# AGE CUM INCOME LEVEL: DETERMINANT FACTORS IN SUSTAINABLE FOREST RESOURCES MANAGEMENT IN BOKI LOCAL GOVERNMENT AREA OF CROSS RIVER STATE, NIGERIA

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**Abstract**
*This study is on Age cum Income Level: Determinant factors in Sustainable Forest Resources Management in Boki Local Government Area of Cross River State, Nigeria. Two research questions and hypotheses were formulated to guide the study. The multi-stage procedure involving purposive and accidental sampling techniques were adopted to select A total of two hundred and ten (210) adult inhabitants (males and female) of all socio-economic status in Boki LGA of Cross River State, Nigeria. Demographic Variables and Sustainable Forest Resource Management Questionnaire" (DVSFRMQ) was used for data collection. The data were analysed with One-Way Analysis of Variance (ANOVA).The results revealed a significant influence of age and income level on sustainable forest resource management in Boki Local Government Area of Cross River State, Nigeria. Based on the findings and conclusion, it was recommended*: that awareness *of environmental challenges should be created in the mind of the people notwithstanding the age or level of education. This will be possible through environmental education even in the primary school curriculum and that environmental government should create alternative means of livelihood to provide income to the forest dwellers other than dependent only on the forest resources*.

**Keywords:** Age, income level, determinant factor, sustainable, forest, resource management,

## Introduction

The importance of forest resources as natural resources capital for economic development, human welfare and ecosystem sustainability cannot be overemphasized. The declining rate of forest resources during the past several decades has raised serious concerns to International, National Organizations and Nongovernmental Organizations. Conservation of forests resources is one of the most urgent and challenging tasks of biologists, social scientists, environmental managers, entrepreneurs, non-profit social organizations, and public administrators.

Forest and its resources are natural endowments which are of high value to both the environment and man. Amongst all forest types, the one situated within the tropics, generally known as tropical rainforest is the most endowed beyond its common environmental and

ecological functions as a source of natural oxygen, a way to mitigate climate change, a way to purify air and water, a way to conserve soil and water, a way to regulate floods, a way to provide natural habitat for various fauna and flora species, etc., it is home to slightly more than half of all biodiversity on Earth, approximately 67% of all fauna and flora species, and stores roughly half of all terrestrial carbon. It also boasts a variety of highly prized and exotic flora and fauna that are endemic to the forest's habitat, earning it the nickname "the largest pharmacy in the world. A staggering $500 billion is generated by its Non-Timber Forest Products (NTFPs), logging, and ecotourism services each year—the highest value of any forest type—and its plants, of which only 2% are thought to have medicinal or herbal value. Furthermore, more than 2.5 billion people live in rural areas, making it the most resource-rich type of forest (Udumo, Uba, & Etim, 2018).

Within the tropical rainforest of West Africa are endemic fauna and flora such as the Cross River gorilla (*gorilla gorilla dielhi),* the bare-headed rock fowl *(picarthates oreas),*Sclater's guenon monkey *(cercopithecus sclateri),*the African rainforest elephant *(loxodonta cyclotis)* and some exotic flora species such as *habenaria prionociaspedon* and *cola philippijonesi*. Already, fauna species such as the black duiker (*cephalophinae niger),* bush cow *(syncerus cafferbrachyceros),* leopard *(panthera pardus pardus),* water chevrotain *(hyemoschus aquaticus)* and the giant pangolin (*smutsia gigantean)* are believed to be extinct within the area (Felix & Bassey (2018).

According to Enuoh and Bisong (2014) in Felix and Bassey (2018), Cross River State had 17 forest reserves as at when Nigeria attained independence from her colonial masters and most of them are situated within the geographical location of the present study area Cross River State. The Forest Reserves (FR), where they are located and their sizes in terms of landmass are stated as follows – Afi River FR (Boki – 383.32 $km^2$);some part of Agoi FR (Akamkpa, Biase &Yakurr – 46.62 $km^2$); Boshi FR (Boki – 41.44 $km^2$); Boshi Extension FR(Boki – 67.34 $km^2$);Cross River North FR (Etung – 129.50 $km^2$);Cross River South FR (Etung &Ikom – 349.65 $km^2$); Ikom Fuelwood Plantation (Ikom – 1.06 $km^2$); Ikrigon FR (Ikom – 5.29 $km^2$); Okwangwo FR (Boki – 468.79 $km^2$), and the Ukpon River FR (Obubra&Yakurr – 313.39 $km^2$).

Regarding wildlife, a number of extincted wild animal species have been replaced, along with others that were formerly common and others that are critically endangered. Among the extinct species are the African giant pangolin, leopards, and bush cows. The following species are classified as critically endangered: Cercopithecus preussi, Red-bellied monkey (*Cercopithecus erythrogaster*), Gorilla (*Gorilla gorilladiehli*), Drill (*Mandrillus leucophaeus*), Chimpanzee (Pan troglodytes), Cercopithecus sclateri unique to Nigeria), and Wilddog (Lycaonpictus).African pygmy squirrel (Myosciurus pumilio), African hippopotamus (Hexaprotodonlib eriensis), African elephant (Loxodonta Africana), Cheeta (*Acinonyx jubatus*), Red-eared guenon (*Cercopithecus erythrotis*), West African mantee (*Trichechus senegalensis*), and Spotted-necked otter (*Lutra maculicollis*) are among the species listed as endangered (Weir, 2018).

There are many factors which may be connected to sustainable forest resources management in Boki Local Government Area that necessitated this study. According to demographic Asanye and Obi (2024) variables such as gender, age, educational level, income level etc. can influence sustainable forest resources management.

Age as a research variable is concerned with the chronological number of years that a person has existed as a living entity on earth. Over the course of a person's lifetime, there is a complicated and dynamic link between age and environmental sustainability. People's viewpoints, actions, and effects on the environment change significantly as they move through different life phases. Research has demonstrated that environmental education and awareness from infancy and adolescence develop pro-environmental attitudes and actions, establishing the groundwork for a lifetime of sustainability (Wu, Font. & Liu, 2021). Research has indicated that

students who take part in outdoor education programs have higher levels of environmental awareness and are more motivated to assist in conservation activities. Due to consumerism and lifestyle decisions, people's environmental footprint frequently grows as they become older. However, this stage also presents opportunities for environmental leadership and activism. A recent study found that adults aged 25-44 are more likely to participate in environmental organizations and advocacy, driven by concerns about climate change and environmental degradation (Enamhe & Okang, 2019). As people get older, they frequently reevaluate their goals and ideals, which increases their activity and concern for the environment. According to research, because of their acquired life experience and feeling of duty, older persons are more likely to participate in environmental conservation activities including volunteering and campaigning (Enamhe & Okang, 2019). This change in viewpoint emphasizes how crucial intergenerational cooperation is in tackling environmental issues. In the end, creating effective teaching and conservation tactics that appeal to a range of age groups requires an awareness of how age affects environmental sustainability.

Income level is variable that refers to the stipulated amount of money which is accruable to an individual in a given period of time. It is considered as one of the rural dwellers' demographic variables which determines the exploitation rate of forest resources that may possibly result to forest depletion. Poverty which is as a result of low income plays a major role in forest resource depletion Many of the worlds' rain forests is found in the poorest areas on the planet. Rural dwellers in Cross River State who live in and around the rain forest rely on these resources for survival. They collect fruits and wood, hunt wild life to put meat on the table and are paid by companies that extract resources from the forest lands. Most low income people never have the options that high income people take for granted. Low income people almost never have a choice to go to college, to be a factory worker, or a secretary ( Lepetu & Garekae, 2015) . According to the Igwebuike and Etan (2018) *Those* people with high 'socio-economic status in the society do not impact great pressure on forest resource as they can afford other means of livelihood rather than depending solely on forest resources, although there are some high socioeconomic individuals who use their wealth to impact negatively on forest resources

The relationship between income level and forest resource conservation is complex and multifaceted. On one hand, increasing income can provide individuals and communities with the financial resources necessary to invest in sustainable forest management practices, such as reforestation and conservation efforts. Higher income levels can also enable governments to allocate more funds towards environmental protection and conservation initiatives. However, rising incomes can also lead to increased consumption and exploitation of forest resources, particularly in developing countries where economic growth is often tied to natural resource extraction. As incomes rise, so does demand for timber, fuelwood, and other forest products, leading to deforestation and habitat destruction.

Research has shown that the relationship between income and forest conservation follows an inverted U-shaped curve, known as the Environmental Kuznets Curve (EKC). Initially, as incomes rise, forest degradation increases, but once a certain threshold is reached, further income growth leads to improved forest conservation and environmental protection (Leal & Marques, 2022). For instance, a study by Pandey and Singh (2017) found that in India, forest cover increased as household incomes rose above a certain level, enabling families to transition from subsistence-based forest dependence to more sustainable livelihoods. Similarly, Okang and Effiom (2019) revealed that economic growth, coupled with institutional factors like property rights and governance, can lead to increased forest conservation efforts. According to Okang and Effiom (2019) the impact of income level on forest resource conservation depends on various factors, including economic development, governance, and societal values. Understanding this complex relationship is crucial for developing effective policies that balance economic growth with environmental protection.

**Theoretical frame work: Demographic theory by Thomas Malthus (1828))**

Thomas Malthus (1766–1834) was an English clergyman who made dire predictions about earth's ability to sustain its growing population. According to Malthusian theory, three factors would control human population that exceeded the earth's carrying capacity, or how many people can live in a given area considering the number of available resources. Malthus identified these factors as war, famine, and disease (Malthus 1798). He termed them "positive checks" because they increase mortality rates, thus keeping the population in check. They are countered by "preventive checks," which also control the population but by reducing fertility rates; preventive checks include birth control and celibacy. Thinking practically, Malthus saw that people could produce only so much food in a given year, yet the population was increasing at an exponential rate. Eventually, he thought people would run out of food and begin to starve. They would go to war over increasingly scarce resources and reduce the population to a manageable level, and then the cycle would begin anew.

According to the Malthus (1798) the human population has continued to grow long past Malthus's predictions. So what happened? Why didn't we die off? There are three reasons sociologists believe we are continuing to expand the population of our planet. First, technological increases in food production have increased both the amount and quality of calories we can produce per person. Second, human ingenuity has developed new medicine to curtail death from disease. Finally, the development and widespread use of contraception and other forms of family planning have decreased the speed at which our population increases. But what about the future? Some still believe Malthus was correct and that ample resources to support the earth's population will soon run out.

A neo-Malthusian researcher named Paul Ehrlich brought Malthus's predictions into the twentieth century. However, according to Ehrlich, it is the environment, not specifically the food supply, that will play a crucial role in the continued health of planet's population (Ehrlich 1968). Ehrlich's ideas suggest that the human population is moving rapidly toward complete environmental collapse, as privileged people use up or pollute a number of environmental resources such as water and air. He advocated for a goal **of** zero population growth (ZPG), in which the number of people entering a population through birth or immigration is equal to the number of people leaving it via death or emigration. While support for this concept is mixed, it is still considered a possible solution to global overpopulation

Whether you believe that we are headed for environmental disaster and the end of human existence as we know it, or you think people will always adapt to changing circumstances, we can see clear patterns in population growth. Societies develop along a predictable continuum as they evolve from unindustrialized to postindustrial.

By implication to the present study, the researchers believe that cties provide numerous opportunities for their residents and offer significant benefits including access to goods to numerous job opportunities. At the same time, high population areas can lead to tensions between demographic groups, as well as environmental strain. While the population of urban dwellers is continuing to rise, sources of social strain are rising along with it. The ultimate challenge for today's urbanites is finding an equitable way to share the city's resources while reducing the pollution and energy use that negatively impacts the environment.

**Statement of the problem**

In Cross River State, specifically Boki Local Government Area the persistent loss of forest resources now constitutes a serious threat to the survival of the local population. A large proportion of the virgin forest has been encroached into, and the people are rapidly losing their old growth forest, which is their source of livelihood. Issues of forest clearings for large scale mono-crop agricultural land uses coupled with slash and burn practices decimate the forest immensely from an

agro-based perspective. From the commercial dimension, logging and fuel wood extraction have also contributed a very significant quota towards the fast rate at which the forest is disappearing. Other rural dwellers activities, with significant impacts on the forest nd its resources, are aspects of unsustainable harvesting non-timber forest products, unauthorized poaching and usage of chemicals/poisons for hunting and fishing. These rural dwellers activities have contributed significantly to endangerment and extinction of most common Fauna and Flora species in the study area

In spite of the massive and uncountable benefits of the forests, the resources are under threat of mass elimination of species and genetic resources through the impact of human activities, hence, rendering government's huge effort toward conservation abortive. The question making round is: what then would be responsible for the existence of these activities in Cross River State? This question has given rise to series of arguments and debates. Many scholars often blame it on inability of state governments to enforce conservation bills and laws, and institutional failures. Others blame it on poor awareness, socioeconomic factors such as illiteracy, poverty, as well as individual thoughts and behaviour which reflects their attitude and emotion towards forest conservation. The problem of this study therefore is to empirically investigate whether rural dwellers age and or income influence forest resource conservation. It is based on this problem that the researcher posed a question; does age and or income level have any influence on sustainable forest resource management in Boki local government area of Cross River State, Nigeria

**Objective of the study**

This study sought to;

1. find out the extent to which age influences sustainable forest resource management in Boki Local Government Area of Cross River State
2. assess the extent to which income level influences sustainable forest resource management in Boki Local Government Area of Cross River State

**Research questions**

The following research questions were posed to guide the study;

1. To what extent does age influence sustainable forest resource management in Boki Local Government Area of Cross River State?
2. To what extent does income level influence forest resource sustainable forest resource management in Boki Local Government Area of Cross River State?

**Statement of hypotheses**

The following hypotheses were formulated to guide the study:

1. there is no significant influence of age on sustainable forest resource management in Boki local government area of Cross River State
2. Income level has no significant influence on sustainable forest resource management in Boki local government area of Cross River State.

**Methodology**

Ex-post facto design was adopted for this study. By using this design, the researchers used the independent variable (demographic variables) that has already occurred to observe the dependent variable (Forest resource conservation practices) as they manifest. Isangedighi, Joshua, Asim and Ekuri (2004) asserted that" ex-post facto research design involves the collection of data to accurately and objectively describe existing phenomena. Studies that make use of this design are employed to obtain a picture of the present condition of a particular phenomenon. Ex-post facto research design is therefore very useful for opinion and attitude studies because it depends basically on questionnaire and interview as means of data collection. This research design is therefore considered appropriate for this study because it will allow the

researcher to make use of a representative sample of the population from where generalization of the study result will be made. Multi-stage procedure involving purposive and accidental sampling techniques was adopted. Four local government areas were purposively selected based on high forest concentration in the areas. At the second stage, a "hat-and-draw "method was applied were the various rural communities within the LGAs was written on pieces of paper which was folded and thoroughly mixed in a container and someone allowed to pick four communities which automatically became the subjects of the study. It is from these sampled communities that the respondents that participated in the study was taken. To select the sample for the study, accidental sampling technique was adopted as the instrument was only administers to the respondent present and were willing to participate. The sample of the sample of the study at the end of the instrument administration and retrieval was 210 adult inhabitants of the research area. The data collected during the study were analyzed with One-Way Analysis of Variance (ANOVA) using package IBM SPSS Version 22. The data were analyzed at .05 level of significance 2 and 206 degrees of freedom'

**Results**

**Hypotheses One:** There is no significant influence of age on sustainable forest resource management in Boki Local Government Area of Cross River State

TABLE 1: One way analysis of variance results of the influence of age on sustainable forest resource management in Boki local government area of Cross River State (N=210)

| Influence of Age | N | $\bar{x}$ | S.D |
|---|---|---|---|
| below 30 | 56 | 12.21131 | 2.66321 |
| 31-50 | 91 | 13.34665 | 2.552112 |
| above 50 | 63 | 13.25221 | 2.683312 |
| Total | 210 | 13.44312 | 2.733321 |

| Source of variation | SS | Df | MS | F | p-value |
|---|---|---|---|---|---|
| Between Groups | 88.152 | 2 | 62.132 | 2.041 | .031 |
| Within Groups | 3426.060 | 207 | 11.057 | | |
| Total | 3514.212 | 209 | | | |

*Significant at .05 level

The analysis of variance (ANOVA) in table1shows that the calculated F-ratioof2.041 (F=2.041, p<.05), is significant at .05 level of significance and 2 and 207 degrees of freedom and since p<.031 is less than p(.05), it implies that there is a significant influence of age on sustainable forest resource management in Boki Local Government Area f Cross River State. Therefore, the null hypothesis as rejected

**Hypotheses two:** Income level has no significant influence on sustainable forest resource management in Boki local government area of Cross River State.

**Table 2:** One way analysis of variance results of the influence of income level on sustainable forest resource management in Boki local government area of Cross River State (N=210)

| Influence income level | N | $\bar{x}$ | S. D |
|---|---|---|---|
| Below N20,000 | 61 | 12.4577 | 2.24456 |
| N20,001-N50,000 | 86 | 14.2344 | 2.98821 |
| Above N50,000 | 63 | 13.12331 | 2.42334 |
| Total | 210 | 12.4456 | 2.28221 |

| Source of variation | SS | df | MS | F | p-value |
|---|---|---|---|---|---|
| Between Groups | 102.117 | 2 | 28.411 | 3.132 | .000 |
| Within Groups | 3412.095 | 207 | 9.451 | | |
| Total | 3514.212 | 209 | | | |

*Significant at .05 level

The analysis of variance (ANOVA) in table 2 shows that the calculated F-ratioof 3.132 ($F=3.132$, $p<.05$), is significant at .05 level of significance and 2 and 207 degrees of freedom and since $p<.000$) is less than p(.05), it implies that there is a significant influence of income level sustainable forest resource management in Boki Local Government Area of Cross River State. Therefore, the null hypothesis as rejected.

**Discussion of findings**

Data in table 1showed that there is a significant influence of age on sustainable forest resource management in Boki local government area of Cross River State. The conclusion in this present hypothesis is in line with the study of Enamhe and Okang, (2019) that stated that as people get older, they frequently reevaluate their goals and ideals, which increases their activity and concern for the environment. According to research, because of their acquired life experience and feeling of duty, older persons are more likely to participate in environmental conservation activities including volunteering and campaigning. According to (Enamhe & Okang, 2019), this change emphasizes how crucial intergenerational cooperation is in tackling environmental issues. In the end, creating effective teaching and conservation tactics that appeal to a range of age groups requires an awareness of how age affects environmental sustainability.

Data in table 2 shows that Income level has no significant influence on sustainable forest resource management in Boki Local Government Area of Cross River State. This result is in agreement with the study of Okang and Effiom (2019) that revealed that economic growth, coupled with institutional factors like property rights and governance, can lead to increased forest conservation efforts. The result is equally in line with the study of Okang and Effiom (2019) that stated that the impact of income level on forest resource conservation depends on various factors, including economic development, governance, and societal values. According to (Okang & Effiom, 2019), understanding this complex relationship is crucial for developing effective policies that balance economic growth with environmental protection. Finally, those with low socio-economic status in the society impact negatively on forest resources. They depend entirely on forest resources for their livelihood.

## Conclusion

The analysis revealed a significant influence of age and income level on sustainable forest resource management in Boki Local Government Area of Cross River State. Specifically, the study found that individuals' age and financial status significantly influence their attitudes and practices towards forest conservation. This suggests that effective forest management strategies must consider the demographic characteristics of local communities, tailoring interventions to address the unique needs and perspectives of different age groups and income levels. Ultimately, understanding the interplay between age, income, and forest management is crucial for developing targeted policies that promote sustainable forest resource use in the region.

## Recommendations

Based on the findings of the study, the following recommendations were made**:**

1. Awareness of environmental challenges should be created in the mind of the people notwithstanding the age or level of education. This will be possible through environmental education even in the primary school curriculum
2. Government should create alternative means of livelihood to provide income to the forest dwellers other than dependent only on the forest resources

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