Eco-cultural Factors and Ecological Footprint as Variables and Measure of Environmental Consciousness and Accounting in Nigeria

Kunle. Oloruntegbe, Temitayo. Abayomi. Oluwatelure and Olaniran. Agbayewa
Science and Technical Education, Adekunle Ajasin University, Akungba-Akoko, Ondo State, Nigeria
* E-mail of the corresponding author: temitayomrs@gmail com

Abstract

 The natural environment is Earth's major asset for humanity, with studies showing less than one-eighth of the planet being available for man's use. In the past, this has been able to support mankind, but, recently, there have been serious overshoots that have prompted various nations to calculate the impact of their ecological footprint (EF) on the Earth's bio-capacity. Many cultural factors influence EF levels and man's attitude toward the environment. This present study investigated these factors: the locations, genders, educational backgrounds and age differences of the respondents randomly drawn from two Nigerian locations. Previously developed and validated EF question items were used for data collection, with t-test and ANOVA methods indicating no significant difference among the considered variables. The EF measures had neither on the low or high indications, which may be attributed to low environmental consciousness cancelled by a low standard of living. Observation, however, revealed serious prevalent economic issues in the region, suggesting the presence of environmental problems greater than EFs: incessant bush burning to kill animals, razing trees for firewood sales, environmental degradation and oil spillage are all contributing, dangerous factors. There is a definite need for established government policies to check the destructive practices, to promote positive environmental attitudes in the public consciousness and for keeping everyone accountable for the environment.

Keywords: Ecological Footprint, Cultural Factors, Environmental Consciousness and Accounting

1. Introduction

The challenge before humanity is how to live productively within the available capacity of the planet, while also protecting it from the degradation of the needed ecological assets for future generations. This is the rationale behind calculating ecological footprints and facing the challenge of sustainable development. The first step is recognizing the full area that could be included for the study. The amount of Earth available for human activities can be illustrated by a teacher's simple explanation to her students:

"Using an apple to represent the Earth, cut the fruit into four pieces. Because oceans are 75% of the Earth's surface area, throw away three of those parts. Slice the remaining piece of 'Earth' in half. Again, throw out one piece that would represent those land areas, such as deserts, that are inhospitable. One-eighth of the apple remains. However, that is still not the amount available to mankind. Further slice the remaining piece into four sections and throw out three of them. These tossed pieces represent areas that are too cold, too steep, or too rocky to produce food. You have 1/32 sized piece left from the whole apple. Peel away the skin and dispose of the rest. This small amount of skin represents the Earth's crust, the area with enough topsoil to produce the food on which we all depend. The Earth's topsoil is, on average, only five feet deep and produces a relatively fixed amount of food. Each yeah, over-farming and erosion take away billions of tons of topsoil. Each inch of topsoil takes, on average, 100 years to form."(Connecticut Energy Education, 2007).

Are these areas of land sufficient enough to withstand man's infringements and the resulting repercussions? Are human activities helping the limited environments support both the present generation and those in the future? As civilizations spread around the planet, how do we know when their involvement begins to negatively impact the Earth's bio-capacity? What human factors influence the carrying capacity of the Earth? And how do they do so?

As outlined by Aaron et al. (2008), these questions are essential to determining the factors for measuring our Ecological Footprint (EF), Environmental Weighted Material Consumption (EMC), Human Appropriation of Net Primary Production (HANPP) and Land and Ecosystem Accounts (LEAC). Of these the many variables for gauging a healthy planetary existence, the ecological footprint is considered in this paper: which cultural factors influence its measure and its overall impact on the Earth's bio-capacity.

By considering the prevailing technologies, the ecological footprint measures the amount of biologically productive land and water area necessary to provide those resources needed for consumption by the human population. It also balances this against the area required for the absorption of the inevitably generated waste. As part of the study methodology, Aaron et al. (2008) includes an area's bio-capacity, or the annual production of biologically provided resources. Essentially, it is the amount of bio-productive land and sea required to support

an individual's lifestyle, including the amount of land needed to grow food, to dispose of waste and absorb carbon emissions. The footprint counts all the impacts of personal spending as well as the business and government expenditures on behalf of the effected people (Calcott and Bull, 2007). There are a number of factors that influence the footprint and its impact on the different and varied environments. The level of a nation's development, the socio-economic status of the citizens, educational backgrounds, age and urban versus rural locations are all coined as 'eco-cultural' in our context. There are certainly prevalent survival practices that pose threats to human health and sustainability that EF may not have accounted for, but they do not negatively impact the environment and, therefore, are not included in the overall equation.

In developed nations, the relatively high standard of living often means a higher use of resources coupled with the generation of large quantities of waste materials. In these areas, the amount of waste produced per person is much higher and results in other devastating problems, such as abandoned hazardous waste sites (Manaham, 2005; Oloruntegbe, 2012). Adversely, in still-developing countries there exists a different—and equally difficult—focus on immediate social and economic problems, which are often believed to be distinct from the rational use of natural resources. In relation to the developing Sub-Saharan Africa, Oloruntegbe (2012) found several hazardous practices:

- Bush burning
- Felling of trees for firewood
- Killing of animals for food by any means including setting bush on fire
- Uncontrolled dumping sites for refuse
- Using toxic chemicals to kill fish for food
- Poor sewage disposal

In 1996, Hampel and Holdsworth compiled information from a study of six secondary schools in Victoria, Australia that focused on such variables as socio-economic status, gender, and age. The results showed varying positive and negative attitudes of environmental consciousness. These answers may havea close relationship with the EF that could lead to local and global overshoots.

2. Research Problem

The size and scope of mankind's daily impact on the Earth, if left unchecked, could quickly and easily lead to a dangerous imbalance between the demands of survival on the environment and its limited ability to provide those essential elements. EF is the measure of this impact and is a contributing element toward society's environmental consciousness and its accountability toward safety and ecological overuse. This study reviewed the socio-cultural influences of Nigeria in relation to various, dichotomous factors, such as locations, ages, socio-economic statuses and educational backgrounds.

Does one's location have any impact on the Earth's bio-capacity? Furthermore, does the age of the respondent influence any such impact? How do educational backgrounds work into the equation? These are the questions raised to determine eco-cultural influences on the EF of Nigerians and the accompanying issues of environmental consciousness and accountability among its population.

3. Hypotheses

Four hypotheses of no significant differences between males and females, rural and urban dwellers, respondents of different qualifications and age groups were formulated.

4. Methodology

The study sample consisted of randomly selected citizens from the areas of Lagos and Akoko in Nigeria. Of the selected, there were 104 urban and 86 rural dwellers, 82 people of different educational backgrounds: 34 with little to no education, 21 with a diploma and 18 university graduates and 247 others that were simply distributed into five age groups. The investigator developed 25 EF items grouped under food, home, transport, energy and recycling. These were validated using a team of experts both in- and outside the country. The collected data were analyzed using t-test and analysis of variance to test the hypotheses at 0.05 significant levels.

5. Results

5.1 Table 1: t-test to determine the significant mean difference in EFs of rural and urban dwellers (Lagos and Akoko land)

Variables	N	Mean	SD	df	t_{valu} v ve t_{table}		Sig
Lagos (Urban)	104	4.97885	3.82803	188	5.75	1.96	.001
Akoko Land	86	5.38837	5.92188				

Table 1 reveals a rejection of null hypothesis with no significant difference between EFs of urban and rural dwellers, though rural dwellers have the higher EF.

5.2 Table 2: t-test to determine the significant mean difference in EFs between male and female dwellers

Variables	N	Mean	SD	df	t cal$_{value}$	t tab$_{table}$	Sig
Male	148	48.0270	7.54843	290	2.67	1.96	0.183
Female	144	50.4444	7.95070				

Table 2 reveals a rejection of null hypothesis with no significant difference between the EFs of males and females, though the females have the higher EF.

5.3 Table 3: ANOVA to determine significant difference in EFs of respondents with different educational qualifications

Variables	Mean	N	Variables	SS	MS	df	F	Ftab	Sig
O Level	43	5.06512	Between	307.381	153.690	2	5.029	3.07	.009
Diploma	21	4.98571	Within	2414.339	30.561	79			
B.A./B.S.	18	5.50000	Total	2721.720					

The analysis of variance within Table 3 indicates no significant difference among the respondents from the different considered qualifications. However, respondents with the highest qualification had a higher EF

5.4 Table 4: ANOVA to determine the significant difference in EF of respondents of different age groups

Age	Mean	N	Variable	SS	MS	df	Fcal	Fab	Sig
Below 25	54	5.05926	Between	500.781	125.195	4	2.489	2 .45	0.178
26 – 35	50	4.87000	Within	12128. 814	50.110	242			
36 – 45	48	5.15625	Total	12829.525					
46 – 55	52	4.79286							
Above 56	42	5.01174							

The analysis in Table 4 indicates no significant difference in the EFs of the various age groups.
6. Discussion
The results from Nigeria in Tables 1, 3, and4 reveal EFsas small as 5.0, similar to those found in some English cities: Plymouth with 5.01, Salisbury with 5.04, and Gloucester with 5.06. Adversely, it also revealed levels that were less than those of other English and Scottish areas. In England, the numbers breakdown as Canterbury having 6.12, Chichester with 6.28, and Winchester with 6.52. And in Scotland, Glasgow's number is 5.21 and Edinburg's is 5.76 (Calcott and Bull, 2007). The respondents' smaller EF statistics are a likely indication of low living standards rather than an overall environmental consciousness. Observation and interaction with young people by researchers Hample and Holdsworth (2009) has indicated their cravings to acquire vehicles, own houses (no matter how low their social status),acquire and consume imported materials (at the expense of those produced locally), synthetic (versus natural) materials, a preference for canned food and drinks, and fast food. Further research revealed that only the few, elite rich could afford such indulgences that are nearly always seen as luxuries in many developing countries.

Table 2 shows a rejection of null hypothesis with no significant difference between the EFs of males and females, though, ultimately, the females have the higher EFs. As defined for the study, "gender differences refer to differences resulting not from biological attributes or preferences, but from gender constructs." Based on the gathered information, it was shown—on a global scale—that higher numbers of women than men live at the poverty level. Women often work twice as much as men, and those men with considerable economic advantages have more time to be engaged in idle time and frivolous spending lifestyles(The Global Footprint Network, 2007). A prime example would be in the United Arab Emirates, known to be home to large numbers of wealthy businessmen; the men make more than women in the same positions. This obvious financial advantageis reflected in the ecological footprint left by the country's men, which tends to leave higher impressions in those areas where excessive luxury spending exists. Overall, however, the pattern of results obtained in this study can be attributed to a recent trend that finds a growing number of females having more than one source of income providing ready resources to excessively purchase pre-packaged, synthetic materials, junk foods. This monetary influx also allows the women to use their generators for longer hours to provide their homes with expanded amounts of time for electricity consumption, a definite contributor to the higher EF.

As stated, there are other practices that may not contribute to high EF numbers, but are still detrimental to the environment and that are virtually non-existent within the area's environmental consciousness. As Oloruntegbe (2012) found, the effects of burning bushes to kill animals for food, felling wood to sell and poor waste disposal are negligible side-effects to the local's skills to survive.

Figure 1   **Figure 2**   **Figure 3**

Figures 1 and 2 show animals and firewood displayed for sale. Figure 3 is poor waste disposal.

Because these seemingly necessary activities go on unchecked, there is no accountability for their negative effects on the environment. Aside from the consequences of the indigenous peoples of Nigeria, other man-made interactions—specifically in the Niger Delta area—concerning land degradation, oil spills, pollution, and dynamite-fueled seismic activities have resulted in the severeloss of biodiversity and agricultural lands. These trends have been the causes of friction between the oil companies and the host communities within the Niger Delta.

7. Conclusion and Recommendations

Based on the gathered facts, the respondents of this study had minimal EFs and there were no significant differences in the EFs among neither the urban and rural dwellers, nor between those with different educational backgrounds and age groups. In fact, observations have revealed more serious issues constituting environmental problems than the environmental footprints specifically concerned by this study. Versus groups simply with low EFs, the effect of incessant and unchecked bush burning alone, for example, is extremely destructive to the environment because it increases the carbon footprint, adds to the greenhouse effect and contributes to erratic climate change. In still-developing areas, the impact of Environmental Protection Agency is minimal. With such wide-spread and rampant destruction, there is a strong and obvious need for established government policies to check the unwholesome practices of both the local people and the intrusive businesses, to develop positive environmental consciousness within the native population and to make all those involved accountable for their treatment of the Nigerian landscape.

References

Aaron, B., D. Biobel, S. Cavalieri, S. Giljum, M. Hammer, S. Lutter, C. Simmons and K. Lewis. 2008. "Potential of the Ecological Footprint for Monitoring Environmental Impacts from Natural Resource Use: An Analysis of the Potential of the Ecological Footprint and Related Assessment Tools for Use in the EU's Thematic Strategy on Sustainable Use of Natural Resources." Report to the European Commission, DG Environment.

Calcott, A. and J. Bull. 2007. "Ecological Footprint of British City Residents: What Can We DoTo Reduce Ours?"WWF-UK World Wide Fund for Nature.

Connecticut Energy Education. 2007. "Energy Efficiency and Climate Change: Ecological Footprint."www.CTEnergyEducation.com

Hampel, B. and R. Holdsworth. 2006. "Environmental Consciousness: A Study in Six Victorian Secondary Schools." Parkville, Youth Research Center: Faculty of Education: University of Melbourne.

Manaham, S.E. 2005. "Green Chemistry and the Ten Commandment of Sustainability."ChemChar Research, Inc.

Oloruntegbe, K.O. 2012."Achieving Green Sustainable Chemistry and environmental Accounting through Senior Secondary Chemistry Organic Curriculum." From a symposium presented at the 22nd Biennial Conference on Chemical Education held at Penn State University, July 29 to August 2, 2012

This academic article was published by The International Institute for Science, Technology and Education (IISTE). The IISTE is a pioneer in the Open Access Publishing service based in the U.S. and Europe. The aim of the institute is Accelerating Global Knowledge Sharing.

More information about the publisher can be found in the IISTE's homepage: http://www.iiste.org

CALL FOR JOURNAL PAPERS

The IISTE is currently hosting more than 30 peer-reviewed academic journals and collaborating with academic institutions around the world. There's no deadline for submission. **Prospective authors of IISTE journals can find the submission instruction on the following page:** http://www.iiste.org/journals/ The IISTE editorial team promises to the review and publish all the qualified submissions in a **fast** manner. All the journals articles are available online to the readers all over the world without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. Printed version of the journals is also available upon request of readers and authors.

MORE RESOURCES

Book publication information: http://www.iiste.org/book/

Recent conferences: http://www.iiste.org/conference/

IISTE Knowledge Sharing Partners

EBSCO, Index Copernicus, Ulrich's Periodicals Directory, JournalTOCS, PKP Open Archives Harvester, Bielefeld Academic Search Engine, Elektronische Zeitschriftenbibliothek EZB, Open J-Gate, OCLC WorldCat, Universe Digtial Library , NewJour, Google Scholar