of promoting waste to wealth program in Nigeria and other developing countries. This is because, composting helps to reduce food waste at home, keep the environment clean, and promote self-discipline and awareness of the harm that food waste improper disposal causes to the environment. Therefore, heads of household's negative attitudes towards food waste composting and perceived global warming constituted a concern for this study. The study upon 30 construct items found out that households often have uncertain or unable to decide attitudes towards food waste prevention between good intentions to reduce food waste and personal participation preferences regarding food waste composting.

It is hoped that the findings will offer some guide to both individuals and communities to undertake a self-check of the various methods of composting for home gardening as it would benefit the soil and the environment at large positively. This action when done, could foster reduce food waste management, bring about proper waste disposal practices and eventually minimize high global warming turnover.

Recommendations

Based on the conclusions drawn, it is recommended that individuals and communities should undertake a self-check of various methods of composting for home gardening. This will help in effective waste management and bring about proper waste disposal practices, thus minimising high global warming turnover.

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