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Exploring the use of Waste Management System towards the Mitigation of Environmental Hazards in the Calabar Education Zone Cross River State

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Keywords

Exploring, Waste, Management, Mitigation, Environmental, Hazards.

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Abstract

This study explores the use of waste management system towards the mitigation of environmental hazards in the Calabar Education Zone Cross River State. To achieve the purpose this study, one research questions and one null hypothesis was formulated and tested at 0.05 level of significance. The research design adopted for this study was the correlational research design. The multi stage sampling technique was used for the study. The population of the study consists of 312,149 household heads in Calabar Education Zone of Cross River State. The sample of this study comprise 1,872 household heads that was selected from research area. A four-point modified likert scale instrument was used for data collection in this study. The instrument is a questionnaire titled "Environmental Management Systems and Control of Environmental Hazards Questionnaire (EMSCEHQ). The instrument was validated by three experts from Department of Measurement and Evaluation and department of adult and continuing education in both in University of Calabar. The reliability of the instrument was determined using Cronbach Alpha reliability estimate method and the instrument reliability estimates range from 0.87 to 0.88. To test the hypothesis, simple linear regression was used. The

	results from data analysis revealed that waste management system significantly predict control of environmental hazards in Calabar Education Zone of Cross River State. Based on these findings it was recommended among thins that government should extend its environmental management programmes beyond certain areas in Calabar urban to other remote streets in Calabar urban through the provision of accessible roads and good drainage channels to ensure effective environmental hazards prevention.

Introduction

A healthy environment promotes not only the wellbeing of the people, but also the survival of other biodiversity needed for a healthy living, economic productivity and societal growth. One of the trending global issues confronting almost all parts of the society in recent time has been environmental health. World Health Organization (WHO) (2014) notes that environmental health involves those aspects of human health and diseases that are determined by factors in the environment and involve theories and practices of assessing and controlling factors in the environment that can potentially affect the health of individuals living in the environment. This implies that maintaining a healthy environment may be a feasible measure to ensuring that the physical, chemical and biotic factors surrounding man in a given society are well managed and controlled to reduce environmental hazard and promote healthy and productive living.

Environmental hazard is an umbrella concept which covers a variety of environmental events that issue potential threats to human society such as pollution, loods, landslides, soil erosion, biodiversity loss, deforestation, floods, global warming, and a lot more (Choudhary, Chauhan, & Kushwah, 2015; Smith & Petley, 2009). This implies that environmental hazard is the direct consequence of environmental degradation which is the deterioration of the environment through depletion of resources such as air, water and soil; the destruction of ecosystems and the extinction of wildlife. When the environment becomes less valuable or damaged, habitats are destroyed, biodiversity is lost, natural resources are depleted, the environment is hurt, water becomes hazardous to life, air becomes detrimental to life, diseases spread more quickly, and thus the hcalth and wellbeing of the people are threatened (Chu & Karr, 2017).

Environmental hazards may be natural or occasioned by human activities in the environment (Smith & Petley, 2009). Those that may happen naturally include such natural occurrences like the acid rain, ice and snow, tropical cyclones, floods, and drought, which can pollute lakes, streams and rivers, thereby wiping away aquatic resources. Epidemic discases, tornadoes, volcanic eruptions, avalanches, landslides, earthquakes, tsunamis, hurricanes, and wildfires are also natural disaster that can destroy plants, forest covers, animal communities and human habitats (Al-sharqia, 2017). Similarly, those caused by human activities include such hazard

as air pollution, explosions and fires, release of toxic or radioactive materials, structural collapse, storage of hazardous materials, deforestation, erosion, desertification, loss of natural resources, release of harmful chemicals and toxic waste into bodies of water, air and land by industrial firms, institutions and domestic homes. However, studies have shown even human activities on the environmental seem to be responsible for a greater percentage of environmental hazards in any society, and that most of the natural hazards are induced by human activities (Nwankwoala, 2015; Patil, Shende & Janbandhu, 2015). This means that an attempt to control environmental hazards in any geographical region will involve a conscious effort to control disastrous human activities on the environment.

In Nigeria, it is been observed that most environmental problems in the country are induced by human activities on the environment. For instance, Echendu (2022) note that soil erosion, flood disasters, salinization or alkalisation, and the desertification were prominent in Niger Delta region due to the effects of shifting agriculture on fragile soils, forest clearing in erosion prone and flood prone areas, bush burning, animal over-grazing and poor construction and maintenance of roads and irrigation system; pollution of water, air and land due to improper disposal of domestic and industrial wastes; pollution from noise; proliferation of slums in urban areas, unsanitary and unsafe housing; congestion of traffic and houses in urban areas and lack of open spaces for active outdoor recreation. Ibimilua and Amuno (2014) also notes that human activities in many parts of Nigeria have resulted into environmental challenges like biodiversity loss, oil spillage, bush burning, urban housing problem, water scarcity, water, soil, air, marine, noise, thermal, radioactive and vehicular pollution, deforestation, urban flooding, destruction of aquatic habitats, over-exploitation of forest resouroes, illegal mining activities and dereliction, in the Nigerian society.

In Cross River State, especially in Calabar Education Zone, this situation seems to be quite serious as drains have been used as refuse dump, where a lot of people dispose their waste into drains, thereby blocking drainage and causing flooding in some parts of the Zone. The researcher noted that many of those living around coastal areas dispose their waste in the river, while some use the river as toilets. Many residential homes and business firms dispose their waste indiscriminately on drainage and dry land. There has been a noticeable high rate of deforestation in rural areas of the Zone due to poor agricultural practices and illegal timber harvesting processes. In most semi-urban and rural areas of the Zone, people live in congested areas due to unplanned housing system, while gas station are sighted within residential areas, market squares.

Consequently, there has been continuous pollution of air, water and land, which has contributed to the high rate of people suffering from diseases like diarrhea, typhoid, dysentery, malaria. Some families in the many parts of the Zone have lost their loved ones and properties to flood and fire incidents. In some parts of the arca, agricultural activities are hampered due to ultra-violet radiation occasioned by uncontrolled bush burning, over-cropping and timber logging. These observed environmental problems in the Zone are clear indication that there is

urgent need to put in place adequate measures to control human-induced environmental hazards. Control of environmental hazards in the society is a comprehensive approach to reducing the propensity or chances of the occurrence of environmental hazards in the society, as well as mitigating the effects of the already occurred hazards on the people.

WHO (2014) posits that environmental hazards control requires that the possible adverse impacts of human activities on the quality of ai, water and other natural elements are minimized. This implies that control of environmental hazards is a proactive rather than reactive measure to minimizing the possible consequences of poor environmental practices in the society. Ogbonna and Bisong (2018) notes that environmental hazards can be controlled by providing clean water, raising sanitary standards and reducing the use of pollution fuels. These researchers further state that formation of laws on deforestation, illegal construction of structures, dumping of wastes, ban on importation of toxic materials substances, provision of designated dumping sites, daily sweeping of areas and markets, daily excavation of wastes, distribution of wastes bins at home, offices, shops, schools , construction of drainages, waterways, culverts, ban on illegal excavation of sand for building, removal of broken down vehicles and machines on the roads and imprisonment of environmental hazard offenders are the measures adopted by Cross River State government to control environmental hazards in Calabar Urban areas. From the foregoing, it seems quite obvious that environmental hazards control in any society involves a carefully planned process of managing environmental practices in communities to ensure that they do not pose uncontrollable threats to human lives and the natural ecosystems. These may go beyond controlling environmental degradation at urban and semi-urban areas as pointed out by Bisong and Kalu (2018), to controlling poor environmental practices in rural communities.

Similarly, waste management system is another environment management system that can generate environmental hazards when it is not properly implemented. When people dump wastes indiscriminately on drains, water bodies and dry land, there possibility of flooding, air, land and water pollution and there is also the tendency for disease outbreak in the locality. The findings from analysis of the second hypothesis showed that the null hypothesis was rejected and the alternative hypothesis upheld which implied that indeed Waste management system significantly predict control of environmental hazards in Calabar Education Zone of Cross River State. The result is in line with the study of Ogundele, Rapheal and Abiodun (2018) that noted that there is a large body of literature on the potential adverse health effects of different waste management options, particularly from landfill and incineration. According to the authors many waste management systems are put in practice to manage all types of waste generated by humans in the society. These methods range from: Recycling (the recovery of materials from products after they have been used by consumers), Composting (an aerobic, biological process of degradation of biodegradable organic matter), Sewage treatment (a process of treating raw sewage to produce a non-toxic liquid effluent which is discharged to rivers or sea and a semi-solid sludge, which is used as a soil amendment on land, incinerated

or disposed of in land fill), Incineration (a process of combustion designed to recover energy and reduce the volume of waste going to disposal), Landfill (the deposition of waste in a specially designated area, which in modern sites consists of a pre-constructed 'cell' lined with an impermeable layer, which may be man-made or natural, and with controls to minimize emissions). Thus, waste management system can contribute to effective hazard control when properly carried Out.

Theoretical framework

Theory of Planned Behaviour by Ajzen (1991)

The Theory of Planned Behaviour was proposed by Ajzen in 1991. This theory considers the intention to act and objective situational factor as direct determinants of pro-environmental behaviour. According to the theory, the intention itself is considered summarizing as it explains the interplay of cognitive variables which include; (knowledge of action strategies and issues, action skills) as well as personality variables (locus of control, attitudes and personal responsibility). The Planned Behaviour Theory grew out of the Theory of Reasoned Action and it suggests that human behaviour is influenced by three belief constructs: beliefs about consequences; expectations of others and things that may support or prevent behaviour. The basic tenet of the theory is that attitude, subject norms, and perceived behavioural control, together shape an individual's behavioural intentions and the way they respond to their environment.

Basic assumptions of the theory

1. The intentions of people largely reflect their personal attitudes, or their perception on the extent of favourability of an act, which is also influenced by his perceived and cognitive beliefs about the act.
2. The subjective noms that the people are exposed or privy to will also have an impact on heir intentions. This assumption recognizes that human being, by nature, is a social creature, so that he will no doubt care about what others think or belief.
3. If society demonstrates general favourability toward an act, it is highly likely that the individuals will think the same, their intentions argely shaped by the extent of approval (and disapproval) by family, friends, co-workers, or pretty much any person he trusts.
4. The intentions and the resulting behaviours of individuals are affected by their perceived behavioural control, or what they think and believe to be their ability to actually perform or engage in the said belhaviours.

Theory of Planned Behaviour is relevant to this study is that it provides further explanations to the connections between knowledge, attitude, behavioural intention and actual behaviour as they influence environment management practices of people in the society. The theory explains that the knowledge people have about environmental management practices adopted in the society, their perceptions about how these practices are favourable to their immediate environment and the way they see other people responding positively to those environmental

management practices, act together to shape their belief about those practices and the extent to which they intend to practice these environmental management approaches. The theory establishes that the behaviour of people about environmental management depends on environmental management policies adopted in their locality, the way other people react to the policies and how they perceive that those policies are favourable to their immediate environment. This implies that the perceptions of people about the prevailing land use system, timber harvesting system, farming system, waste management system and housing system determines the extent to which they would display effective environmental management behaviour and thus the extent of reduction in environmental degradation and consequential environmental hazards in the society.

Objectives of the study

Specifically, the study investigated whether:

1. Waste management system predicts control of environmental hazards in Calabar Education Zone of Cross River State

Research Questions

1. How does waste management system predict control of environmental hazards in Calabar Education Zone of Cross River State?

Statement of Hypotheses

1. Waste management system does not significantly predict control of environmental hazards in Calabar Education Zone of Cross River State

Methodology

The population of the study consists of 312,149 household heads in Calabar Education Zone of Cross River State. The sample of this study comprise 1,872 household heads that was selected from research area. A four-point modified likert scale instrument was used for data collection in this study. The instrument is a questionnaire titled "Environmental Management Systems and Control of Environmental Hazards Questionnaire (EMSCEHQ). The instrument was validated by three experts from Department of Measurement and Evaluation and department of adult and continuing education in both in University of Calabar. The reliability of the instrument was determined using Cronbach Alpha reliability estimate method and the instrument reliability estimates range from 0.87 to 0.88. To test the hypothesis, simple linear regression was used.. The sampling techniques adopted for this study is multi-stage sampling. Multistage sampling is sampling procedure that involves a combination of different sampling techniques based on the nature of the population. Stratified proportionate and accidental sampling techniques was equally used for this study. First the researcher used stratified sampling to differenciate the Zone by the seven LGAs, The researcher then used proportionate sampling to select thirty percent (30%) of the households heads in the research area. To further reduce the sample to a manageable size, the researcher used accidental sampling to select three

percent (3%) of the previously selected households heads sample for this study. The data collected were analyzed with Simple linear regression analysis at .05 level of significance.

Results

Ho_1: Waste management system does not significantly predict control of environmental hazards in Calabar Education Zone of Cross River State. The independent variable is Waste management system while the dependent variable is control of environmental hazards. In analyzing the hypothesis simple regression statistical analysis were employed and finding outlined within Table 1

Table 1: Simple regression analysis of waste management system and control of environmental hazard in Calabar Education Zone of Cross River State (N=1,872)

Source of variation	SS	Df	MS	F-ratio	Sig.
Regression	194.352	1	194.352	31.312	.000[b]
Residual	14027.464	1870	10.021		
Total	14221.816	1871			

significant at $p < .05$, $R = .343$, $R^2 = .178$, Adj $R^2 = .176$

The analysis in Table 1 showed that the Adj $R^2$is .176. This implies that 17.6 % of the variance within dependent variable (control of environmental hazard) could be accounted for by waste management system. However, though the percentage contribution is small, a cursory look at the table showed that $F = 31.312$ ($p < .05$) is significant. Also since p(.000) is less than p(.05), it implies that waste management system significantly predicts control of environmental hazard in Calabar Education Zone of Cross River State. Therefore, the stated null hypothesis is rejected. Implying that efficient waste management system will go a long way in controlling of environmental hazard in Calabar Education Zone of Cross River State.

Discussion of findings

The findings from analysis in the stated hypothesis showed that the null hypothesis was rejected and the alternative hypothesis upheld which implied that indeed Waste management system significantly predict control of environmental hazards in Calabar Education Zone of Cross River State. The result is in line with the study of Ogundele, Rapheal and Abiodun (2018) that noted that there is a large body of literature on the potential adverse health effects of different waste management options, particularly from landfill and incineration. According to the authors many waste management systems are put in practice to manage all types of waste generated by humans in the society. These methods range from: Recycling (the recovery of materials from products after they have been used by consumers), Composting (an aerobic, biological process of degradation of biodegradable organic matter), Sewage treatment (a process of treating raw sewage to produce a non-toxic liquid effluent which is discharged to rivers or sea and a semi-solid sludge, which is used as a soil amendment on land, incinerated or disposed of in land fill), Incineration (a process of combustion designed to recover energy and reduce the volume of waste going to disposal), Landfill (the deposition of waste in a specially designated area, which in modern sites consists of a pre-constructed 'cell' lined with

an impermeable layer, which may be man-made or natural, and with controls to minimize emissions).

Conclusion

From the analysis of data and testing of hypotheses in the study it was found that Waste management system significantly predict control of environmental hazards in Calabar Education Zone of Cross River State.

Recommendations

On the basis of the findings of this study, the following recommendations were made: that the Government should extend its environmental management programmes beyond certain areas in Calabar urban to other remote streets in Calabar urban through the provision of accessible roads and good drainage channels to ensure effective environmental hazards prevention.

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