SCHÓLARENA

Appropriate Environmental Sanitation Practices among Agricultural Produce Marketers

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Abstract

The study examined compliance to appropriate environmental sanitation practices (AESP) and associated factors among agricultural produce marketers in selected market places of Ibadan metropolis, Nigeria. Three agricultural produce markets (Bodija, Shasha, and Ojee) were purposively selected, being the most central and large-scale agricultural produce markets in the metropolis. Interview schedule was used to obtain information from a total of 184 randomly (simple) sampled produce sellers across three most central produce markets in the metropolis. A total of six Focus Group Discussion sessions were also conducted. Simple narratives, descriptives, ANOVA and Tobit regression α 0.05 were used to analyse data. Average quantity of waste generated by each produce seller per day was 12 kg. Market trash cans, waste dumping sites, portable water source and toilet were not adequate. Compliance to AESP was generally low among produce sellers due largely to inadequate availability of waste facilities and services ($\beta=0.246$) and severity of constraints faced to appropriate environmental sanitation practices ($\beta= -0.277$) across selected agricultural produce markets. Government should establish a working collaboration with market associations and private business owners to make facilities and waste disposal services available in major commodity markets of Ibadan metropolis.

Keywords: Agricultural Produce Marketers; Compliance; Environmental Sanitation; Market Trash

Introduction

Expanding agricultural production has naturally given rise to increase in quantities of livestock waste, agricultural crop residues and agro-industrial by-products in the market. Reports have also shown that there is likely to be a remarkable increase in agricultural wastes globally if developing countries continue to intensify farming system [1]. This situation is not in the interest of a healthy and sustainable environment as it serves as avenue to various environmental and health problems. The World Health Organization – WHO (2017) reports that close to 10% of the global sets of diseases and one third of annual deaths in most developing countries is caused by poor sanitation [2]. Globally, the issue of environmental sanitation is a paramount concern and this is evident in the establishment of eight Millennium Development Goals (MDGs) [3,4] by United Nations in 2000 one of which catered for environmental sustainability which had safe water and sanitation as one of its targets.

The MDGs were replaced with Sustainable Development Goals (Sustainable Development Knowledge Platform, n.d.), with more specific goals and targets. The sixth Goal specifically calls for clean water and sanitation. The official wording is: "Ensure availability and sustainable Management of water and sanitation for all". "The goal has eight targets to be achieved by at least 2030 ". For this goal to be achieved, compliance (and its enforcement) with standard sanitation practices is a necessary action among relevant actors and stakeholders. However, about six years after the policies were formulated and actions have been implemented, there has not been any significant improvement in the environmental cleanliness in the major cities of Nigeria, with Ibadan being popularly known as one of the dirtiest cities in Nigeria, agricultural waste contributing a significant proportion.

As a confirmation of this popular belief and significance of agricultural waste, the Ministry of Housing and Environment of Oyo state where Ibadan is the capita asserted that the volume of waste generated in Ibadan increased from 350,823 kg in 1980 to 998,894 kg in 2010 [5]. [6] corroborated that the composition of solid waste generated in Ibadan can vary but is mainly composed of organic waste accounting for 42% of the total waste generated. Furthermore, in a survey carried out by an online news media, Sahara Reporters, Ibadan has been described as one of the filth centers of the world ranking as the number one of the dirtiest cities in the world [7]. Although the report has been widely contested, a personal observation of the city does not seem to present a contrasting reality. In a study by Adedeji [8], attitude of marketers towards environmental cleanliness and sanitation were reported

to be bad such that a loose system with insufficient emphasis on legislation and enforcement of relevant laws can hardly achieve any shift in the status quo.

It is to this end therefore that the Oyo state government has in the recent past come up with a number of policies and legislations with the primary aim of improving the environmental and health wellbeing of the citizenry. One of such is the revitalization of the already abandoned monthly environmental sanitation which was not just guided by policy statement but by laws and deliberate legislations in this direction. Along the line, an extra day of every Thursday was added when it became obvious that the one-a-week law was not effective at addressing the issue. This has been in operation for about eight years. In order to ensure the efficiency of the Sanitation exercise, the state government established Oyo State Waste Management Agency (OYWMA) with primary aim of ensuring cleanliness of the state and also empowered the agency with vehicles, trashcans, road sweepers and created several refuse collection points towards ensuring cleanliness especially. A number of waste prone areas, key among which are produce markets, were targeted in the state capital. Provisions for a Private Sector Participation (PSP) and use of contractor, procurement of new waste conveyor lorry, provision of new sanitation facilities and maintenance of old ones were also made.

A number of local and international organizations have also carried out varying campaigns, on the negative health and environmental implications of creating and multiplying dump sites which are unmanaged. Despite all these measures, sanitation practice and generality of environmental and other relevant indicators indicate that compliance with appropriate environmental sanitation practices is not yet a culture among stakeholders, especially marketers. Heaps of refuse and agricultural wastes have remained common sights in and around major commodity market places with little or no concerns about their proper disposals. The market men and women have perhaps failed to acknowledge that poor environmental sanitation is a serious health risk and an affront to human dignity. However, it may be an over generalization to posit that all agricultural produce marketers are guilty of this act of indiscriminate and unlawful dumping of refuse , as several factors, personal, communal and even institutional cannot but interplay to determine appropriateness of environmental sanitation practices. It is against this background that the study seeks to determine adherence to appropriate environmental sanitation practices (AESP), alongside associated factors in major markets of Ibadan metropolis of Nigeria.

The aims and objectives of this study are; 1) ascertained the quantity of waste generated in the selected major markets; 2) ascertained the extent to which agricultural produce marketers perceived agricultural wastes to constitute health and environmental risk; 3) identified availability of waste disposal facilities and services in the study area; 4) determined various constraints faced by agricultural marketers to appropriate environmental sanitation practices among marketers in the study area; 5) ascertained produce marketers' compliance to AESP in the study area. The study was carried out in Ibadan, the largest city in West Africa. Ibadan is a central city in the southwest region of the country and has a number of specialty markets. These specialties bother on specific commodities as emphasis goods. These range from clothing, interior materials and other wears to cattle and other livestock, in live and processed forms.

There are also designated markets for sacks and bottles, electronics and electrical materials/devices, while others exist as home of industrial consumables like provisions, toiletries, agrochemicals and others. Bodija is although a mixed-item market, however, the market is more a destination for agricultural produce than other goods. Ojee and Shasha market deal more specifically and predominantly (but not exclusively) with fruits and pepper/vegetables, respectively. The study took place between March and October, 2019.

Review of Literature

Abogan [9] defined environmental sanitation as the hygienic means of promoting health through prevention of human contact with the hazards wastes. Hazards can be physical, microbiological, biological or chemical agents of diseases. Federal Republic of Nigeria [10] added that environmental sanitation is the principle and practice of effecting healthful and hygienic conditions in the environment to promote public health and welfare, improved quality of life, reduce poverty and ensure a sustainable environment. [8] described environmental sanitation as a set of actions geared towards improving the quality of the environment and reducing the amount of diseases. According to [11], environmental sanitation is still a front line task in many developing countries including Nigeria.

Globally, [12] reported that 2.3 billion people live without access to a basic sanitation service. It was further said that Sanitation was one of the major Millennium Development Goals globally, it was estimated that only about 39% of the world's population have access to safely managed sanitation, while according to [13], about 3.4 billion of the global population is yet to have access to basic sanitation services. The [14] further posited that sub-Saharan Africa and Southern Asia still struggle with low sanitation coverage. [6] also asserted that in Nigeria, a large proportion live more than thirty minutes away from working water source. [15] reported that since the demise of the second Republic in 1983, environmental sanitation has become a pressing issue in Nigeria. Divers sanitation edicts have been promulgated by state governments and many of these edicts have at least temporarily had considerable impact on the lives of citizens in the major cities. Environmental sanitation has remained poor in Nigeria for a long time; consequently, there is a high morbidity and mortality from sanitation related diseases.

This scenario, which is associated with impoverishment and poor standard of living among the populace has been great concerns to successive governments and efforts had been made at various times and levels to complement the socio-cultural norms of

sanitation practices in the communities. Further efforts include the creation of several State and Local Government Agencies responsible for sanitation and lately, the creation of the Federal Ministry of Environment in 1999. Despite all these efforts, infant mortality and child mortality rates have remained high at one hundred (100) and two hundred and one (201) per thousand (1,000) live births respectively, mainly due to diseases such as malaria, diarrhea and acute respiratory infections, which are traceable to poor environmental sanitation. Components of environmental sanitation according to the [16] include Clean and safe water supply, Clean and safe ambient air components, efficient and safe animal, human and industrial waste, disposal Protection of food from biological and chemical contaminate and Adequate housing in clean and safe surroundings.

In addition, The Federal Ministry of Environment [10] listed out 13 components of environmental sanitation as contained in the policy document. Of these 13, solid and waste management and market and abattoir sanitation are core to environmental sanitation in market places which is very core to this study. Solid waste is any garbage, refuse, sludge from waste water treatment plant, water supply treatment plant or air pollution control facility and other discarded material, including solid, liquid, semisolid or contained gaseous material resulting from industrial, commercial, mining and agricultural operations and from community activities [17]. European Council [18] also defined waste management as the collection, transport, recovery and disposal of waste, including the supervision of such operations and after-care of disposal sites. It concerns itself with existing amount of waste, trying to minimize potential impact. Waste management should concern itself not only with final disposal of waste but also with the whole cycle of waste creation, storage, treatment and recovery. According to [10], waste management is at the lowest ebb in most towns and communities.

Most parts of the city centers do not have benefits from public waste disposal services and therefore have to bury their wastes or dispose it haphazardly. In most cities and peri-urban centers, refuse heaps are left unattended to and where the Local Government authorities do the collection, it is often irregular and sporadic. The recycling of waste is negligible while method of storage, collect, transportation, compaction and final disposal are very unsatisfactory.
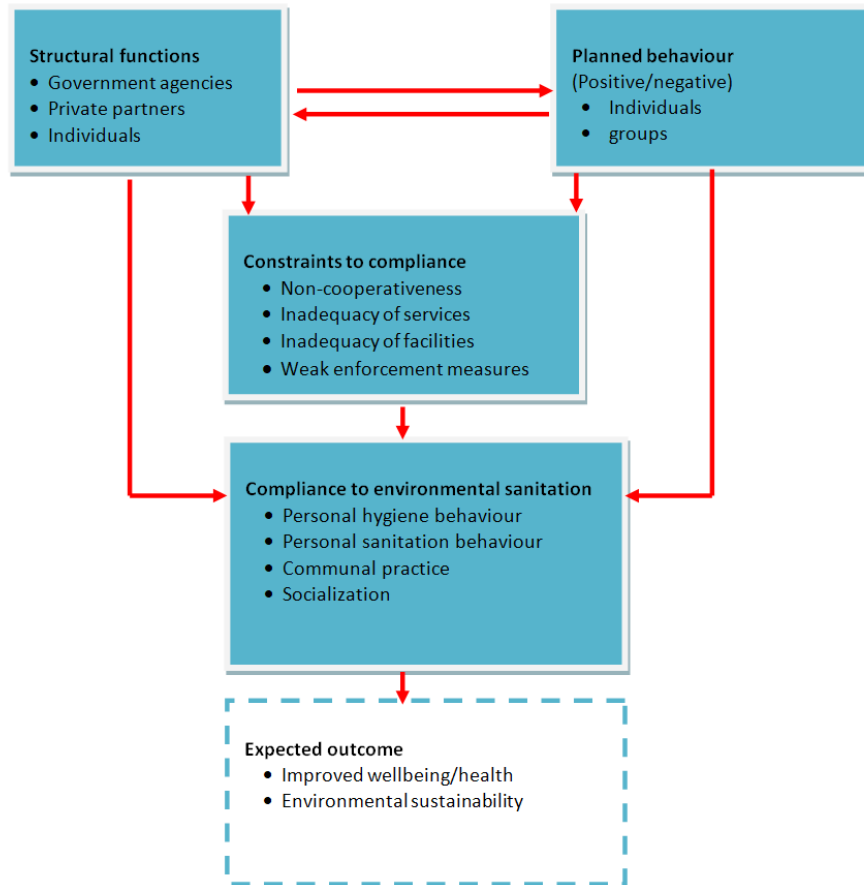
On market and abattoir sanitation, the Federal Ministry of Environment [10] remark that markets and abattoirs are built without proper layouts and where such layouts exist, they have been distorted. Besides, provision of adequate water supply, proper drainage, and waste disposal facilities are lacking. Transportation of animal meat from abattoirs in passenger vehicles or motorcycles is a common practice in most towns and cities. Contamination can occur during transportation especially while using passenger vehicles. It is also common practices to see animal meat hawked on the streets. These practices expose the animal meat to contaminants such as dust, flies and other pathogens in the environment.

Fakere & Fadamiro [19] opined that the existence of markets in any city is expedient due to the fact that commercial activities are the back-bone of several economies and that people should be able to buy and sell and transact their businesses so that life could go on normally, however, lack of control in the proliferation of markets and trading spells doom for such cities due to the inherent risks. It was further posited that one factor that is common with markets is the generation of waste which if not well managed will increase public health risks. The wastes that are been generated from markets include animal wastes, equipment wastes and wastes from several food products sold in such markets. In many developing countries like Nigeria, proper hygiene in markets has not been a major consideration; hence, markets spring up sporadically without any attention to provision of proper refuse dumps and public toilets. In order to forestall such occurrences ass food poisoning, the importance of cleanliness of market environment cannot be overemphasized [19].   .

Theoretical and Conceptual Framework

The theory of planned behavior and the Structural Functionalism Theory are used as the guiding thoughts and propositions for this study [20]. The two theories present the imperativeness of synergy of roles of individuals and institutions, as asserted in the latter, and how positive behavioural intentions and eventual behaviour can be engendered in individuals for a functional society, as explained by the former. The Theory of Planned Behaviour (TPB) states that an individual's behavioural beliefs, normative beliefs and control beliefs determine his/her attitude towards a given behaviour, subjective norm, and perceived behavioural control, respectively which then collectively influence the behavioural intentions and actual behaviour of the individual when participatory decisions in an action are voluntary and under an individual's control. The theory is based on the assumptions that individual behavioural intentions are directly associated with their attitudes and hence compliance to certain practices.

The theory concludes that, it is best to examine human behaviour when participation decisions are voluntary and under an individual control. While it is arguable that the theory's assertion is valid, it is however important to note that compliance to appropriate environmental sanitation practices is not only a function of human intentions, as a number of other factors are not always within the control of the individual. Such factors in the case of compliance to good environmental sanitation practices are availability of social services and facilities as well as enforcement of regulations. This is where the Social Functionalism Theory becomes relevant. The theory, as posited by Omolawal & Shittu [21], asserts that institutions must survive by adapting to changing circumstances by means of interdependence on its various branches or partners. In this case, the governmental institutions like the monitoring team of the Oyo state environmental sanitation programme, and the Oyo state waste management agencies and other enforcement bodies as well as private partners, have roles to play, failure of which compliance are not achievable. It is therefore a logical conclusion that all actors in environmental management, ranging from individuals to groups and institutions have clear roles and responsibilities if the goal of environmental and health sustainability of the larger social unit will ever be attained. The framework shown in Figure 1 further explains this synergy.

Figure 1: Compliance to appropriate environmental sanitation practices framework (Adapted from Omolawal & Shittu [21])

Materials and Methods

The study was carried out in Ibadan metropolis which is the capital and the most populous city of Oyo State with a population of about six million inhabitants [22]; it is the third most populous city in Nigeria after Lagos and Kano. Ibadan is located in south-western. Nigeria in the southeastern part of Oyo state at about 119 kilometers (74 miles) northeast of Lagos and 120 kilometers (75 miles) east of the Nigerian international border with the Republic of Benin [23]. The city comprises of eleven local government areas and majorly occupied by Yorubas. The population of the study is all agricultural produce marketers in major markets in Ibadan metropolis. Multi-stage sampling procedure was used to select respondents. Three markets (Bodija, Ojee and shasha) were purposively selected because of their large agricultural produce presence and sales capacity. Random sampling was used to select 50% of all the clusters of agricultural produce sections present in each of the three markets.

Simple random sampling was used to select 8% of agricultural produce markets from each of the sections selected to give a total of 87 respondents from Bodija, 57 from Sha-sha and 40 from Ojee, giving a total of 184 respondents across the three markets. Quantitative data was obtained through the use of validated interview schedule and structured questionnaires while qualitative data was obtained using focused group discussions (FGDs), Participant observation, and in - depth interview. The criterion variable is compliance of agricultural produce marketers to environmental sanitation practices, while the independent variables are respondents' socioeconomic characteristics, quantity of agricultural produce generated, constraints faced to compliance to sanitation practices, availability of waste disposal facilities and services, perception on the health and environmental risk issues associated with poor sanitation practices.

Commonly generated agricultural waste was measured in quantity (kg) of waste per day for different agricultural commodities being traded by produce sellers. Agricultural produce are any commodity, mainly food items, including grains, tubers, fruits, vegetables, pepper, and tomatoes, which are traded by different actors within the market place. Availability of waste disposal facilities and services operationalized using an 11-item scale, as respondents indicated "available" and "unavailable" as it applies in each case with scores of 1 and 0 assigned in each case. To measure constraints, a list of possible constraints to practicing environmental sanitation among agricultural produce marketers was generated, along a three-point scale in which 2, 1 and 0 were assigned based on severity. In addition, problem tree was used during the Focus Group Discussions to ascertain the causes and consequences of a waste-laden market place. Perceived environmental and health risks of agricultural wastes was measured by on a Likert-type scale in which scores of 1, 2 and 3 were assigned along a continuum of agreement to a list of items. The dependent/criterion variable is compliance of agricultural produce marketers to environmental sanitation practices, and this was operationalized by measuring respondents' sanitation practices against the standard. Compliance to the standard practice of each practice indicated by respondents was assigned a score of 1 and noncompliance assigned a score of 0.

An index of each of the variables was generated and used in the hypothesis. Compliance was categorized into two groups of partial compliance and total compliance, using the mean compliance score of 8.14 as the benchmark. Frequency distribution, mean and percentages were used to explain data while ANOVA and Tobit regression were use tested the hypotheses. The later was used to estimate the effect of each of the selected socioeconomic characteristics and other dependent variables on compliance to environmental sanitation practices. The model was used because the compliance score was right-censored, having a lower limit of 12. The model specification and the mode in which each of the variables was entered is represented as Equation 1.

$$Y = a + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + Bx + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \ldots \beta_{14} X_{14} + \mu \qquad (1)$$

Where;
Y=Compliance to environmental sanitation practices (1= compliance 0=Non compliance)
a= Constant term
$\beta_1, \beta_2, \beta_3 \ldots \ldots \beta_n$= Regression coefficients
μ=   Error term
$X_1, X_2 \ldots \ldots X_n$= selected independent variables
X_1= Age (Actual age in years)
X_2= Sex (Male=1 Female=0)
X_3= Religion (Christianity =1, otherwise =0)
X_4= Marital status (others 0, married =1)
X_5= Educational level (others 0, formal education= 1)
X_6= Household size (Actual no of households size)
X_7= Years of sales experience (Actual number of years)
X_8 =commonly generated agricultural wastes
X_9= perception of respondents on how agricultural wastes constitutes health and environmental risks
X_{10}= Availability of waste disposal facilities and services
X_{11}= Constraints faced in practicing environmental sanitation
X_{12}= Perceived needs of respondents to practicing environmental sanitation

Results and Discussion

Commonly Generated Agricultural Wastes in Quantity

Table 1 shows that the average quantity of commonly generated agricultural waste was 11.97kg per day. This is an implication that agricultural wastes constitute a large portion of overall wastes being generated in the markets on a daily basis. On the contrary, the findings of Efe [5] revealed that agricultural wastes contribute 8% of the total waste that is being generated per day.

Commonly generated wastes	Frequency	Percentage	Mean
Quantity in (kg)			11.97
≤10	123	66.8	
20-Nov	30	16.3	
21-30	18	9.8	
31-40	7	3.8	
>40	6	3.3	

Table 1: Commonly generated wastes of respondents in quantity (kg)

Respondents Perceived Environmental and Health Risk of Agricultural

The study reveals in Table 2 that on the average, the marketers of agricultural produce across the markets had low knowledge of the environmental and health risks that agricultural wastes constitute. On the possible health risk that poor sanitation practices pose, respondents on the average agreed that there could be an outbreak of diseases such as malaria, typhoid, diarrhea, dysentery and cholera if agricultural wastes are not properly managed ($\overline{X}$ = 1.95). Marketers also agreed that trachoma can be contracted under a unhygienic market condition ($\overline{X}$ = 1.92). On the environment, the study reveals that respondents also agreed that improperly managed solid wastes causes aesthetic nuisance ($\overline{X}$ =1.92), that unguarded burning of refuse may cause fire disaster which can lead to serious devastating effect on human beings ($\overline{X}$ =1.92) and that debris in the market becomes a breeding ground for pests, such as snakes and rats ($\overline{X}$ =1.92). The result therefore implies that respondents perceived that agricultural wastes constitute unfavorable environmental and health risks in the study area. The result of the FGD, particularly the problem tree analysis concurs with this as it indicates that flooding, death, diseases and drainage blockage are all health and environmental consequences and risks associated with poor sanitation practices. One of the discussants said:

" diverse forms of diseases can be contacted if one's environment is dirty, a person can be stooling or be vomiting. Malaria can also set in, if one fails to take good care of his environment" (Male/FGD/Bodija).

Environmental and Health risks	Mean
Health risk factors	
Many diseases can be prevented if wastes are properly administered and managed	1.58
Solid waste is a breeding ground for diseases vectors	1.58
Polluted air from refuse dumping sites brings out odour and causes respiratory diseases.	1.58
Sources of water can be contaminated by' water' flowing slowly from refuse dumps	1.58
Indiscriminate disposal of refuse promote the prolific breeding of arthropod borne like mosquitoes, houseflies, lice, cockroaches etc	1.95
Trachoma can be contacted from an untidy environment	1.92
Environmental risk factors Solid waste causes aesthetic nuisance	1.92
Dropping leftover food stuffs into gutters can cause flooding in the market place due to drainage blockage	1.58
Debris in the market can hinder ease of movement within the market	1.58
Debris in the market becomes a breeding ground for pests e.g. Snakes and rats	1.92
Unguided burning of refuse may cause fire disaster which can lead to serious devastating effect on human beings	1.92
Grand mean	1.75

Table 2: Distribution of respondents based on their perceived Environmental and health risk of poorly managed agricultural waste

This is therefore an indication that given an enabling policy and regulatory actions for proper waste disposal, an average produce marketer will manage wastes properly such that effects on both health and the environment will be reduced to the barest minimum. This finding is in line with that of Abejegah, *et al.* [24] where majority (96.7%) of marketers in Oregbeni area of Benin City, Edo state, Nigeria agreed that improper waste management is associated with a number of consequences of health and environmental dimensions. This is line with the position of Ibanga [25] who also indentified diarrhea, lower respiratory infections, unintentional injuries, and malaria as commonly reported health issues associated with improper disposal of waste in Nigeria.

Availability of Waste Disposal Facilities and Services in the Market

Table 3 shows that market trashcans ($\overline{X}$ =0.36), waste collection vehicles ($\overline{X}$ = 0.42), waste dumping site ($\overline{X}$ = 0.23) and potable water source ($\overline{X}$ =0.39) and toilet ($\overline{X}$ = 0.40) are public facilities which were least available for produce marketers' use in the market. On the other hand, private facilities such as toilet ($\overline{X}$ = 1.91) and bathroom ($\overline{X}$ = 1.92) were the most available public facilities. Furthermore, regarding public services, waste collectors ($\overline{X}$ = 1.56) and environmental health officer's visit ($\overline{X}$ = 1.89) the most available. On a personal note, majority had brooms ($\overline{X}$ = 1.94), waste bin ($\overline{X}$ = 1.47) and disposable waste nylon ($\overline{X}$ =1.82). This suggests that public facilities and services are not in adequately available for produce marketer's use in the market. This is in line with the findings of Steve and Daniel (2014) who reports lack of adequate waste collection and disposal facilities in some markets in major markets in sub-Sahara Africa countries. This agrees with World Health Organization [13] that More than 2.4 billion people in the world with majority in developing countries currently lack access to adequate sanitation and are forced to dispose of their excreta in unimproved and unsanitary conditions. Those who suffer from this, lack most basic human needs and also tend to be victims of poverty, ill health and an overall poor quality of life.

Variables	Mean	Rank
Public facilities		
Market trash cans	0.36	14th
Waste collection vehicles	1.09	10th
Waste dumping site	0.23	15th
Potable water source	0.39	13th
Adequate toilet	0.41	12th
Public services		
Waste collectors	1.56	8th
Environmental health officers visit	1.89	4th
Private facilities		
Toilet	1.91	3rd
Bathroom	1.92	2nd
Waste collection vehicles	0.42	11th
Private services		
Market waste carriers	1.86	5th

	Mean	Rank
Market sweepers	1.69	7th
Variables	**Mean**	**Rank**
Personal facilities		
Brooms	1.94	1st
Personal waste bin	1.47	9th
Disposable waste nylon	1.82	6th

Table 3: Distribution of respondents based on the availability of waste disposal facilities and services in the market

Constraints and Perceived Needs to Practicing Environmental Sanitation

Table 4 shows that inefficiency of waste collection services ($\overline{X}$ = 0.95), insufficient toilet ($\overline{X}$ =0.53), lack of site for disposing waste ($\overline{X}$ = 0.49), poor state of toilet facilities ($\overline{X}$ = 0.47), inadequate waste disposal bin ($\overline{X}$ = 0.47) and unavailability of disposal bins ($\overline{X}$ = 0.47) were the most severe constraints faced by respondents in practicing environmental sanitation. Constraints such as lack of fund to pay waste collectors ($\overline{X}$ =0.44), location of waste disposal bin is too far ($\overline{X}$ =0.38), and lack of cooperation from other marketers ($\overline{X}$ = 0.34) were less severe, as they ranked lowest on the constraints scale. This is in line with Taiwo & Ajayi [26] who identified lack of adequate management of refuse dump as contributory to the increasing pollution of the environment and a clog in the wheel of environmental development in Ibadan. The result also agrees with Hussaini, *et al.* [27] where marketers requested for the provision of adequate sanitary facilities, specifically modern toilets and equipments in Kofar Wambai Market of Kano state Nigeria. A similar situation had also been reported by Daramola & Olowoporoku [28] and [29] who observed that due to poor and/or lack of toilet facilities in market places in Nigeria, open urination and defecation are widespread and the resultant contamination of the environment contributes to environmental degradation.

Constraints	Mean	Rank
Inadequate waste disposal bin	0.47	5th
Inadequate portable water source	0.47	5th
Disposal bins are never provided	0.47	5th
Lack of cooperation from other marketers	0.34	10th
Location of waste disposal bin is too far from the market	0.38	9th
Lack of site for disposing waste	0.49	3rd
Inefficiency of waste collection services	0.95	1st
Lack of fund to pay waste collectors	0.44	8th
Insufficient toilets	0.53	2nd
Poor state of toilet facilities	0.47	4th

Table 4: Constraints of respondents in practicing environmental sanitation

This is also in line with the response of the respondents during the Focus Group Discussion;

"It really difficult to dispose wastes in this market since marketers have been warned by the current administration of this state not to drop wastes by the road sides any longer. The waste collection vehicles do not give time ahead for the people in the market to bring out waste before they leave; this makes people in the market store wastes over and over" (Male/IDI/Ojee market).

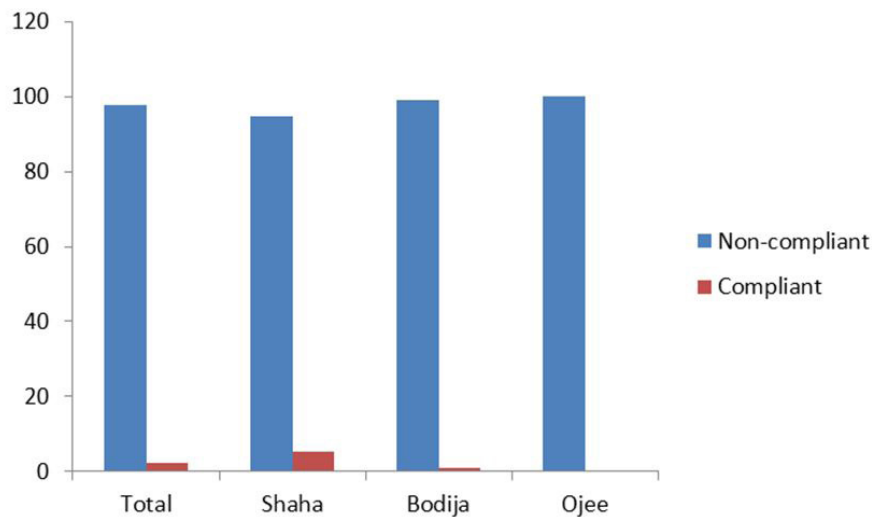This is in tandem with the findings from the Focused Group Discussion:

"The government did not provide waste collection vehicle in this market, but money is contributed by members of market associations to buy own waste collection vehicle and that is the only vehicle that comes into the market to collect marketers waste. Another waste collection vehicle is needed because the vehicle bought is already old and it not functional well again" (Male FGD/Shasha market).

One of the male Focus Group discussants emphasised the need for functional and modern toilet facilities in the market:

"Apart from waste collection vehicles, public toilets is also of urgent need because as big as this market is, there is no single toilet facilities. This has also worsened the hiegene practice of individuals and also of the market generally. This also constitute a threat to public health and environmental sustainability." (Male participant /FGD Ojee market).

Result on appropriate sanitation practices shows (Figure 2) that 97.8% of market women are categorized as practice non-compliant, as against 2.2% grouped as compliant. This is an indication that majority of the market women in the major produce markets of Ibadan metropolis are non-compliant to AESP. This can simply be connected to limited services and facilities which have been implicated in the study. Oluwole, *et al.* [30] had posited that it is quite common to observe mountains of refuse at market places, and this poses danger for good health and environmental sustainability as the heaps of refuse provide excellent breeding grounds for vectors of communicable diseases including rodents and insects. This study also agrees with Ye-Obong & Uduak [31] who asserted that the different categories of wastes in many Nigerian cities are most times disposed in an unsustainable manner in open dumps, streets,

aesthetic quality but also pollutes soil and water resources while also serving as potential health hazard to the people.

Figure 2: Categorization of respondents showing percentage compliance to appropriate environmental sanitation practices in selected markets

Difference in the Level of Compliance of Respondents to Environmental Sanitation Practices across the Three Markets

Table 5 shows that there is no significant difference (F = 2.205, P = 0.113) in the level of compliance of agricultural produce marketers to AESP across the three markets (Bodija, Ojee and Shasha). This implies no one market complied than the other when it comes to sanitation practices, produce marketers across the selected markets are in the same level of compliance to AESP. This is in tandem with the findings of [15] that there exists similar situation in terms of behavior and facilities across major markets of Ibadan.

Compliance	Sum of squares	Df	Mean square	F	p-value	Decision
Between group	8.078	2	4.039	2.205	0.113	Not significant
Within group	331.525	181	1.832			
Total	339.603	184				

Table 5: Test of difference in the level of compliance of respondents to environmental sanitation practices across the three markets

The result of the Tobit regression as presented in Table 6 shows that availability of services and facilities (β= 0.246) is the most important predictor of respondents' compliance to environmental sanitation practices. This implies that the more services and facilities are made available to marketers, the higher the compliance to environmental sanitation practices. The study also establishes a significant relationship between respondents' compliance to appropriate environmental practices and level of constraints to appropriate environmental practices. This also implies that constraints were sufficient and were responsible for the poor practice of AESP. The constraints have been highlighted in Table 4 as include inefficiency of waste collection services, insufficient toilet facilities and inadequate disposing sites for wastes, and hence have negative significant effects on compliance to AESP. Perhaps, this is the reason majority of cities like Ibadan are renown for disposing wastes at canals and roadsides where they constitute negative health and environmental risk to the populace. The result however shows that level of formal education and constraints faced to waste disposal and perceived environmental and health risks of refuse had no significant effect on compliance. This could simply be due to the common attributes the markets share in their educational attainment, which may limit variance across the continuum of educational attainment. The significance of availability of waste disposal services and facilities is also a pointer to its significance among other constraints to AESP.

Variables	Estimates coefficient	Standard error
Environmental risk score	0.39	0.304
Age	0.038	0.033
Religion(Christianity dummied)	-0.191	0.73
Availability of services and facilities	0.246***	0.091
Married (dummied)	0.513	0.913
Constraints	-0.277**	0.066
Household	-0.213*	0.123
Sex	-0.597	0.774
Education(formal edu dummied)	0.632	0.894

Variables	Estimates coefficient	Standard error
Sales experience	-0.021	0.036
Perceived health risk	-0,283	0.279
Log sigma	1.097***	0.138
Constant	5.449	3.488
N	184	
Log Likelihood	-148.103	
Akaike inf.crit	322.206	
Bayesian inf.crit	364	

*Significant at the 10 percent level; **Significant at the 5 percent level*significant at the 10 percent level

Table 6: Determinants of respondents' compliance to environmental sanitation practices

The study however establishes no significant contribution of sales experience, educational status and sex to compliance to appropriate environmental sanitation practices. This result agrees with Reininger, *et al.* [33] who postulated that length of stay of individuals in a particular area influence environmental consciousness. The result also disagrees with Oluwole, *et al.* [30] and Olofsson & Öhman [34] who postulated that educational attainment is expected to play a significant role in environmental consciousness and awareness [35].

Conclusion and Recommendations

This study concludes that the quantity of agricultural wastes that is being generated by respondents in the study area on the average is 12kg per day and that inefficiency of waste collection services, insufficient toilet and lack of site for disposing waste were the most severe constraints to appropriate environmental behaviour of agricultural produce markers. Also, prompt and frequent waste collection, more trash vehicles and portable water source were identified as the most pressing needs in practicing appropriate environmental sanitation. Finally, the study concludes that the major factor responsible for low compliance to environmental sanitation practices was availability of facilities and services. Therefore, non-compliance to appropriate environmental practice is largely due to failure on the part of the governmental institutions in terms of provision of aid and enabling environment to appropriate environmental behaviour. Just like the theory of planned behaviour posited, good intentions as established among marketers are a requirement to behavioural change. However, such intentions can only get translated to good behaviour when, as established by the theory of structural functionalism, all components of the social unit play their roles.

Therefore, efforts in the forms of enlightenment of the marketers of health implication of inappropriately managed waste as well as other potentially positive personal characteristics, and enforcement of environmental laws can achieve desired results only to the extent that institutional factors are favourable. The following recommendations become important in the light the conclusion of this study as; 1) There is need for the Federal ministry of environment to embark on thorough and proper monitoring of the waste collectors to ensure that they perform their duties effectively and also come up with better waste collection strategies that will benefit all and sundry; 2) Government should partner market associations and private business owners to make facilities and waste disposal services available in major commodity markets of Ibadan metropolis.

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References

1. Obi F, Ugwuishiwu B, Nwakaire J (2016) Agricultural Waste Concept, Generation, Utilization and Management. Niger J Technol 35: 957.

2. World Health Organisation (WHO) (2017) Water Sanitation Hygiene.

3. World Bank (2018) Sanitation. World Bank.

4. World Health Organisation (WHO) (2012) The Regional Strategy for Traditional Medicine in the Western Pacific (2011–2020) pp. 1-71.

5. Efe SI (2013) Waste Disposal Problems and Management in Ughelli, Nigeria. J Environ Prot 04: 4-11.

6. World Bank Group (2017) Private sector participation in solid waste management activities in Ibadan.

7. Oyeniyi AB (2011) Waste Management in Contemporary Nigeria : The Abuja Example. Int J Politics Good Governance 2: 1-18.

8. Adedeji I (2015) Attitude of Market Woman towards Weekly Environmental Sanitation Exercise in Bodija Market in Ibadan , Oyo State , Nigeria. J Sociol, Psychol Anthropol Pract 7: 57-62.

9. Abogan BS (2014). Appraisal of Existing Sanitation Technology in Nigeria; A Critical Review. Global J Geogr 14: 1-15.

10. Federal Ministry of Environment Abuja (2005) National Environmental Sanitation Policy 2005.

11. Bichi MA, Gadanya MA, Adamu A, Bichi AA (2012) Environmental Sanitation and National Development. J Res National Dev 10: 91-7.

12. World Health Organization (WHO) (2018) Millennium Development Goals (MDGs). World Health Organization.

13. World Health Organisation (WHO) (2019) Sanitation.

14. United Nations Department of Economic and Social Affairs (UNDESA) (2014) International Decade for Action "Water for Life" 2005-2015. Focus Areas: Access to sanitation.

15. Owolabi BO (2017). Effect of Housing Condition and Environmental Sanitation on the Residents of Oyo State, Nigeria. Int J Res Environ Sci 3: 20-36.

16. Business Dictionary (2020) Who are ? - BusinessDictionary.com.

17. Legal Information Institute (2020) 42 U.S. Code § 6903 - Definitions | U.S. Code | US Law | LII / Legal Information Institute.

18. European Council (1991) Council Directive 91/156/EEC of 18 March 1991 amending Directive 75/442/EEC on Waste Official Journal L 078.

19. Fakere AA, Fadamiro JA (2012) Decentralization of Markets and Environmental Sanitation Scheme : A Focus on Urban Core of Akure, Nigeria. J Environ Earth Sci 2: 14-25.

20. Ajzen I (1991) The theory of planned behavior. Organizational Behav Hum Decis Processes 50: 179-211.

21. Omolawal SA, Shittu OS (2016) An Assessment of Environmental Sanitation and Solid Waste Management in Ibadan North Local Government, Oyo State, Nigeria. Ibadan J Social Sci 14: 183-201.

22. Ivan Bruce (2019) Planning a city for today, tomorrow and the future: Ibadan, Nigeria.

23. Ibadan (2020) Wikipedia.

24. Abejegah C, Abah S, Awunor N, Duru C, Eluromma E, et al. (2013) Market Sanitation: A Case Study of Oregbeni Market Benin- City. Int J Basic, Appl Innovative Res 2: 23-31.

25. Ibanga EE (2015) An assessment of environmental sanitation in an urban community in Southern Nigeria. Afr J Environ Sci Technol 9: 592-9.

26. Taiwo PA, Ajayi OJ (2013) Environmental Pollution in Urban Market : The Case of Bodija. Developing Country Stud 3: 53-67.

27. Hussaini UM, Madaki AM, Baba A (2018). Environmental Sanitation Practices Among Traders of Kofar Wambai Market-Kano State of Nigeria. Int J Sci Res Publ 8: 785-90.

28. Daramola O, Olowoporoku O (2016) Environmental Sanitation Practices in Osogbo, Nigeria: An Assessment of Residents' Sprucing-Up of Their Living Environment. Econ Environ Stud 16: 699-716.

29. Olowoporoku OA (2017) A Recipe for Disaster : An Assessment of Environmental Sanitation Situation in Nigeria. MAYFEB J Environ Sci 1: 1-5.

30. Oluwole D, Oluwaseun O, Oluwafemi O (2017) Assessment of environmental sanitation behaviour of market traders in selected markets in Ibadan, Nigeria. Adv Environ Res 6: 231-42.

31. Ye-Obong U, Uduak A (2013) A Sustainable Approach to Municipal Solid Waste Management in Southern Nigeria.

32. Okosun AE (2011) Promoting Environmental Sanitation through Incorporation of Urban Planners in Solid Waste Management in Enugu. J Environ Manag Saf 2: 49-55.

33. Reininger BM, Rahbar MH, Lee MJ, Chen Z, Alam SR, et al. (2013) Social capital and disaster preparedness among low income Mexican Americans in a disaster prone area. Social Sci Med 83: 50-60.

34. Olofsson A, Ohman S (2006) General Beliefs and Environmental Concern. Environ Behav 38: 768-90.

35. Sustainable Development Knowledge Platform (2020) Sustainable Development Goals.