

A Review of Nigeria and The United States of America's Environment and Desertification

Dr. Omodele, Adeyemi Oyedele, LLB, BL, LLM, PhD.¹ and Dr. Adekunbi A. Imosemi, LLB, BL, LLM, PhD.²

¹School of Law and Security Studies, Babcock University, Ilisan-Remo, Ogun State, Nigeria. ²School of Law and Security Studies, Babcock University, Ilisan-Remo, Ogun State.

Corresponding author: yemiomodelaws@yahoo.com

Abstract

The process by which vegetation in drylands like arid and semi-arid lands, like grasslands decreases and eventually disappears is called desertification. Vegetation resources in Nigeria and the USA are important for the development of the countries. This resource is in danger because of climate-induced impacts. Northern states in Nigeria and New Mexico, Texas, Arizona, and Navajo Indians in the USA experienced it. The study analyzed, and juxtaposed desertification in Nigeria and the USA. Historical and case study designs were adopted. Doctrinal method was used in data collection. The primary sources of data were the Constitution of Nigeria 1999, the Federal Republic of Nigeria Official Gazette No. 40 Vol. dated 03/05/2011, and the National Environmental Standard and Regulation Enforcement Agency Act 2007; sources of secondary data were published textbooks, scholarly peer-reviewed journals, and articles. Data were content-analyzed and presented thematically. Findings revealed that land degradation caused global warming. Ranching, mining, clearing of land, and emission generation contributed to a rise in temperatures and a reduction in precipitation, human interventions created a vicious cycle that exacerbated. It reduced soil productivity, environmental hazards, [food insecurity](#), loss of biodiversity, and ecosystem problems in both countries. The study concluded that the involvement of the governments in curbing desertification yielded no result. It recommended the need for proactive action and management efforts warranting, the changing of climate in Nigeria and the USA. Local bodies should restore soil fertility. World Bank should fund ecological restoration, and fixing of dunes in the countries. There should be tree-planting, to promote public awareness of the presence of desertification and drought.

Keywords: Desertification, Degradation, Nigeria, USA, Environment.

Introduction

In line with the provision of Section 20 of the Constitution of the Federal Republic of Nigeria, 1999 (as amended), the state shall protect and improve the environment and safeguard the water, air, land, forest, and wildlife of Nigeria. It suffices to say that it is the responsibility of the Federal Government of Nigeria to protect, save, and guard the environment for its citizens. Desertification is the depletion of terrestrial ecosystems under the influence of harsh weather conditions and human activities. It is also known as land degradation, especially in arid, semi-arid, and sub-humid ecosystems. This problem has debilitating economic and environmental consequences, impacting over 70 million Nigerians, 75 million hectares of land, and 1.4 billion people worldwide, of whom over 70 percent are poor.

According to the UN Secretariat of the Conference on Desertification (1977), "Desert encroachment in Nigeria is generally associated with human activities such as tree cutting, bush burning, and adverse climatic conditions. Deforestation is the primary cause of desertification in Nigeria. This is because firewood has become a reliable source of fuel for the local populations, who do not understand the consequences of their actions." UNEP (1975) found that "deforestation is a main contributor to global warming and the second source of anthropogenic emissions after fossil fuel combustion. Although its emissions are somewhat indirect, they account for 10-20 percent of carbon emissions globally."

Fiona et al. (2008) opined that "natural forests provide ecological functions through watershed protection, hydrological stabilization, and carbon sequestration, including food and medicinal plants." It also regulates global warming, acting as an important means of carbon exchange in the atmosphere. Deforestation is responsible for more greenhouse gas emissions than the whole aviation and automobile industries combined. Forests store over a trillion tons of carbon emissions worldwide, which is more than 40 percent of all human-induced emissions in the pre-industrial era (Parmeshwor & Anowarul, 2018). The growing level of deforestation in Nigeria is due to the uncoordinated land use policy and agriculture, urbanisation, and industrialization, triggered by activities in the oil and gas industry, contributing to the overwhelming trend in the country (Olagunju, 2015).

Over the past 30 years, a gradual and consistent encroachment arising from high activities of dry sand and the shrinking of open water resources has been observed in northern Nigeria. The country lost over 90 percent of its total forest cover, that is, 10 million hectares, or 10 percent of its total land area, and has the largest desertification rate in the world, approximately 3.5 percent, which is between 350,000 and 400,000 hectares annually, with a significant loss of billions of dollars.

Olagunju (2015) concluded that "the Sahara Desert from Northern Nigeria advances at 0.6km per annum to the south. This threatens about 75 million hectares of land in Northern Nigeria and increases the frequency of coastal flood and storm surges in the country, taking over 30-40 meters of land annually." The rainy season in the north also dropped to 120 days from an average of 150 days over the last 30 years, reducing food production in the region by 20 percent. This portends grave danger to food security in Nigeria and, to an extent, sub-Saharan Africa. Nigeria is not the only country affected by desert encroachment and desertification; this trend has become a global issue that affects many countries in the world, especially Africa, America, and the Middle East (Olagunju, 2015).

Similarly, arid lands in parts of [North America](#) are among those severely affected by desertification; almost 90% of such habitats are moderate to severely desertified (Kelly et al., 2018). The arid and semi-arid lands of the western and southwestern United States of America are highly vulnerable to this kind of damage. McGinnies & W. A. Laycock (1985) found that "the perennial [grasses](#) and shrubs that dominate arid land vegetation provide good forage for cattle, but overstocking leads to overgrazing and degradation of the natural vegetation cover, which, in turn, contributes to [erosion](#) and desertification." In addition,

excessive withdrawals of [groundwater](#) to irrigate [crops](#) and supply cities are exceeding the ability of the aquifers to replenish, resulting in a rapid decline in the height of the water table (Sabadell, 1980) & (MacCleery, 1993) stated that "groundwater depletion by over-pumping of the sandstone Ogallala [aquifer](#) in the Southwestern United States has contributed to desertification in Nebraska, Kansas, Oklahoma, and Texas. Moreover, the salts left behind on the soil surface after the irrigation water has evaporated result in land degradation through salinization, creating toxic conditions for crops and contaminating groundwater. Salination resulting from decades of heavy irrigation has compromised the soil quality in California's San Joaquin Valley, which produces much of the produce sold in the United States."

The native Americans, reliant on mesquite beans for food, planted mesquite throughout the Chihuahuan Desert of Arizona, New Mexico, Texas, and northern Mexico. Stands of mesquite developed around campsites and watering holes and replaced the local grasses and other vegetation. The Pueblan culture, which flourished in the southwestern United States beginning around A.D. 800, used the meager stands of trees for housing material, resulting in local [deforestation](#) (Alon, 2007; Eric & Thomas, 2016).

Dregne (1987) discovered that "a classic example of desertification is the 1930s Dust Bowl period in the United States, which devastated Midwestern states. It was a time when severe droughts combined with poor land-management practices caused tremendous suffering and economic loss. But during those Dust Bowl years, scientists learned valuable lessons that continue to influence U.S. agricultural practices."

Today, U.S. scientists address the continuing problem of land becoming barren and not usable for production due to drought, inappropriate farming techniques, deforestation, or certain other human activities. Globally, more than two billion hectares of previously productive land have already been degraded, according to the United Nations. By 2045, some 135 million people around the world may be displaced by desertification.

Ashkenazi, Avni, & Avni (2012) found that "when desertification happens, people go hungry and leave their land and must find other places to make a living. We are all about helping people stay on their land by giving them the information they need to manage it better."

This paper therefore investigates the existence of desertification in Nigeria and the United States of America, looking at its implications and the legal framework in both countries.

Statement of the Problem

The natural causes of desertification include the poor physical conditions of soils, vegetation, and topography as well as the inherent extreme climatic variability as evidenced in periodic droughts. Climate variation is perhaps the most important natural cause of desertification and drought in the dry lands of Nigeria and the United States of America.

The adverse effect of desertification is felt on the Nigerian economy since it leads to environmental issues like overpopulation in some parts of the country. People from the

northern part of the country are forced to migrate to the southern part, once the desert spreads.

Seventeen states in the Western United States of America can be categorised as arid, semi-arid, or dry subhumid based on climate and soil type; this characterises them as vulnerable to desertification. The most severely affected areas in the United States are in New Mexico, Texas and on the Navajo Indian reservation in New Mexico and Arizona.

Desertification reduces crop yields, causes food shortages, and increases poverty in impacted populations by destroying fertile land and water supplies. People displaced because of desertification can lead to increased competition for scarce resources and conflicts, worsening economic issues.

Over-exploitation and inappropriate land use: the practice of inappropriate agricultural produce, overgrazing, cultivation, and deforestation are major issues that cause desertification in northern Nigeria and some parts of America. This is due to poverty and total dependency on natural resources for the survival of the poor.

Methodology

The study adopts historical and case study designs. Doctrinal method is used in data collection. The primary data are the Constitution of the Federal Republic of Nigeria 1999, the Federal Republic of Nigeria Official Gazette No. 40 Vol. dated 03/05/2011, and the National Environmental Standard and Regulation Enforcement Agency Act 2007; 19 U.S.C. 3741 - Sense of the Congress regarding efforts to combat desertification in Africa and other countries, United Nations Conference to Combat Desertification (UNCCD) 1994; secondary data are published textbooks, scholarly peer-reviewed journals, and articles. Data will be content-analysed and presented thematically.

Nigeria and Desertification

Constitution of the Federal Republic of Nigeria, 1999 (as amended), National Environmental (Desertification Control and Drought Mitigation) Regulations, 2011 contained in the Federal Republic of Nigeria Official Gazette No. 40 Vol. 98 Government Notice No. 126 dated May 3, 2011, and the National Environmental Standard and Regulation Enforcement Agency (NESREA) Act, 2007.

What are the enabling laws concerning desertification in Nigeria? The later law states that "2. The objectives of this part of these regulations are to:

Objectives.

- a) provide an effective and pragmatic regulatory framework for the sustainable use of all areas already affected by desertification and the protection of vulnerable lands;
- b) sensitize the public on the causes and dangers associated with desertification and the attendant land degradation;
- c) encourage the sustainable use of fuelwood through the use of more efficient and energy-saving devices, with a view to encouraging their wider use and adoption at all levels;

- d) promote the use of alternative sources of energy, including wind, solar, briquettes, coal, gas, etc.
- e) encourage reforestation, reseeded, afforestation, and conservation of areas under desertification or vulnerable to the same for the rehabilitation of degraded lands; (l) attain 25% national forest cover as prescribed by the United Nations Food and Agricultural Organization (FAO) with a view to being self-sufficient in wood and other forest resources, including the enhancement of ecological integrity and the abatement of the impacts of climate change;
- f) ensure sustainable agricultural and range management practices, improved animal husbandry, and management of water resources in desertification-prone areas to achieve sustainable livelihoods, poverty reduction, and wealth creation through the introduction of modern and affordable production technologies to the poor farming community."

Land degradation and drought are the result of multiple complex factors. There are strong interactions between desertification and climate change. Climate change exacerbates desertification and land degradation by increasing the frequency and severity of heat-related events, including droughts, heat waves, and wildfires. It also accelerates soil erosion on degraded lands. The way these processes interact results in populations that are less resilient and able to adapt to desertification, land degradation, and extreme events such as droughts and floods. Bennett (1939) stated that "climate change and desertification reduce both the quantity and quality of food suitable for human consumption and disrupt food security. Water scarcity and water pollution interact as dwindling sources of water face increased use from dryland populations. In 2019, the United Nations Environment Programme estimated that the annual cost of land degradation and desertification is approximately \$127 billion."

The United Nations Educational, Scientific, and Cultural Organization estimates that over 3 billion people may face water scarcity by 2050. "Water resources in drylands also face pressure from increasing demand. Up to 35 percent of global water withdrawals for irrigation exceed sustainable levels, combining with increasingly frequent and severe droughts to dangerously deplete water supplies (Kovda, 1980).

Desertification in the United States of America

The Bureau of Land Management (1995) found that "arid lands in parts of [North America](#) are among those severely affected by desertification; almost 90% of such habitats are moderately to severely decertified. The arid and semi-arid lands of the western and southwestern United States are highly vulnerable to this kind of damage. The perennial [grasses](#) and shrubs that dominate arid land vegetation provide good forage for cattle, but overstocking leads to overgrazing and degradation of the natural vegetation cover, which, in turn, contributes to [erosion](#) and desertification. In addition, excessive withdrawals of [groundwater](#) to irrigate [crops](#) and supply cities are exceeding the ability of

the aquifers to replenish, resulting in a rapid decline in the height of the water table.” Glickman & Babbitt (1995) stated that “groundwater depletion by over-pumping of the sandstone Ogalalla [aquifer](#) in the Southwestern United States has contributed to desertification in Nebraska, Kansas, Arizona, Mexico, Oklahoma, and Texas. Moreover, the salts left behind on the soil surface after the irrigation water has evaporated result in land degradation through salinization, creating toxic conditions for crops and contaminating groundwater. Salination resulting from decades of heavy irrigation has compromised the soil quality in California's San Joaquin Valley, which produces much of the produce sold in the United States.”

Desertification in the United States of America is very complex and difficult to combat continuously and on a large scale. It can be due to improper agricultural practices, livestock grazing, mining, fire management, recreation practices, deforestation, urbanization, and the introduction of exotic species. Thus, national, state, and local policies must deal with a wide range of circumstances and land uses, and they must be comprehensive and dynamic, providing flexibility as issues, knowledge, and needs change. The United States can demonstrate many causes, but also successes, in combating desertification. However, much more work is needed to ensure the sustainable use of millions of hectares, particularly in the drylands of the western United States. Vigilance on policies and their implementation is required to assure that efforts to combat desertification are effective. Over time, some policies outlive their purpose and require change, but that is not always easy to achieve, and many times it takes a concentrated effort over several years or more to bring about, especially if that policy has its basis in law. Although this process sometimes seems slow, new laws continue to be enacted and policies are adopted that address land uses and the difficult task of combating desertification (Day, Ludeke, & Tucker, 1977).

The U.S. commitment to combating desertification did not begin with ratification, nor will it end with ratification. President Franklin Delano Roosevelt observed during the Dust Bowl that a nation that destroys its soil destroys itself. Chen, Park, Wang, Piao, Xu, Chaturvedi, Fuchs, Brovkin, Ciais, Fensholt, Tømmervik, Bala, Zhu, Nemani & Myneni (2019) stated that “Our historical and ongoing struggles against desertification in the United States underpin our commitment to implementing the Convention and working cooperatively with other nations in our common struggle.”

19 U.S. Code § 3741: Sense of the Congress regarding efforts to combat desertification in Africa and other countries

a) findings The Congress finds that:

1. Desertification affects approximately one-sixth of the world's population and one-quarter of the total land area;
2. Over 1,000,000 hectares of Africa are affected by desertification;
3. Dryland degradation is an underlying cause of recurrent famine in Africa;

4. The United Nations Environment Programme estimates that desertification costs the world \$42,000,000,000 a year, not including the incalculable costs of human suffering; and
 5. The United States can strengthen its partnerships throughout Africa and other countries affected by desertification, help alleviate social and economic crises caused by misuse of natural resources, and reduce dependence on foreign aid by taking a leading role in combating desertification.
- b) Sense of the Congress It is the sense of the Congress that the United States should expeditiously work with the international community, particularly Africa and other countries affected by desertification, to:
1. strengthen international cooperation to combat desertification;
 2. promote the development of national and regional strategies to address desertification and increase public awareness of this serious problem and its effects;
 3. develop and implement national action programs that identify the causes of desertification and measures to address it; and
 4. recognize the essential role of local governments and non-governmental organizations in developing and implementing measures to address desertification.

Environmental Economics Theory

Natural resources and ecosystems may be depleted in the pursuit of economic development. With every cost, there are externalities, in this case, waste, leading to degradation as well as a depletion of natural resources and ecosystems. The theory draws upon the Pareto criterion that if accurate compensation is made to the 'an overall optimal position can be achieved. The overall principle is that it is possible to achieve optimal growth through an efficient economic system that accurately takes into account the contribution of environmental ecosystems (David & James, 2014). Environmental problems have their roots in the failure of the economic system to maximize human well-being. Kepner, Fox, Baker, Breckenridge, Elvidge, Eno, Flueck, Franson, Jackson, Jones, Meyer, Mouat, Rose, & Thompson (1991) stated that "environmental economics seeks to ensure that ecosystems are valued as important contributors to overall human well-being as well as economic growth objectives. Maximizing overall benefits through optimal economic use of natural resources is not sustainable because of the multifunctional contribution of ecosystems. The expectation of technological advances and progress is therefore a necessary part of ensuring the environmental economics approach is sustainable."

Glickman & B. Babbitt (1995) stated that "Environmental Economics Theory seeks to demonstrate and estimate the value of ecosystem services generated from natural capital. Environmental economics also seeks to place a value on ecosystems to rebalance the market failure that results in negative externalities. Valuation in environmental economics

often seeks to place a monetary value on ecosystem services to internalize the effects of pollution within a cost-benefit analysis. Valuation in monetary terms is also useful for comparing ecosystem costs and benefits with other economic costs and benefits within the process of environmental impact assessment."



Figure 1: sources United Nations site which was visited on 28/12/2023

The Roles of the United Nations in Curbing Desertification

Rozanov (1977) stated that "the United Nations Conference on Desertification was convened in Nairobi from August 29 to September 9, 1977. A comprehensive Plan of Action to Combat Desertification (PACD) was adopted."

The World Meteorological Organization (1980) found that "some researchers consider desertification to be a process of change, while others view it as the result of a process of change. This distinction underlies one of the main disagreements about what constitutes desertification. Desertification as a process has generally been viewed as a series of incremental changes in biological productivity in arid, semi-arid, and subhumid ecosystems. It can encompass such changes as a decline in the yield of the same crop or, more drastically, the replacement of one vegetative species by another, maybe equally productive or equally useful, or even a decrease in the density of the existing vegetative cover. Desertification-as-event is the creation of desert-like conditions as the result of a process of change. To many, it is difficult to accept incremental changes as a manifestation of desertification."

These two views represent different aspects of a broader concept of desertification. Thus, seemingly different statements such as the creation of desert-like conditions in areas once green, the encroachment of desert-like conditions, the intensification of desert-like conditions, as well as less drastic projections like changes in soils and climate or the land becoming less fit for range and crops (Zonn, 1981).



Figure II post-rainfall event (March 2018). Near Amman, Jordan. Source: Stefan Strohmeier. Extracted from the United Nations website on 22/12/2023

Form of Change of Land Affected by Desertification

Grove (1973) opined that "within the dozens of existing definitions of desertification, many words are used to describe the phenomenon, some of which complement each other while others appear to be contradictory." Daly (1991) reasoned that "a point on which they all agree, however, is that desertification is viewed as an adverse environmental process." Le Clercq & Bertolini (2003) concluded that "the negative descriptors used in these definitions of desertification include: deterioration of ecosystems, degradation of various forms of vegetation, destruction of biological potential, diminution of biological potential, delay of a productive ecosystem, reduction of productivity, decrease of biological productivity, alteration in the biomass, intensification of desert conditions, and impoverishment of ecosystems."

Rees (2003) stated that "each of these terms suggests change from a preferred or preferred state to a less preferred one, and each has been used to describe the condition of vegetation, moisture availability, soils, or atmospheric phenomena, depending on the definition." Pearce (2002) suggested that "other descriptors used in these definitions connote a movement or a transfer of the characteristics of a desert landscape into an area where such characteristics had not existed: extension, encroachment, acceleration, spread,

and transformation. If one combined each of these negative and transfer descriptors with all the other factors cited in the existing definitions, desertification would encompass most kinds of environmental changes related to biological productivity.”

Different definitions focus on changes in soil, vegetation, or water. Most of them, regardless of primary emphasis, also describe changes in biological productivity, with comments related to the type, density, and value of vegetation (Cohen, 2006).

Alberti & Marzluff (2004) were of the view that “type-of-vegetation comments center on changes from desired species to less desired ones. Such comments cover a reduction in the proportion of preferred species having an economic or societal value, the lowering of yields of an existing preferred species, or a major ecological change such as species replacement.” Changes in the density of the vegetative cover constitute an important factor acknowledged by many authors in their definitions of desertification. As density decreases, for example, the risks of wind erosion, water erosion, and the adverse effect of increased solar radiation on bare soils increase dramatically. Surface albedo, also enhanced by a reduction in vegetative cover, is a major contributor to desertification processes (Gill et al., 2007)

Leiserowitz, Kates, and Parris (2005) studied that “concerning the value of vegetation, a few researchers have explicitly referred to lower useful productivity, reduced productivity of desirable plants, sustained decline in the yield of useful crops, and loss of primary species. However, the concern with the value of vegetation in desertification processes is not shared by all.” Some researchers have dismissed the value concern by suggesting that any type of vegetation that holds the soil in place is of value in the fight against desertification, whether it has an economic value (Igu, 1975).

As a final comment on what desertification is, it is important to note that disciplinary and institutional biases may appear in any given definition of the phenomenon. For example, a meteorological bias might require the use of the term desertification, meaning that a change takes place in the meteorological parameters of a given region so that they become like those of a desert region. As another example, he alluded to the disciplinary bases for desertification when he wrote that desertification could be characterized by the following components: climate: increasing aridity; hydrological processes: runoff becoming more irregular; morpho-dynamic processes: intensification of distinct geomorphological processes; soil dynamics: desiccation of soils and accumulation of salt; vegetation dynamics: decline of vegetation (Mabbutt & Wilson, 1988).



Figure III: Sources United Nations site. Visited on 27/12/2023.

Location of change Desertification

Meckelein (1980) stated "There is no agreement on where desertification can take place. Many researchers identify arid, semi-arid, and sometimes subhumid regions as the areas in which desertification can occur or where the risks of desertification are highest. Others imply that the areas prone to desertification might not be restricted to arid, semi-arid, or subhumid regions, by using such descriptive words as extension, encroachment, and spread of desert characteristics into non-desert regions. Still others refer to the intensification of desert-like areas. Many oppose this view, however, contending that desert-like conditions cannot be created in a desert. They assert that desertification can only occur along the desert fringes."

Reversibility of Desertification

Few definitions explicitly refer to whether desertification is permanent; for example, explain briefly the conditions under which desertification might be reversible. Others have implied reversibility concerning the higher costs of rehabilitation of desertified areas as opposed to prevention. For example, Adams (1999) suggested that the "reversibility of desertification was a function of technology and the cost of rejuvenating an area... Irreversibility should refer to a situation in which the costs of reclamation were greater than the return from a known form of land use." Still others implied irreversibility by referring to the result of desertification as the creation of desert-like conditions (Zhu & S. Liu, 1981). Two additional important considerations relating to the permanence of desertification are (a) when desertification might be reversed and (b) under what conditions.

Huang, Zhang & Zhang, *et al.* (2020) opined that "Concerning the time factor, desertification may be considered by some observers to be irreversible during a season or a few seasons but may be reversible on the scale of decades, or if not decades, perhaps centuries. Peel saw great danger in the concept of irreversibility because it has no time limitations whatever. One author has distinguished temporary and permanent desertification. Is it possible to distinguish between temporary desertification and, for example, seasonal environmental changes? Some have addressed this question by defining desertification as a sustained decline in biological productivity."

Concerning how desertification might be reversed, the reversal might occur naturally, once the contributing causes have been removed. Otherwise, human intervention might be required if there is a desire on the part of decision-makers to reverse it in less time than might be required to do so naturally. Chinese scientists, for example, have recently suggested a program for reversing desertification in the People's Republic of China (Liu, 2010).

Desertification and the Climate

Some researchers consider climate to be the major contributor to desertification processes, with human factors playing a relatively minor supporting role. Other researchers reverse the significance of these two factors. Desertification or desert encroachment can result from a change in climate or from human action and it is often difficult to distinguish between the two. Each of these views can be shown to be valid, at least at the local level, and on a case-by-case basis. This suggests that there is a region-specific bias to perceptions about desertification, one that spills over to the definitions. Debates about the causes of desertification occupy a large part of the desertification literature and need only be summarised here.

Ma (1999) in his work discovered that "References to climate in these definitions relate either to climate variability, climate change, or drought. Climate variability seems to refer to the natural fluctuations that appear in the statistics representing the state of the atmosphere for a designated period, usually of the order of months to decades. Fluctuations may occur in any or all the atmospheric variables. A result of those fluctuations may be the alteration of an ecosystem, and this could eventually affect societal activities that have been developed to exploit the productivity of that ecosystem."

It is important to note that during the annual dry season, the characteristics of the atmosphere in an arid or semiarid area are like that of a desert-like region, and if improper use of the land occurs during this period, degradation results. Thus, short-term fluctuations in climatic factors as well as seasonal dry periods, when combined with improper land-use practices, can give the appearance of the impact of a climate change when none may have occurred at all (Kassas, 1977).

In their study, Kharin & Petro (1977) discovered that "Climate change refers to the view that the statistics that represent the average state of the weather for a relatively longer period are changing and that desertification is primarily a result of such natural shifts in climate

regimes. It has been suggested, for example, that there has been a trend towards increasing aridity in the West African Sahel, a natural desiccation of the region that man can do nothing to stop. Usually cited as evidence for longer-term climate changes in that area in the past are fossil dune fields near the West African coast far from the active dunes close to the desert. The debate over long-term climate change in the West African Sahel continues." Drought episodes have also been cited as a major cause of desertification, since during such extended dry spells desertification becomes relatively more severe, widespread, and visible, and its rate of occurrence increases sharply. Le Houverou (1962) found that "As the probability of droughts increases as one moves from the humid to the more arid regions, so, too, does the proneness to desertification. Landforms, soils, and vegetation are often transformed during such extended drought periods."

Human activities and Desertification

Cultivation, herding, and wood-gathering practices, as well as the use of technology, have all been cited in the definitions as major causes of, and contributors to, the desertification process in arid, semi-arid, and subhumid areas. Cultivation practices that can lead to desertification include land-clearing practices, cultivation of marginal climatic regions, cultivation of poor soils, and inappropriate cultivation tactics such as reduced fallow time, improper tillage, drainage, and water use (Johnson, 1977). For example, areas that might support agriculture on a short-term basis may be unable to do so on a long-term sustained basis. Even areas that are considered suitable for cultivation may become degraded if they are managed in a way that is inappropriate to the ecological and climatic setting.

Rapp (1974) concluded that "Rangeland use that can lead to desertification includes excessively large herds for existing range conditions and herd concentration around human settlements and watering points. Government policies towards their pastoral populations can also indirectly lead to desertification by, for example, not pursuing policies that encourage herders to cull their herds, putting a floor on grain prices and a ceiling on prices that pastoralists might receive for their livestock, and so forth."

"Gathering fuelwood by itself or in combination with overgrazing or inappropriate cultivation practices creates conditions that expose the land to existing otherwise benign meteorological factors, thereby contributing to desertification" Reining (1978).

Slocum (2004) stated that "The use of technology in arid, semi-arid and subhumid environments is the result of the policy-makers desire for economic development. Thus, deep wells, irrigation, and cash-crop schemes, and even the reduction of livestock diseases such as sleeping sickness, each in its way, can increase the risk of desertification processes in an area. It has been shown that desertification can result from road building, industrial construction, geological surveys, ore mining, settlement construction, irrigation facilities, and motor transport."

Findings

The study found that a broader conception of desertification would shed a different light on progress in the understanding and combating of the phenomenon. There is a need for more research on soil erosion, range management, deforestation, increasing biological productivity in arid lands, and so forth.

Conclusion

It concludes that many activities contribute to an increase in our knowledge and understanding of the phenomenon known as desertification. Only in this broader conceptualization one can we develop a more accurate assessment of how nations are faring in their war against desertification.

Recommendation

The study recommends thus:

- i. There is a need for a global approach of proactive action and risk management efforts to warrant the changing landscape and climate in Nigeria and the USA,
- ii. local bodies must rehabilitate the land to restore soil fertility, which has positively affected the countries whose economy is largely dependent on agriculture,
- iii. The World Bank should fund projects for ecological restoration and fixing of dunes in Nigeria and the USA, and
- iv. both countries should curb land degradation through tree-planting efforts by promoting public awareness of the presence of desertification and drought.

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