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KNOWLEDGE OF ECOSYSTEM AMONG FOREST GUARDS IN SOUTHERN NIGERIA

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ABSTRACT

Undertaken study assessed the level of ecological knowledge among forest guards in Southern Nigeria. Descriptive survey research design was used for study. A structured questionnaire was administered to 60 respondents that are employed by forest guards system. Central question the study attempts to answer is the level of knowledge of the ecosystem among forest guards. Analysis of data revealed that forest guards have inadequate knowledge of ecosystem. Calculated mean score of respondents was 14.25. This mean score is lower than theoretical mean of 16 (80%). A binomial test revealed that fairly high number of respondents had inadequate knowledge of ecosystem which affects their level of job performance. It was recommended by researchers that regular training and retraining of these forest guards should be strictly adopted and effectively implemented by forestry officials. Moreover, further research should be embarked upon to ascertain other factors that might influence the poor work performance of forest guards other than their level of knowledge about the ecosystem.

Keyword: Forest management; Environmental Education; forest services

INTRODUCTION

Globally, forests are viewed as essential habitats in terms of their biological diversity and ecological functions. Taking species count as an illustration of biological diversity, the number of described organisms are about 1.75 million, and it is assumed that the actual number of species could be as high as 13.6 million (Hawksworth and Kalin- Arroyo, 1998). Therefore, it can be inferred that forest is home for diverse living organisms and beneficial for mankind as well. Diverse nature of forest ecosystem makes it the most important ecosystem on earth.

Consequently, forest ecosystem is seen as the entire assemblages of organisms (trees, shrubs, herbs, bacteria, fungi and animals, including people) together with their environment substrate (the surrounding air, soil, water, organic debris and rocks) interacting inside a defined boundary (Kimmins, 1997). Trees tend to dominate other plant types in ecosystem due to their size and longevity. Ecosystems are presumed to change from place to place and from time to time. A major determinant to these changes on a particular type of forest in an area is climate. Other changes in this environment can be attributed to include the rising temperature, drought, more extreme fires and flood events, habitat destruction, regulation of greenhouse gases, sustainability of water supply (Intergovernmental Panel on Climate Change, IPCC, 2007). These factors and others which are observed to cause ecosystem changes should constitute a major component of the training and retraining that

forest guards are exposed to. Knowledge of these factors should be considered as a major component for the training and retraining of forest guards. Undertaken study is intended for addressing a major area within this concern.

According to World Bank (2010); 90410sq km forest area was estimated in Nigeria which signifies a 9.9 percent of land area. Forests in Nigeria are highly valued due to their tendency of providing essential products needed for consumption (such as avocado, guava, coconut oil for making mayonnaise, plantain), medicinal purposes (such as quinine for anti-malaria treatment), timber products (such as teak, mahogany, iroko). Unfortunately, the rate of deforestation was estimated to be 4,000km^2 per year, while about 30 million tonnes of soil are washed away in Nigeria every year due to soil erosion and loss of forest cover (Dada, Jibrin and Ijeoma, 2006). In early 90's, some forest areas were designated as *forest reserves* due to the passage of the nation forest law and other regional forest laws in Nigeria. In Edo State, there are 37 *forest reserves* which cover a total of 597,557 ha (Kalu et al., 2009). These reserves are spread through its 18 local government area and are managed by the State Forestry Department, Ministry of Environment and Public Utilities. Personnel in the department are categorized into administrative units which are composed of divisional forest officer, sub-divisional forest officer, range assistant, forester, loggers and forest guards.

Paramount attention is given solely to forest guards in this study. Forest guards are uniformed field personnel that oversee day to day running of the forest. They are in closer contact with the forest ecosystem than any other forestry official. Primary duties of these guards are to monitor, record, prevent and punish illegal forest related activities.

This requires continuously walking through large forest areas allocated to each of them for careful monitoring. Other duties accrued to forest guards included: responsibility for all public dealings of forestry department; cutting of creepers and climbers during perambulation in forest; keeping the sign board of forest in good condition. Moreover, ensuring that forest products are removed in accordance with transit rules and submission of reports to section officer and ranger officer. The roles of forest guards are highly sensitive and sacrosanct towards maintaining essential ecological values and benefits.

PROBLEM

Forestry is an important sector in the society and their officials are in charge of managing the forest and its resources in a particular region or area designated to them. Forest is an essential ecosystem to mankind. Nigerian government has established forest reserves due to the delicate nature of forest ecosystem and intense need to protect the remaining stands of valuable forest from destruction. These forest reserves were flourishing with abundant flora and fauna species which the government handed to the Forestry departments of each State to ensure they are adequately protected from encroachers. Despite this, there has been an increase in the rate of degradation of these forest reserves.

Forest reserves in the Nigerian Delta are now shadows of their ones flourishing state, even as each of the reserves are divided into beats to be protected by trained forest guards. Adequate knowledge of forest ecosystem should be considered as paramount for the training of forest guards. But the alarming rate at which forest reserves are being depleted, local environmentalists wonder whether the forest guards have the basic knowledge to function

effectively. Current study attempts to shed more lights on this concern. This study attempts to shed more lights on this concern.

RESEARCH QUESTIONS

The study attempted to answer the following questions:

1. What is the level of knowledge about the forest ecosystem among the forest guards in Edo state?
2. What is the influence of educational background on forest guards' knowledge of forest ecosystem?
3. Is the years of experience of forest guards related to the level of knowledge of forest ecosystem?

HYPOTHESES

In order to have a better understanding of the questions raised, the following hypotheses were formulated;

1. The proportion of forest guards with adequate knowledge of forest ecosystem is not significantly different from the proportion with inadequate knowledge
2. There is no significant relationship between educational level of the forest guards and their knowledge of forest ecosystem.
3. There is no significant relationship between years of experience of the forest guards and their knowledge of forest ecosystem.

METHODS

The population for the study consists of the entire forest guards employed in Edo state, which is one of the states in the Southern Nigeria. According to records from the Forestry Department, Edo State Ministry of Environment and Public Utilities, there are 75 forest guards in the State up till May 2016 when the study was done. A census sampling was adopted for the study as the researcher perceived the population of the study can be managed appropriately.

During undertaken study, a self-structured questionnaire was used containing 24 items which were divided into two sections (A and B). Section A is made up of 4 items to ascertain the biographic information from the respondents. The section B comprised of 20 multiple choice items which was presented with four options each. Each respondent was scored based on the number of correct options selected. The hypotheses were tested at conventional alpha level of 0.05 by employing binomial test, chi-square (X^2) and Pearson Product Moment Correlation Coefficient formula.

RESULT

In the study seventy five (75) questionnaires were distributed but sixty (60) of them were adequately filled and returned to the researchers. This shows a return rate of eighty percent (80%).

Ho$_1$: The proportion of forest guards with adequate knowledge of the ecosystem is not significantly different from the proportion with inadequate knowledge.

The data in table 1 shows a binomial test. Thus, the null hypothesis which states that the proportion of forest guards with inadequate knowledge is not significantly different from the proportion with adequate knowledge of the ecosystem in Edo State is accepted. Thus, it can also be inferred that 41.7% (25 out of 60) of respondents possessed adequate knowledge and 58.3% (35 out of 60) have inadequate knowledge of the ecosystem. Hence, there are more forest guards with inadequate knowledge of the ecosystem. Similarly, the result revealed the mean score of 14.25 for the respondents' level of knowledge, which is lower than the

Table 1: Binomial test for the proportion of forest guards with inadequate and adequate knowledge of the ecosystem.

Knowledge level	No. of respondents	Observed proportion (%)
Adequate	25	41.2
Inadequate	35	58.3

Test proportion= 0.50; Exact Sig. (2-tailed)= 0.24; cal. value= 14.2; Theoretical mean= 16 (80%)　(N= 60, p>0.05)

theoretical mean of 16 which was set by the researchers based on the notion that as experts, the respondents should not score less than 80% from the items.

Ho_2: *There is no significant relationship between educational level of forest guards and their knowledge of ecosystem.*

Table 2 shows a chi-square test for hypothesis which states that there is no significant relationship between educational attainment of the forest guards and their knowledge of ecosystem. The calculated value was 12.69 which is higher than the critical value of 5.99 at 2 degree of freedom and 0.05 level of significance. Thus, the null hypothesis is rejected and hence there is a significant relationship between the forest guards' highest educational attainment and their level of knowledge towards the ecosystem. This reveals that the educational attainment of the forest guards influence their level of knowledge towards the ecosystem in Edo State forest.

Table 2: Chi-square test for assessing the influence of educational attainment on the level of knowledge of forest guards towards forest ecosystem.

Educational Background	Adequate Knowledge Fo	Inadequate Knowledge Fo	df	Cri Value	X^2
WAEC/NECO	7.0	26.0			
NCE/OND	9.0	4.0	2	5.99	12.69
HND/ BSC	9.0	5.0			
				c	g

N= 60; df= 2; X^2= 12.69; P< 0.05)　WAEC/NECO- West Africa Examination council certificate/Nigeria Examination council certificate (Secondary school certificates); NCE/OND- Nigeria Certificate in Education/ Ordinary National Diploma; HND/BSC- Higher National Diploma/ Bachelor of Science.

Ho₃: There is no significant relationship between years of experience of forest guards and their knowledge of forest ecosystem.

Table 3 shows the chi-square test of respondents' knowledge as influenced by their years of experience. When the data was subjected to analysis, the calculated value was 3.08 which is lower than the critical value of 7.82 at 3 degree of freedom and at a 0.05 alpha level of significance. Thus the hypothesis states that there is no significant relationship between the years of experience of forest guards and their knowledge of the ecosystem is hereby retained. This signifies that the level of knowledge about the ecosystem possessed by forest guards in Edo State is not influenced by their years of cognate experience.

Table 3: Chi-square test of respondents' knowledge level and their years of experience as forest guards.

Number of years as forest guard	Adequate		Inadequate		df	Critical Value	Calculated Value (X^2)	Remark
	Fo	Fe	Fo	Fe				
1-5years	5.0	5.8	9.0	8.2				
6- 10 years	7.0	5.8	7.0	8.2				
11- 15 years	6.0	8.3	14.0	11.7	3	7.82	3.09	Accept
16years & above	7.0	5.0	5.0	7.0				

DISCUSSION OF FINDINGS

The result of the study in table 1 revealed that the respondents have a fairly low level of knowledge of the forest ecosystem. The mean score from the analysis portray that the forest guards have low level of knowledge pertaining to the ecosystem they are assigned to manage and protect. This result from this study is not in line with the work of Pierrott and Wildcat (2000) and Costanza et al (1997) when they stated that high level of knowledge is observed towards the environment among forest managers, planners, conservationist, and forest guards. In this regard, the forest ecosystem is seen as being undervalued and this had led to their high rate of deforestation in this region. This is in line with USDA (2001) statement that ecosystem services are undervalued because we frequently lack knowledge regarding the role of ecosystem in the life of mankind. Hence, it implies that the respondents' level of knowledge impacts to their performance in the job. It is presumed that knowledge of the ecosystem limit their capacity to effectively protect and manage the forest effectively.

Meanwhile, in terms of the hypothesis stated to test the difference between proportion of forest guards with inadequate knowledge and those with adequate knowledge of the ecosystem in Edo state, the binomial test statistics was applied. The result revealed that there was no significant difference between the

proportion of forest guards with adequate knowledge and those with inadequate knowledge. The categorization of respondents was derived by setting a theorised mean of 16 point which is 80% of the total items in the questionnaire that is the respondents with scores below 16 (80%) out of maximum score of 20 (100%) are regarded as having inadequate knowledge and those who scored above the theorised mean score are regarded as having adequate knowledge.

Furthermore, the findings from the second hypothesis revealed that there is a significant relationship between highest educational attainment of the respondents and their level of knowledge of the ecosystem. Therefore, the educational attainment of forest guards has an influence on the knowledge they possess about the forest ecosystem. By implication, educational background is seen as a perquisite towards the attainment of an adequate level of knowledge towards the ecosystem. Likewise, other result from the analysis revealed that there is no significant relationship in the years of experience as forest guards and the level of knowledge towards the ecosystem. This is evident in table three which revealed a chi-square test value of 3.096 which is lower than the critical value of 7.82. Hence, job experience is not a reliable factor to determine the level of knowledge possessed by respondents. It can be deduced that knowledge of forest guards is independent of their job experience but has a direct relationship with their level of education attained. Therefore, forest guards should be encouraged to pursue higher academic degree in order to broaden their knowledge.

Conclusion

Forest possess capability to provide a wide range of socioeconomic and ecological benefits to the society hence, they require protection from encroachers. Forest guards are known to be in charge of monitoring, recording, preventing and punishing illegal forest encroachers. On the basis of the findings revealed by undertaken study, it can be concluded that most of the forest guards in Edo State have inadequate level of knowledge about forest ecosystem. It was found that average score for respondents' level of knowledge is lower than proposed theoretical. Meanwhile, there was a significant relationship between the educational attainment of the forest guards and their level of knowledge towards the ecosystem. It is pertinent to create various avenues (educational) to increase forest guards' level of knowledge towards the ecosystem by the government and other key stakeholders in this sector. This can be done by ensuring regular training and retraining of incoming and already existing forest guards about the forest ecosystem. This training should be done by experts in environmental and forestry disciplines especially environmental educators.

Recommendations

Regular training and retraining sessions should be organized by government, professional bodies and non-governmental organizations for the forest guards in order to make them fully acquainted and updated. Environmental and forestry experts should be consulted in creating the training program for forest guards on ecosystem issues. Meanwhile, government should increase the manpower by employing more forest guards to ensure the adequate coverage in various forest reserves of state. Moreover, Area Forest Officers should ensure the strict monitoring and supervision of forest guards.

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