



Awareness and Consideration of the Impact of Lifestyles on the Environment and actual Ecological Footprints of Individuals in Borno State, Nigeria

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ABSTRACT

The Ecological Footprints of individuals based on their awareness and consideration of the environmental impact of lifestyles in consumption was studied in Borno State, Nigeria using purposive primary data generated from 2241 individuals. The Ecological Footprints of each respondents were calculated using the Refining Progress Calculator. The study average total Footprint was 1.61 ± 0.21 global hectares (gha); there were differences in the total Footprints of individuals based on both their awareness of the environmental impacts of lifestyles and their considerations of the environmental impact of lifestyles. Chi-square test result did not show a significant association between the Footprints of individuals based on their awareness of the environmental impacts of lifestyles. However based on the consideration of the environmental impacts of lifestyles by individuals there was a significant association between the Footprints of individuals and their consideration of the environmental impact of their lifestyles at the 0.01 level of significance. The Ecological Footprints of individuals in the study area are sustainable being lower than the globally available fair share 1.80 gha bio capacity per capita. If everyone lived similar lifestyles there will be environmental sustainability. Government can promote sustainable use of resources by educating citizens on responsible lifestyles that are environmentally sustainable.

Keywords: Ecological Footprints, awareness and consideration of environmental impact, lifestyles, biocapacity,

INTRODUCTION

Human utilization of natural resources creates impact on the environment with implications on the sustainability of resources and contemporary global climate change is blamed on the unsustainable use of resources. It has been observed that climate change already has impacts on the planet's biodiversity and bio capacity which affect the well-being of humanity in areas of food and water security. WWF (2014) and the 2014 IPCC report revealed that almost every part of the natural world and its interdependent social and economic systems is either already being, or will be, affected, thus the sustainability of environmental resources is a defining global need.

The Ecological Footprint (hence forth Footprints) was developed by Rees in 1992 and further developed by Wackernagel and Rees (1996) measures the sustainability of peoples use of environmental resources. Wackernagel and Rees (1996) defined Footprints as "an accounting tool that enables us to estimate the resource consumption and waste assimilation requirement of a defined human population or economy in terms of a corresponding productive land area". It measures the amount of biologically productive land and water required by an individual, population or activity to produce all the resources it consumes and to absorb the carbon dioxide emissions it generates using prevailing technology and resource management practices (Global Footprint Network, 2003-2009). Footprints is compared to available global bio capacity in a specific region; Footprints that exceed the global bio capacity is considered as an overshoot and are not sustainable, while those that are less than or within the global bio capacity are considered sustainable. The main benefit of Footprints is in its being a planning tool that helps in translating sustainability concerns into public action and in helping people

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make wise choices. It is thus both an analytical and educational tool that measures the burden of lifestyles. Lifestyles are the drivers of Footprints. Lifestyle is a set of practices and attitudes that differentiate people (Harison and Davies, 1998). Msheliza (2012) observed that although it should be common knowledge that Footprint is a function of lifestyles, people are not usually aware that their lifestyle choices have impacts on the environment.

To achieve sustainability requires that individuals' consumption of resources is kept within the planet earth's bio capacity but at the present human demands on the biosphere have exceeded the planets ability to sustain. Reducing Footprints require changes in lifestyles. This is important as Footprints that exceeds the biosphere's carrying capacity are unsustainable and to achieve ecological sustainability requires that human impacts are kept within the natural limits imposed by the planets carrying capacity. The unsustainable demands have resulted in human induced climate change along with wide spread increases in natural disasters. In addition to the threatening impacts of climate change that could wipe off the gains of development the world is facing so many challenges that are almost overwhelming its capacity to respond. This entails that the exploitation of renewable resources has to be kept within the margin of increase if sustainability is to be achieved, which requires a reduction in the present over consumption of renewable resources. To reduce consumption requires both awareness and change in lifestyles i.e. consumption of resources. Awareness is important for change to take place. Awareness of the impact of individual lifestyles on the environment can bring about environmentally friendly use of resources or green consumption. There are two questions that need to be answered. Are there differences in the Footprints of people based on their awareness of the impact of their lifestyles on the environment? And are there differences in the Footprints of individuals based on their consideration of the impacts of their lifestyles on the environment? In answer to the questions this paper presents study findings on the "Awareness and Consideration of the Impact of Lifestyles on the Environment and actual Ecological Footprints of Individuals in Borno State, Nigeria"

METHODOLOGY

Borno State is located in the north eastern part of Nigeria on latitude 10°-13°N and longitude 12°-15°E with a land area of about 70,000km². It is bordered in the north by the Republic of Niger, in the north east by the Lake Chad, in the east by Cameroon Republic, in the south by Adamawa State, west by Yobe State, and south west by Gombe State. Borno state has twenty seven Local Government Areas (LGAs). The State capital is Maiduguri. Figure 3.1 presents a map of Borno State showing the study LGAs. The state has a population of 4,141,193 people (National Population Census, 2006).

Data for study was obtained from a population of 2241 individuals in Borno State, Nigeria. A purposive random sampling technique was used to select the individuals studied conducted in Maiduguri the state capital and some Local Governments. The research was to determine the Ecological Footprints of individuals in Borno state based on their awareness of and the consideration of the environmental impacts of their lifestyles. This is based on the a priori expectation that individuals' level of awareness of the environmental impacts and their consideration of the environmental impacts of lifestyles should be associated with their total Footprints.

The research employed the use of structured questionnaire based on the Redefining Progress Ecological Footprint (RPEF) calculator. The Redefining Progress Ecological Footprint calculator is specially designed for generating data for application on the calculator. The data generated formed the input information on the calculator to determine the Footprints of individuals. Footprint results are expressed in global hectares (gha) and are compared to the globally available threshold bio capacity of 1.80 gha. A global hectare is a measurement of biological capacity of the earth. It represents the average yield of biologically productive areas on the earth. The use of global hectares allows for a meaningful comparison of different people, regions or country. The Footprint results are expressed in global hectares per person. It is generally accepted that the available supply of biologically productive land and sea on earth is 1.8 global hectares per person (Wackernagel and Rees, 1996; Global Footprint Network, 2003-2009; Mcmanus and Haughton, 2006; Tinsley and George, 2006; Wackernagel *et al.*,

2006; Redefining Progress, 2007; Ohl *et al.*, 2008; Wackernagel, 2008; Wiedmann *et al.*, 2008; Ewing *et al.* (2010), WWF Living Planet Reports 2008, 2010). The 1.8 gha is the fair average share of the world's resources available to each person i.e. per capita and therefore acts as a threshold value. Footprints less than the available bio capacity of 1.80 gha are sustainable and if everyone lived similar lifestyles the planet earth will be sustainable. There will be no overshoot as only a single planet is required for sustenance. Footprints are unsustainable when they are higher than the threshold biocapacity of 1.80 gha and represent an overshoot.

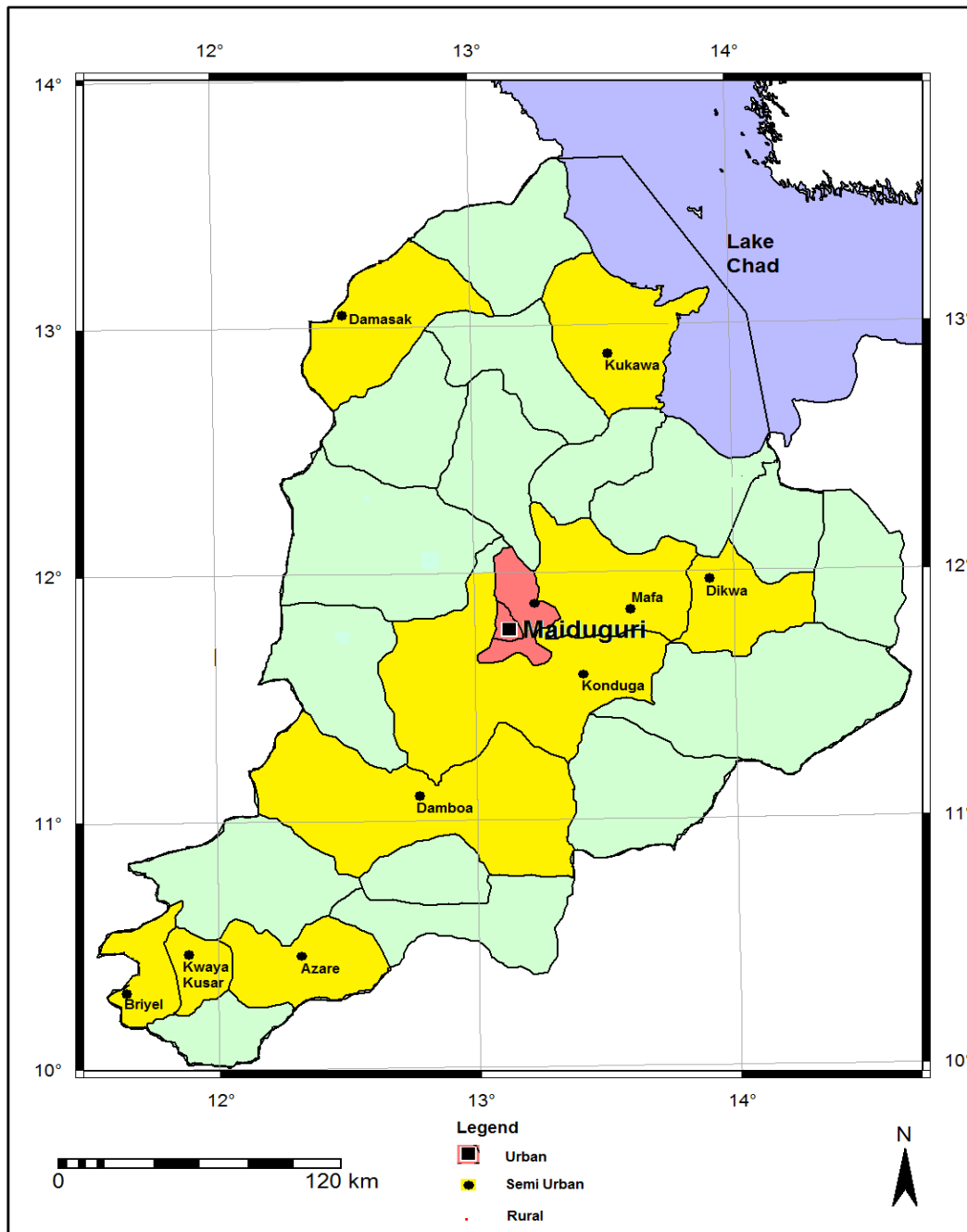


Figure 3.1: Map of the Study Area showing the Sampled LGAs

The awareness of the environmental impact refers to the awareness that individuals have on how their consumption of resources impacts on the environment which is classified into three, namely weakly aware, aware and strongly aware. Consideration of the environmental impacts of lifestyles in consumption activities is classified into three, namely, never, sometimes and always. This helped to determine if individuals considered the impacts of their use of resources on the environment.

RESULTS AND DISCUSSION

The findings on the total Footprints of each individual are presented on Table 1 and the descriptive statistics on Table 2. The lowest total Footprint was 0.40 gha. The highest total Footprint was 6.7 gha. As many as 1747 individuals who constitute 78% of the study population had total Footprints ≤ 1.80 gha which is the globally available threshold fair share biocapacity of 1.8 gha per capita. The study area Footprints are sustainable; consumption is at levels that require only a single planet for sustaining them.

Average total Footprint of all the individuals studied was 1.61 ± 0.021 (Table 2). Footprints of most people are therefore sustained on less than the threshold globally available 1.8 gha biocapacity per capita. Although average total Footprint was 1.61 gha, 31.7% of the populace had total Footprints ≤ 1.0 gha. Only 13.3% of people studied had total Footprints ≥ 2.7 gha which is the global average total Footprint computation by Ewing *et al.* (2012). 82% of the people have Footprints less than the global average of 2.7 gha per capita. Borno state Footprints are thus sustained on a single planet without an overshoot. The findings are in agreement with the Ecological Footprints of nations by Venetoulis, (2004), Redefining Progress (2007), and Ewing *et al.* (2010) and WWF (2012). These findings mask the fact that up to 38% of the people have total Footprints ≤ 1.0 gha.

Table 1: Total footprints of individuals in Borno State

Total Footprints in global Hectares	Number of individuals	Percent (%)	Cumulative percent (%)
0.40	2	0.1	0.1
0.50	4	0.2	0.3
0.60	84	3.7	4.0
0.70	88	3.9	7.9
0.80	109	4.9	12.8
0.90	99	4.4	17.2
1.00	325	14.5	31.7
1.10	198	8.8	40.6
1.20	113	5.0	45.6
1.30	123	5.5	51.1
1.40	130	5.8	56.9
1.50	122	5.4	62.3
1.60	247	11.0	73.4
1.70	61	2.7	76.1
1.80	42	1.9	78.0
1.90	42	1.9	79.8
2.00	30	1.3	81.2
2.10	10	.4	81.6
2.20	18	.8	82.4
2.30	29	1.3	83.7
2.40	11	.5	84.2

2.50	14	.6	84.8
2.60	42	1.9	86.7
2.70	40	1.8	88.5
2.80	28	1.2	89.7
2.90	12	.5	90.3
3.00	27	1.2	91.5
3.10	18	.8	92.3
3.20	15	.7	92.9
3.30	9	.4	93.4
3.40	12	.5	93.9
3.50	7	.3	94.2
3.60	8	.4	94.6
3.70	8	.4	94.9
3.80	12	.5	95.4
3.90	4	.2	95.6
4.00	2	.1	95.7
4.10	7	.3	96.0
4.20	4	.2	96.2
4.30	4	.2	96.4
4.50	4	.2	96.6
4.60	7	.3	96.9
4.70	6	.3	97.1
4.80	4	.2	97.3
4.90	11	.5	97.8
5.00	3	.1	97.9
5.10	21	.9	98.9
5.20	3	.1	99.0
5.30	6	.3	99.3
5.50	6	.3	99.6
5.60	2	.1	99.6
5.70	2	.1	99.7
5.80	1	.0	99.8
6.00	1	.0	99.8
6.10	1	.0	99.9
6.30	2	.1	100.0
6.70	1	.0	100.0
Total	2241	100.0	

Table 2: Descriptive statistics of total footprints of individuals

Number of individuals	Obtained Footprint values		
	Mean \pm SE	Minimum	Maximum
2241	1.61 \pm 0.021	0.40	6.70

The low total Footprints of up to 31.7% of people studied being ≤ 1.0 gha implies that many people do not have enough resources to meet basic needs. Although there is global need for a reduction in the consumption of resources, a reduction in consumption for most people will not be justified. Sustainability development has an equality aspect to it; therefore the global drive to reduce resource use has to be along human wellbeing considerations. For many people standard of living is at the level of poverty and deprivation.

Awareness of the environmental impacts of lifestyles and ecological footprints of individuals

The distribution of the Footprints of individuals based on the awareness of the environmental impacts of lifestyles by people is presented on Table 3. Individuals' levels of the awareness of the environmental impacts of lifestyles did not affect the Footprints of individuals in Borno State since it can be observed that the awareness of the impacts of lifestyles on the environment by individuals in Borno State did not result in lower Footprints. The strongly aware had the least average total Footprints of 1.4659 ± 0.11124 gha which is lower than that of the weakly aware of 1.5682 ± 0.04988 gha, but those who are just aware had an average total of 1.6272 ± 0.02339 gha. It would be expected that the Footprints of the aware would be lower than that of the weakly aware.

Table 4: Average total Footprints of individuals based on their awareness of the environmental impacts of lifestyles based on the wet and dry seasons

Awareness of lifestyle on environment level	Population	Ecological Footprints in global Hectares		
		Mean (\pm SE)	Minimum	Maximum
Strongly aware	88	1.4659 \pm 0.11124	0.60	5.60
Aware	1804	1.6272 \pm 0.02339	0.40	6.70
Weakly aware	349	1.5682 \pm 0.04988	0.60	6.30
Total	2241	1.6116 \pm 0.02083	0.40	6.70

The differences in the Footprints are however low. Awareness of the environmental impact of lifestyle is observed to have no association with Footprints of individuals as supported by the chi-square computation below, which showed that there is no association between the level of awareness of environmental impacts of lifestyles and Footprints. Therefore, in answer to the question on the association between the awareness of the environmental impacts of lifestyle and Footprints it can be stated that there is no significant association between the awareness of the environmental impacts of lifestyles and Footprints. $X^2 = 10.72$; $P < 0.611$, $df = 112$.

Although differences were observed in the average Footprints of individuals based on their awareness of the environmental impacts of lifestyles, the awareness of the environmental impacts did not result in the reduction of Footprints. It will be expected that the strongly aware will have lower average Footprints than the aware and the weakly aware. However the findings reveal that the weakly aware have the lowest average Footprints which is contrary to the a priori expectation. Despite this, it can be stated that awareness of the environmental impact of lifestyles is useful. Footprints are generally low and sustainable due to low consumption levels. The study area average total Footprint of 1.61 ± 0.021 gha is lower than the available 1.80 gha global threshold bio capacity per capita. Footprints in the study are sustainable being lower than the threshold value. Individuals total Footprints are maintained on a single planet's biocapacity.

Consideration of the environmental impacts of lifestyles and ecological footprints in Borno State

The finding on the consideration of the environmental impact of lifestyles on the environment and Footprints is presented on Table 5, which shows that there are differences in the Footprints of people based on their consideration of the impact of lifestyles on the environment. Those who never considered the impact of lifestyles have the highest average total Footprints of 1.79 ± 0.046 gha, those who never do have the lowest average total Footprints of 1.48 ± 0.033 gha. The individuals who sometimes had average total Footprints of 1.61 ± 0.031 gha. This means that the a priori expectation that individual's consideration of environmental impacts of lifestyles is associated with their total Footprints is factual.

Table 5: Average total Footprints of individuals based on their consideration of the environmental impacts of lifestyles based on the wet and dry seasons

Consideration of Environmental Impact	Population	Ecological Footprints in global Hectares		
		Mean (\pm SE)	Minimum	Maximum
Never	Never	1.7863 ± 0.04633	0.50	6.30
Sometimes	Sometimes	1.6090 ± 0.03125	0.40	6.00
Always	Always	1.4785 ± 0.03331	0.40	6.70
Total	Total	1.6116 ± 0.02083	0.40	6.70

Chi-squared results to test the association between the consideration of the environmental impacts of lifestyles and Footprints presented below showed an association at the 0.01 level of significance. Thus there is an association between the Footprints of individuals and their Footprints. $X^2 = 19.67$; $P < 0.001$, $df = 112$.

Therefore it can be stated in answer to the question on the association between the consideration of the environmental impacts of lifestyles and Footprints of individuals, that the consideration of the environmental impacts of lifestyles by individuals has a significant influence on Footprints. An increase in the level of considerations of the environmental impact of lifestyles did result in a reduction in the Footprints of respondents. Individuals who always and those who sometimes consider the impacts of lifestyles have lower Footprints than those who never consider the environmental impacts of Footprints. The majority of people studied are aware of the environmental impact of lifestyles but this does not translate into differences in Footprints. Those who consider the environmental impacts of lifestyles however have lower Footprints. This implies that globally a raising of awareness of people to the consequences of unsustainable consumption can yield positive results. Therefore there is a great need for awareness creation and the inculcation of sustainable behaviours.

CONCLUSION AND SUGGESTIONS

Ecological Footprints of individuals in Borno state are generally low with 31.7% having total Footprints ≤ 1 gha. There is a need to improve people's standards of living which should be the desire of every government in a fashion that will not necessarily increase Footprints. To avoid unsustainable consumption there should be advocacy that will create awareness of the impacts of resource use on the environment. People should also be educated on sustainable consumption and the need to consider the environmental impacts in their lifestyles. Awareness creation is important as standards of living improve. It has been observed by Fule and Kenez (2005) that environmental awareness influences human behaviour by reducing consumption, changing wasteful or harmful consumption patterns, preference of environmentally friendly products, selective waste collection. Also although not considered in this paper, study findings on the Ecological Footprints and sustainability in Borno (Msheliza, 2012) revealed that mobility is the main driver of Footprints. Mobility component contribution to total Footprints was mainly due to the use of motor cycles as a means of mobility. With improvements in roads construction the use of motor cycles will reduce and thus check the contribution by mobility to total Footprints. Development and industrialization elsewhere have resulted in increases

in the consumption of natural resources and the associated environmental problems. As Nigeria develops, the consumption of non-renewable resources will invariably increase. Consumption needs to be checked as overconsumption apart from the associated high Footprints is one of the causes of climate change. Consumption and lifestyles are also related (Douglas *et al.*, 1998; Mackeller *et al.*, 1998; Rayar and Malone, 1998; Thompson and Rayar, 1998; and Weyant and Yanigisawa, 1998), and have been suggested as the major cause of contemporary climate change.

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