Benchmark Journals

INTERNATIONAL JOURNAL OF EDUCATIONAL BENCHMARK (IJEB),
eISSN: 2489-0170 pISSN:2489-4162 University of Uyo

Impact of Environmental Education Methods on Biodiversity Conservation in the Communities of Okwangwo Division of Cross River National Park (CRNP), Nigeria

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Abstract
Promoting community members commitment to protecting biodiversity is an integral goal of Environmental Education for sustainable development in the National Park. The essence of the Environmental Education was to create knowledge, interest and necessary skills to solve various biodiversity problems with reference to the local context. This study assessed the impact of Environmental Education methods on biodiversity conservation in the communities of Okwangwo division of Cross River National Park. One purpose of the study and research question was posed in the study. This study adopted a survey research design and the instrument for data collection was an eight item four point rating scale questionnaire designed to answer the research questions. Data was analysed using percentages, mean and standard deviation. The finding of the study revealed that Environmental Education has a significant impact on biodiversity conservation in the support zone communities of the Cross River National Park (CRNP). It was recommended that National, State and Local Governmental and Non-Governmental Organizations (NGOS) should intensify efforts towards organizing conferences, workshops and seminars in the communities of the Cross River National Park in order to create more awareness about the need to and ways of conserving biodiversities.

Keywords: Biodiversity Conservation, Environmental Education, Forests, Resources**,**

Introduction

Nigeria and off course Cross River State is blessed with substantial zones of tropical rain-forest and is an extremely rich biodiversity hotspot. Biodiversity sustains life on earth and this is inclusive of human life, and it is one of the means to shielding the abundance of the world's resources for our generation yet unborn. By using biodiversity wisely and efficiently, man is not only hopeful that the environment is wealthier and safer, however we likewise secure all the resources that will keep on providing the necessary changes in the environment for better human life. Biological diversity is the different quality of existing creatures on planet which includes different types of floras and faunas and small scale life forms, eg. micro organism, g1 the huge decent variety of quality in these species, the diverse environments found on earth, for example, sands, vegetations, and mountains, etc (Oribhabor, 2016). About 7,895 types of flora distinguished in 338 classes and 2,215 genera are recorded in Nigeria ecosystems (Habu & Gila, 2016).

In Nigeria, including Cross River State, around 22, 000 vertebrates and invertebrates have been recorded, of these, around 20, 000 are crawling animals like insects, 1,000 are different species of fish, 247 are animals that give birth to their young ones and breast feed them which are known as Mammals, 123 are reptiles and 894 are birds, and furthermore around 1,489 types of micro organisms have been recorded. This positions Nigeria as one of the wealthiest nations of Africa as it concerns biodiversity, Federal Government of Nigeria (FGN, 2010). All of these different types of plants and animals are dispersed distinctively inside the nation's vegetation extending from the tropical trees that grow in mud or at edge of rivers to drift which is found along the South and to the Sahel. Almost all the biological resources found in the environment are gotten from the forest and so the forests play vital roles in our environment.

In Cross River State, more than 65% of people in the zone are involved in variety of plants and animals employments and activities, for example, agriculture, hunting, fishing, wood exploitation, animal husbandry, forest resource marketing, saw milling and wood processing, etc. Biodiversity conservation has assumed a significant position in global debates and conferences due to excessive exploitation of environmental resources and the consequences this has on the environment. Since natural resources are finite and exhaustible, there is an overwhelming need to maintain a balance between resources and population. There are challenges of biodiversity conservation that are calling for attention such as: cultural practices, unemployment and poverty which have resulted to unabated encroachment in the protected areas.

The loss of biodiversity remains one of the most challenging environmental problems of our time. Nothing influences the nature of man's life as the condition of nature, and no future can be very worrisome as one in which the living resources, for example, plants and animals which are fundamental for human survival and advancement are progressively being devastated gradually by man's unsustainable activities. Environmental education implies learning about the environment. It is education in, about, and for the environment. An approach, a philosophy, a tool and a profession. As a discipline, it is applied in many ways for many purposes. This simple description reinforces the different purposes that environmental education often serves: programs provide opportunities to explore nature in the outdoors, information about conservation and environmental issues, and opportunities to gain knowledge and skills that can be used to defend, protect, conserve, or restore the environment. This multidimensional definition was confirmed by the delegates at the Tbilisi Intergovernmental Conference in Georgia, USSR in 1977 (UNESCO, 1980) in their three goals for Environmental Education:

i. To foster clear awareness of, and concern about, economic, social, political, and ecological interdependence in urban and rural areas;
ii. To provide every person with opportunities to acquire the knowledge, values, attitudes, commitment, and skills needed to protect and improve the environment;
iii. To create new patterns of behavior of individuals, groups, and society as a whole toward the environment. The delegates provided additional information about the role of environmental education in creating these new patterns of behavior:

Environmental Education methods form an integral part of education which stimulates processes and knowledge to enhance environmental sustainability. Again, since environmental education is aimed at promoting a sustainable environment, it could be formal or informal. In the formal setting, it involves classroom experience where people are taught

how to conserve the environmental resources and in informal setting through field trip experiences, seminars, workshops, conservation clubs, campaigns and so on.

Interestingly, efforts have been made by the state and federal governments to strongly address biodiversity depletion. Among these efforts is the reservation of tracts of forest areas and their biotic components like the Cross River National Park in Cross River State, the Afi Mountain/Wildlife sanctuary etc. In spite of the massive and uncountable benefits of biodiversities, the biological resources are under threat of mass elimination of species and genetic resources in the support Zones communities of Okwangwo division of Cross River National Park, hence, rendering government's huge effort toward conservation abortive.

The question making round is: what then would be responsible for the existence of this resource exploitation? It is based on the above background and problem that this research assessed biodiversity conservation through Environmental Education methods in the support zones communities of Okwangwo division of Cross River National Park .

Purpose of the Study

The purpose of this study is to assess the impact of Environmental Education methods on biodiversity conservation in the communities of Okwangwo division of Cross River National Park.

Research Question

What is the extent of the impact of Environmental Education methods on biodiversity conservation in the communities of Okwangwo division of Cross River National Park?

Literature Review

Everyday biodiversity is confronted with multiple aggressions due to human activities. Despite the many efforts made so far, we are still witnessing the disappearance of certain species. Ecological instruction (EE) assumes a huge job in advancing protection. In addition, individuals' perspectives and practices toward untamed life preservation and securing their condition can be influenced by accurately planned protection training programs (Sterlinl, 2017). It is realized that open acknowledgment and commitment influences the achievement or disappointment of ecological insurance endeavors, in this manner, there is a requirement for protection training and effort (Meadows, 2011).

Ecological instruction programs (EEPs) may deliver huge social changes in their intended interest group and might be more significant to fruitful long haul preservation than organically engaged logical work (Padua, 2014). There has been earlier research which shows that appropriate instruction and effort projects can add to feasible conduct, advance open help for preservation, decrease poaching and vandalism rehearses in ensured territories, and raise consistence with natural guidelines (Monroe, 2013). These projects have likewise been appeared to expand diversion conveying limits and affect approaches and choices that impact the earth and regular assets.

The Department of National Parks and Wildlife Conservation (DNPWC), National Trust for Nature Conservation (NTNC) and World Wide Fund for Nature (WWF) are a portion of the major legislative and non-administrative associations that progress in the direction of preservation training in Okwangwo division. The systems for protection instruction utilized by these associations are banners, introductions (classes), productions and school exercises through eco-clubs.

The fundamental motivation behind Environmental Education (EE) is to survey natural issues, recognize attainable arrangements lastly make master ecological conduct (Magnuset, 2017). Ecological instruction gives an individual natural data and ecological information

which can cultivate a change their ecological conduct (Hungerford and Volk, 2010). One approach to reveal if investment in EE can change the mentalities of individuals toward preservation is to survey and analyze different degrees of natural instruction and their relating impact on biodiversity protection. Earlier research has demonstrated that proper instruction and effort can encourage feasible conduct, improve open help for preservation, decrease poaching and vandalism in ensured territories, improve consistence with ecological guidelines, increment entertainment conveying limits, and impact approaches and choices that influence the earth and common assets (Monroe, 2013).

Therefore, instruction can be one of the most significant devices in assisting with securing and ration untamed life, wild living spaces and the Earth's common assets. Ballantyne et al. (2001) contemplated the job of program viability in encouraging intergenerational impact in Environmental Education. They inferred that understudies can and do impart their learning and natural mentalities to their folks, and that they can realize positive change in family unit rehearses. Other research in EE likewise shows that youngsters can viably impact their folks' natural mindfulness and activities (Uzzell, 2019).

Trewhella, Rodriguez-Clark, Entwistle, Garrett, Garnek, Lengel and Swall (2015) incorporate preservation and training results as expanded mindfulness and comprehension of protection issues. The issues likewise incorporate improved information on the status of species, arrangement making and enactment advancement, reinforced pledge to protection and a more prominent ability to complete it, joining of natural issues into educational plan, foundation of dynamic nearby ecological NGOs, and backing for multidisciplinary preservation programs. Jacobson (2016) inferred that preservation instruction and effort projects can illuminate and include people in general to bring issues to light, improve information, secure perspectives and abilities, and urge investment to help accomplish asset the executives objectives.

The board of shielded zones has advanced from an emphasis on natural life and jeopardized species, to increasingly extensive undertakings incorporating joint effort and interchanges with the encompassing neighborhood networks (Ledec and Goodland, 2018). The World Wide Fund for Nature (WWF) Nepal Program runs numerous preservation mindfulness programs for various objective gatherings. These projects focus on preservation of the normal and social condition, including security of natural decent variety and reclamation of woodland hallways, which give long haul benefits (Parajuli, individual correspondence).

World Wide Fund for nature as a team with various network based associations, neighborhood nongovernmental associations, Village Development Committees (VDCs) and nearby pioneers, composes different limit building projects to expand the capacity of neighborhood individuals to moderate Nepal's biodiversity in a manner that is naturally suitable, financially gainful and socially evenhanded. As indicated by Gurung and Shrestha (2014): "Correspondence and instruction assume a huge job in bettering comprehension, among the individuals living in the National Parks and the encompassing Buffer Zone, about the significance of rationing the normal and social condition." There have been various methodologies for biodiversity preservation and maintainable improvement in the TAL of southern Nepal, for example, limit building programs, school based natural clubs ("eco-clubs"), ecological mindfulness and expansion programs, and non-formal training. A portion of these methodologies have been fruitful, while others still can't seem to show results (Gurung and Shrestha, 2014).

Methodology

The area of the study is Okwangwo Division of Cross River National Park. The Okwangwo Division lies between longitudes 5º 05'-6º29' N and Latitudes 8º15'-9º30' Okwangwo was created by amalgamating three former Forest Reserves (Boshi extension, Okwa Hills and Okwangwo Reserve) and covers an area of 1000km^2(Dun & Bergl, 2014). The area is generally made up of primary rainforest, montane forest and derived Savanna. With about 1545 identified species of plants in 98 families, Okwangwo division is rich in biological diversity (Ezearlor, 2012). The population of the study comprised all residents of Okwangwo communities. There are about 19,327 residents of Okwangwo communities. The sampling technique utilized in this study was the simple random sampling technique in selecting the 189 respondents sampled for the study. The reliability of the instrument was determined using the Cronbach Alpha reliability method at .82. The instrument for data collection is a four point modified likert scale questionnaire titled: Environmental Education methods and Biodiversity Conservation questionnaire (EMBCQ). The questionnaire contains sections A and B. Section A dealt with the demographic variables of respondents, while section B dealt with eight (8) questions on environmental education and biodiversity conservation.

Descriptive statistics of mean and standard deviation was used to analyse the research question.

Results/findings

Research Question: What is the impact of Environmental Education methods on biodiversity conservation in communities of Okwangwo division of Cross River National Park? The result is presented in Table 1.

Table 1: Descriptive analysis of the impact of Environmental Education on biodiversity conservation

S/N	Variable Item	SD (%)	D (%)	A (%)	SA (%)	$\bar{x}$	S^2	Remarks
1	Education on biodiversity has encouraged me to reduce my level of exploitation.	10.1	37.0	16.4	36.5	2.79	1.05	Significant
2	Seminars on environmental protection have enabled me to know that bush burning kills animals	6.9	3.02	23.3	39.7	2.95	.988	Low contribution
3	Workshop attendance has enabled me to know that it is possible to do selective hunting.	13.8	10.6	28.6	47.1	3.09	.1.61	Low contribution
4	Environmental Education teaches me that it is not good to use chemicals to	8.5	10.6	28.0	52.9	3.25	.955	Low contribution

	weed grasses in the farm							
5	Conservation education in the buffer zone has been beneficial by teaching members our community how to conserve plants and animals.	10.1	1.1	26.5	62.4	3.41	.933	Low contribution
6.	Conference attendance on Environmental Education has taught me that it is important to protect the animals around my environment.	8.5	18.0	11.6	61.9	3.27	1.03	Low contribution
7.	I am willing to contribute for biodiversity conservation since the day I was taught about the importance of conserving these resources through organized enlightenment campaigns	1.1	7.9	37.0	54.0	3.44	.686	Low contribution
8.	Reading bill boards and flex banners on about biodiversity has provided me the skills to use environmental resources sustainably	12.7	15.9	33.9	37.6	2.96	1.02	Low contribution
	Grand mean					**3.15**		

The response of the respondents indicates that 10.1% and 37.0% strongly disagree and disagree respectively that education on biodiversity has encouraged them to reduce their level of exploitation. The mean and standard deviation ($\bar{x} = 2.79$, $S^2 = 1.05$) were obtained indicating that there is a significant impact of Environmental Education on biodiversity conservation in the research area.

Furthermore, the response of the respondents indicates that 6.9% and 30.2% strongly disagree and disagree respectively that seminars on environmental protection have enabled them to know that bush burning kill animals. The mean and standard deviation ($\bar{x} = 2.95$, $S^2 = .988$) were obtained indicating that there is a significant impact of Environmental Education on biodiversity conservation in the research area.

Again, the response of the respondents indicates that 13.8% and 10.6% strongly disagree and disagree respectively that workshop attendance has enabled them to know that it is possible to

do selective hunting. The mean and standard deviation ($\bar{x}$ = 3.09, S^2 = 1.61) were obtained indicating that there is a significant impact of Environmental Education on biodiversity conservation in the research area. The response of the respondents also indicates that 8.5% and 10.6% strongly disagree and disagree respectively that Environmental Education taught them that it is not good to use chemicals to weed grasses in the farm. The mean and standard deviation ($\bar{x}$ = 3.25, S^2 = .955) were obtained indicating that there is a significant impact of Environmental Education on biodiversity conservation in the research area. Furthermore, the response of the respondents also indicates that 10.1% and 1.1% strongly disagree and disagree respectively that conservation education in the buffer zone has been beneficial by teaching members of the community how to conserve plants and animals. The mean and standard deviation ($\bar{x}$ = 3.41, S^2 = .933) were obtained indicating that there is a significant impact of Environmental Education on biodiversity conservation in the research area.

Again, the responses of the respondents indicate that 8.5% and 18.0% strongly disagree and disagree respectively that it is important to protect the animals around their environment. The mean and standard deviation ($\bar{x}$ = 3.27, S^2 = 1.03) were obtained indicating that there is a significant impact of Environmental Education on biodiversity conservation in the research area. The responses of the respondents also indicates that 1.1% and 7.9% strongly disagree and disagree respectively that they are willing to contribute for conservation since the day they were taught about the importance of conserving these resources. The mean and standard deviation ($\bar{x}$ = 3.44, S^2 = .686) were obtained indicating that there is a significant impact of Environmental Education on biodiversity conservation in the research area.

Finally, the responses of the respondents indicates that 12.7% and 15.9% strongly disagree and disagree respectively that Environmental Education provided them the skills to use environmental resources sustainably. The mean and standard deviation ($\bar{x}$ = 2.96, S^2 = 1.02) were obtained indicating that there is a significant impact of Environmental Education on biodiversity conservation in the research area. Considering the grand mean of 3.15 as against expected mean of 2.5, the research question can therefore be answered that there is significant impact of Environmental Education methods on biodiversity conservation in the support zones communities of Okwangwo division of Cross River National Park.

Discussion of Findings

Considering the grand mean of 3.15 as against expected mean of 2.5, the research question can therefore be answered that there is significant impact of Environmental Education methods on biodiversity conservation in the support zones communities of Okwangwo division of Cross River National Park. This result is not surprising because Environmental Education (EE) gives individuals environmental information and environmental knowledge which can foster a change in their environmental behaviour.

The finding of this study agrees with Padua (2014) that Environmental Education programs (EEPs) may create critical social changes in their intended interest group and might be more essential to fruitful long haul protection than naturally engaged logical work. This is likewise bolstered by Monro (2013) that there has been earlier research which shows that appropriate training and effort projects can add to manageable conduct, advance open help for preservation, lessen poaching and vandalism rehearses in secured territories, and raise consistence with ecological guidelines. Along these lines, training can be one of the most significant apparatuses in assisting with ensuring and monitor untamed life, wild living spaces and the Earth's common assets.

Conclusion

In line with the results obtained from this study, it was concluded that there is significant impact of Environmental Education methods on biodiversity conservation in the support zones communities of Okwangwo division of Cross River National Park. The loss of variety of plants and animals existing on earth remains one of the most challenging environmental problems of our time. Nothing influences the nature of our lives as the condition of nature, and no future can be very worrisome as one in which the living resources, for example, plants and animals which are fundamental for human survival and advancement are progressively being devastated gradually by man's unsustainable activities.

Recommendations

Based on the findings of the study, it is recommended that:

1. There is need to extend teaching and learning activities into the immediate environment (natural/built) of the students beyond the classroom and other residents in the study area for inculcating a culture of biodiversity conservation.
2. National, State and Local Governmental and Non Governmental Organizations (NGOS) should intensify efforts towards organizing conferences, workshops and seminars in the communities of the Cross River National Park in order to create more awareness about the need to and ways of conserving biodiversities.

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