

**RURAL DWELLERS PERCEPTION AND EDUCATION ON USE OF  
PESTICIDES FOR THE CONTROL OF MOSQUITOES IN THE SOUTHERN  
SENATORIAL DISTRICT OF CROSS RIVER STATE, NIGERIA.**

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**Abstract**

This research sought to determine the perception of rural dwellers and education on use of pesticides for the control of mosquitoes in Southern Senatorial District of Cross River State, Nigeria. Stratified random sampling technique was used to sample 298 rural dwellers from 46 communities, and an 18 item structured questionnaire was administered on the respondents. Pearson product moment correlation coefficient was used to analysis the data obtained. The results of the treatment of the hypotheses revealed that there is a significant relationship between rural dwellers perception and the use of pesticides to control mosquitoes and that rural dwellers' unguided use of pesticides significantly relate with adverse effects of those pesticides on humans. The researchers recommend that aggressive Environmental Education should be embarked upon in communities in Nigeria and Africa to let them know about the existence of the Zika virus spread by mosquitoes, its mode of transmission, and how keeping the environment clean can effectively put away mosquitoes and reduce the risk of the spread of zika virus. Secondly, they should be educated on how to cautiously use pesticides to prevent the proliferation of mosquitoes which harbour and spread zika virus while avoiding the adverse side effects of those chemicals on humans and the environment.

**Key words:** Pesticides, zika virus, mosquitoes, perception, environmental education and rural dwellers.

**Introduction/background to the study**

That which has economic importance has value to the user in terms of benefit though at the long run, the effects may be disproportionate to the perceived usefulness or benefits. A great majority of the inhabitants of Cross River South Senatorial District of Nigeria can best be described as rural dwellers. Most of the citizens reside in villages, engage in small scale cultivation of crops and rearing of animals for subsistence and sale in local market for petty cash. Government does not provide social housing for them to warrant collective fumigation of the communities to control pests nor are the communities properly planned to aid drainage, or proper waste disposals.

Because of the rural nature of most communities in the area, conditions which favour the breeding and multiplication of mosquitoes are rife and the commonest ailments of the people over the years has been malaria caused by parasite of the plasmodium type. In an attempt to kill these mosquitoes and other household/farmyard pests, indigenes utilize a variety of pesticides available in the open market to achieve their aim. Very



recently news broke out across several mass media of the emergence of another mosquitoes' born ailment, this time around a virus named "zika" discovered in faraway Brazil in Southern America.

At first, the people of Cross River State's Southern Senatorial District, and indeed Nigeria, felt Brazil was quite far and they were far from the danger, but of late, news of the spread of the virus to other nations equally far from Brazil such as Indonesia and Cape Verde (an island on the Atlantic Coast) has spread panic on the inhabitants of the study area. To avoid the spread of zika to them, they have intensified their use of pesticides in the fight against mosquitoes, and marketers of these pesticides have increased their tempo of sales and advertisement for their products.

Worried about the likely effects of these myriad of pesticides on the environment and humans, the researchers decided to investigate rural dwellers perception and education on the use of pesticides for the control of mosquitoes and zika virus in southern senatorial district of Cross River State, Nigeria. It is important to note here that the senatorial district is made up of seven local government areas namely: Akpabuyo, Akamkpa, Bakassi, Biase, Odukpani, Calabar South and Calabar Municipality. Each of them hosts many rural dwellings with a few townships in the last two.

Perception implies understanding or recognizing a particular thing in a distinctive way. It is response to external stimuli. The process of perception involves a series of psychological transformations which enable an individual to acquire, code, store, recall and decode information concerning a certain phenomenon. It involves a two way process between the individual and his environment. According to Anijah-Obi (2001), the environment presents the stimuli in terms of distinction, purpose, psychogenic make-up and socio-cultural characteristics; selects, organizes and endows with meaning. Perception therefore is not just a mechanical response to environmental stimuli, but more of a cultural and subjective process. So, man's behavior is dependent on his perception of the environment. The way he perceives things in the environment influences his decisions and actions or charts his life course in this complex world.

The way rural dwellers perceive the usefulness of pesticides has a strong influence on their usage of these chemicals as a viable source of keeping pest and insects away from their surroundings, crops and other farm produce Yeager (2014). The ailments and wastage incurred through pest infestation is usually avoided through the use of pesticides and citizens are gradually embracing the new approach to pest control. This has become a continuous and sustained practice among rural dwellers in the Southern senatorial District of Cross River State. They seem to neglect other forms of pest control in their environment in favour of pesticides despite their environmental and health implications.

They often perceive these chemicals as being less time consuming than the drudgery of manual labor of cleaning the environment. They also perceive them as being harmless to both humans and the ecological systems. This is why environmental education helps to tactically guide individuals to comprehend the dangers their actions or inactions have on the environment and help to shape their attitudes to act and behave in ways that would promote environmental sustainability at all times.

Perception and actions explains the "why" of people behavior. Why do people generally behave the way they do, why do people use pesticides, burn bushes, etcetera.

Yeager (2014) revealed that the motivation of rural dwellers towards the use of chemicals is largely determined by the expected benefits from use of these chemicals. Farmers who use pesticides to control pests that attack their crops are mostly rewarded with improved yield from their farms. This is one of the factors that have motivated them

to consistently engage in the use of various types of chemicals to control weed and crop pests. They often believe that the rewards associated with the use of pesticides far outweigh the environmental consequences that are posed by their actions.

Various colours, shapes and brands of knapsack sprayers now adorn a lot of residences in the communities; retail outlets and vendors of a variety of pesticides with frightening names have sprung-up across the area. You hear of such names as “touch down”, rodeo, round up, broncho, gliforox, kleen-up, weed off, among others, all containing the chemical glucophosphate. Gadi. Raltan and Mohaptara (2010) listed the following as common insecticide trade names in the market: Flee containing permethrin, Baygon containing propoxur, Dursban containing chlorpyrifos, shell stock containing Diatomaceous earth among others all of which affect the nervous system, the endocrine system, water balance and energy production. As reported by Sharma, Thapa, Manandhar, Shrestha and Pradhan (2012) incidences of various cancers, lungs and general respiratory problems, birth defects have been reported in various parts of the world. In Cross River State, the state Ministry of Health has also reported an increase in diseases due to pesticides use and agrochemicals.

United States Environmental Protection Agency (USEPA) (2012); Sharma et. Al (2012) noted that pesticides are substances used to kill animals, plants, insects and pests in agricultural, domestic and institutional settings. And that organochlorides, organophosphate and carbamates are of major concerns because of their toxicity and persistence on the environment. Yassin, Abu Mourad and Safi (2002) observed that majority of rural dwellers are not aware of pesticides types, level of poisoning safety precautions and potential hazards on the environment.

In the view of Vianio (1999), pesticides which are in use today belong to chlorinated hydrocarbons, organophosphates, carbamates, synthetic pyrethroids and zinc compounds which have carcinogenic effects on human health. The author noted further that most pesticides are associated with adverse effects on human health and environment such as cancer, birth defects, reproductive problems, tumours, and damage to liver and kidney and neural organs. This is due to inappropriate use and handling by untrained handlers. Sharma et.al (2012) observed that, use of pesticides affect soils, food, human health, and environment.

Despite these health implications, why is there an increase in the use of pesticides and other associated biocides? How do indigenes perceive these pesticides and what motivates their persistent usage of pesticides to kill mosquitoes? These are the questions this study seeks to answer.

### **Statement of the problem**

There has been a significant increase in the use of pesticides among rural dwellers in Southern Cross River State, Nigeria in the last two years. This has been largely due to the desire of citizens to protect themselves from various pests attacks especially mosquitoes. The main problem associated with the use of pesticides in the study area is that only about 1 percent of the chemicals get to the targeted mosquitoes and pest. The remaining part of it mostly destroys non-target organisms and constitutes severe threat to environmental and human health. Part of this chemicals form residue in plants making them poisonous to those who consume them (Sharma, etal, 2012). Large parts of the pesticides are washed into nearby water sources, thereby contaminating such water sources and make them unsafe for human consumption. This has often resulted in widespread water contamination and sometimes pollution especially during the rainy season (Sharma etal, 2012:69).

The main issue of utmost concern is that the actions of these rural dwellers are only shaped by their desire to satisfy their short term needs of killing mosquitoes to prevent the spread of malaria and zika virus without considering the long term effect of their action on the environment. The use of these pesticides has been done haphazardly without considering their inherent threats to the sustainability of the natural environment. This study is therefore aimed at answering the question what is rural dwellers perception, and education on the use of pesticides for the control of mosquitoes in Southern Cross River State, Nigeria.

**Methodology**

The research design considered most appropriate for this study was the correlational design, which considers the relationship that exists among variables - rural dwellers perception, and education on the use of pesticides to control mosquitoes and the zika virus. The population of this study consists of all rural dwellers of Southern Senatorial District of Cross River State, Nigeria. They comprised males and females engaged in various activities in the study area.

The sample for the study consists of 298 rural dwellers selected through stratified and simple random sampling technique from 46 communities in the seven Local Government Areas that make up Southern Senatorial District of Cross River State. The researchers considered a structured close-ended questionnaire as the most suitable instrument for data collection. The instrument tagged rural dwellers perception and education on use of pesticides to control mosquitos' questionnaire (RDPPCMQ) was divided into two parts. Part A contained items on respondent personal data; while part B was designed using four point modified Likert-type scale of strongly agree (SA), Agree (A), Disagree (D) and strongly Disagree (SD). It contained 18 items measuring the variables of the study with each variable represented by six (6) items in the questionnaire. The research instrument covered all the variables of the study and was properly face-validated by two experts in test and measurement to ensure that the items selected for inclusion in the questionnaires were capable of generating the required responses from the respondents, which is required for valid analysis in the study.

To ensure the reliability of the research instrument, Cronbach Alpha reliability method was employed using a smaller sample of 50 respondents that were not part of the actual study. The Cronbach coefficient obtained from analysis of data obtained was .673 and .721 which showed that the item were reliable enough to be used for the study.

**Hypothesis one**

There is no significant relationship between rural dwellers perception and their use of pesticides to control mosquitoes. The independent variable is rural dwellers perception while the dependent variable is use of pesticides to control mosquitoes. Pearson product moment correlation statistical tool was used for data analysis. The result of this analysis is presented in Table 1

**Table 1: Pearson product moment correlation analysis of the relationship between rural dwellers perception and their use of pesticides to control mosquitoes**

Variables	X	SD	Cal-r
Rural dwellers perception	17.8114	2.74320	.511*
Use of pesticides	16.2391	2.18275	

Significant at 0.05; df = 296; critical r-.113

The result obtained from analysis of data presented in Table 1 shows that the calculated r-value of .511 is higher than the critical r-value of .113 at 0.05 level of significance with 296 degree of freedom. The result is significant and the null hypothesis is rejected. This implies that there is a significant relationship between rural dwellers perception and their use of pesticides to control mosquitoes in Southern Cross River State Nigeria.

### Hypothesis two

Rural dwellers use of pesticides to control mosquitoes does not significantly relate with the adverse effects of pesticides on humans and the environment. The independent variable is use of pesticides to control mosquitoes while the dependent variable is adverse effects of pesticides on humans and the environment. Pearson product moment correlation statistical tool was used for data analysis. The result of this analysis is presented in Table 2

**Table 2: Pearson product moment correlation analysis of the relationship between rural dwellers use of pesticides to control mosquitoes and adverse effects of pesticides on humans and the environment.**

Variables	X	SD	Cal-r	Sign
Use of pesticides to control mosquitoes	18.5134	2.17457	.199*	.001
Effects of pesticides on humans and environment	16.2391	2.18275		

Significant at 0.05; df = 296; critical r-.113

The result obtained from analysis of data presented in Table 2 shows that the calculated r-value of .199 is higher than the critical r-value of .113 at 0.05 level of significance with 296 degree of freedom. The result is significant and the null hypothesis is rejected. Therefore, rural dwellers use of pesticides to control mosquitoes significantly relates with the adverse effects of pesticides on humans and the environment.

### Discussion findings

The result obtained from analysis and testing of hypothesis one indicates that there is a significant relationship between rural dwellers perception and their use of pesticides in Southern Cross River State, Nigeria. The result of this analysis is in agreement with the findings of Yeager (2014) which revealed that the sudden change in attitude by rural dwellers from cleaning their surroundings to drive away pests using manual methods to the use of pesticides, herbicides and fumigants. They often perceive these chemicals as being less time consuming than the drudgery of manual labour. They also perceive them as being harmless to both humans and the ecological systems. This is why environmental education helps to tactically guide individuals to comprehend the dangers their actions or inactions have on the environment and help to shape their attitudes to act and behave in ways that would promote environmental sustainability at all time.

This finding is in agreement with Sharma, et. Al (2012) who noted that people's perception lead them to misuse pesticides especially the broad spectrum ones in Nepal and most parts of the world has caused pests to adapt and become resistant to pesticides.

Gadi et al (2010) observed that most users of pesticides do not perceive them to have any side effects on humans and the environment. They use organochlorides,

organophosphates, carbamates to destroy insects and pests and their knowledge ends there.

The result obtained from analysis and testing of hypothesis two indicates that rural dwellers unguided use of pesticides to control mosquitoes significantly relates with the adverse effects of pesticides on humans and the environment.

The result of this analysis is in agreement with the findings of Vaino (1999) who noted that the resultant effect of use of pesticides on human health include cancer, birth defects, reproductive problems, tumors, and damage of liver, kidney and neural organs and that in many developing countries, most pesticides are associated with adverse effects on human health and environment due to inappropriate use and handling of the pesticides by untrained users.

The findings of the study also agrees with the views of Gadi, Raitan, Mohapatra (2010) who noted that pesticides effects are determined by their effects on the organisms they interact with especially when they interact with and affect human internal function such as the endocrine systems. The authors observed further that pesticides are synaptic poisonous in humans and causes weakening of the muscles, dizziness and discomfort.

### Conclusions and recommendations

From the findings of the study, it is concluded that, the use of pesticides as a viable means to stop pest attacks and control mosquitoes by rural dwellers has been on the increase due to the need to free the population from mosquitoes and zika virus attack. The environmental consequences associated with the use of these chemicals are enormous, with attendant consequences on human and environmental health. Hence, the need to continually encourage these indigenes to consider the negative effects resulting from the use of pesticides on the environment has become imperative.

Based on the findings obtained in this study, the following recommendations are made;

1. Aggressive environmental education should be embarked upon in communities in Nigeria and Africa to let them know about the existence of the Zika virus, its mode of transmission, and how keeping the environment clean can effectively put away mosquitoes and reduce the risk of the spread of zika virus.
2. Rural dwellers should be educated on how to cautiously use pesticides to prevent the proliferation of mosquitoes which harbour and spread zika virus while avoiding the adverse side effects of those chemicals on humans.

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