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Waste Generation and Management Practices in Urban Agriculturally Oriented Business for Sustainable Development in South-East, Nigeria

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Abstract

The study identified urban agricultural waste management as a means for sustainable development in South-eastern Nigeria. Three research questions were posed and answered by the study, while two null hypotheses were formulated and tested at 0.05 level of significance. A multi-stage sampling procedure involving simple random sampling and purposive sampling techniques were used to select 240 registered farmers and 50 Staff of Waste Management Board from a population of 749,538 registered farmers and 1,105 Staff of Waste Management Board in the study area. The total sample of the study was 290. Questionnaire, Focus Group Discussion (FGD) guide and documentary evidence were the instruments used for data collection. Cronbach alpha formula was used to determine the internal consistency of the instrument which gave a reliability coefficient of 0.85. Mean and standard deviation were used to answer the research questions while t-test was used for testing the null hypotheses at 0.05 level of significance. The findings of the study revealed that urban agricultural wastes can be generated through various agricultural operations within the premises used for agriculture or a farm and managed by minimizing activities that generate wastes, reuse and recycle wastes among others. Based on the findings of the study, some recommendations were made.

Keywords: Waste Generation, Urban Agriculture, Agricultural Wastes, Waste Management, Sustainable Development.

Introduction

Income level and urbanization are highly correlated with the amount of waste generated in every settlement. According to Olalere, Matthew and Kehinde (2015) the volume of waste being generated in urban areas of Nigeria are parallel to its economic dimension and population growth. Similarly, Egun, (2012) opined that waste characteristics vary according to season, income level, population, social behaviour, climate, and industrial production. Abd'razack,

Yusuf, and Utange, (2013) reported that little attention is given to waste management practices in Nigeria, as it is common to see heaps of waste in the major cities littering the streets, dumped indiscriminately in drainages, vacant plots and open space. Open dumping of wastes is unhealthy and can deteriorate the environment over time. Sangodoyin, in Amori, Fatile, Ihuoma, and Omoregbee, (2013) stated that open dumping of wastes serves as breeding place for flies, insects and rats. The author explained that, flies are capable of transmitting diseases through contact with food and water such as dysentery and diarrhea. Also the spread of rats to neighbouring house in the vicinity of refuse could be linked with diseases such as Salmonellosis, Leptospirosis and Lassa fever. In another opinion Mohammadi and Soleimani (2014) reported that rapid urbanization in recent decades has involved destructive impacts on environment on one hand and many pressures on nature to supply the necessities of urban life including food, energy, materials, and natural resources. Ibrahim, Uba-Eze, Oyewole and Onuk (2009) observed that urban areas in Nigeria are faced with the problem of increasing population and consequently inadequate food supply. Zeeuw, Van and Dubbeling (2011) opined that the ongoing food and economic crisis within cities due to rapid urbanization requires proper planning and strategies to face the future conflicts regarding food insecurity, urban poverty and low economic development. Planning for cities must include strategies that will enhance food security. Therefore, with the urbanization process and the pursuit for food security, urban and peri-urban agriculturally oriented business has evolved from a simple, traditional and also informal activity into a commercial and professional initiative.

Urban agriculturally oriented business according to Ango, Abdullahi and Abubakar (2011) is a complex system encompassing wider spectrum from core of activities associated with the production, processing, marketing, distribution and consumption of food and non food products. Mohammadi and Soleimani (2014) reported that urban agriculture involves the growth of plants and breeding of animals to provide food and other defined materials within and around cities and towns and its related activities such as production and delivering production factors, processing and marketing. Thus, the practice of producing vegetables, food and fruits within urban environment for household consumption as well as sale to the rapidly growing urban population is termed urban agriculturally oriented business. Danso, in Ango, Abdullahi and Abubakar (2011) opined that urban agriculture is a vital component for the existence of most cities, especially in the developing countries where it contributes substantially to the urban economy of the city dwellers in terms of employment and the supply of food. Involvement in

agriculturally oriented business enterprises has created a number of environmental crises, among which are agricultural wastes.

Agricultural wastes in the opinion of Ashworth, Geoffrey and Pablo (2009) are natural and non-natural wastes produced as a result of agricultural activities. According to the Environmental Association for Universities and Colleges (EAUC) (2006), agricultural wastes are wastes produced as a result of various agricultural operations within the premises used for agriculture or a farm. These activities or operations may include but are not limited to dairy farming, horticulture, seed growing, livestock breeding, grazing land, market gardens, nursery plots and woodlands. Olu, (2013) reported that agricultural wastes are made up of biodegradable and non-biodegradable materials ranging from plant and animal residues to inputs of farming such as packaging, plastic films, animal health products among others. According to Davidson (2011), agricultural wastes are all potential resources since they have multiple uses like, providing manure as fertilizers, improving the water holding capacity of the soil, recycling bio-degradable waste(gasification and pyrolization), land filling, reduction of well water contamination and minimizing of surface water pollution among others. The above uses might depend on the abilities of farmers to manage waste generation. Agricultural waste generation connotes the sequence of agro wastes effluence within an agricultural sector (Agamuthu, 2009). The author estimated that 988 million tonnes of agricultural wastes are produced globally in a year. Similarly, Olalere, Matthew and Kehinde (2015) revealed that agricultural waste generation involves the proportion of agricultural wastes discarded to the environment, which may in turn result in various degrees of air, water and land pollution. To the best knowledge of the researchers, information on the quantity of wastes generated from agriculture in Nigeria including South-East States is not yet verified and therefore is lacking. Nwibo and Okorie (2013) opined that in order to maintain an upward shift and to unleash the enormous potential for attracting entrepreneurs' investments to agribusiness and agro-industries, policies and regulations affecting agricultural production, the legal environment of the investment as well as the overall investment climate in Nigeria need to be overhauled and a framework for managing the generated wastes be evolved. Ojekunle (2011) observed that despite the impact of urban agriculture to sustainable development in the society, the inability to manage waste from agricultural operations is a major challenge to urban farmers and the society at large. One of the most important challenges faced by urban agriculture is waste management. Therefore, adequate attention should

be given to waste management for a safe environment.

Waste management according to Uchegbu in Osinem, (2005) is a planned system of effectively controlling the production, storage, collection, transportation, processing and disposal or utilization of wastes, in a sanitary, aesthetically friendly acceptable and economical manner. Omuta in Uwadiegwu and Chukwu (2013) opined that managing waste concerns the interplay among generation, storage, collection and final disposal. Therefore, waste management involves activities that deal with waste before and after it is produced, to final disposal. According to Uwadiegwu and Chukwu (2013), there are two major approaches to waste management in Nigeria which include, private and public sectors. The authors explained that the private system is a contractual arrangement between an individual or group of persons who undertake waste disposal as a business venture and the waste generator. The defunct Federal Environmental Protection Agency (FEPA) which was formed in 1986 and upgraded to become the Federal Ministry of Environment (FME) in 1999 are charged with the responsibility of public waste management in Nigeria. This is complimented by section 1, (24) of FEPA Decree No.8 (1988) empowering both local and State government to set up their own environmental protection agencies (Osinem, 2005). It is expected that the FME should be more effective in monitoring and possibly controlling industrial pollution, environmental degradation and occupational hazard in the country. However, Oyeniyi (2011) reported that environmental hazards of varying magnitude dangerously threaten human and animal lives in most urban centres in Nigeria and an attempt to manage these wastes has overwhelmed the Nigerian government. A draft policy on Municipal and Agricultural Wastes was reviewed in August, 2012 in Nigeria and is hoped that the policy in time will lead to development of a comprehensive legislation and possibly a plan that will address the issue of waste generation and management in the country. The need to promote urban agricultural waste management is being influenced by increasing agricultural oriented business in urban areas and productivity globally, as adequate waste management will enhance sustainable development.

Sustainable development is all about equity and could be regarded as equality of opportunities for human well-being as well as comprehensiveness of objectives in the economic, social, and environmental context (Kayoma and Oharisi, 2013). Stoddart, (2011) opined that sustainable development requires the integration of economic, environmental, and social objectives across sectors and territories throughout decision making processes in order to move towards

development that is truly sustainable. Thus, sustainable development is aimed at meeting human needs while preserving the environment so that the needs can be met not only in the present but also for future generations. In this light, the classical definition given by the Brundthland Commission in 1987 is apt. The term sustainable development according to the commission is "development which meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development, 1987).This paper will therefore attempt to investigate ways to effectively manage wastes generated from urban agriculturally oriented business for sustainable development in Nigeria.

Purpose of the Study

The general purpose of the study was to find out ways of enhancing waste management in urban agriculturally oriented business for sustainable development in Nigeria. Specifically, the study sought to determine the:

1. types of waste generated from urban agriculturally oriented business, in South-East Nigeria;
2. ways to effectively manage wastes generated from urban agriculturally oriented business in South-East, Nigeria; and
3. Roles of government towards waste management in urban agriculturally oriented business in South-East, Nigeria.

Research Questions

The following research questions have been posed to guide the study.

1. What are the types of wastes generated from urban agriculturally oriented business in South-East Nigeria?
2. What are the ways to effectively manage wastes generated from urban agriculturally oriented business in South-East Nigeria?
3. What roles can the government play in the management of urban agricultural wastes in South-East Nigeria?

Research Hypotheses

The following null hypotheses were tested at 0.05 level of significance to guide the study:

Ho_1: There is no significant difference in the mean responses of registered farmers and staff of waste management board on the types of wastes generated from urban agriculturally oriented business in South-East, Nigeria.

Ho_2: There is no significant difference in the mean responses of farmers and staff of waste management board on the ways to effectively manage wastes generated from urban agriculturally oriented business in South-East, Nigeria.

Methodology

***Design of the Study*:** Survey design was adopted for this study. Emaikwu (2011) described survey research design as that in which the same information is gathered from an

unbiased representative group of interest. This design was considered suitable because the opinion of a representative of respondents were collected from registered farmers and Staff of Waste Management Board in Anambra, Abia, Ebonyi, Enugu and Imo States.

Area of the Study: The study was carried out in South-East, Nigeria. The area comprises of five States namely; Anambra, Abia, Ebonyi, Enugu, and Imo. The area has a total population of 16.4 million people who are mainly of Igbo extraction (National Population Commission, 2006). The area is endowed with abundant natural resources and lots of agricultural activities which leads to lots of agricultural waste generation. The agricultural activities conform to the tri-aggregates of agribusiness which include; farm supply, farm processing and distribution/marketing of processed products (Nwibo and Okorie, 2013).

***Population for the Study*:** The target population for the study was all registered farmers and Staff of Waste Management Board in the study area. In all there are 749,538 registered farmers and 1,105 Staff of the Waste Management Board in the five States of the South-East, Nigeria.

***Sample and Sampling Techniques*:** A multistage sampling procedure involving simple random sampling and purposive sampling techniques were employed in arriving at the sample size used for the study. In the first stage, three (3) States out of the five (5) States which are regarded as agricultural rich States in South-East, Nigeria were randomly and purposively selected. These States include Abia, Ebonyi, and Enugu. Secondly, from the three (3) selected States, two agricultural zones noted for their agricultural activities were randomly and purposively selected from the three (3) existing zones of the States as follow. In Abia State – Abia North and South agricultural zones were selected. In Ebonyi State – Ebonyi North and Central agricultural zones were selected, while in Enugu state, Enugu East and North agricultural zones were selected. Thus a total of six (6) agricultural zones were selected for the study. Thirdly, two hundred and forty (240) large scale registered farmers were purposively selected from the total number of registered farmers (749,538) in the selected agricultural zones of the States and fifty (50) field staff out of one thousand one hundred and five (1,105) Staff of Waste Management Board available in the selected zones were purposively selected for the study. The selection of farmers was done proportionately according to the population of farmers in each of the zones using Uzoagulus' 2011 model in sample size selection. In the sample size selection, 40% of the population for the States were sampled as follows: Ebonyi North (33 farmers), Ebonyi Central (58 farmers), Abia Central (40 farmers), Abia North (56 farmers), Enugu East (17 farmers) and Enugu North (36 farmers), giving a total of

240 farmers. Generally, a total of 290 respondents were used for the study.

Instrument for Data Collection: Questionnaire, Focus Group Discussion (FGD) guide and documentary evidence were the instruments used for data collection.

***Use of questionnaire*:** A questionnaire of four point rating scale of Strongly Agree, Agree, Disagree and Strongly Disagree with corresponding values of 4, 3, 2 and 1 respectively, with 28 identified items in urban agricultural waste management was used for the collection of data from respondents.

***Focus Group Discussion (FGD) guide*:** The researchers organised a FGD with 10 Staff of Waste Management Board (SWMB); two each from each State in the South-East, to get information on the types of wastes generated and the possible measures to be put in place for agricultural waste management. The views collected from the discussants showed that agricultural wastes generated are mainly from crop and livestock residues, sewage sludge wastes, slaughter house wastes and green wastes among others.

Records from the discussants (SWMB) showed varying degrees of quantities of agricultural wastes generated in their various States and is presented in Table 1b. The management techniques suggested included- minimizing activities that generate wastes, recycling biodegradable and non-biodegradable wastes among others.

***Validation of Instrument*:** The instruments were subjected to face validation by three experts; one from Agricultural and Bioresources Education, University of Nigeria, Nsukka and two Senior Officers of Staff of the Waste Management Board Imo State, Nigeria.

***Reliability of the Instrument*:** The Cronbach Alpha method was used to determine the reliability of the questionnaire instrument, which yield a reliability coefficient of 0.85.

***Method of Data Collection*:** The questionnaire instrument was administered by the researcher to the respondents with the help of three research assistants. The research assistants were briefed on the methodology of this study. The rationale for using these research assistants was to make clarification on items wherever the need arises and ensure that the actual respondents for whom the instrument is meant were those who completed them. The FGD guide was used to collect qualitative data from the 10 discussants by the researchers.

***Method of Data Analysis*:** Data collected using the questionnaire were analyzed using mean and standard deviation to answer the research questions, while t-test statistic was used for testing the null hypotheses at 0.05 level of significance. The null hypotheses of no significant difference were upheld for items which the critical t-value is greater than 1.96 and rejected for items which critical t-value was less than 1.96. Any item with a mean score of 2.50 and above was considered agreement and the items

that had mean scores below 2.50 were considered disagreement. The data from the FGD were analysed qualitatively and used to support the quantitative data collected.

Results

***Research Question 1*:** What are the types of wastes generated from urban agriculturally oriented business in South-East, Nigeria?

Ho_1: There is no significant difference in the mean response of registered farmers and staff of waste management board on the types of wastes generated from urban agriculturally oriented business in South-East Nigeria.

Table 1a: Mean and t-test analysis of the respondents on types of wastes generated from urban agricultural practices. (t-critical value = 1.96)

		Responses: Farmers		SWMB			
S/N	**Types of Wastes**	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	**t-cal**	**Remarks**
	Biodegradable waste						
1	Sewage sludge waste	3.79	0.51	3.32	0.62	5.67	NS
2	Slaughter house waste	3.49	0.51	3.58	0.53	-1.09	S
3	Animal dung	3.75	0.43	3.40	0.49	5.06	NS
4	Green wastes (mulch, weeds etc)	3.05	0.59	3.24	0.55	-2.09	S
5	Dead animal and meat decay	2.52	0.79	2.42	0.85	0.76	N
	Solid waste						
6	Crop residue (grain stalks, straw, nutshells)	3.02	1.11	2.96	0.69	0.37	NS
7	Empty aerosol cans, paint can and compressed gas cylinders	3.02	0.37	3.26	0.77	-3.22	S
8	Packaging and non-packaging plastics Silage films (Refuse and garbage)	3.14	0.75	3.08	0.72	0.49	NS
	Hazardous waste						
9	Building waste (General Construction and Demolition waste, Asbestos cement, Metal)	3.48	0.52	2.92	0.56	6.71	NS
10	Animal health waste (Unused medicines, Syringes and needles)	2.48	0.72	2.78	0.76	-2.60	S
11	Machinery waste (Batteries, Tyres, Fluorescent light tube, Machinery)	2.96	0.39	2.74	0.82	2.82	NS
12	Agrochemical concentrates and compounds	3.45	0.56	3.10	0.61	3.85	NS
13	Used agricultural related oil	3.05	0.37	3.10	0.78	-0.62	S

N_1= Farmers: 240, N_2 = Staff of Waste Management Board (SWMB): 50; $\bar{X}_1$ =Mean for Farmers, $\bar{X}_2$ = Mean for SWMB; NS = Not Significant, S =Significant; SD_1 = Standard Deviation for Farmers and SD_2= Standard Deviation for SWMB.

The data in Table 1a indicates that the means of the 13 items ranged from 2.50 to 3.57. This implies that the means were above the cut-off point of 2.50 indicating that the items are agreed upon by the respondents as types of wastes generated from urban agriculturally oriented business in South-East Nigeria. The table also revealed that the calculated t-value ranged from -3.22-6.71. The result shows that items 2, 4, 7, 10 and 13 had calculated t-value below the t-critical value of 1.96. The result showed that the responses from farmers and Staff of Waste Management Board did not differ significantly in 5 out of 13 items. This implied that the two groups of respondents shared the same view on the types of waste generated from urban agriculturally oriented business. Therefore the null hypothesis was not rejected. The data from the FDG showed that green wastes, livestock and crop residues and sewage sludge were among the agricultural wastes generated.

Table 1b: Estimated Agricultural Wastes Generated in Urban Cities of South-East, Nigeria

City	Tonnage/ Month	Density(Kg/m3)	Kg/Capital/Day
Abakaliki	48,242	340	0.48
Afikpo	36,678	290	0.36
Enugu	20,675	230	0.51
Nsukka	10,200	350	0.42
Umuahia	11,000	270	0.63
Aba	31,248	360	0.54
Orlu	28,137	310	0.53
Owerri	14,785	280	0.46
Onitsha	29,026	320	0.56
Awka	17,825	300	0.58

Source: Records from the office of WMB of each State, 2015.

The data in Table 1b are records from the discussants (SWMB); it shows various degrees of quantities of agricultural wastes generated in their various States. Abakaliki, Afikpo, Aba, Onitsha and Orlu ranked high on the amount of agricultural wastes generated while Enugu, Awka, Owerri, Umuahia and Nsukka followed suit. The difference in the degree of wastes generated in their various States may be as a result of the nature of urban agriculture and its related business practiced in those States.

Research Question 2: What are the ways to effectively manage wastes generated from urban agriculturally oriented business in South-East Nigeria?

Ho $_2$: There is no significant difference in the mean response of farmers and staff ofwaste management board on the ways to effectively manage wastes generated from urban agriculturally oriented business in South-East Nigeria.

Table 2: Mean and t-test analysis of the respondents on ways to effectively manage the types of waste identified in table1(t-critical value = 1.96)

		Responses:	**Farmers**		**SWMB**		
S/N	**Ways to Manage Wastes**	$\bar{X}_1$	**SD$_1$**	$\bar{X}_2$	**SD$_2$**	**t-cal**	**Remarks**
14	Minimize activities that generate biodegradable waste	2.56	0.61	2.92	0.98	-3.33	S
15	Use biodegradable waste for land filling	3.16	0.48	2.94	0.31	3.09	NS
16	Recycling of biodegradable waste (Re-use)	3.06	0.38	3.76	0.51	-11.0	S
17	Minimize activities that generates solid waste	3.13	0.47	3.10	0.67	0.41	NS
18	Use solid waste for land filling	3.23	0.44	3.40	0.49	-2.37	S
19	Recycle solid waste(Re-use)	2.67	0.59	2.76	0.62	-1.00	S
20	Minimize hazardous waste	2.80	0.76	2.82	0.56	-0.17	S
21	Use hazardous waste for land filling	2.20	0.47	2.12	0.32	1.13	NS
22	Recycle hazardous waste (Re-use)	2.28	0.71	2.14	0.63	1.23	NS
23	Policies on municipal and agricultural waste management should be formulated.	2.83	0.74	2.82	0.53	-0.18	S

N_1= Farmers: 240, N_2 = Staff of Waste Management Board (SWMB): 50; $\bar{X}_1$ =Mean for Farmers, $\bar{X}_2$ = Mean for SWMB; NS = Not Significant, S =Significant; SD_1 = Standard Deviation for Farmers and SD_2= Standard Deviation for SWMB.

The data in Table 2 revealed that the mean of all the 10 items ranged from 2.16-3.41. The items 14 through 20 and 23 had a mean value above 2.50, while items 21 and 22 had a mean value below 2.50 which indicated that some items are not ways to effectively manage the types of wastes identified in table 1. The results of the t-test analysis showed that the t-calculated value of 5 items (14, 16, 18, 19 and 20) were less than the t-critical value of 1.96. Four items (15, 17, 21 and 22) exceeded this value. On this basis the

null hypothesis was rejected for 5 items and upheld for 4 items. This implies that the groups of respondents rated the items from different perspectives maybe because of their background. The FDG focus was on recycling of agricultural wastes and the formulation of comprehensive policies on municipal and agricultural waste management in Nigeria.

Research Question 3: What roles can the government play in the management of urban agricultural wastes in South-East Nigeria?

Table 3: Mean and standard deviation of the respondents on the roles government can play towards urban agricultural waste management

S/N	Roles of Government	Farmers 240		Staff WMB 50		Over All		Remarks
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	
24	Providing special dump site for farmers	3.00	0.62	3.04	0.28	3.02	0.45	Agreed
25	Enlightening farmers on modern waste management practices through extension agents	3.19	0.53	3.02	0.55	3.10	0.55	Agreed
26	Provision of waste management facilities for farmers in designated urban locations	3.06	0.42	2.56	0.73	2.81	0.57	Agreed
27	Providing loans to farmers to acquire waste management facilities	3.23	0.53	3.06	0.47	3.14	0.50	Agreed
28	Formulating policies on municipal and agricultural waste generation for a comprehensive legislation in Nigeria	3.05	0.51	3.01	0.45	3.03	0.48	Agreed

Staff WMB = Staff of Waste Management Board, $\bar{X}$=mean, SD = Standard Deviation

Table 3 shows the mean values and standard deviation of the respondents on the roles of government towards urban agricultural waste management which ranges from 2.81 – 3.14. The mean scores are above the cut-off point of 2.50 which indicated that all the items in table 3 are the roles of government towards urban agricultural waste management. The standard deviation ranged from 0.45 - 0.57 which indicates that the responses are close to each other and relevant for successful urban agricultural waste management for sustainable development in south-east Nigeria. The FDG revealed that a comprehensive legislation should be

put in place to tackle agricultural waste management in Nigeria and non-governmental organizations should as well assist in the management of urban agricultural wastes.

Discussion of Findings

Findings in Table 1 revealed that all the items are types of wastes generated from urban agriculturally oriented business. This is in consonance with the research report of Ashworth, Geoffrey and Pablo, (2009) which stated that agricultural wastes are natural and non-natural wastes produced as a result of agricultural activities. Batteries, fluorescent light tubes, empty aerosol cans, paint can and compressed gas cylinders were identified as agricultural wastes. The result of the FGD showed that agricultural wastes generated are mainly from crop and livestock residues as well as green wastes and sewage sludge wastes. This finding is in line with Olu, (2013) who reported that agricultural wastes includes plant and animal residue as well as inputs of farming such as packaging, plastic films, animal health products among others.

Secondly Table 2 showed that majority of the items identified in table 1 can adequately be managed. This is in agreement with Davidson (2011) who opined that agricultural waste are all potential resource since they have multiple uses like, providing manure as fertilizers, improving the water holding capacity of the soil, recycling bio-degradable waste(gasification and pyrolization), land filling, reduction of well water contamination and minimizing of surface water pollution among others. The FGD result showed that recycling and policy formulation are keys to effective urban agricultural waste management. However, in order to achieve the effective waste management practices identified, the interplay among generation, storage, collection and final disposal must be given adequate consideration (Omuta in Uwadiegwu and Chukwu, 2013).

In Table 3 all the items from 24-28 were agreed upon as roles of government towards urban agricultural waste management. This implies that Nigerian government is lacking in its roles. However, the findings may point to the fact that Non-governmental organizations have a role to play and not leaving everything to the hands of the government. Oyeniyi (2011) reported that environmental hazards of varying magnitude dangerously threaten human and animal lives in most urban centres in Nigeria and an attempt to manage these wastes has overwhelmed the Nigerian government. The FGD result showed that non-governmental organizations should also assist in the management of urban agricultural wastes and a comprehensive legislation needs to be put in place to tackle agricultural wastes. Therefore, all hands must be on deck to help government manage wastes generated from urban

agriculturally oriented business for sustainable development.

Conclusion

It was observed from the study that the types of wastes generated from urban agriculturally oriented business are enormous and requires ways to effectively manage them. For a sustainable development to be achieved in South East, Nigeria, there is need for government and nongovernmental organizations to partner with farmers and the Waste Management Board for improved agricultural practices especially in the area of urban agricultural waste management.

Recommendations

Based on the findings of this study, the following recommendations were made:

i. Farmers and Staff of Waste Management Board should collaborate and locally manage urban agricultural waste so as to attract government and investors
ii. Awareness should be created so that decision-makers will be convinced about the benefits of urban agricultural waste management for creative decision making in the Federal Ministry of Agriculture
iii. Budgetary provisions should be made by government to ensure that training is organized on a continuous basis for farmers and Staff of Waste Management Board on modern waste management practices
iv. Non-governmental organizations should also assist in the management of urban agricultural waste for a safe environment for all.
v. Government should revisit the draft policy on Municipal and Agricultural Wastes which was reviewed in August, 2012 in order to come up with a comprehensive legislation and possibly a plan that will address the issue of urban agricultural waste generation and management in the country.

References

Abd'razack, N.T.A, Yusuf, A.E. and Utange, J. Z. (2013). An appraisal of solid waste generation and management in Jalingo City, Nigeria. *Journal of Environment and Earth Science. 3* (9) 20 - 28.

Agamuthu, P. (2009). Challenges and opportunities in agro-waste management: An Asian perspective. Inaugural Meeting of First Regional $_3$R Forum in Asia 11-12 November, 2009.Tokyo, Japan. Retrieved 16th April, 2015 from :*http://www.um.edu.my/_system/media/images/main_temp...*

Amori, A. A., Fatile, B. O., Ihuoma, S. O. and Omoregbee, H.O.(2013). Waste generation and management practices in residential areas of Nigerian tertiary institutions. *Journal of Educational and Social Research. 3* (4) 45 -52.

Ango A. K., Abdullahi A. N. and Abubakar B. B. (2011). Role of

socioeconomic parameters in determining the efficacy of urban agriculture in providing food security in Birnin Kebbi metropolitan area, Kebbi State, north western Nigeria. *Journal of Agricultural Science and Soil Science.1* (6) 185 – 192.

Ashworth, Geoffrey, S. and Pablo, A. (2009). Agricultural wastes. Retrieved 16th April, 2015 from: *http://www.novapublishers.com/catalog/product_info.php?products_id=9698.*

Davidson,G.(2011).*Waste management practices.* Retrieved from http://www.dal.ca/content/dam/dalhousie/pdf/11th July, 2015.

Egun, N. K. (2012). The waste to wealth concept: Waste market operation in Delta State, Nigeria. *Journal of Social Sciences 2* (6) 206-212**.**

Emaikwu, S.O (2011). *Fundamentals of research methods and statistics.* Selfers Academic press limited, Makurdi. Benue State.

Environmental Association for Universities and Colleges (EAUC) (2006). Agricultural waste. Retrieved from http://www.eauc.org.uk/page.php? 11th July, 2015.

Ibrahim, H., Uba-Eze, N. R., Oyewole, S. O. and Onuk, E. G. (2009). Food security among urban households: A case study of Gwagwalada area council of the Federal Capital Territory Abuja, Nigeria. *Journal of Nutrition. 8* (6) 810 - 813.

Kayoma, F.O. and Oharisi, J. O (2013) Revitalizing technical vocational education and training towards capacity building for sustainable development in Nigeria. *Journal of Nigerian Vocational Association (NVA). 2*(18) 204-214.

Mohammadi, J. And Soleimani S. M. (2014). The effect of urban agriculture in urban sustainable development and its techniques: A case study in Iran. *Journal of Agriculture and Forestry. 4*(4) 275-285.

Nwibo, S. U. and Okorie, A. (2013). Constraints to entrepreneurship and investment decisions among agribusiness investors in Southeast, Nigeria. *Journal of Small Business and Entrepreneurship Research. 1*(4) 30 - 42.

Ojekunle, O. Z. (2011). Multiple utilization of wetland for sustainable food and water recycling production in Nigeria *Journal of Agricultural Research and Management. 3* (2) 64-71.

Olalere W. O., Matthew O. I., and Kehinde A. T. (2015). Assessment of the waste generation and management practices in Nigerian food industry: Towards a policy for sustainable approaches. *Journal of Scientific and Industrial Research. 6* (1) 12 – 22.

Olu, O. (2013). Food, agricultural and environmental biotechnology: Wastes and waste management. *A Publication of the Biotechnology Society of Nigeria. 117-161.*

Osinem, E. C. (2005). *Environmental education in agriculture.* Cheston Agency Limited, Enugu, Nigeria.

Oyeniyi B. A. (2011). Waste management in contemporary Nigeria: The Abuja example. *Journal of Politics and Good Governance. 2* (2) 76 - 95.

Stoddart, H. (2011). *A pocket guide to sustainable development governance.* Stakeholder Forum.

Uwadiegwu, B. O. and Chukwu, K. E. (2013) Strategies for effective urban solid waste management in Nigeria. *European Scientific Journal. 9*(8) 296 – 308.

Uzoagulu, A. E. (2011). *Practical guide to writing research project reports in tertiary*

institutions. Cheston Limited, Enugu, Nigeria.

World Commission on Environment and Development, (1987). *Our common future.* Oxford University Press (Brentland's Commission).

Zeeuw, H., Van, V. R., and Dubbeling, M. (2011) Foresight project on global food and farming futures: The role of urban agriculture in building resilient cities in developing countries. *Journal of Agricultural Science.* 1 -11.