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Perceived Effects of Environmental Hazard on Health Conditions of Rural Farm Households in Imo State, Nigeria

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Abstract: This paper highlighted the perceived effects of environmental hazard on health conditions of rural farm households in Imo State, Nigeria. Multi- staged purposive and random sampling techniques were used to choose the samples. The study ascertained the incidence of environmental hazard-related diseases within the study area, described the effect of environmental hazard on health conditions, and analysed the relationship between environmental hazard health conditions of respondents. Primary data collected from 116 respondents were used for the study. Data analysis was carried out with the use of descriptive statistics and multiple regression analysis. Results from the study show a grand mean score of 1.63 on a three point likert-liked scale which indicated that respondents were unaware of the effects of environmental hazards on their health. Twenty-one thousand, one hundred and fifty (21,150) incidences of Cholera were reported within the study area while, 1943 cases of Typhoid were officially reported. The result of the regression analysis shows that flood, oil pollution, wind storm were all significant and positively related to the health conditions of the respondents. It was therefore recommended that multi-national corporations that engage in oil exploration activities within the rural areas should endeavour to carry out adequate environmental impact analysis to reduce the effects of their activities on the health conditions of the rural households. Efforts should also be made to shield the rural dwellers from unavoidable negative effects of these hazards to their health. This could be achieved by providing health insurance schemes for farmers.

Key words:— Environment, Hazard. Rural households, Oil pollution.

INTRODUCTION

The target of Nigeria to attain the set Millennium Development Goals (MDGs) for child health, maternal health and environmental sustainability by 2015 cannot be achieved without adequate study of the rural environment, the prevailing hazards, as well as raising the consciousness of the rural dwellers on the effects of these hazards on their health conditions.

A hazard is a situation or condition that threatens life, health, property, or environment (Occupational Safety Group (O.S.G), 2014) Most hazards are dominant or potential, with only a theoretical risk of harm. However, once a hazard becomes "active", it can create an emergency situation. A hazard does not exist when it is not happening. A hazardous situation that has come to pass is called an incident.

Hazards can present themselves in various media. The influence they can exert on our health is very complex and may be modulated by our psychological factors and our perceptions of the risk that they present. There is hardly any job that can be said to be completely devoid of hazards. (Ifenkwe, 2007)

General air pollution arises from a variety of causes. Combustion of coal and other solid fuels can produce smoke. Combustion of liquid petroleum products which can generate carbon monoxides also poses major threat to health. Health effects of concern are cholera, malaria, typhoid, asthma, bronchitis and similar lungs disease and there are good evidences relating an increased risk of symptoms of these diseases with increasing concentration of sulphur dioxides, ozone and other pollutants. (Agius.com, 2014). Rural farmers will be more affected since they constitute the group of people who depend solely on nature.

The health status of the rural dwellers is of utmost concern because rural dwellers' active involvement in agriculture ensures adequate supply of food, labour and raw material for the industrial sector, and these activities are influenced by their health status. A study of their environmental health hazard and its impact on health will therefore be useful in guaranteeing food availability and security.

The benefits of good health and economic prosperity are well known and can be detected in numerous measures, such as increased income, wages, efficiency, and productivity. Making the link between farmers health and

productivity is a necessary step to assess the full impact of poor health, but the next step is even more important to improve the health of farmers, provide good working conditions and with that increase morale, motivation and performance. This is only possible on a sustainable basis with an integrated health management approach. Studies show that healthier people earn higher wages. Statistics on various health input measures in Sub-Saharan Africa demonstrate a positive relationship between these measures and levels of agricultural value-added. The prevalence of child stunting, prevalence of underweight children, percentage of overall households with improved sanitation, and percentage of rural households with improved sanitation demonstrate a distinct connection between higher levels of agricultural value-added and better health status or health-system measures. . (Torado and Smith, 2009)

OBJECTIVES OF THE STUDY

The broad objective of the study was to evaluate Perceived Effects of Environmental Hazard on Health Conditions of Rural Farm Households in Imo State, Nigeria. Specifically, the study

i. Socio-economic characteristics of respondents
ii. identified the incidence of environmental hazard-related diseases in the study area
iii. ascertained the effect of environmental hazard on health and
iv. Analysed the relationship between environmental hazard and health conditions of respondents.

THEORITICAL FRAMEWORK

A theory is set of assumptions, propositions, or accepted facts that attempts to provide a plausible or rational explanation of cause-and-effect (causal) relationships among a group of observed phenomenon. The word's origin (from the Greek *thorós*, a spectator), stresses the fact that all theories are mental models of the perceived reality.

Prospect Theory

As a descriptive technique, prospect theory explains how individuals choose among alternatives when outcomes associated with those alternatives are probabilistic or uncertain in nature. By investigating anomalies and contradictions in human behaviour, Kahneman and Tverskey (1992) concluded that psychological factors influence choices under uncertainty and were often able to capture departures from rational model. They challenged the explicit rules of rational decision making theory by noting that choices that individuals make under situations of risk and uncertainty exhibit several characteristics that are inconsistent with the fundamental. They argued that, for example, individuals underweight probable outcomes in comparison with outcomes that are certain. They called this phenomenon the certainty effect. They also pointed out that the certainty effect brings about risk-aversion in choices involving certain gains and risk-seeking in choices involving certain losses (Kahneman and Tversky, 1979). This means that people weigh losses heavier than gains and because of that they prefer status quo. They also found that individuals facing a choice among different prospects disregard components that are common to all prospects under consideration. They termed this commonality the framing effect. The framing effect, they argued, will cause the framing of a prospect to change the choice that the individual decision-maker makes. A third element of the decision-making process that they discovered was the reference point effect, which is whether decision outcomes are viewed as gains or losses relative to a psychologically neutral reference point. Decision outcomes that are perceived to fall below the reference point are viewed as potential losses and conversely, outcomes that are perceived to exceed the reference point are seemed as gains. Accordingly, it is argued that choice depends on the reference point and changes in the reference point may cause preference reversals.

This theory is of essential effect in understudying the relationship between environmental hazards and agricultural production. Farming communities make different choices under uncertainty caused by environmental hazards. These choices may include seeking for alternative farm land, change in farm practice and system of production, reclaiming lost cultivable areas. Decisions are made after under weighing probable outcomes in comparison with outcomes that are certain. After passing through these psychological influences, decisions made usually affects agricultural production.

Evaluating this in line with agricultural production and environmental hazard, it is possible to evaluate the effect of hazards on productivity, farm labour supply and overall farmers' income. This would involve incorporating the hazard variables into the utility function and then introducing an explicit production technology for hazards. Hazard can either improve or reduce a rural community productive ability (Asgary and Levy, 2009) Increased environmental hazards will result in a loss of days worked, cultivable farm area, increased cost of production

and reduced worker capacity. For example, prolonged exposure to pesticides could cause cardiovascular problems, neurological and haematological symptoms, and adverse dermal effects which could significantly hamper farmers' work capacity in the field and reduce their management and supervision abilities (Spear, 1991).

METHODOLOGY

This study was carried out in Imo State which lies within latitudes 4^0 45'N and 7^0 15'N, and longitude 6^0 50'E and 7^0 25'E. It occupies the area between the lower River Niger and the upper and middle Imo River. The State is bounded on the east by Abia State, on the west by the River Niger and Delta State; and on the north by Anambra State, while Rivers State lies to the south. (Okoli, 2003)

The state is located within the rainforest belt of Nigeria, and the temperature ranges between 20^0 C and $30^{0\ C.}$ It is characterized by the dust-laden north easterly winds, which blow across the country during the dry season (Mid October to March). The rainy season is from April to October, during which the moisture-laden south westerly winds blow, bringing with it the rains. Imo State has an average annual relative humidity of 75 per cent which is highest during the rainy season, when it rises to about 90 per cent. The high temperature and humidity experienced in the state favour luxuriant plant growth, which ideally should produce the climax vegetation of the tropical rain forest. (Okoli, 2003)

The population for this study comprised of all rural households in Imo State. The sampling frame comprised of rural households in some selected rural communities within the three agricultural zones of the state, namely Okigwe, Orlu and Owerri A multistage sampling procedure involving purposive and random sampling techniques were used for the study. A sample size of 116 respondents selected from across the three (3) geo-political zones of the state was used for the study.

DATA COLLECTION AND ANALYSIS

Data were generated from both primary and secondary sources. The primary data were collected with questionnaire, and interview schedule. Field observation was also employed. Secondary data were obtained from literature in form of textbooks, journal, annual reviews, internet, and electronic libraries.

Descriptive and inferential statistics such as frequency distribution, percentage, mean, and regression were employed in data analysis.

Responses were elicited using a three-point likert-scale of 'Agreed' 'Undecided' and 'Disagree'. Every 'Agreed' was scored (3), 'Undecided' was scored (2) while 'Disagreed' was scored (1) for perceived effects of environmental hazards on health.

RESULTS AND DISCUSSION

1. Socio-economic characteristics of respondents

Socio-economic variables such as age, sex, marital status, household size, level of education and income variables play major roles in enhancing the level of awareness, agricultural production and health conditions of respondents, as well as the functional analysis employed.

Data presented in Table 4.1 show that 51.73% of the respondents were males and 48.27% females. This indicates that majority of the respondents were males and that there were more male heads of households than their female counterparts in the study area. Okonkwo *et al* (2010) in a previous study opined that there are more females in the rural areas. Agricultural production is usually a family affair involving father, mother and children.

Table 4.1 also shows that about 27.58% of the respondents were between the ages of 36 to 45years, and 1.74 % were between 15-25 years respectively. The mean age of the rural farmers was 46 years. It can be seen from the study that a predominant number of the farmers were middle aged. This is wholesome for agricultural development as most of them will be receptive and venturesome to adopting new technologies.

Table 4.1: Socio economic characteristics of respondents

Variables	Frequency	Percentage
Sex		
Male	60	51.73
Female	56	48.27
Total	**116**	**100.00**
Age		
15-25	2	1.74
26-35	19	16.38
36-45	32	27.58
46-55	28	24.13
56-65	30	25.86
65-Above	5	4.31
Total	**116**	**100.00**
Marital Status		
Single	17	14.65
Married	87	75.00
Divorced	4	3.46
Widowed	8	6.89
Total	**116**	**100.00**
Household Size		
1-5	54	46.55
6-10	48	41.37
11-15	10	8.64
16-20	4	3.44
Total	**116**	**100.00**
Years of Formal Education		
0	50	43.11
1-6	29	25.00
7-12	29	25.00
13 and Above	8	6.89
Total	**116**	**100.00**
Monthly income		
Less than 4500	16	13.79
4501-9000	5	4.31
9001-18000	10	8.64
18001-22500	61	52.58
22501-26000	18	15.51
Above 26501	6	5.17
Total	**116**	**100.00**
Membership of Co-operative		
Yes	79	68.10
No	37	31.90
Total	**116**	**100.00**

Source: Field Survey, 2013

The middle aged farmers are usually more productive than the older ones and their high number will lead to increased productivity. Okwoche and Obinne (2010) has in a previous study shown majority of the rural dwellers as being within 36 to 45 years, while Bategeka and Okurut (2005) described this age as the 'working

age' arguing that when the head of household is of the working age, there is likelihood of moving out of poverty and becoming financially independent.
The result also reveals that 75% of the respondents were married, 14.65% single, 16.89% widowed and 3.46% divorced. The low percentage of divorce may be attributed to the fact that though Nigeria has adopted more liberal divorce laws in the last two decades, many households in Imo State still value the sanctity of marriage.
From the result, 87.92% (majority) of the respondents had a household size of below 10 persons, while 12.08% of the respondents had a household size of above 10 persons. The mean household size is 6 persons. The issue of family size generally is important in every aspect of farming production. This is because it affects the labour force, as well as per capita output (Olawoye, 2010). Rural inhabitants of Imo State, Nigeria maintain a relatively sizeable household which could serve as insurance against shortfalls in labour supply (Obi-Ifeanyi and Njoku, 2014).
The result also depicts that 68.11% (majority) of the respondents spent below 6 years in school, while 31.89% spent above 6 years in school. The mean number of years spent schooling by the respondents was 6 years. This implies that most of the respondents finished primary school. The Federal Government Universal Basic Education programme and adult education programme in the state may have prompted many households to seek formal education. Literacy is an asset in agricultural development especially for extension services. This implies that farmers will be fast to adopt new technologies given to them to prevent the occurrence of natural disasters. According to the extension guide on Strategies against Risk and Uncertainty, education is a vital strategy against uncertainty in farming. The farmers will have analytical minds; they will also be fast in seeing the advantages of various technologies, always seek up-date information about production technologies, and will able to read extension journals and newsletters for more information (David, 2008). Imbur, *et al* (2008) also noted that the literacy level of the farmers is a very important variable as it influences the ability to properly comprehend new techniques and methods required to bring positive changes in knowledge, attitudes, skills and aspirations of the farmers.
Entries in Table 1 also reveal that 64.8% of the respondents earned above N18, 000 per month, while 35.2% of the respondents earned below N18, 000 per month. Income generally is low from agricultural production as a result of low capital input into production, low level of education, low price level of farm produce, and poor accessibility to credit facilities, among others.(Olawepo, 2010).The mean monthly income of the respondents was ₦19, 500. Obi-Ifeanyi and Njoku (2014) had in a similar study identified the mean monthly income of rural dwellers in South-Eastern Nigeria to be ₦21, 000. From the result, one could say that the rural dwellers of this zone are still struggling to have the basic necessities of life since they live on barely five dollars per day.

2. Incidence of environmental hazard related diseases in the study area.
Data from the Imo State Ministry of Health (Fig 1) on the incidence of selected environmental hazard-related disease between 2000 and 2012 showed that there were 44,491 reported cases of malaria within the study area. Twenty-one thousand, one hundred and fifty incidences of Cholera were reported within the study area, while 1,943 cases of Typhoid were officially reported.

The most deadly of these diseases is cholera. The most common path of infection is by contaminated sewage coming into contact with water used for drinking, though the disease can also be transmitted through contact with the faeces of a victim (Brian, 1997). Okuli et al in opined that changes mentioned in a focused group discussion as relating to impact of climate change on agriculture included increase in human diseases such as malaria, cholera and typhoid. It was also revealed that bad years had increased and good years decreased.(Okuli et al, 2012)

The major organism for the spread of malaria is mosquitoes. The organism enters the human domain through the feeding bite of the female anopheline mosquito. An infected human can introduce the disease to a hitherto unaffected area (Brian, 1997). The high incidence of malaria cases couldn't have come as a surprise. But, considering the Roll Back Malaria campaign of the Federal Government of Nigeria, in which Imo State participated, it therefore becomes a matter that calls for serious concern.
Typhoid fever is contracted from contaminated food and drinking water, and from infected shellfish taken from sewage-contaminated sea and river waters. The disease is also spread by flies which come into contact with human faeces (Brian, 1997). Symptoms of these diseases may include fever, chills, Headache, Sweats, Fatigue, Nausea and vomiting

Good health and productive agriculture are both essential in the fight against poverty. The occurrence of these health conditions has tremendous implications for agriculture. In the general population, the prevalence of malnutrition and disease influences market demand for agricultural products. In the agricultural population, workers in poor health are less able to work, a situation that cuts productivity and income, perpetuates a downward spiral into ill health and poverty, and further jeopardizes food security and economic development for the wider population (Corinna and Marie, 2006).

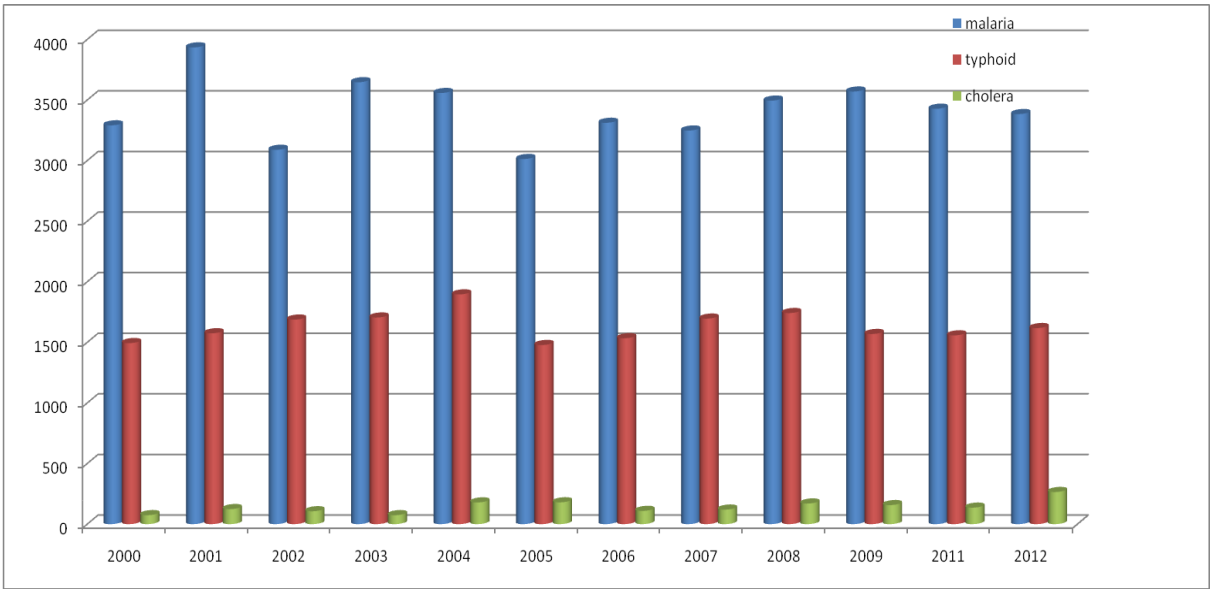

Fig 1: Incidence of environmental hazard-related diseases, 2000-2012

Source: Imo State Ministry of Health, 3rd December, 2014

3. Perceived effect of environmental hazards on health

Table 3 shows responses on the perceived effect of environmental hazard on their health. A grand mean score of 1.63 indicated that respondents were unaware of the effects of environmental hazards on their health.

The comparative difference in the respondent's knowledge of the effects of hazard on agricultural production when viewed *vis-a vis* their knowledge on the effects of hazard on their health is a source of concern. This could be attributed to the fact that environmental hazard effects on agricultural production can be observed and with empirical evidences on the farm, while the effects on health manifest slowly and may not be easily attributed to these hazards.

Also, results from Table 1 shows that majority (68%) of the respondents spent less than seven years of formal education.

3. Respondent's knowledge on the effects of environmental hazards on their health

	Item	Agreed	Undecided	Disagreed	$\overline{X}$
1.	Lead to contamination of water sources	103(70.55)	31(21.23)	12(8.22)	2.62
2.	Lead to respiratory diseases	17(12.89)	17 (12.87)	98 (74.24)	1.25
3.	Increase cost of health maintenance	12(8.45)	18(12.68)	112 (78.87)	1.26
4	Lead to malaria, typhoid and cholera	46 (34.32)	29(21.65)	59 (44.03)	1.90
5.	Lead to contamination of source of food supply	53(36.81)	21(14.58)	70(48.61)	1.88
6.	Increase frequency of visitation to hospital	9(8.03)	2(1.79)	101 (90.17)	1.18

4. Analysed the relationship between environmental hazard and health of respondents in the study area
Double log, semi-log, exponential and linear log functional forms of regression were employed in analysing the relationship between environmental hazard and health of respondents. Linear log functional form was chosen as the lead equation for effects of environmental hazard on health among respondents in the study area. This was based on the number of significant variables, magnitude of the coefficient of multiple determinants (R^2) and the signs of the significant variables conforming to *a priori* theoretical expectations. The linear log function had four significant variables with R^2 value of 0.81, which shows that 81% of the total variation observed in the dependent variable (number of times the respondent visited the hospital) for respondents in the study area is accounted for by the independent variables included in the model. The F- value of 22.029 indicated that the model is significant for respondents in the study area.

Table 4: Regression analysis on the perceived effect of environmental hazards on Health

Variable	Double log	Semi-Log	Exponential	Linear
Constant	.304 (1.439)	.617 (.572)	.073 (0.499)	-.100 (-.160)
Flood	.229 (1.180)	1.713 (1.730)*	.147 (2.345)**	.695 (2.563)**
Oil Pollution	.664 (3.368)***	2.831 (2.816)***	.147 (2.399)**	.621 (2.334)**
Windstorm	.430 (2.459)**	2.524 (2.828)***	.140 (2.883)***	.825 (3.867)***
R^2	.675	.757	.795	.081**
R^{-2}	.565	.769	.765	.785
F-RATIO	11.573***	9.837***	20.275***	22.029***

wells within the study area with average oil exploration activities on daily bases. In a study on the impact of gas flaring on the environment, it was found that about 100% loss in yield of all crops cultivated occurred 200 metres away from Izombe flow station (Zabbey, 2012).
Windstorm was significant at 1%. This implied that increase in windstorm led to increase in the frequency of visit to hospitals by respondents in the study area. Eke and Onafalujo (2012) reported that windstorm is a factor that can increase the frequency and severity, that is probability of ill health. The highest health risk is for sickness to result in death known as morbidity. Climate change might accentuate health risks and morbidity rate.

CONCLUSION

This paper has evaluated the perceived effects of environmental hazard on health conditions of rural households in Imo State, Nigeria. The study has brought to limelight the fact that environmental hazard affects agricultural production and that respondents were relatively aware of these effects. Flood, oil exploration activities, erosion and wind storm were significant and positively related to the agricultural production of respondents in the study area.
Since findings from this research reveal that hazards exist in the rural areas of Imo state, the following recommendations will mitigate the effects of environmental hazards on agricultural production of rural dwellers. Multi-national corporations that engage in oil exploration activities within the rural areas should endeavour to carry out adequate environmental impact analysis to reduce the effects of their activities on the health conditions of the rural households. Efforts should also be made to shield the rural dwellers from unavoidable negative

effects of these hazards to their health. This could be achieved by providing health insurance schemes for farmers.

The public should be given the right of access to environmental information. This will be more efficient when public authorities make environmental information available proactively. Also, an applicant (requester) should not need to give reasons for wanting environmental information.

More avenues should be employed for environmental health education and eco-vigilance.

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