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IMPLICATIONS OF ENVIRONMENTAL AND NATURAL RESOURCES EDUCATION AMONG RURAL STAKEHOLDERS OF FORESTRY AND WILDLIFE ADMINISTRATION: A REVIEW

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ABSTRACT
Environment, its degradation and restoration are the outcries of scientists, foresters, wildlife managers, geographers, National Park personnel and other conservationists around the Sub-saharan Africa. Apart from providing livelihoods for plants, it offers food, habitat and breeding grounds for fauna group (wild and domestic), birds (flying and gregarious), mammals and reptiles (terrestrial and aquatic). This paper reviews different publications from different authors at different times on current issues about various perspectives of environment, relevant terminologies, causes of environmental degradation, their scientific evidences, different forms by which they manifest and sensitisation of various stakeholders and the public in general about the need to safeguard the environment and the treasured resources from the pathway of collapse using different strategies by individuals, corporate bodies and governments. The study therefore calls for sensitisation about natural resources conservation using various mass media techniques such as print and electronic media, in order to save key wildlife from extinction. It also calls for incorporation of Natural Resources conservation in Secondary schools Agricultural Science, Biology and Geography curricular. Enactment and enforcement of biodiversity over exploitation laws by Governments at all tiers are essential for fauna and flora sustainability.

Keywords: Environment, climate change, global warming, Rural Sociology, and Extension

Introduction

Environment derived from French word "Environia" meaning "to surround". It refers to biotic and abiotic components of living organisms' surroundings. Environment and organisms are two dynamic and complex components of nature which are linked physically, biologically and culturally (Mondal, 2017). It is also the sum total of all surroundings of a living organism and the types of environment are also aquatic, terrestrial and arboreal (Pranav, 2013). Environmental Education is a process that allows individuals to explore environmental issues, engage in problem solving and take actions to improve the environment on the basis of results obtained. The actions include awareness and sensitivity, knowledge and understanding, attitude and participation (UEPA, 2018). The socioeconomic characteristics put rural dwellers as deriving their primary source of livelihood from agriculture and their assessment is carried out from the perspectives of income and infrastructure that is, water and electricity (Cathy-Austine, 2017).

Environmental Degradation

Environmental degradation is the deterioration of the environment through depletion of resources like soil, water and air, ecosystem and habitat destruction, extinction of wildlife and pollution (Parris and Schneider, 2010). Environmental degradation is caused by over exploitation of natural resources, over-consumption of assets, earth disintegration and aggravation of nature's turf; it can be seen by long-term ecological effects some of which can demolish the environment especially when technological advancement splits up areas of land (Paras, 2018).Environmental degradation is primarily caused by abuse of land use leading to deforestation (Adekunle and Akinlemibola, 2008). Another way in which man distorts his environment is deforestation. It implies 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 extended 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). 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 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; reduction of fruiting intensity, aberrations in animal mating and changes in birds and animal migratory pattern (Ijioma and Aiyeloja, 2008).

Human Interference with Animal Populations in the Wild

The earth has lost half of its wildlife in the last forty years says World Wildlife Fund (WWFG, 2010), species across land, rivers and seas decimated as humans kill for food in unsustainable numbers and destroy habitat; the causes globally includes; exploitation, habitat degradation and others. Each year, hundreds of millions of plants are caught or harvested from the wild and then sold as pets, ornamental plants, leather, tourist curios and medicine. This act threatens the survival of many endangered species with over-exploitation being the second largest direct threat to many species after habitat loss (WWF Global, 2010). Habitat destruction is the process by which natural environment is damaged or destroyed to such an extent that it no longer capable of supporting the species and ecological communities that naturally occurs there. This can happen directly through human activities such as farming, mining, hydroelectric dam construction and urbanization (Orhiere, 1999).

Tropical rainforests which lies along the earth's equatorial zone are among the most diverse habitats in the world. These warm and drippy environments harbour thousands of plants species some yet unidentified. Useful ones include teak, mahogany, rose wood, ebony, food trees like cocoa, coffee, scores of medicinal plants most of which bloom in succession (Redford *et al*., 2009). Forest is more productive than savanna; growth rates are high and new leaves are produced almost year round producing equilibrium between leaves and branches' decay with growth (Sangotoyinbo *et al.,* 2009).Rainforest fauna cuts across all categories of tree-dwelling birds and mammals. Others are reptiles, amphibians and invertebrates that rely on a certain kind of habitat and which must adapt to changes while searching for food, water and breeding partners (Sangotoyinbo *et al., ibid*).Habitats of different types for wild animals in forest have been dwindling at a very high rates as man manipulates his environment to maximize exploitation (Ajibade and Ayodele, 2007).

Other consequence of deforestation is absconding of habitats by species. Otegbeye and Onyeanusi (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 (Onyeanusi and Abafaras, 2006). It was on this note that Ine *et al.* (2016) recommended that climate change awareness should be created among 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 studies, 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 dangers associated with the disequilibrium in the natural arrangements and working of the environment especially in the area of climate change. It results in species' extinction, decrease in floristic richness; reduction of fruiting intensity, aberrations in animal mating and changes in birds and animal migratory pattern (Ijioma and Aiyeloja, 2008). Evidence of climate change in Ibadan which is a centrally placed city in South-West Nigeria includes unpredictability of August dry spell that guides farmers in their planting; decline in rainfall, increase in minimum and maximum temperatures and reduction of the number of rainy days for 46 years (Odofin, 2017). The situation is summarized in Table 1 as provided by Forestry Research Institute of Nigeria (FRIN), Ibadan.

Rural Sociology, Natural Resources Extension and their Benefits

Rural Sociology is a field of Sociology traditionally associated with the study of social structure and conflict in rural areas on topical areas such as food and agriculture or natural resource access (Wiley On-line library, 2016). This area of study was also defined by Reetu (2017) as the study of village or village society concerning different aspects of rural life, the

problems, culture, religious, economic and political life. In continuation with the above definition, MO Space, (2018) asserted that Rural Sociology is a branch of Sociology dealing with the study of rural communities and the rural way of life. Natural Resources Extension and Resource Management was defined by Quora (2018) specifically as the application of scientific research and knowledge to agricultural practices through farmer education and generally as delivery as information input to farmers. In furtherance to these statements, Johnson *et al*.(2008) reported that history of forest administration in South-West Nigeria could be traced to pre-colonial era when kings with the assistance of their subordinate chiefs directed affairs of the town to be sure that forests rules (when and how to use them) were enforced.Benefits of Natural Resource Extension and Administration on forest and wildlife resources were summarised by Johnson *et al*. (2008) to include knowledge of gender distribution of forest services staff, women's perception in forestry service and recognition of more potentially useful species of forest fauna and flora. Extension of the above observation was provided by Adeogun and Adewusi (2008) in the area of soil nature understanding for crop planting, maximum biomass production, planting methods for optimum yield, site choice and establishment. More gains embedded in natural resources education among rural stakeholders are establishment of small scale enterprises for poverty reduction, weather forecast, treasure of endangered species to avoid their extinction, understanding of key wild animals' ecology and acquisition of freedom dignity, self respect, security and justice among rural populace (Aiyeloja and Popoola, 2008). This position was supported by Onyeanusi and Abafaras (2006) that Extension equips rural and urban settlers with the knowledge and facilities of animal domestication in order to combat the over harvesting of some species in the wild.

Conclusion

Extension Education for proper forestry with wildlife utilisation and administration is an integral part of natural resources conservation. Orientation of both rural and urban dwellers towards population decline of key flora and fauna species will go a long way in conservation for both *in situ* and *ex situ* patterns. This strategy will directly and indirectly achieve the use of sustainable use for both present and future human generations. Governments at all tiers should see this aspect of natural resources management as a task to be accomplished through various mass media technologies. In addition, natural resources conservation should be introduced as a subject in secondary schools or made appreciable chapters in Secondary Schools Biology, Geography and Agricultural Science curricula. This policy if implemented will start and grow in citizens' rights from their teenage and school days.

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Table 1: Weather Records of Ibadan for 46 years

Years	Rainfall (mm)	Rainy days	Min. Temp. (ºC)	Max. Temp (ºC)
1970 – 1979	1444.0	92	21.6	26.9
1979 – 1989	1408.0	86	23.4	31.6
1990 – 1999	1373.0	100	23.6	32.7
2000 – 2001	1178.4	72	23.7	32.7
2001 – 2002	1133.6	54	23.6	32.9
2003 – 2004	1304.0	79	23.2	25.8
2004 – 2005	1006.6	62	24.2	24.2
2005 – 2006	1314.0	62	25.5	25.8
2006 – 2007	1198.5	56	23.7	23.9
2007	1079.3	66	23.7	32.6
2008	1435.8	98	24.5	32.1
2009	1504.1	93	24.2	31.5
2010	1702.5	117	24.8	32.2
2011	1433.6	99	24.7	31.7
2012	1433.7	99	24.0	31.4
2013	1530.9	90	24.2	31.9
2014	1130.1	87	24.4	31.5
2015	1150.2	88	24.7	31.8
2016	1150.4	88	24.9	32.0

Source: Odofin, (2017)