

HUMAN ACTIVITIES AND CLIMATE CHANGE IN RELATION TO NATURAL RESOURCES' SUSTAINABLE USE: THE WAY FORWARD

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ABSTRACT

Natural resources are free gifts of nature, this explains why activities are numerous within and beyond the forests as human beings pursue different needs on daily basis. Diversity, distribution and abundance of natural resources are therefore on a decline due to indiscriminate land use, excessive exploitation of natural resources without consideration of replenishment and obedience of conservation rules. This situation has therefore resulted over a long time span into distortion of natural and biological cycles within the environment. Climate change which is a resultant process of environmental abuse, changes the natural stereotypes that ensure environmental sustenance. This paper reviews different publications in immediate and remote past by concerned foresters, wildlife managers, geographers, environmental conservationists and other relevant professionals in renewable resources management with a bid to criticising human overexploitation in the forests during their search for timber, mineral resources, firewood, medicines, proteins and nutrients as well as construction of building structures. Different global effects of environmental imbalance were reviewed while measures of stopping or reducing to the minimal level in terms of effects of human over-exploitation and climate change were also discussed. Establishment of more forest reserves including the review of current forest laws and policies, intensified public awareness campaigns using different mass media, enacting more wildlife laws and environmental rules; and enforcing them with strict penalties meted to violators, pollution reduction method campaigns, domestication of plant and animal species especially endangered ones were recommended.

Key words: Human activities, deforestation, biodiversity, agroforestry, domestication

INTRODUCTION

Natural resources are those gifts that our planet offers us without the need for human intervention, they are essential for survival but if consumed faster than regeneration, they can be exhausted (Iberdrola, 2019). According to World Wildlife Fund (WWF) (2016), human beings are depleting the natural resources, this may lead to standard of living beginning to decline by 2030 unless immediate actions are taken. According to the same source, world's population of fish, birds, mammals, amphibians and reptiles declined by 58% between 1970 and 2012 due to human activities and it was predicted that by 2020 this percentage will soar to 67% .The International Union for Conservation of Nature (IUCN (2018) also reported that out of 30 million different

animal and plant species existing, 26,197 species are threatened with extinction.

Human activities reducing forest biodiversity are multi-factorial in nature, they are often caused by land use for mining, tree felling, tourism, hunting, fishing and agriculture (FAO, 2015a). There is no doubt that human civilization has had a negative impact on biodiversity particularly since industrial revolution: overfishing and hunting, habitat destruction through agriculture and urban sprawl, the use of pesticides and herbicides and release of other toxic compounds into the environment have taken their toll particularly on vertebrates (Ogunjimi *et al.*, 2014).

Human impact on the natural environment is of crucial importance for social and economic life in the area of resource for food

supply, energy source, major source of medicines and natural source of industrial products. Today, human pressure on natural environment is greater than before in terms of magnitude and efficiency in disrupting nature and natural landscapes through agriculture, energy, tourism and technology (Ogunjimi *et al.*, 2014).

Archaic methods of farming such as Shifting cultivation and slash and burn methods culminate in land fragmentation, nutrient loss, bush fires and biodiversity loss in addition to deforestation (Brown and Schreckenberg, 1998). To support this assertion, Adedire (2002) reported that shifting cultivation as a traditional farming method leads to both soil and climate related constraints while Butler (2012) observed that road construction to access logging, oil and mining sites in the forests opens vast stretches of forests to exploitation by landless peasants who are responsible for majority of rainforest destruction today. Adedire (2002) supported this report by documenting his observation that deforestation in Nigeria is at the rate of 300,000 hectares per annum but there is a negative correlation between forest exploitation and regeneration. Other causes of deforestation are excessive logging, forest conversion to farmlands, urbanisation, timber production, forest fires (causing Greenhouse emissions), soil erosion and floods (Toppr, 2018).

Comparing species-specific human activities on the same spatial scale is crucial in order to evaluate human impacts on ecosystem and make more robust generalisations about the temporal dynamics of landscapes (Matthias *et al.*, 2000). Many times human activities take resources and habitats from plants and animals in the process of cutting trees for timber, agriculture, urbanisation, bush burning and more uses (Sompa, 2013). The author continued by stating that rapid increase in human population has placed significant stress on wildlife populations in the process of converting wildlife habitat into settlements and commercial subdivisions, roads and agricultural practice. Wildlife species are both plants (flora) and animals (fauna) living in their natural habitats with little or no human interference (Odoemena and Egwali, 2006) and according to the same

source, this definition is necessary because there is tendency to regard only animals as wildlife. This paper compiles different ideas, observation and research results of previous authors and scientists over the years and around the world as a guide for future environmental sustainability.

FOREST RICHNESS IN TROPICAL AFRICA

There has been a lot said about relationships between species diversity and ecosystem function; the general view of these relationships is that the diverse ecosystems are more productive, they use resources more efficiently and are more stable (Ishola, 2014). However, little data exist on how the abundance of animals varies with radiation especially with no effort to census animals in their local levels but information suggests a reduced and continuously declining abundance of animals especially birds in most contaminated areas (Moller and Mousseau, 2010).

The situation was partly interpreted as secondary forests having important roles to play in the conservation of biodiversity if secondary succession can accumulate species rapidly (Scorecard, 2011). Therefore managers of landscapes dedicated to forest commodity production require information about how practices influence biological diversity. Individual species and communities may be threatened if management practices truncate or simplify forest age classes that are essential for reproduction and survival (Jay *et al.*, 2012). Each year, hundreds of millions of plants and animals are lost from the wild as food, pets, ornamentals, leather, tourist curios and medicine, while a lot is illegal and survival threatening, many lead to over-exploitation and habitat loss (WWF, 2015). Hunting in Bioko has reduced primate population in Equatorial Guinea by 90% in some areas; beautiful forests are becoming increasingly silent as their wildlife is hunted (WCS, 2015).

The devastating effects of Wildlife poaching include negative side effects that affect local communities, wildlife populations and the environment; the crime is encouraged by lucrative black market trade of animal parts

which are sold as novelty items and “medicinal” assets (One Green Planet, 2015).

HUNTING POSITION IN AFRICA

Hunting in the Free State means hunting in the most central South African province within high open plains bordering the Maluti Mountains of Lesotho; hunting in the free state is something different from traditional walk-and-stalk hunting because rifle hunting and lying in ambush can be effective in the sense that games happen to pass or stay in a particular spot for a particular purpose where they are hunted (Slander, 2012). Trophy hunting is of key importance to conservation in Africa by creating financial incentives (Adam, 2016). In South west Nigeria, the state of hunting is such that animals are shot with little regard to existing laws with the result that larger animals have become rare in Bendel State and the bush meat is highly commercialised, a situation where substantial profits accrue to middle men (Anadu *et al.*, 1988). Conservationists long discovered that bush meat sold in southeast Nigeria is sourced from Cameroon and they advocate collaboration between the two countries (Talabi, 2018).

Hunting describes pursuing, tracking and/or killing of animals, wildlife hunting is most practised by humans for food, recreation, predation and pest reduction or for trade (Williams, 2007). Perception of hunting varies with communities, culture and government policies (Byrd *et al.*, 2015). A hunter is a person that kills or traps wild animals for different utilization purposes; it is a hobby or occupation which may move along human generations (Odewo *et al.*, 2008) or acquired by experience (Collins, 2014).

IMPLICATIONS OF ANIMAL POPULATION PROBLEMS IN THE BIOSPHERE

The main fundamental cause of animal extinction in most recent times has been human demands resulting to habitat destruction, over-exploitation of rainforests cleared for wood/timber resources. It also includes development of petroleum resources, poaching, wildlife trade, overhunting and man-wildlife

conflict especially ones with narrow ranges (Adebola and Agbede, 2012).

Extinction implies abolition and annihilation of something that previously existed in the world and this situation in biology refers to the end of an evolutionary line or a branch on the tree of life, because animals are closely tied to their ecological niches and environment to bring healthy ecosystems (Encheaten, 2013).

BIODIVERSITY LOSS

Adebola and Agbede (2012) referred to biodiversity as variability among living organisms from all species including inter alia, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species and ecosystems. Emelue and Akinwande (2013) defined biodiversity as the variety of living things in an environment, according to them, use and preservation of these varieties should be of great concern at the local, national and international levels because biodiversity is important in the areas of food production, soil formation and its fertility, economic uses and crop yield boost (GKToday, 2016). It was observed that human activities have contributed to species extinction and this situation has made the safeguarding strategies imperative (Ayodele *et al.*, 2013). In continuation to this, Ajibade and Ayodele (2007) assessed effects of human activities on the environment; they observed that human forest exploitations lead to forest disruption/habitat destruction and animal population decline. Canon *et al.* (1998) cited by Adebola and Agbede (2012) observed that the diversity of trees is fundamental to rainforest diversity and that the world forest, Nigeria inclusive is devilled with the problem of forest depletion; the negative impact of such includes loss of biodiversity, desertification and famine to mention a few. Adegoke *et al.* (2013) however, explained biodiversity from the aspects of variety and variability among living organisms and the ecological complexes in which they occur. The authors defined diversity as the number of different items which are organized at many levels ranging from complete ecosystem to chemical structures with molecular basis of heredity encompassing different ecosystems,

species, genes and their relative abundance. Ayodele *et al.* (2013) linked tourism with conservation of biological life as well as ecosystem maintenance. They asserted that habitat losses can be attributed mainly to the exponential increase in human population leading to increase in the demand for recreational use of public lands in many parts of the world. Plant and animal biodiversity is lost in tropical rainforests through natural disasters, human activities, habitat loss and fragmentation, pollution, over-exploitation, climate change and invasive species (Adegoke *et al.*, 2013). Consequences of biodiversity changes on the biosphere and nature are ecosystem alteration, increased concentration of atmospheric carbon-dioxide and other gases leading to global warming, climate change and greenhouse effect (Nature Publishing Group, 2015). However, for conservation strategies to be effective, stake holders must take a ‘habitat’ rather than ‘species’ approach (Ayodele *et al.*, 2013).

As part of addressing the issues of biodiversity loss, Etuk *et al.* (2013) recognized biodiversity conservation as a relatively new science which must involve many professional fields such as ecology, biology, genetics, anthropology, philosophy and economics in approaching *in-situ* and *ex-situ* conservation approaches. They recommended traditional and conventional conservation strategies such as agroforestry, school programmes, zoological and botanical gardens establishment in saving biological species from going into extinction.

DEFORESTATION AND CLIMATE CHANGE

Another way in which man distorts his environment is deforestation, it means conversion of forest lands to non-forest lands for use as arable land, pastures, urban use or logged area, it also includes removal or destruction of significant areas of forest cover that has resulted in a degraded environment with reduced diversity (Williams, 2003). Causes of deforestation include use of forest for fuel wood, commercial logging and shifting cultivation and the consequences include global warming, irregular rainfall and flooding (Adekunle and Akinlemibola, 2008). The reasoning was expanded by Komolafe *et al.* (2011) by describing flood as occurring when water which is usually below the level of the stream banks much of the year overflows its banks due to higher discharge. They categorized flood as natural and induced but reported that the damages of both are devastating.

Deforestation also results in climate change which is deviation from the normal climatic condition of an area due to land-atmosphere, land-ocean and ocean-atmosphere interactions of an area causing alterations of gases in the atmosphere (Okali, 2007). Evidence of climate change in Ibadan includes unpredictability of August dry spell that guides farmers in their planting; irregular rainfall with minimum temperature patterns but steady increase in maximum temperatures as summarised by Odojin, (2014). His study is shown in Table 1 as provided by Forestry Research Institute of Nigeria, (FRIN); Ibadan.

Table 1: Statistical Figures of Rainfall and Relative Humidity in Ibadan over Fifty Years

Period	Rainfall (mm)	Mean (mm)	Max. Temp (°C)	Mean (°C)	Min. Temp (°C)	Mean (°C)
1965 – 1974	12550.06	104.58	3847.00	32.06	2581.00	21.51
1975 – 1984	12726.39	120.06	3449.00	32.54	2408.00	22.72
1985 – 1994	14196.20	119.30	3778.00	31.75	2775.00	23.32
1995 – 2004	12950.50	107.92	3904.30	32.54	2821.30	23.71
2005 – 2014	13908.00	115.90	3816.00	31.8	2923.00	24.36
SUM	176331.20	567.76	18794.30	160.69	13508.30	115.62
MEAN	35266.23	133.55	3758.86	32.14	2701.66	23.12
SD	97.0579	82.7433	100.3041	21.014	98.545	9.443
X ² -tab	9.488	9.488	9.488	9.488	9.488	9.488
Significance	15.729*	10.110*	21.742*	11.985*	18.432*	9.917*

*Significantly different at 5% probability level

Source: Odojin, (2014).

Effects of these forms of environmental degradation are numerous: they include distortion of agricultural cycle, animal mating aberration and changes in migration pattern (Ijioma and Aiyeloja, 2008). More effects of deforestation are disturbance in metabolic rates, egg development, survivorship, sex ration, length of oestrus cycle parasitic infection rates and flooding pattern (Adekunle and Akinlemibola, 2008). Climate change also results in species' extinction, decrease in floristic richness and reduction of fruiting intensity (Ijioma and Aiyeloja, 2008).

Other consequence of deforestation is absconding of habitats by species because Otegbeye and Onyeausi (2006) reported that honey bees disappeared from some farming communities in Katsina State of Nigeria when tree species on which bees nested to produce honey were removed from the landscape. Wildlife population is also suffering under man-wildlife conflict; based on population conflict, International Union on conservation of Nature (IUCN) reported that species status should be given serious concern and remedy strategies (Onyeausi and Abafaras, 2006).

THE WAY FORWARD

Ethical Practices

The best ways to stop deforestation are replanting, reorientation about tree felling, implementation of regulation laws at organisational and international levels against deforestation; and awareness spread with sensitisation in different educative programme (Toppr, 2018).

Legislation

Endangered animals could be protected through legislation by defending and strengthening endangered species through acts, holding federal agencies and others accountable for illegal hunting and poaching, advocating for increased funding, protecting and restoring habitats for endangered animals (National Wildlife Restoration, 2015). The problem could also be solved through proper knowledge of endangered species in one's area, visiting national park refuge, making wildlife home friendly, slowing down when driving and refusal to buy endangered animal products (Endangered Species Coalition, 2015). In developed countries,

red lists of endangered plants and animals have become an important standard tool in conservation science; it is a well-known fact that many species can survive if only their habitats are kept intact, but we need monitoring and warning systems that "ring" whenever species are threatened (Ibisch *et al.*, 2008). Determining which species and ecosystems are thriving and which are rare or declining is crucial for targeting conservation towards elements of diversity in greatest need (Nature Serve Explorer, 2012). Wildlife policy can take a number of forms, ex policy national policy is a part of a national nature conservation strategy or a component of a national development plan (Thomas and McHenry, 2016). The policy aims at a conservation and sustainable development of forest and wildlife resources for the maintenance of environmental stability and continuous flow of optimum benefit from the sociocultural and economic growth with benefit (Germy, 2016). In some laws, wildlife falls under the definition of forest produce and may be subject to the same or similar regimes as regards their ownership; despite the difference in their nature (Mekooaur, 1999). It was on this note that Ine *et al.* (2016) recommended that climate change awareness should be created on the students via their teachers and consequently, the whole populace; in this respect, efforts should be made to put in place integrated approaches for the adaptation and mitigation and one sustainable way to achieve this is through education and capacity building. According to these workers, to realize this, the curriculum of educational institutions has to be revised to accommodate the current issues of climate change and deforestation. Such revision will ensure that people gain detailed knowledge and awareness of the danger associated with the disequilibrium in the natural arrangements and working of the environment.

Domestication

Domestication of wild animals was started by the early man, it is a successful attempt to make a wild animal depend on humans throughout its life for food, shelter, reproductive mates medication and protection from enemy (Cole and Ronnings, 1974; Onyeausi and Abafaras, 2006). In today's world, we take animal domestication for granted, but from meat

and dairy products to faithful companionship, domesticated animals provide us innumerable products, services and hours of labour that have had profound effect on the history of humanity (Mcgrath, 2019).

A tamed animal is one which has been taken from its natural environment and has learnt from experience that man is not a source of danger but a source of comfort (Onyeausi and Abafaras, 2006). Only a few animal species have been successfully bred to get along with humans, the reason scientists say is found in their genes (Ratliff, 2019). It was further stated that for an original wild-caught animal which is nurtured in captivity and the off-springs are further bred on particular traits (docility, colour, horn-size and meat production), its taming merges into domestication indistinguishably (Ward, 2015).

Wild animal domestication is also beneficial to human beings in the aspects of skin production, transportation, hoofs and horns (Kenyapex, 2019), while taming is a conditioned behavioural modification of an animal, domestication is permanent genetic modification of a bred lineage that leads among other things to a heritable predisposition towards human beings (Mcgrath, 2019). On the other hand, the domesticated animal has undergone series of genetic mutations, it has experienced selective breeding and reached docility (National Geographic Education NGE, 2019). People's disposition and perception toward animals vary with societies but Guthrie *et al.* (2018) reported that animals especially pets have a positive influence on human's physical and psychological well being.

AGROFORESTRY AS STRATEGY FOR AMELIORATING DEFORESTATION

Nurudeen and Ekpo (2010) defined agroforestry as planting of two more forest species on the same management plan. They asserted that agroforestry provides the landowner to develop a portfolio of short and long-term investments where the proper combination of trees/shrubs and crops/livestock provide both economic and environmental benefits; requiring research, teaching, extension and policy. According to them, benefits of agroforestry are crop protection, livestock protection, fauna diversity/crop yields, water quality maintenance,

nutrient reduction, herbicide and nutrient reduction, air quality, soil erosion control, supply of food for livestock, cash income and economic security. Olaleye and Aiyelaja (2013) opined that continued deforestation and forest degradation around the world affect the availability of forest goods and services. They mentioned planting of leaf and fruit vegetables, tree fruits; spices and stimulants and wildlife resources conservation as valuable non-timber forest resources as strategies in environmental restoration as well as rural dwellers' empowerment if managed properly. In the same vein, Odewo *et al.* (2011) emphasized that non-timber forest products in addition to cushioning the effects of climate change and deforestation cure human infertility of various origins.

FAO (2015b) classified agroforestry as agrisilvicultural, silvopastoral and agrosilvopastoral. Nurudeen and Ekpo (2010) observed that classification of agroforestry systems is necessary in order to provide a framework for evaluating systems and development action plans for their improvement.

CONCLUSION AND RECOMMENDATIONS

Forest inventories on regular basis within forest reserves and their Permanent Sample Plots should be accorded serious concern by forest managers. Timber species which have been classified as endangered, vulnerable or rare by IUCN should be adequately protected in forest and nature reserves, also forest poachers be made to face the law. Stakeholders in forest timber resources should be re-orientated about tree population problems and need for amends and alternatives. They should be educated about the dangers of bush fires on fauna and flora species.

In spite of the fact that wild animals serve as food and Ethno Medicinal materials for both rural and urban settlers, governments at all tiers should encourage the promotion of wildlife domestication as alternative sources of food or lean meat (for health purposes) and ethno-medicinal material using various mass media techniques. This is because domesticated animals have become docile and easier to handle. This strategy in addition to reducing overdependence of stakeholders on forest and wildlife products will empower school leavers and retirees and

make a living. Hydrocarbon pollution from vehicles and other automobiles should be controlled through enactment of laws by governments with stiff penalties meted to offenders. Environmental conservation should be as subjects in primary and secondary schools, in the alternative it should be incorporated and given priority attention in the Junior Secondary school classes Basic Science and senior secondary classes' Biology, Geography and Agricultural science curricula as a result of low public awareness in natural resources conservation. The implication of this step is injection of environmental conservation into the students and pupils right from young ages for it to become parts and parcel of their psyche when they grow up. Governments should also establish more National Parks and forest reserves to enhance in-situ conservation and create more jobs for Nigerian populace. Traditional medical practitioners and hunters should be educated from time to time about wild animals and their population problems in a bid to discouraging them from indiscriminate harvesting of wildlife.

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