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Impact of Overpopulation on the Biological Diversity Conservation in Boki Local Government Area of Cross River State, Nigeria

Sam Ime Edet*, Nnaji Emeka Samuel, Asuquo Edung Etim, Etefia Titus E.

Department of Curriculum and Teaching, Faculty of Education, University of Calabar, Nigeria

Abstract This study on the impact of overpopulation on the biological diversity of Boki Local Government Area of Cross River State, Nigeria is aimed at establishing the extent overpopulation has impacted on the conservation of biological diversity in the study area. The Ex-post facto research design was adopted. To achieve the purpose of this study, two null hypotheses were formulated and tested at 0.05 level of significance. The simple random sampling technique was adopted in selecting four (4) communities, while the multi-stage stratified random sampling technique and accidental sampling technique was used to select the two hundred and twenty (120) community dwellers used for the study. A fifteen (15) items four point'slikert scale which span from Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD) questionnaire was the instrument used for data collection. To test the hypotheses, Pearson product moment correlation statistical analysis technique was used for data analysis. The results obtained from analysis of data revealed that overpopulation has a negative impact on the conservation of biological diversity in the study area. Based on these findings, it was recommended that population education should be carried out to sensitize couples on the need to have a minimal family size that they can cater for.

Keywords Impact, Overpopulation, Biological diversity and conservation

1. Introduction

Human overpopulation occurs if the number of people in a group exceeds the carrying capacity of the region occupied by the group. The term often refers to the relationship between the entire human population and its environment, the Earth or to smaller geographical areas such as countries. Leadley, (2010) opined that overpopulation can result from an increase in births, a decline in mortality rates, an increase in immigration, or an unsustainable biome and depletion of resources. It is possible for very sparsely populated areas to be overpopulated if the area has a meager or non-existent capability to sustain life (e.g., a desert). Quality of life issues, as well as sheer carrying capacity or risk of starvation, are a basis to argue against continuing high human population growth.

The human population has been growing continuously since the end of the Black Death, around the year 1400 (BBC News, 2013) although the most significant increase has been in the last 50 years, mainly due to medical advancements and increases in agricultural productivity. The rate of population growth has been declining since the 1980s. The United Nations has expressed concern on continued excessive population growth in sub-Saharan Africa. As of June 18, 2014 the world's human population is estimated to be 7.17 billion by the United States Census Bureau, and over 7 billion by the United Nations (Zinkina and Korotayev, 2014). Most contemporary estimates for the carrying capacity of the Earth under existing conditions are between 4 billion and 16 billion. Depending on which estimate is used, human overpopulation may or may not have already occurred. Nevertheless, the rapid recent increase in human population is causing some concern. The population is expected to reach between 8 and 10.5 billion between the year 2040 and 2050 (World Population Prospects, 2010).

The recent rapid increase in human population over the past three centuries has raised concerns that the planet may not be able to sustain present or larger numbers of inhabitants. The Inter Academy Panel Statement on Population Growth as reported by (Coleman, 2011) has stated that many environmental problems, such as rising levels of atmospheric carbon dioxide, biological diversity loss, global warming, and pollution, are aggravated by the population expansion. Other problems associated with overpopulation include the increased demand for resources such as fresh water and food, starvation and malnutrition, consumption of natural resources (such as fossil fuels) faster than the rate of

* Corresponding author:
imesam12@yahoo.com (Sam Ime Edet)
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regeneration, and deterioration in living conditions. However, some believe that waste and over-consumption, especially by wealthy nations, is putting more strain on the environment than overpopulation (Fred, 2009).

Human population has increased at an almost exponential rate. With this growth comes an increase in demand for land, food, water, energy and other resources. As human numbers grow species and their habitat diminish. Biodiversity is the variety of all forms of life throughout an ecosystem. High rates of extinction are quickly reducing biodiversity especially in areas of the world with high human population density and growth. The direct and indirect effects that humans have had on biodiversity are challenging.

2. Statement of the Problem

Throughout history, populations have grown slowly despite high birth rates, due to the population-reducing effects of war, plagues and high infant mortality. During the 750 years before the Industrial Revolution, the world's population increased very slowly, remaining under 250 million. By the beginning of the 19th century, the world population had grown to a billion individuals, and intellectuals such as Thomas Malthus and physiocratic economists predicted that mankind would outgrow its available resources, since a finite amount of land was incapable of supporting an endlessly increasing population, (Malthus, 1998). Mercantilists' argued that a large population was a form of wealth, which made it possible to create bigger markets and armies.

Growth of the human population is a major factor affecting the environment. Simply put, overpopulation means that there are more people than there are resources to meet their needs. Almost all the environmental problems we face today can be traced back to the increase in population in the world. The human population is at 6 billion; with an annual global growth rate of 1.8%, three more people are added to the earth every second. This represents an increase of almost 60% since 1970 and over 150% since the Second World War. (Miller, 1992).

The human population has gone through a number of periods of growth since the dawn of civilization. Therefore, this study seeks to address the principal causes of these problems and how they affect the processes and mechanisms which maintain biological diversity.

3. Literature Review

IMPACT OF OVERPOPULATION ON THE BIOLOGICAL DIVERSITY CONSERVATION

Population is recognized as an indirect driver of biodiversity loss, as human demands for resources like food and fuel play a key role in driving biodiversity degradation. This happens primarily through the conversion of ecosystems to food production. Household demographic factors, such as household size, have important implications for resource consumption, degradation of ecosystems when wilderness is converted to agricultural land to meet the needs of increasing human population (Ridley, 1999). Agricultural land expansion is the most dominant driver for habitat loss, which, combined with unsustainable forest management, contributes to the greatest cause of species moving closer towards extinction.

According to Roberts, (2012) Urbanization is also associated with species loss. With more than half of the world's population now living in urban areas, urban sprawl has led to the disappearance of many habitats. Urbanization spurs consumption, increasing the demand for food and energy and thereby increasing pressures on ecosystems. With the majority of population growth expected to take place in urban areas, there are indications that this pressure on biodiversity will be sustained, if not compounded. Other activities associated with urbanization, such as infrastructure and industrial developments, are also important contributors to habitat loss.

Conversion of habitats, over-exploitation of resources, pollution, and climate-change are four drivers which directly lead to biodiversity loss. However, intermediate factors such as population growth can exacerbate the pressure caused by the direct drivers. Continued Population growth will interact with the direct drivers to create multiple pressures on biodiversity and ecosystems. Population size, growth and density are often regarded as important factors in explaining the loss of species (Gregory, 2002).

Cormac (2009) view that Over-exploitation and habitat loss as a result of population and other pressures is likely to contribute to a high risk of extinction of plants and animals. This is especially true in parts of the world where people are heavily dependent on them for livelihoods. Areas of rapid population growth overlay those with high numbers of threatened and vulnerable plant species.

Hays (1998) maintain that human population size, growth, density and migration are underlying causes of biodiversity loss. Global population is projected to grow to anywhere between 8 billion and 11 billion by the middle of the century, with much of the growth expected to take place in the humid tropics whose ecosystems harbor the planet's richest forms of biodiversity. Increased demand for goods and services to meet the needs of a growing population will undoubtedly exert more pressure on the components of biodiversity - ecosystems, genes and species. Slowing population growth will not only ease off pressure on biodiversity, but will also empower women and their families (Widjojo, 2006).

As observed by Cincotta and Engelman (2000) Biodiversity worldwide continues to deteriorate, despite an increase in conservation efforts. Biodiversity loss varies among regions, and affects genes, species and ecosystems. Trends in the average size of species vary greatly between regions, according to the Living Planet Index, which monitors abundance of the world's vertebrates and offers insights into which habitats or ecosystems have species that are declining rapidly. The index demonstrates an observed severe and ongoing loss of biodiversity in tropical

ecosystems. Some species of birds and mammals used for food and medicine are facing a greater extinction risk.

Lewis (2007) said that terrestrial ecosystems, which contain the majority of the world's known plant and animal species, are being rapidly destroyed. The same holds for inland water ecosystems, including wetlands, which have long been declining. Highly valuable marine and coastal ecosystems, including mangroves, sea grass beds, salt marshes and shellfish reefs, continue to be threatening by degradation. Eighty percent of the world's fish stocks have either been fully exploited or overexploited.

Population is recognized as an indirect driver of biodiversity loss, as human demands for resources like food and fuel play a key role in driving biodiversity degradation. This happens primarily through the conversion of ecosystems to food production (Whitehouse, 2005). Household demographic factors, such as household size, have important implications for resource consumption, with rapid increases in household numbers associated with loss in biodiversity.

Habitat loss is generally greatest where population density is highest, and regions rich in endemic species have higher-than-average population densities and population growth rates. This is true in many parts of Asia and Africa where people and threatened species are often concentrated within the same localities (Rosenthal, 2012). The number of threatened species is likely to rapidly increase in regions where human population growth rates are high, as the demands for resources of a growing population are predicted to increase in these regions. Habitat loss appears to be the most significant threat to biodiversity, and current trends and projections show that land use is and will remain the most prominent driver of biodiversity and ecosystem deterioration. According to the Millennium Ecosystem Assessment, major habitats including forests, grasslands and coastal zones have been heavily impacted by human activities leading to degradation.

Agriculture has had a significant effect on biodiversity because of its prevalence over the landscape, particularly in the central regions of Cross River State. Effects include habitat alteration (conversion to farmland for crops and grazing), exotic pest introductions and pollution from pesticides and fertilizers. There is the potential for agriculture to play a beneficial role in the conservation of certain plant species, mainly by protecting habitats from urbanization. This could be achieved by cultivation processes that integrate wild species into agricultural landscapes. (Sam, 2007). Agriculture has the greatest impact on the environment of any human activity both because of the degree of habitat alteration that occurs and because of the widespread geographical scale of this alteration. Some of the impacts include: global changes in atmospheric CO2 concentrations, changes in natural genetic plant stocks, changes in established ecosystems, the introduction of exotic species and large-scale drainage modifications which disrupt natural flood regimes and increase topsoil erosion. (Statistics Canada, 1994).

Ryerson, (2010) in McKibben, (2004), the population explosion affects us humans in many ways in terms of sharing natural resources such as land, water, food, energy and so on. However, we often forget that we share these resources not just with fellow human beings, but also with the countless creatures that form an equally important part of our ecosystem. Thus, it goes without saying that the population explosion affects them as much as it affects us, if not more. Increase in population leads to an increase in the demand of land for residence, an increase in the demand of food, and hence, an increase in cultivation. Increasing productivity and cultivation requires more land under cultivation; more water for irrigation, and more chemical fertilizers, pesticides etc. that lead to pollution of the environment. Increase in land under cultivation is causing a loss of habitat for many species. Also, sinking water levels affect both humans and animals alike. All these factors will eventually lead to a decrease in the population of other species, thus distorting the natural balance of the ecosystem Diamond, (2008).

4. Purpose of the Study

The main purpose of the study was to examine the impact of over-population on the conservation of biological diversity in Boki Local Government Area, Central Cross River State, Nigeria.

5. Hypotheses

1. Overpopulation does not significantly relate with biological diversity conservation in Boki Local Government Area, Central Cross River State, Nigeria.

6. Methodology

A sample of one hundred and twenty (120) community members from 20 years and above were selected for the study four (4) communities in BokiLocal Government area which include Abo Ogbagante, Owambe-Beebo, Kanyang and Abiasu were used for the study. The Ex-post facto research design was adopted because the researcher will not have any control in the manipulation of the independent variable since it has already occurred.

7. Instrumentation

A ten item questionnaire called impact of overpopulation and biological diversity conservation questionnaire (OBDCQ) was used in date collection. The instrument was designed in two sections, "A" and "B" section. "A" consisted of the respondents' personal data while "B" consisted of ten items on issues that relate to the variables under discussion. Test experts in the Faculty of Education, University of Calabar validated the instrument. A test-retest reliability

estimate was calculated using 20 members in a community who were not part of the study sample and the reliability coefficient of 0.86 was obtained. With a high estimate the instrument was considered valid for the study. The data collected for this study was analyzed using the Pearson product moment correlation coefficient analysis of the relationship of over population and biological diversity conservation.

N=120

Variables	∑x	∑y	$\sum X^2$	$\sum y^2$	∑xy	r-cal
impact of overpopulation	440		39400		65800	0.88
biological diversity conservation		160		13400		

Significance @ .05, df =118, t.crit. 0.190.

From the result of the data analysis presented in the table above, revealed that the t-calculated value of 0.88 is greater than t.critical value of 0.190 at 0.05 level of significance with 118 degree of freedom. With this finding the null hypothesis was rejected while the alternate was upheld and retained which implies that over population significantly relate with forest resource conservation.

8. Discussion of Findings

The result of these findings reveals that overpopulation significantly influences biological diversity conservation. The result of the study support the assertion of Coleman, (2011) which states that many environmental problems, such as rising levels of atmospheric carbon dioxide, biological diversity loss, global warming, and pollution, are aggravated by the population expansion. Other problems associated with overpopulation include the increased demand for resources such as fresh water and food, starvation and malnutrition, consumption of natural resources (such as fossil fuels) faster than the rate of regeneration, and deterioration in living conditions.

9. Conclusions

Despite the increase in population density within cities (and the emergence of megacities), UN Habitat states in its reports that urbanization may be the best compromise in the face of global population growth. Cities concentrate human activity within limited areas, limiting the breadth of environmental damage. But this mitigating influence can only be achieved if urban planning is significantly improved and city services are properly maintained.

10. Recommendations

From the result of the findings, the following recommendations are inherent in the work.

1. Population education should be carried out to sensitize couples on the need to have a minimal family size that they can cater for.
2. Government should enact law that would couple parents to raise the number of children they would be able to support.
3. Modern childbirth preventive measures and contraceptives should be introduced and couples educated on how to make use of them to reduce the number of child birth.

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