Journal of Empirical Studies
2018 Vol. 5, No. 1, pp. 12-19
ISSN(e): 2312-6248
ISSN(p): 2312-623X
DOI: 10.18488/journal.66.2018.51.12.19
© 2018 Conscientia Beam. All Rights Reserved.

URBAN POPULATION GROWTH AND ENVIRONMENTAL SUSTAINABILITY IN NIGERIA

Richardson Kojo Edeme[1+]
Nnadi Paschal Chibuzo[2]

[1,2]*Department of Economics, University of Nigeria, Nsukka, Nigeria*

(+ Corresponding author)

Article History
Received: 5 October 2018
Revised: 8 November 2018
Accepted: 10 December 2018
Published: 31 December 2018

Keywords
Urban population growth
Environmental sustainability
Fresh water supply
Arable land
Renewable energy
Greenhouse emission
Forest reserve.

JEL Classification:
Q23; Q24; Q56.

ABSTRACT

It is believed that the increasing urban population has led to rapid forest decline and degradation of the environment. This paper examines the impact of urban population growth on environmental sustainability using Nigeria data from 1981-2017. The variables used are urban population growth, fossil fuel consumption, carbon emissions, food production index, arable land, and agricultural raw material exports with renewable energy consumption and forest reserves as explanatory variables. Autoregressive lag model was used to determine the impact of urban population on renewable energy consumption and forest reserves, which are proxies for sustainable environment. From the findings, urban population growth had significant impact on environmental sustainability while real gross domestic product does not have significant impact on renewable energy consumption and forestry. Findings also show that urban population growth increase renewable energy consumption but decrease forest reserves. A basic policy in this direction is effective curtailing in the rate of population growth and depletion of forest reserves.

Contribution/Originality: This study contributes in existing literature by examining the influence of urban population growth on several sustainable environment variables such as fossil fuel consumption, carbon emissions, renewable energy consumption and forest reserves.

1. INTRODUCTION

Sustainable environment is described using parameters relating to the availability of water supplies, air quality and the provision of environmental infrastructure for sanitation and waste management. As a result of urbanization, sustainable environmental infrastructure is necessary through adequate pricing policies, educational programmes and equitable access mechanisms that are economically and environmentally sound and viable (York and McGee, 2017; Gara, 2018). In most developing countries of Africa, the inadequacy and lack of sustainable environmental framework have contributed to widespread ill-health and large number of preventable deaths each year. As highlighted by United Nations Statistics Division (UNSD) (2015) conditions are set to worsen due to growing needs that have exceeded the capacity of governments to respond adequately. The increasing urban population has led to rapid forest decline and degradation in Nigeria (Abughlelesha and Lateh, 2013; Sambe *et al.*, 2018). Forests are lost every through the industrial, commercial and other urban-related activities. Deforestation is an ongoing phenomenon in Nigeria, and it is becoming more pronounced with increasing population and urbanization.

© 2018 Conscientia Beam. All Rights Reserved.

Deforestation also leads to forest degradation, impoverishment of the soil and general deterioration in environmental condition. An integrated approach to the provision of environmentally sound infrastructure in human settlements, in particular for the urban areas, is an investment in sustainable development that can improve the quality of life, increase productivity, health and reduce the burden of investments in curative medicine and poverty alleviation.

.Sustainable environment has met with serious controversies as nations try to satisfy their citizen's welfare and also make provision to leave the environment undamaged. The last two decades have witnessed an unprecedented global warming. Increasing carbon dioxide emissions (CO2) produce massive build-up of greenhouse gas, which has given rise to recent warm temperatures. This is just one aspect of environmental problem. One of the consequences of overpopulation is the pressure that is put on available land for building of residential houses, water resources, forest reserves and energy reserves. This increasingly high demand for environmental resources will also affect food production in areas where they are lacking, more especially water and usable land (Altieri, 2016).

However, forest ecosystems play multiple roles at global as well as local levels and provide a range of important economic and social goods and services that have impact on the well being of poor rural communities, local and national economies and global environmental health. The environmental parameters chosen were access to clean water, mode of human and solid waste disposal, population density, mode of land and house tenure and household income. Also posits that companies in the start-up phase and experienced companies expanding into new markets both should evaluate the strengths and weaknesses of competitors and as well the general economic climate and customer demand. Businesses evaluate these factors and often find ways to succeed through innovative technologies, clever marketing tactics and unique product and service offerings; all these aid in protecting the environment; environmental resources would certainly be used in their business arena. From perspective of the common environment we live, environmental values and psychological factors all play a significant role in the prediction of waste management behaviour. For instance, those living in the rural areas do not care about the importance of keeping the environment clean; someone can drop wastes anywhere, anyhow, without considering their impacts in their surroundings. More widely, urban population growth in Africa is happening so quickly that it overwhelms government's abilities to provide education, health services, housing, drinking water, electricity, and waste disposals (Mutunga *et al.*, 2012). The natural environment is central to economic activity, providing the resources needed to produce goods and services, and absorbing and processing unwanted by-products (Everett *et al.*, 2010; Amar, 2013). Environmental assets contribute to managing risks to economic and social activity, regulate flood risks, the local climate and maintaining the supply of clean water and other resources.

In Nigeria, evidence indicates that available agricultural land areas reduced to 0.28 hectares in 2001 and further to 0.24 in 2008. It further increased from 99.65 units to 105.78 units in 2013 and 2016 respectively. This implies that the rate at which agricultural land was used increased overtime. Meanwhile, population growth in urban areas which was 3.5 percent in 2001 remained almost the same between 2013 and2015. Also, renewable energy consumption decreased from 87.78% in 1990 to 82.95% in 2003, though there was gyration within the period which continued till 2017 (87.50%), when it became almost at par with that of 1990 (87.78%). As expected, increase in renewable energy would result to reduction in emissions generated from non-renewable energy sources. In 1990, carbon emissions was 0.41 metric ton per capita. In 2003, it increased to 0.77 metric tons. This decrease in renewable energy consumption (1990 and 2003) resulted to more use of fossil energy up till 2003, and this has a serious damage to the environment.

From the above, there is evidence that environmental degradation is a problem in urban area, despite the fluctuations in renewable energy consumption. In the quest for growth, the environment is violated and this does not essentially assure improvement in humanistic values and welfare for both present and future generation (Edeme, 2018). The environmental Kuznets curve hypothesized that per capita growth initially allows great environmental damage but with time the degradation reduces due to innovation, technological progress and

© 2018 Conscientia Beam. All Rights Reserved.

awareness. While this laid the discussions in this area of study, this paper is guided by the following research questions: What is the impact of urban population growth on renewable energy consumption? What is the impact of urban population growth on forest reserves?

2. LITERATURE REVIEW

There are theories that link various indicators of environmental degradation and growth variables. They include ecological theory, political theory, demographic transition theory and the environmental Kuznets theory. The ecological model examines the impact of man's activities on the environment in the quest for survival. The political model focus on sustaining the environmental conditions of a fully human life, concerned with the way in which local and global environmental problems jeopardize human dignity. The argument here is that individuals are entitled to right to life; and every activity of providing them with basic needs must secure their dignity-their right as humans dominating other ecological habitats. Democratic conditions must be put in place for institutions to determine how the citizens are captured in their pursuit of efficiency. The demographic transition theory according to Todaro and Smith (2012) postulates the phasing-out process of population growth rates from a virtually stagnant growth stage characterized by high birth rates and death rates through a rapid-growth stage with high birth rates and low death rates to a stable, low growth stage in which both birth and death rates are low. The growth rate of population would not be the same at all times. From the beginning of time, there was a high result of fertility, increase in death rates and lack of awareness (or illiteracy), but as time went on, level of education rose, and people were able to control birth rates. Generally, population growth rate changes from time to time; and the rate depends on the state of the economy. For instance, literature has suggested that most developing nation's population tend to rise faster than their developed counterparts. Nigeria, being a developing nation would as well be painted the same picture as those of her sister countries. The environmental Kuznets theory is a hypothesized relationship between environmental degradation and income per capita. The environmental Kuznets curve laid the theoretical foundation on studies linking various indicators of environmental degradation and growth. The underlying principle of environmental Kuznets theory is that there is an inverted U shaped relationship between environmental degradation and economic development (Uchiyama, 2016). Proponents of the thesis argue higher levels of development ushers structural change towards information-intensive industries and services, coupled with increased environmental awareness, enforcement of environmental regulations, better technology and higher environmental expenditures, which will result in levelling-off and gradual decline of environmental degradation (Stern, 2003). While this is essentially theoretical phenomenon, most of the empirical studies have provided weak evidence in this regard.

Romero-Lankao *et al.* (2016) sought to break the knowledge, theory and practice of urban sustainability and resilience. The focus is on what capacities urban actors draw on to create sustainability and resilience, and how different definitions of these concepts intersect, complement, or contradict each other. They also examine the implications of those intersections and differences in the efforts by urban actors to enhance the capacity to transform themselves, their communities, and their cities toward sustainable and resilient relationships with the environment. Their findings are that urban sustainability and resilience are technical problems that can be addressed through greater knowledge, innovation and technical expertise. Muhammad *et al.* (2015) examined the barriers, policies, prospects as well as the factors affecting the development and diffusion of renewable energy technologies (RETs). Weak institutional framework, poor policy implementation, inadequate financing, and lack of awareness of the socioeconomic, technological and environmental merits of renewable energy technologies were identified as the major barriers hindering its development in Nigeria.

Zannawaziri *et al.* (2012) analyzed the possible impact of global renewable energy consumption in the Nigerian and findings reveal that Nigeria, should uncover alternative corridors other than oil and gas to provide revenue in order to improve the nation's economy. Ayeni (2013) found that for about 40 years then, Nigeria's forests including

© 2018 Conscientia Beam. All Rights Reserved.

the conservation areas have continued to shrink, especially in the north, where uncontrolled commercial exploitation of privately owned forests began in the late nineteenth century. This situation is expected to deteriorate further in future if adequate conservation measures not properly introduced.

Oyedepo (2013) reviewed the pattern of energy use in Nigeria and makes a case for the implementation of an energy efficiency policy as a possible strategy to address the nation's energy crisis. The paper also shows that industrial energy efficiency in Nigeria is readily achievable, cost effective and has potential of reduction in industrial consumption using good energy management practices and energy efficient equipment.

Barr (2007) examined three waste management behaviors (waste reduction, reuse, and recycling) with the use of a conceptual framework developed by the author. The framework was tested in a self-report questionnaire of 673 residents of Exeter, UK and it was found that the predictors of waste reduction, reuse, and recycling behavior differed significantly, with reduction and reuse being predicted by underlying environmental values and knowledge. Recycling behavior was, in contrast, characterized as highly normative behavior.

Katz (2015) attempts to reconsider the Environmental Kuznets relationship through the examination of the relationship between growth and water use using panel datasets on water withdrawal and consumptive use. Employing both traditional least squares and nonparametric regression analysis, the research finds some support for the existence of an EKC, but such is highly dependent on dataset and statistical technique (York and McGee, 2017) assessed how renewable electricity production interacts with GDP per capita to influence CO2 emissions per capita. They used cross-national data from 1960 to 2012 in the analysis and found interaction effect between the quantity of renewable energy and GDP per capita, where, economic growth is more closely tied to emissions in nations with a large share of their electricity from renewable sources. Growth of renewable electricity has a smaller effect on emissions in more affluent nations, because of their technological prowess in the application of innovative strength in the development of renewable energy sources in replacement of the depleting fossil energy that generate such emissions. They use fixed effects panel regression models with robust standard errors adjusted for clustering of residuals by nation. They used data for 128 nations to run the regression. They also include dummy variables for each year to control for period effects. GDP per capita had positive effect on emissions per capita, where emissions grow approximately 0 .50 percent for each 1 percent growth in GDP per capita.

Gupta *et al.* (2011) study focused on population, poverty and sustainable development with findings indicating that while policy and institutional settings are key in shaping economic growth and poverty reduction prospects, the rate of population growth also matters because with decline in fertility rate declines, low dependency ratio will happen which could as well create opportunities for increasing productivity, savings, and investment growth in the near future. It was also argued that rapid population growth can constrain economic growth, especially in low-income countries where there exist poor environmental policies. What this shows is that as the population is rising, pressure on the environment (like land availability, environmental common property resources, land degradation, or energy use) would also be increasing. However, part of the pressure on these resources can be curtailed by reducing the rate of population growth. Although, family planning programs are only one policy direction that can help reduce fertility, studies have found them to be effective in reducing excess demand on resources.

Shi (2001) sought to examine the impact of population growth on carbon dioxide emissions in 93 countries using data from 1975-1996. One of the major findings is that population growth has been one of the major driver of increased carbon dioxide emissions over the last two decades. Economic growth can also exert pressure on nature This pressure on nature implies the sum of energy, mineral, net forest depletions and carbon dioxide damage. Empirical evidence on this relationship was provided by Asici (2011). The panel data used comprises of 213 countries and spans between 1970 and 2008. The cross-country evidence revealed that there is positive relationship between income and pressure on nature; however the relationship is not linear across countries. The effect was much stronger in middle-income countries than in low and high-income countries. The outcome is at variance with

© 2018 Conscientia Beam. All Rights Reserved.

the Environmental Kuznets Curve (EKC) hypothesis, which foresees a reduction in environmental degradation once a certain level of growth is attained.

Other studies like Martínez-Zarzoso *et al.* (2006) analyzed the impact of population growth on CO2 emissions in European Union countries. The study treated population as a predictor rather than being modeled as explanatory variable. The sample covers the period of 1975-1999 for European Union members; and results show that the effect of population growth on emissions is stronger than proportional in recent accession countries whereas for old EU members, the elasticity is less than unity. Another striking finding is that positive relationship exists between population growth and carbon emissions.

In a study on the impact of population growth on land use changes in Wadi Ziqlab area of Jordan, Mhawish and Muna (2016) conclude that population growth has resulted in land use changes. In essence, land areas for orchard trees and urban areas increased by 22.4% and 6.2% into field crops, forest and rangeland areas. Garg (2017) was able to highlight the various environmental implications of overpopulation because of rural-urban migration which has affected land use pattern which is having serious implications leading to deforestation, loss of ecosystems that sustain global atmospheric oxygen, and carbon dioxide balance.

3. DATA AND METHODOLOGY

Data for this study are time series generated from World Bank data base and Central Bank of Nigeria Statistical Bulletin. Variables under consideration are urban population growth, real gross domestic product, fossil fuel consumption, carbon emissions, food production index, arable land, and agricultural raw material exports with renewable energy consumption and forest reserves. Theoretically, ecological model examines the impact of man's activities on the environment. The theory captures the model thus: Environmental resources depend on urban population growth, real gross domestic production, fossil fuel consumption, food production index, agricultural raw materials exports, and carbon emissions. For the purpose of this study, the model is specified such that renewable energy consumption, cultivable land area, and forestry are functions of urban population growth, real gross domestic product, fossil fuel consumption, food production index, agricultural raw materials exports, crop production index, carbon emissions, and lagged values of dependent variables. To determine the impact of urban population on renewable energy consumption, the model is specified functionally as:

$$REC = F(UPG, RGDP, FFC, CE) \quad (1)$$

Linearly, equation (1) is specified thus:

$$REC_t = B_0 + B_1UPG_t + B_2RGDP_t + B_3FFC_t + B_4CE_t + B_5REC_{t-3} + U_{it} \quad (2)$$

To examine the impact of urban population on forest reserves, the functional form of the model is specified as:

$$FR = F(UPG, RGDP, ARME, FPI, AL) \quad (3)$$

When linearized, equation (3) is specified as:

$$FR_t = \delta_0 + \delta_1UPG_t + \delta_2RGDP_t + \delta_3ARME_t + \delta_4AL_t + \delta_5FPI_t + \delta_6FR_{t-1} + U_{2t} \quad (4)$$

where REC = renewable energy consumption, UPG = urban population growth, RGDP = real gross domestic product, FFC = food production index, CE = carbon emissions, FR = forestry, ARME = agricultural raw materials exports, FPI = food production index, AL = arable land.

4. RESULTS AND DISCUSSION

4.1. Unit Root Test

The Augmented Dickey Fuller (ADF) unit root test was adopted to ascertain the stationarity or otherwise of the variables. Following the Dickey Fuller unit root test for stationarity, a variable is stationary if its ADF-test statistic value is greater than the critical value at 5% level. In all cases, a constant and a linear trend were included since this represents the most general specification. The result is presented in the table 1.

© 2018 Conscientia Beam. All Rights Reserved.

Table-1. Unit Root Test result

Variables	ADF test statistic @ level	Critical values @ level	ADF test statistic 1st difference	Critical values @ 1st difference	ADF test @ 2nd diff	Critical values @ 2nd diff	Order of integration
REC	-2.9432	-3.5403	-6.3617	-2.9484	-5.5282	-3.5628	I(1)
UPG	-12.0944	-3.5875	-4.1682	-3.5950	-2.6142	-3.6032	I(0)
LRGDP	-2.2077	-3.5403	-4.5900	-3.5442	-8.0135	-3.5484	I(1)
FFC	-2.9754	-3.5403	-6.1303	-2.9484	-9.4106	-3.5484	I(1)
CE	-1.9504	-3.5403	-6.4167	-3.5442	-6.4254	-3.5529	I(1)
LFR	-1.6022	-3.5484	-1.6022	-3.5484	-5.9312	-3.5484	I(2)
ARME	-3.8065	-3.5442	-6.2347	-3.5484	-7.7578	-3.5529	I(0)
LFPI	-1.8939	-3.5484	-3.1699	-3.5484	-4.0107	-3.5742	I(2)
AL	-2.7327	-3.5403	-3.6315	-3.5484	5.4631	-3.5577	I(1)

Source; Authors computation

From the result, urban population growth and agricultural raw material export are stationary at level form, meaning that they are integrated of order 0. Renewable energy consumption, real GDP, fossil fuel consumption, carbon emissions, and arable land are stationary at first difference, meaning that they are integrated of order 1, while forestry and food production are stationary at second difference, meaning that they are integrated of order 2.

Table-2. Regression Result for Model 1

Variables	Coefficient	Std.Error	t-statistic	Probability
C	81.3452	26.8289	3.03199	0.0114
UPG	2.5157	0.6194	4.0611	0.0019
LRGDP	-13.7302	7.3744	-1.8618	0.0895
FFC	-0.6093	0.0616	-9.8872	0.0000
CE	-3.6048	0.7795	-4.6244	0.0007
REC-3	-0.1633	0.0700	-2.3302	0.0398

Source: Authors computation

The result in Table 2 indicates that an increase in urban population increases renewable energy consumption by 2.5 percent and it is statistically significant at 5 percent. The coefficient of -0.6093 shows that increase in fossil fuel consumption on average reduces renewable energy consumption by 0.6 percent. Once fossil energy consumption reduces, it then implies that the level of clean energy consumed increases. Thus, decrease in consumption of this type of energy would trigger consumption of the alternative energy (clean energy). Also, increase in renewable energy consumption leads to reduction in carbon emissions, which has adverse effects on the environment. The negative coefficient of -0.1633 for renewable energy consumption is indicative that the level of investment and innovation made on renewable energy consumption is minimal, and this partly explains why energy consumption in the last three years is higher than what was consumed in the current period.

In Table 3, the result depicts that urban population growth reduces forest areas. Specifically, an increase in urban population decrease forest areas by about 0.1 percent on the average. From the result, it can be inferred that that population growth does not have adverse effect on the environment. Also, the coefficient 0.0608 for gross domestic product and the *P*-value indicates that it does not have any significant impact on forestry in Nigeria.

Table-3. Regression Result for Model 2

Variables	Coefficient	Std.Error	t-statistic	Probability
C	24.5240	5.6485	4.3416	0.0012
UPG	-0.1295	0.0576	-2.2482	0.0460
LRGDP	0.0608	0.6514	0.0934	0.9272
LFPI	-0.2904	0.2576	-1.1276	0.2835
AL	-0.2077	1.2302	-0.1688	0.8690
ARME	0.0429	0.0095	4.4893	0.0009
LFR_{-1}	0.6665	0.1691	3.9417	0.0023

Source: Authors computation

© 2018 Conscientia Beam. All Rights Reserved.

The result indicates that arable land has no significant while agricultural raw material exports have significant influence on forest reserve. The estimated coefficient shows that an increase in agricultural raw material exports reduces the availability of forests by about 0.04 percent The coefficient of 0.6665 for economic growth indicates that the variable has significant impacts on forest reserves in the current year because increase in forest reserves last year increases its level in the current period, ceteris paribus.

5. CONCLUSION

The continuous urban population growth in Nigeria has led to increase in human activities which have also increased fossil fuel consumption, carbon emissions, food production, renewable energy consumption and depletion in forest reserve areas. It is believed that as urban population is growing, the environment will no longer be sustainable such that human welfare is jeopardized. This paper sought to examine the influence of urban population growth on several sustainable environment variables such as fossil fuel consumption, carbon emissions, renewable energy consumption and forest reserves. The paper found that urban population growth significantly impacts on renewable energy consumption while urban population growth significantly impacts on forest reserves. Findings also show that urban population growth increase renewable energy consumption which such increase reduces forest reserves. A basic policy in this direction is effective curtailing the rate of population growth and depletion of forest reserves.

Funding: This study received no specific financial support.
Competing Interests: The authors declare that they have no competing interests.
Contributors/Acknowledgement: Both authors contributed equally to the conception and design of the study.

REFERENCES

Abughlelesha, S.M. and H.B. Lateh, 2013. A review and analysis of the impact of population growth on water resources in Libya. World Applied Sciences Journal, 23(7): 965-971.

Altieri, D., 2016. The effects of overpopulation on water resources and water security. Department of Engineering, Swarthmore College. Available from fubini.swarthmore.edu/~ENVS2/dan/Essay4.html.

Amar, M.B., 2013. Energy consumption and economic growth: The case of African countries. The Journal of Energy and Development, 38(1&2): 65-78.

Asici, A.A., 2011. Economic growth and its impact on environment: A panel data analysis. Ecological Indicators, 24(2): 324-333. Available from https://mpra.ub.uni-muenchen.de/30238/. Available at: https://doi.org/10.1016/j.ecolind.2012.06.019.

Ayeni, A.O., 2013. Forestry in Nigeria: A brief historical overview, phases of development and present challehges. African Association of Remote Sensing of the Environment (AARSE) Special Publication. Available from www.africanremotesensing.org/page-1524987/1440697.

Barr, S., 2007. Factors influencing environmental attitudes and behaviours: A UK case study of household waste management. Environment & Behaviour, 39(4): 435-473. Available at: https://doi.org/10.1177/0013916505283421.

Edeme, R.K., 2018. Revisiting the economic growth-welfare linkages: Empirical evidence from Nigeria. Asian Themes in Social Sciences Research, 1(1): 28-33. Available at: https://doi.org/10.33094/journal.139.2018.11.28.33.

Everett, T., M. Ishwaran, G.P. Ansalon and A. Rubin, 2010. Economic growth and the environment. Department for Environment, Food and Rural Affairs, MPRA Paper No. 23585.

Gara, T., 2018. Sustainable development or environmental Kuznets Curve model: Which route for Africa?. Environment, Development and Sustainability: 1-16. Available at: https://doi.org/10.1007/s10668-018-0084-4.

Garg, S., 2017. Impact of overpopulation on land use pattern. India: Kurukshetra University.

© 2018 Conscientia Beam. All Rights Reserved.

Gupta, D.M., J. Bongaarts and J. Cleland, 2011. Population, poverty, and sustainable development: A review of the evidence. Policy Research Working Paper No. 5719, The World Bank.

Katz, D., 2015. Water use and economic growth: reconsidering the Environmental Kuznets Curve relationship. Journal of Cleaner Production, 88: 205-213. Available at: https://doi.org/10.1016/j.jclepro.2014.08.017.

Martínez-Zarzoso, I., A. Bengochea-Morancho and R. Morales-Lage, 2006. The impact of population on CO2 emissions: Evidence from European countries. Environmental and Resource Economics, 38(4): 497-512. Available at: https://doi.org/10.1007/s10640-007-9096-5.

Mhawish, Y.M. and S. Muna, 2016. Impact of population growth on land use changes in Wadi Ziqlab of Jordan between 1952 and 2008. International Journal of Applied Sociology, 6(1): 7-14.

Muhammad, A.Y., M.G. Abdullahi and N.Y. Mohammed, 2015. Critical factors affecting the development and diffusion of renewable energy technologies (RETS) in Nigeria. Journal of Multidisciplinary Engineering Science and Technology, 2(8): 2260-2264.

Mutunga, C., E. Zulu and R. De Souza, 2012. Population dynamics, climate change, and sustainable development in Africa. Population Action International (PAI).

Oyedepo, S.O., 2013. Energy in perspective of sustainable development in Nigeria. Sustainable Energy, 1(2): 14-25.

Romero-Lankao, P., D.M. Gnatz, O. Wilhelmi and M. Hayden, 2016. Urban sustainability and resilience: From theory to practice. Sustainability, 8(12): 1-19. Available at: https://doi.org/10.3390/su8121224.

Sambe, L.N., C.O. Adeofun and G. Dachung, 2018. The economic and ecological effects of deforestation on the Nigerian environment. Asian Journal of Advanced Research and Reports, 1(2): 1-25.

Shi, A., 2001. Population growth and global carbon dioxide emissions. Paper Presented at IUSSP Conference in Brazil/session-s09, June.

Stern, D., 2003. The environmental Kuznets Curve, internet encyclopaedia of ecological economics. International Society for Ecological Economics. Internet Encyclopedia of Ecological Economics the Environmental Kuznets Curve.

Todaro, M.P. and S.C. Smith, 2012. Economic development. 11th Edn., New York, San Francisco: Boston Columbus Indianapolis.

Uchiyama, K., 2016. Environmental Kuznets curve hypothesis. Environmental Kuznets Curve and Cabon Dioxide Emissions. Development Bank of Japan Researh Series. pp: 11-29.

United Nations Statistics Division (UNSD), 2015. Progress towards to millennium development goals, goal 7-ensure environmental sustainability, United Nations Statistics Division. Available from http://millenniumindicators.un.org/unsd/mi/mi_coverfinal.htm.

York, R. and J.A. McGee, 2017. Does renewable energy development decouple economic growth from CO2 emissions? Sociological Research for a Dynamic World, 3: 1 –6. Available at: https://doi.org/10.1177/2378023116689098.

Zannawaziri, B., A.K. Kyari and A. Masud, 2012. Global renewable energy consumption and oil and gas export: An empirical analysis of the Nigerian economy. The International Journal of Applied Economics and Finance, 6(4): 148-156. Available at: https://doi.org/10.3923/ijaef.2012.148.156.

Views and opinions expressed in this article are the views and opinions of the author(s), Journal of Empirical Studies shall not be responsible or answerable for any loss, damage or liability etc. caused in relation to/arising out of the use of the content.

© 2018 Conscientia Beam. All Rights Reserved.