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Environmental Sanitation Practices in Traditional Markets of sub-Saharan Africa

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ABSTRACT: Environmental Sanitation is the principles and practice of effecting healthful and hygienic conditions in the environment to promote public health such as human excreta control, managing solid waste and wastewater, and pest and vector control. Hence, the objective of this work is to assess the environmental sanitation practices in Ondo Main Market in the City of Ondo, Ondo State, Nigeria using standard appropriate techniques by administering. 249 structured questionnaires out of which 228 were retrieved. The study found that majority (76.3%) of the market operators cover a distance of 100 meters and above for water supply. Others cover distances of 51 to 100 meters (18.0%), and few cover distances of less than 50metres (5.7%). On access to toilet facilities, while 85.1% of the traders travel 100 meters and above to use the toilets, 10.1% travel 50-100 meters, while 4.8% travel less than 50 meters to use the toilet. The study concluded that the environmental sanitation practice in Ondo Main Market is inadequate. The study recommends that the government and the management of the market should bring water supply and toilet facilities closer to the market to enhance its environmental sanitation. This study adds to existing knowledge by revealing the state of sanitation of Nigerian traditional markets using Ondo Main Market as a case study.

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One of the crucial, unsolved, or even unresolved problems for those concerned with the quality of life in the world, especially the developing world is that of adequate, accessible and acceptable basic sanitation [World Health Organization (WHO, 2011). According to the National Sanitation Foundation of USA, the word sanitation is defined as a way of life that is associated with a clean home, farm, business, neighborhood or community. Also, WHO defines sanitation as the provision of facilities and services for the safe disposal of human urine and faeces (UNEP International Environmental Technology Centre, 2009; Ekong, 2015; Gusti and Sari, 2020; Olatunji and Olanrewaju, 2022). Traditional commodity markets involve large groups of buyers, sellers and notably pre-school children who have followed their mothers to the markets. The coming together of buyers and sellers in markets give opportunities for the spread of contagious diseases with substantial prospects to reach endemic proportion (Abejegah *et al.,* 2013; Sukresno *et al.,* 2019; Yoade and Olatunji. 2019). Traditional markets have been given various descriptions by different authorities. Although rural markets have some similarities in characteristics, they differ a little based on their spatial location and cultures. According to Will (1962) traditional markets are rural markets where agricultural produce dominates manufactured items among commodities put up for sale. This establishes the fact that there is a link between agricultural production centers and traditional markets (Mmom and Mmom, 2011; Angmor, 2012). According to Muli (2007), a traditional market is a city

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square where traders set up stall and buyers browse the merchandise. Markets are often temporal with stalls only present for two days a week; however some are open every day of the week. In terms of operations, traditional markets do function on some specific days of the week at a specific location with set up stalls to facilitate sells and better display of goods for buyers (Angmor, 2012). Traditional markets have numerous characteristics which span from spatial, commodities, and operational days to female dominance. In the perspective of commodities, traditional market assemblies have a wide range of commodities which are exchanged in monetary terms. According to Abejegah, *et al.,* (2013), it is quite common to find heaps of refuse at traditional market places. The pile of refuse gives outstanding breeding ground to vectors of transferable ailment including rodents and insects, which boost the chances of contracting diseases in such markets (Afon *et al.,* 2006). It is also acknowledged that many of the diseases that disturb Nigerians, including malaria, tuberculosis and diarrhoea are due to baleful environmental circumstances.

Waste dumps can also cause fire risks apart from being eyesores and origins of horrible smell. Very frequently, waste is disposed in sewerage or canals and along water channels which leads to distasteful environmental results. One more usual characteristic of markets in Nigeria is the gross deficiency of sanitary facilities such as portable water, toilets, bathrooms, and waste disposal systems. Open urination and excrement are widespread, the aftermath of which is environmental contamination in most traditional markets (Angmor, 2012; Daramola, *et al.,* 2012; Fakere and Fadamiro, 2012; Olatunji and Yoade, 2022). Cointreau (1994) identified challenges of traditional markets which include unhealthy environment, inappropriate dumping of refuse and animal wastes; lack of toilet facilities; water shortage; and lack of prompt health facilities following injuries [Abejegah *et al.,* 2013]. However, environmental sanitation and solid waste management are very important for maintaining the aesthetic beauty of human environment as well as reducing health hazards, but it could not be effectively done without the involvement of all stakeholders in the process (Akiyama *et al.,* Baffes, Larson and Varangis, 2003; Tsinda *et al.,* 2018; Yoade et al., 2018; Arinda *et al.,* Zuska and Lubis, 2019; Ibrahim *et al.,* Adedotun, Waheed and Akinbosoye, 2019; Sukresno *et al.,* 2019; Gusti and Sari, 2020). It is clear from the foregoing, that there exist gaps and many ignored questions in market analysis, especially environmental sanitation practices and management; hence this study. Therefore, the objective of this work is to assess the environmental sanitation practices in Ondo Main Market in the City of Ondo, Ondo State, Nigeria

MATERIALS AND METHODS

Study area: Ondo City is one of the major urban centers in Ondo State and the city is located on latitude 06°30^{I}N and longitude 04°45^{I}E. The city is bounded on the north by Oluji/ Okeigbo, on the east by Idanre, on the west and south by Odigbo local government areas. The population of the town stood at 288,868 during the 2006 population census. Ondo falls within the 'tropical wet and dry climate' with a relatively small dry season. Currently, there are 12 political wards in Ondo City. Goods sold in Ondo Main Market include tubers, grains, cassava flakes, yam flour, frozen foods, electronics, shoes, bags, plastics imported clothing, shoes and bags, kitchen utensils, food stuffs, provisions among others. The roads in the market are unpaved and littered with refuse (Yoade, 2018; Yoade, et al., 2018).

Traditional markets are usually associated with negative impressions of being dirty and uncomfortable. If traditional market conditions are not improved, they could become unattractive to customers and may be ultimately abandoned as a result. However, traditional markets have advantages that are not usually associated with modern markets. They are strategically located, with large sales areas, diversity of goods, low prices and a bargaining system that demonstrates intimacy between sellers and buyers (Maulidya, 2018). Traditional markets are often uncomfortable to visitors because they are dirty, smelly, muddy, and stuffy. Consequently, they provide breeding grounds for disease vectors such as cockroaches, flies and mice (Fig. 1).

The data used in this study was obtained from both primary and secondary sources. The primary data was obtained through a cross-sectional survey of the Ondo Main (traditional) Market stall/shop owners. The cross-sectional survey is suitable to elicit the opinions of the market users on their environmental sanitation practices. The population for this study consisted of all stall owners in Ondo Main Market. The data collected include stall owners' socio-economic characteristics, types of waste frequently generated, methods of waste disposal and agencies involved in waste management in the market. A list of stall owners in the market was obtained from the Ondo Main Market's Management Committee. The total number of shops in the market is 1,248, 20% of which were selected for the administration of questionnaires. Therefore, a total number of 249 questionnaires were administered on the respondents out of which 228 questionnaires was retrieved. Both descriptive (tables) and inferential

(Pearson correlation) statistics were used for this study.

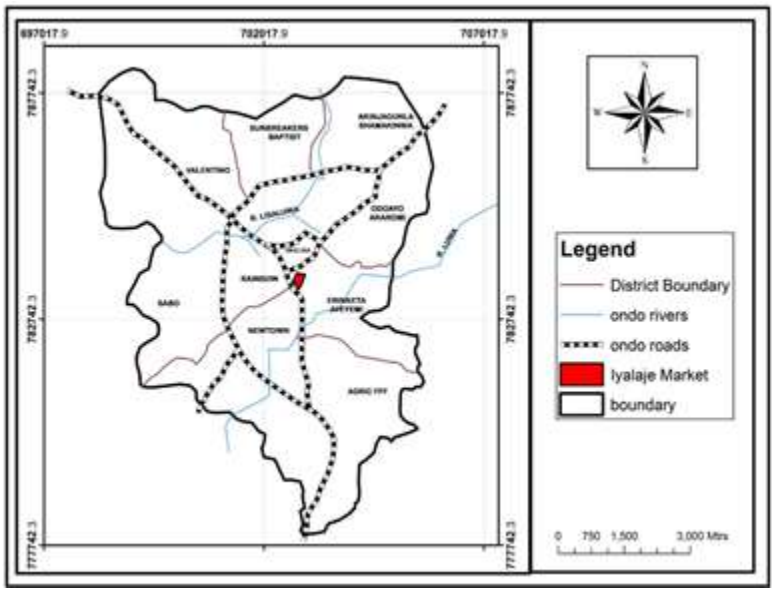

Fig. 1: Map of Ondo City showing Ondo Main Market, Nigeria
Source: Ondo West Local Government Town Planning (2018)

To assess possible solutions to environmental sanitation practices in the study area, respondents were required to rate their opinion on some factors mentioned. Indices were computed following a process similar to that of Relative Importance Index (RII). Similar uses of the RII are obtainable in such studies as Afon (2000 and 2006), Sambasivan and Soon (2006), and Olojede *et al*. (2017). The respondents were asked to rate each of the variables of interest following the principle of the Likert Scale (Likert, 1961). They were to express their opinions using a 5-point Likert scale: 'Strongly agree' (SA=5), 'Agree' (A=4), 'Neutral' (N=3), 'Disagree' (D=2), and 'Strongly Disagree' (VU=1). In order to measure the respondents' opinion on possible solutions to the environmental sanitation problems of the market, Solution Perception Indices (SPI) were computed. To arrive at the SPI, the following procedures were followed:

a. Summation of Weight Value (SWV) which is the addition of the product of the number of responses to each solution variable and the respective weight value attached to each rating.
b. The index for each solution variable was arrived at by dividing the Summation of Weight Value (SWV) by the total number of responses.

This is mathematically expressed as (Eq. 1)

$$SWV = \sum_{i=1}^{5} x_i y_i \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where: SWV= Summation of weight value; x_i= number of respondents to rating i; and y_i= the weight assigned to a value (i=1, 2, 3, 4, 5). SWV was then divided by the number of respondents' to arrive at each environmental perception index (EPI).
This is expressed mathematically as (Eq. 2)

$$EPI = \frac{SWV}{\sum_{i=1}^{5} i = X_i} \quad \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

The index for each identified solution factor thus takes a value between 5 and 1. The closer the EPI of a facility is to 5, the higher the residents' rating of it; the farther it is from 5, the weaker the rating of respondents of such a facility.

RESULTS AND DISCUSSION

Socio-Economic Characteristics of the Respondents: The social demography of the respondents is as contained in Table 1. The result of the findings showed that 34.6% of the respondents are male while 65.4% are female. Those between the ages of 36-45 years constitute 41.7% of the respondents while the lowest were those between 18-25 years of age being 6.6% of the sample. The summary of data collected and analyzed on the occupation of the respondents is presented in the Table 1. The occupation is categorized

into two: trader and store attendants where traders have the higher percentage of 74.6% while the store attendants constitute the remaining 25.4%. At the time of the survey, majority (50.9%) of the respondents were married while 18.0% of the respondents were divorcees. On academic qualifications, school certificate holders have the higher percentage of 48.2% while 22.4% of the respondents were first school leaving certificate holders (Table 1).

Demography	Frequency	Percentages of Respondents (%)
Gender		
Male	79	34.6
Female	149	65.4
Age		
18-25	15	6.6
26-35	56	24.6
36-45	95	41.7
46-56	62	27.2
Occupation		
Store Attendant	58	25.4
Trader	170	74.6
Marital Status		
Single	71	31.7
Married	116	50.9
Divorced	41	18
Widowed	---	---
Academic Qualification		
Primary	51	22.4
Secondary	110	48.2
Tertiary	67	29.4
Total	228	100

Table 1: Socio-Economic Characteristics of the Respondents

Market operators' access to environmental sanitation facilities in the study area: This section examines the market operators' access to environmental sanitation facilities in the study area. Findings established that majority (56.1%) of the respondents claimed they had access to water from bore hole, 42.1% indicated that their source of water was well water while 1.8% of the respondents had access to tap water in the study area. On accessibility to toilet, findings revealed that 56.6% of the respondents had access to toilet while 43.4% of the respondents do not have access to toilets in the study area. The implication of this is that respondents who do not have access to toilets will explore alternative places for defecation which may not be environmentally unfriendly. The result on type of toilet available to traders in the study area revealed that 82.9% and 3.9% of the respondents respectively defecated in pit latrine and water closet in the study area. About 13.2% of the respondents did not have access to toilet facilities in the study area. Findings on the type of drain available showed that 89.5% of the drains were opened while the remaining 10.5% of the drains were closed drains. Open drains are susceptible to blockage by solid waste which leads to the breeding of pests and outbreak of diseases and epidemics (Table 2).

Table 2: Market operators' access to environmental sanitation facilities in the study area

Variables	Frequency	Percentage of Respondents (%)
Modes of water supply		
Borehole	128	56.1
Well	96	42.1
Tap water	4	1.8
Access to toilet facility		
Yes	99	43.4
No	129	56.6
Type of toilet facility		
Pit latrine	189	82.9
Water closet	9	3.9
None	30	13.2
Type of drainage		
Open drainage	204	89.5
Closed drainage	24	10.5
Total	228	100.0

Market operators' environmental sanitation behavior in the study area: Sequels to the findings on market operators' access to environmental sanitation facilities, this section presents results of the analysis on market traders' environmental sanitation behavior in the market (Table 3).

Table 3: Physical Characteristics of the Study Area

	Frequency	Percentage of Respondents (%)
Type of waste storage facility		
Sacks	109	47.8
Polythene bags	49	21.5
Container without lid	61	26.8
Container with lid	9	3.9
Total	228	100.0
Waste disposal method		
Open dumps	164	59.0
Burning	63	22.7
Waste collection service	43	15.4
Barrow	8	2.9
Total	**278	100.0
Distant to nearest water supply (m)		
≤ 50	13	5.7
51 – 100	41	18.0
≥100	174	76.3
Total	228	100.0
Distant to nearest toilet facility (m)		
≤ 50	11	4.8
51 – 100	23	10.1
≥100	194	85.1
Total	228	100.0
Factors discouraging use of toilets		
Long distant	38	11.2
Poor sanitary condition	207	60.9
Others	95	27.9
Total	**340	100.0

***This exceeded the number of questionnaires administered because respondents identified more than one method/factors*

Findings on solid waste storage facility in the study area indicated that the most prominent solid waste

storage facility were sacks (46.7%) followed by metal/plastic containers without lid (26.8%), plastic baskets (21.5%) while 3.9% of the respondents make use of containers with lip. On solid waste disposal methods, it was observed in the study area that majority (59.0%) of the respondents dump their wastes in open spaces, 22.7% of the respondents practiced burning of waste, 15.9% engaged the services of solid waste collectors while 2.9% of the respondents engaged the services of waste collectors that use wheelbarrow. The high rate of dumping of waste at open spaces in the study area can be attributed to the lack of evidence of physical planning in the arrangement of traditional markets. However, dumping of wastes in pits and open spaces in the long-run constitute temporary/permanent filth nuisances around markets. As regards findings on the distance between respondents' shops/stalls and source of water, the initial quantitative data were categorized into three: 1-50 meters, 51-100 meters and 100 meters and above. Majority (76.3%) of the respondents claimed that the distance between their stalls and their source of water was 100 meters and above, 18.0% claimed the distance of 51-100 meters while 5.7% travelled less than 50 meters. The distance travelled by traders to access toilet facilities was likewise examined. For easy analysis, data were categorized into three: 1-50 meters, 51-100 meters and 100 meters and above. It was found that most (85.1%) of the traders travel 100 meters and above to use the toilets, 10.1% travel 50-100 meters to use the toilet while 4.8% travel less than 50 meters to use the toilet. The mean distances travelled by traders to use toilet in the study area is 213.9 meters.

On factors influencing the use of toilets, the results showed that 60.9% of the respondents do not use toilets within the market because of poor sanitary condition, 27.9% of the respondents claimed to be discouraged by other reasons such as fear of contracting diseases, irritating sight among others, while 11.2% of the respondents claimed to be discouraged because of the distance to toilet facilities in the market (Table 3).

Table 4: Environmental Perception Index

Elements	D	SD	I	A	SA	EPI
Provision and maintenance of toilet facilities	1	15	16	19	177	4.56
Provision of adequate water supply	6	10	13	50	149	4.43
Provision of environmental facilities	--	26	-	102	100	4.21
Regular collection of waste materials	17	-	70	19	122	4.00
Environmental literacy and awareness	14	30	50	33	101	3.78
Clearance of blocked drains and construction of more drain	17	50	-	144	17	3.41
Community/market operators participation in environmental services	35	43	120	19	11	2.68
Enforcement of environmental law	56	48	95	21	8	2.42

From the summary presented in Table 4, it is important to note that seven (7) out of eight (8) factors listed are significant, which points to the existence of environmental sanitation challenges in the market. That is, 7 out of 8 variables scored averages above 2.5 which is the mid-point of the Likert scale used. However, some factors are more important than the other. Findings show that provision of and maintenance of toilet facilities (EPI= 4.56) is the most important environmental factor. This factor pulled an average of 4.56. Next to this factor is provision of water adequate supply (4.43), provision of environmental facilities (4.21), regular collection of waste materials (4.00), environmental literacy and awareness (3.78), clearance of blocked drains and construction of more drains (3.41), community/market operators' participation in environmental services and the least factor is enforcement of environmental law (2.42).

Corroborating with studies of Ekong (2015), Amasuomo and Baird (2016) and Daramola *et al.*, (2017), this study established that traders in the Ondo Main Market travel longer distances to access environmental amenities such as water supply and toilets. This study also established that there is a need to improve waste collection, storage, and disposal at the market place to reduce the potential of spread of infectious diseases and environmental degradation.

Conclusion: This study assessed environmental sanitation practices in Ondo Main Market in the City

of Ondo, Nigeria with a view to providing guidelines that could improve environmental sanitation practices in the study area. This study concludes that environmental satiation practices in Ondo Main Market should properly look into in other to avoid dirty environment and unnecessarily health crises in study area. Based on the findings, the following recommendations were suggested to help in achieving a satisfactory, clean and conducive environment in Ondo main market in the City of Ondo, Nigeria. Local government should improve properly waste management practices in the market. Also, the shop owners/traders should improve on their waste properly without littering the environment. Furthermore, strict enforcement of laws should be ensured where administrative penalties for minor violations should be taken with urgency. Lastly, adequate provisions of all facilities should be made and how to maintain it should be properly looked into. Likewise, adequate provision should be made for the disposal of waste materials in the market in order to make the market more conducive for both buyers and sellers.

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