

**CLIMATE CHANGE, FOOD SECURITY, NATIONAL SECURITY and
ENVIRONMENTAL RESOURCES**

GLOBAL ISSUES & LOCAL PERSPECTIVES

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Climate Change, Food Security, National Security and Environmental Resources

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Preface

This book adopts an exegetical approach as well as a pedagogic model, making it attractive agriculture and environmental economics teachers, professional practitioners and scholars. It eschews pedantry and lays bare the issues in such clarity that conduces to learning. The book elaborates on contemporaneous climate change, food security, national security and environmental resources issues of global significance and at the same time, is mindful of local or national perspectives making it appealing both to international and national interests. The book explores the ways in which climate change, food security, national security and environmental resources issues are and should be presented to increase the public's stock of knowledge, increase awareness about burning issues and empower the scholars and public to engage in the participatory dialogue climate change, food security, national security and environmental resources necessary in policy making process that will stimulate increase in food production and environmental sustainability.

Climate Change, Food Security, National Security and Environmental resources: Global issues and Local Perspectives is organized in four parts. Part One deals with Climate Change with Six Chapters, Part Two is concerned with Food Security with Nine chapters, Part Three deals with National Security with Five Chapters, while Part Four pertains Environmental Resources, has Five Chapters.

Ahmed Makarfi / Eteyen Nyong

April 2024

CHAPTER 12

Evolution of Desert Encroachment Narratives and How it affects Desertification Policy Implementation in Nigeria

Abdullahi Umar^{i*}; Abdullahi Adamuⁱⁱ; Kabiru Shehuⁱⁱⁱ; Ismail Alfa Adamu^{iv} and Sadiq Abdullahi Yelwaⁱⁱ

Abstract

Confusion and ambiguity surrounding the exact meaning of the term desertification are manifold and widespread. Defining desertification has been difficult. It has been argued that the concept remains vague and cannot be defined operationally. In the same vein, experts and non-experts erroneously conceived desertification to be the process of turning fertile arable lands in drylands into deserts, or advancing of desert or its invasion of neighbouring arable areas; the Sahel and or Mediterranean regions by the Sahara desert. The French colonialism in Africa played a significant role in the incubation of desert metaphor notion and creation of human induced Sahelian desert encroachment crisis narratives. In the late 1970s, the United Nations commissioned a research to assess the spatial extent of desertification in the drylands. The study erroneously made a conclusion that the Sahara desert was expanding southward at the shocking velocity of 5–6 km annually. The framing of desertification as desert encroachment has been proven to be wrong and misleading and it was refuted even by the UNCCD itself. However, it has been reported that the powers of NGOs, governments, donor agencies and academia where some of them have common interest in the narrative influenced the existence and persistence of the contested desert encroachment crisis narrative instead of the current accepted dry-land degradation account of the phenomenon. This misconception is abundantly available in government policy implementation documents in Nigeria where it heavily impacted on the Nigerian governments' perspectives on desertification. This chapter was aimed at making an exposition discourse of evolution of contested Desert Encroachment Narrative and how it affects Policy Implementation in Nigeria.

Introduction

Confusion and ambiguity surrounding the exact meaning of the term desertification are ubiquitous. Many people consider desert as endpoint of desertification. For instance, the Merriam Webster's Collegiate Dictionary defines the desertification as the process of becoming a desert. This apparent simple to define nature of desertification terminology caused so much misguidance to its actual meaning. Defining desertification has been difficult. It has been argued that the concept remains vague and cannot be defined operationally. In the same vein, experts and non-experts erroneously conceived desertification to be the process of turning fertile arable lands in drylands into deserts, or advancing of desert or the invasion of the Sahel and or Mediterranean regions by the Sahara desert. Desert and desertification though share some resemblance as regards to their causal factors and effects; however, desertification sharply contrasts with desert and *desertization*.

The French colonialism in Africa played a significant role in the incubation of desert metaphor notion and creation of human induced Sahelian desert encroachment crisis narratives. In the late 1970s, the United Nations commissioned a research to assess the spatial extent of desertification in the drylands. The study erroneously made a conclusion that the Sahara desert was expanding southward at the shocking velocity of 5–6 km annually. It is acknowledged that, after so many years of research and despite the existence of bodies of United Nations Convention to Combat Desertification (UNCCD) and rubout scientific literature, there is a paucity of reliable sub-national and global information of degraded and susceptible lands. This has influenced the 1977 United Nations Environment Program (UNEP) Plan of Action to Combat Desertification (PACD) definition a definition adopted by the United Nations Conference on Desertification (UNCOD0. This conception also influenced European scientific and philosophical circles thoughts in the 18th and 19th centuries and survived virtually unchanged into the 20th century. The early 1990s scientific critiques challenged the earliest theory of Sahelian desert encroachment crisis narratives and the inflated estimates of the geographical expansion of the Sahara or the confounding of drought with irreversible land degradation.

The framing of desertification as desert encroachment has been proven to be wrong and misleading and it was refuted even by the UNCCD itself. However, it has been reported that the powers of

NGOs, governments, donor agencies and academia where some of them have common interest in the narrative influenced the existence and persistence of the contested desert encroachment crisis narrative instead of the current accepted dry-land degradation account of the phenomenon. This misconception is abundantly available in government policy implementation documents in Nigeria where it heavily impacted on the Nigerian governments' perspectives on desertification. The foregoing explained problem has been the main reason why "desert encroachment", "advancing sand" and "encroaching Sahara" are still an important part of the desertification expression among Nigeria's official and NGO circles. The annual rate of desertification or desert encroachment in Nigeria's desertification frontline states was estimated to move at rate of 0.6km per year. This, a part from being unclear how it was arrived at, its trend is also extremely difficult to explain. This chapter was aimed at making an exposition discourse of evolution of contested Desert Encroachment Narrative and how it affects Policy Implementation in Nigeria.

Conceptualizing Desertification: The views and or notions one holds on observable facts or events are paramount as they dictate the way one relates with those phenomena. According to Webster's dictionary the term 'desert' originated from Latin word 'desertum meaning an abandon uninhabited tract of land, a region in its natural state of wilderness or a dry barren region that is largely sandy and vegetation-less or treeless. The Latin origin of desertification whose central word "desert" from both noun and adjectives connotations: *deserta* (meaning wilderness); *desertus*, (meaning vacuous); and *desertum* (meaning unfrequented places) affects the way people conceive this phenomenon. This, therefore, results in confusion and ambiguity to many people as to the exact meaning of the term. The Merriam Webster's Collegiate Dictionary defines desertification as "the process of becoming a desert". This "auto-defined" nature of desertification terminology caused so much misguidance to its actual meaning. Defining desertification has been difficult. This is why Prince, (2016) argues that the concept remains vague and cannot be defined operationally. In the same vain, some people (from the academia and press) have erroneously conceived desertification to be the process of turning fertile arable lands in drylands into deserts, or advancing of desert or the invasion of the Sahel and or Mediterranean regions by the Sahara desert. Dry-lands are terrestrial regions of the Earth that are moisture constrained. These are areas where water scarcity limits the production of crops, forage, wood and other ecosystem

provisioning services (UNEP-MA, 2005). These regions not only suffer moisture deficit, but also experience extreme inter-annual rainfall variability and prolonged droughts. Some people have used desertification to mean the depopulation of marginal dryland rural areas due to migration and land abandonment (this is only part of the problem) or that land is becoming irreversibly barren. Rozanov in the early 80s defined desertification as a process of “irreversible change of soil and vegetation of dryland in the direction of aridization” resulting in the “conversion of land into desert” (Scoones and Toulmin, 2021; D’Odorico et al., 2013; Katyal and Viek, 2000).

It is pertinent to note that, desert and desertification though share some resemblance as regards to their causal factors and effects; however, desertification sharply contrasts with desert and *desertization* (or desert contraction and expansion or encroachment into previously non-desert areas) which people erroneously confuse with desertification (Higginbottom and Symeonakis, 2014; Mortimore, 2010; Le Houerou, 2006). There are those who hold that desertification will not make a landscape of the hyper-arid zone (extremely low rainfall area) more desert-like, as it already represents the "core" desert. It should be noted that desert is not the endpoint of desertification. The major World deserts such as the Sahara, the Arabian, the Namib, the Kalahari and the Gobi have remained in the location they are today for about 65 million years. These desert landscapes only shrink and expand at their peripheral areas with dictates of global climate regimes (Higginbottom, and Symeonakis, 2014; Devis, 2016). High intensity desertification may be worst form of land degradation. It is a fact in the hyper arid areas across the globe; un-disturbed natural deserts are hale and hearty and relatively stable ecosystems that support a variety of, sometimes impressive, life forms. It has been observed that desertification threatens livelihoods in some of these deserts. For example, It has been found that, the South Algerian region and the famous Oasis of Siwa, Baharia and Farafra in the south of Egypt are large part of the Sahara Desert that are seriously been threatened by desertification (Ali, 2006; Yousef, 2006). Land degradation or precisely dry-land degradation is certainly a reality in so many localities of the global drylands. It is however acknowledged, in the Sahel, there has been no evidence of the so much talked catastrophic Sahelian desertification crisis which was reported in literature with much ambiguity and misinformation (Behnke and Mortimore, 2016a; Leroux et al., 2017).

It was reported that the term desertification was first used in 1927 by a French ecologist L. Lavauden who happened to observe the land degradation occurring in North and West Africa (Grainger, 2014; O'Connor, and Ford, 2014). Hence, the French in their North African colonies applied desiccation theory to semi-arid environments to advance the notion of creation or expansion of deserts by people. They called upon the notion of desertification to natives' environmental mismanagement for the benefit of their imperial rule and sharing of land to European settlers (Davis 2007). From their North African possessions, French administrators and scientists carried the desertification concept across the Sahara into West Africa (Toulmin and Brock, 2016). Corroborating this, Reynolds, (2012) traced the historical evolution of desertification terminology. He posited that from 1920s-1930s during France Colonial rule in West Africa, government officials and scientists showed concerns about the drying up (or desiccation) of forests in their colonies. Resources users such as the pastoralists were implicated of 'creating deserts' as a result of the stresses (such as overgrazing, overcultivation, and deforestation) they exert on the environment. Raynolds, (2013) further stated that "the term 'desertification' was coined to depict human culpability in creating these deserts". The topical issue with both the experts and press in describing desertification then was that of "encroaching Sahara" as was championed by Bovill in the early 1920s; 'moving desert', 'advancing sand,' or 'a living environment becoming irreversibly sterile and barren' and etc (Leroux et al., 2017; Toulmin and Brock, 2016; Behnke, and Mortimore, 2016b).

This conception that viewed desertification as a process that transforms fertile arable non-desert lands into "desert-like" lands is erroneous and misleading. Because, although desert landscapes may be exacerbated by human destructive land-use, but they are caused purely by natural biophysical factors and deserts do emerge independent of human activities. Aridity, not drought, is the cause of *aridization* a term used to refers to the natural development of deserts through evolution of drier climates which takes place much more slowly than desertification. This was why as early as end of 1970s, a renowned expert on the Sahel; Le Houerou asserted that "the term desertification has been misused for decades to describe the degradation of vegetation and soil conditions in arid, semi-arid and even humid zones. He further stated that "in many cases these processes have nothing to do, scientifically, with the desert. According to him "the regression of

tropical forest into savanna and that of Mediterranean forest into steppe are examples of this and neither climatically, geomorphologically nor biologically speaking can savanna and steppe be classified as deserts" (Behnke and Mortimore, 2016a; Bonkougou, 2010). The 1970s was a catastrophic decade due to the famous Sahelian extreme drought that culminated in widespread famine. Responding to this tragedy, the United Nations convened its Conference on Desertification (UNCOD) in Nairobi in 1977. In 1977, UNEP had in its Plan of Action to Combat Desertification (PACD) made a definition which also formed the definition adopted by the United Nations Conference to Combat Desertification (UNCOD) in 1977 that "Desertification is the diminution or destruction of the biological potential of land, and *can lead ultimately to desert-like conditions*. It is an aspect of the widespread deterioration of ecosystems under the combined pressure of adverse and fluctuating climate and excessive exploitation and has diminished or destroyed the biological potential, i.e. plant and animal production, for multiple use purposes at a time when increased productivity is needed to support growing populations in quest of development" (UNCCD, 2002).

This definition identified abusive land-use practices such as overcultivation, overgrazing, deforestation and mismanagement of irrigated cropland among the human induced degradation cause of soil borne desertification (Grainger, 2014; D'Odorico et al., 2013). This conception around this time has put desertification as the most relevant and of topical concern of the environmental degradation that was not fully understood. Also scholars understood its causes to surely involve the interaction of adverse climatic variation and farmers' pressure on the land (Bonkougou, 2010; Higginbottom, and Symeonakis, 2014). This happened towards the end of 1940s, when Aubreville implicated climatic variations as a factor of desertification (D'Odorico *et al.*, 2013). The UNCOD definition has so many limitations such as (i) Its description did not clearly identify the target geographical area of applicability of the term desertification (ii) the barrage of misinformation with regards to the conception of desertification has to do with not fully divorcing desertification from aridization and seeing the phenomenon as an environmental degradation leading to non-recoverable desertification (desert-like conditions) which at that time was believed to be occurring in Sahel (Behnke, and Mortimore, 2016a; Toulmin and Brock, 2016). This means that the notion restricted desertification to degradation that leads to sterility of land. However,

according to Mainguet (2003: 647) if desertification is used as “a synonymous with definitive degradation of lands”, referring to irreversibility and to completely sterile areas, then only 0.2% of the Earth surface would be affected. Thus the definition was criticized as it was found to be deficient and not sufficiently operational when attempts started in different parts of the world to implement various practical recommendations of the PACD and to undertake the quantitative assessment of desertification. The “moving desert” conception prompted Lamprey in 1975 to posit that the Sahara was expanding year on year at a rate of 5.5 km/year, a theory that multitude studies refuted and discovered to be wrong and an outcome of a faulty analysis (Scoones and Toulmin, 2021; Behnke, and Mortimore, 2016a; Umaru-Baba, 2015; Katyal and Vlek, 2000).

There was the need also to distinguish between desertification and *desertization*, a phenomenon of observed cyclic oscillations of vegetation productivity at desert fringes related to climate fluctuations, And because the UNCOD description did not clearly identify the target geographical area of applicability of the term desertification (say semi-arid, humid etc), the early 1990 UNEP definition of desertification – "land degradation in arid, semiarid and dry sub-humid areas resulting mainly from adverse human impact" - specified the environments in which land degradation was to be regarded as desertification (Getachew and Isral, 2022; D’Odorico, *et al.*, 2013; Bonkougou, 2010). During the 1992 Earth Summit desertification conference held in Rio de Janeiro, Brazil, a politically-laden agenda driven mainly by African states linked desertification to poverty, recurring drought, and food insecurity (Bauer and Stringer 2009). In the same year, UNEP published a World Atlas of Desertification (UNEP, 2012). In this Atlas, UNCED felt that the influence of climatic variability in desertification should be reflected. The United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992 adopted this definition: “Desertification is land degradation in arid, semiarid and dry sub-humid areas, resulting from various factors, including climatic variations and human activities/action, and it involves the loss of biological or economic productivity of cropland, pasture, wetlands, forests or woodlands” (UNCCD and Davos, 2013). This definition of desertification adopted by the UNCCD has vividly made revisions or adjustments on the previously held conceptions. For instance, it dropped the desert metaphor of desertification due to the early 1990s scientific critiques who challenged the elements of the crisis narrative and the inflated estimates of the geographical expansion of the

Sahara or the confounding of drought with irreversible land degradation (Tang, *et al.* 2016). Land degradation (essentially soil erosion) and death of tree was the impetus behind the story of a persistent Sahara desert advancement. However, in Niger Republic, around mid-1990s, this story was challenged by the reforestation of more than 5 million hectares in Maradi and Zinder Regions which was estimated to involve 200 million trees and had a positive impact on the livelihoods of 4.5 million people (Sendzimir *et al.* 2011; Toulmin and Brock, 2016).

Thus, from the foregoing, United Nations Convention to Combat Desertification (UNCCD) acknowledged that degradation can result from various factors including climate variations (aridity and drought) and human activities (overgrazing, overcultivation, etc). It is quite different from the phenomenon of observed cyclic oscillations of vegetation productivity at desert fringes ("desert expansion or contraction") as revealed by satellite data and related to climate fluctuations (Tang, *et al.* 2016). Recent changes that ushered improvement in rainfall patterns have witnessed the re-greening of much of the Sahel (Seaquist *et al.* 2009; Bégué *et al.* 2011; Olsson *et al.* 2005; Anyamba and Tucker 2005; Herrmann *et al.* 2005). NASA has published several satellite imageries that reveal the 'greening' (vegetation regeneration) of the southern limits of the Sahara. The United Nations Economic Commission for Africa - UN-ECA, (2005) guided by the desertification narratives reported that at present (that is around 2005) desertification directly affects about 3.6 billion hectares-70% of the total drylands, or nearly one quarter of the total land area of the world, and about one sixth of the world's population. These figures represented only the drylands (arid, semiarid and dry-sub-humid areas) excluding the hyper-arid areas or deserts. Behnke and Mortimore, (2016a) are of the view that If desertification means an environmental crisis consisting of irreversible degradation on a sub-continental scale, then the most significant thing about desertification in the Sahel is that it never happened. The two however, acknowledged that Localized, even severe land degradation certainly exists in the Sahel region. Herrmann and Sop, (2016) reported widespread, long-term degradation of trees species while Hiernaux *et al.*, 2016 disputed existence of widespread, long-term degradation of herbaceous and shrub vegetation in the northern Sahel. Conclusively, "there was no evidence of a catastrophic regional environmental crisis: "existing data do not support the claim that the African Sahel is a desertification hotspot" (Benjaminsen and Hiernaux, 2019; Lepers *et al.*, 2005: 122).

Causes and Effects of Desertification: As there are variations in the definitions or conception of desertification, so also the cause and effect theories explaining desertification differed, There is little consensus concerning the environmental forces that drive the desertification phenomenon (Peters, *et al.* 2015; Tang, *et al.* 2016). Scientific views of desertification usually entail human causes on the one hand and climatic causes on the other. The earliest theory explaining the cause of desertification was that of Sahelian desert encroachment crisis narratives or ‘desiccation theory’. This has been ‘the idea that deforestation causes the climate to dry out and diminishes rainfall’ (Giannini, 2016). This according to the theory happens as a result of excessive and abusive land use practices such as overcultivation, overgrazing, urbanization uprooting woody species, and borehole drilling (Le Houérou, 2006). Later some cultural factors such as poverty and total dependency on natural resources for survival by the poor were added to the causes or accelerating agents. Some may perfectly correlate these cultural factors with excessive and abusive land use practices. It has been reported that substantial proportion of the desertified lands are found in rural settings due to poverty laden agricultural practices and other land use systems. Poor agronomic practices like continuous cultivation without fallowing and or addition of supplements, overstocking/overgrazing, unwise utilization of soil and water resources, bush burning result in land degradation through depletion of natural vegetative cover, deterioration and erosion of soil and transforming drylands into unproductive “badlands” through the processes of soil erosion (by wind and water), salinization, and alkalisation which culminate into desertification (Rechkemmer, 2005; Brown, 2006). Land degradation such as deforestation and overgrazing not only worsen its twin sister, drought, but also lead to soil degradation where poor cropping methods and improper soil conservation techniques culminate into reduced water retention of the soil (Grainger, 2014; UN-ECA, 2005).

From the foregoing, it is evident that desertification is phenomenon caused by multiple direct and indirect factors both natural processes and human activities. The process is measured and quantified through measurements of vegetation productivity and cover. Based on this, it is commonly believed that adverse climate variations such as aridity and drought in dryland ecosystems play a critical role here, if not being the primary causes for desertification they serve as accelerating or triggering agents. The main biophysical causes of desertification include low and irregular rainfall (aridity and drought), excessive temperature, evaporation and wildfire.

However, some researchers argued that by drastically reducing or destroying vegetation cover and soil fertility, human activities can result in desertification even if there is no water stress condition (aridity and drought), but not vice versa (Bauer and Stringer 2009; Leroux et al., 2017). These scholars hold the view that overgrazing reduces both productivity and biodiversity of grasslands and can lead to a grassland-to-shrubland transition. In line with this conception, Charney, (1975) put forward a theory for a bio-geophysical feedback between albedo (change as a result of changing of Earth surfaces), rainfall (amount) and vegetation cover (what some scholars called Sahel droughts enhancing desertification theory). It argued that by removing vegetation, traditional agriculture exacerbated erosion and increased the reflectivity of the earth's surface, permanently shifting the regional climate towards more arid conditions (Charney et al. 1975). This theory which literally updates the desiccation theory sees the underlying cause of Sahelian droughts to land degradation that culminates in changing weather patterns manifested through the excessive build up of heat on the earth's surface, meteorological changes which result in a reduction of rainfall, and reduced cloud cover, all of which result in greater evaporation rates.

Climatological research works have refuted the theory of Sahel drought and showed that the immediate cause of the great Sahel droughts had not even been terrestrial in origin (as per the saying that the albedo or reflectance of Sahelian degraded surfaces was changed), but resulted from changes in Sea Surface Temperatures (SSTs), and changes in the composition of the air pollutants emitted in the highly industrialized nations (Giannini, 2016). It has been stated that the sporadic rainfall periods experienced in the Sahel (such as wet 1950s to early 1960s and persistently dry conditions at the end of the 1960s), or the contraction of desert that is present re-greening have strong relationship with changes in the global SSTs. It was further stated that the dry periods that led to desiccation in the Sahel are the consequence of elevated SSTs in the tropical oceans combined with cooler conditions in the north Atlantic (Brandt et al.,2020; Palmer, 1986; Folland *et al.*, 1986). Though drought which remains the twin sister of desertification may be intensified or lessened its effects by land use changes, however, the great Sahelian droughts are primarily caused by oceanic temperatures fluctuations. Even simulations from the state-of-the-art atmospheric models lead to the conclusion that drought was caused by large-scale, if subtle, shifts in oceanic temperatures, not by local anthropogenic pressure on the environment (Giannini, 2016).

The 20th century Sahelian crisis that commenced around 1970s with prolonged and severe droughts that caused tremendous human suffering was confused to be long-term desertification. Up recent changes in rainfall patterns ensured more humid with increased vegetation and canopy coverage Sahel (Giannini *et al.*, 2013; Brandt *et al.*, 2020).

Concerning its effects on ecological systems, desertification is agreed to have a serious impact on water, soils, biodiversity, agrarian systems, and in turn on the people who live off the services provided by agro-ecosystems. Also as climate change impacts have been worsening in the 21st century, so they expand their range on desertification. Scholars also differ on the extent to which desertification lead to the migration of populations and exacerbate resource-related conflicts that threaten national or regional security. However, there is no denying of the fact that population pressures from overgrazing and overexploitation of marginal lands in drylands have aggravated the human and livestock temporary and permanent migrations from the desertification frontline areas to more humid area and these cause civil strives and conflicts that are related to environmental resources accessibility and utilization (Adamu and Umar, 2017; Umar and Danjuma, 2022). According to the UN-ECA (2007) present desertification in the drylands manifests itself through resources depletion and degradation of 3,333 million hectares (73%) of the total area of rangelands which are of low potential for human and animal carrying capacity and a low population density but may be fundamentally resilient and might possess significant capacity to ameliorate and recover their potential productivity if properly managed. Secondly, it entails decline in soil fertility and structure resulting in steadily to soil loss in 216 million hectares of rainfed croplands (47%) of their total area in the drylands, which constitute the most vulnerable and fragile marginal cultivable lands subjected to an increasing population pressure. Lastly desertification involves degradation of 43 million hectares of irrigated croplands amounting to nearly 30% of their total area in the drylands, which usually have the highest agricultural potential and the greatest population densities when well managed.

Dimensions of Desertification in Africa and Nigeria: Desertification was categorized as an “auto-defined” terminology whose lexical background – originating from Latin words denoting desert or condition that has to do with desert and apparent clarity creates obfuscation and confusion in comparison with its underlying processes that define it. This influenced European scientific and philosophical circles thoughts in the 18th and 19th centuries that survived virtually unchanged into

the 20th century. Behnke and Mortimore, (2016a, p21) are of the view that “The idea of desertification that was broadly accepted until the late 20th century labelled a clearly defined process: desert encroachment caused by destructive land use practices and population growth in dryland areas” The framing of desertification as desert encroachment has been proven to be wrong and misleading and it was refuted even by the UNCCD itself, as it takes pain to stress that desertification is not desert encroachment (Umaru-Baba, 2015). Verheye(n. d.) discussed this confusion that some authors created as a through exaggerating or overemphasizing human land degradation which delineated desertification even in humid (adequate rainfall) areas of northern Europe (Arnolds, 2000). He further added that: “a great deal of the confusion or deliberate obfuscation about desertification reflects a poorly defined or incorrect use of terms, a failure to identify the various combination of processes at different time and space scales and ignorance or lack of data, and this confusion may even be politically, economically, socially and scientifically motivated”.

Apart from Arnolds, (2000) scholars (Scoones and Toulmin, 2021; Wood and Lenne 2005) observed that the powers of NGOs, governments, donor agencies and academia where some of them have common interest influenced the existence and persistence of the desertification narrative. It has been noted that there were lack of scientific rigour (such as oversimplification in mapping cause-effect relationships among land degradation variables) in the preparation and interpretations of desertification data, and estimates are often based on subjective experts’ opinions (Reynolds *et al.* 2007; Verstraete *et al.*, 2009). All the data referring directly to desertification needed improvement in citation to an authority in the field. The only data properly cited were physical characteristics and population figures of the dryland areas. Therefore, conceptualizations (for instance defining and formulating cause-effect-relationships) desertification in this context will definitely have influences in delineating the dimensions or areas affected by various degrees of severity of desertification. It has been argued that, from its inception to the present, the bulk of desertification research has been targeted at and deeply involved in the formulation of public policy (Toulmin and Brock, 2016) Most desertification policy is based on what Adger *et al.*, (2001), called the Global Environmental Management (GEM) discourse one of the three discourses on desertification. GEM discourse’s key themes are built on the notion that local land users are both victims and offenders (culprits) in land degradation, and donor organizations, Non Governmental

Organizations and the Governments can provide solutions. Adger *et al.*, (2001) stated that these solutions include external interventions through technology and knowledge transfer, and international agreements and regulations such as the UNCCD. It is apparent that this desertification discourse is a continuation of colonial narrative of desiccation theory that was prompted by the imperial subjugation motive as explained by (Davis 2007).

As explained in the preceding paragraph that the bulk of desertification research has been targeted at and deeply involved in the formulation of public policy, in the late 1970s, the United Nations commissioned a study to assess the spatial extent of desertification in the drylands. The research conducted a reconnaissance survey to delineate the desert boundary making reference to a previous work published vegetation map by Harrison and Jackson (1958). The study, as depicted by Fig. 3. 1, erroneously made a conclusion that had estimated that the Sahara desert was expanding southward at the startling pace of 5–6 km annually (Lamprey 1988; Herrmann and Sop, 2016). Subsequently, findings of this work became one of the most widely cited references for the rate of southward expansion of the Sahara desert. Because this work took into consideration a snapshot (one or few year(s)) not an adequate time-series assessment of the biophysical variables of the study area, this led to the misnomer that the desert was advancing. A decade later, the expert opinion-based Global Assessment of Soil Degradation (GLASOD) provided a new official perspective on the extent of degradation (Tang, *et al.* 2016). GLASOD is a survey of homogeneous landscape units compiled from subjective reports by 250 soil scientists. It has been one of the most influential global appraisals of land degradation and has majorly contributed to the perception of widespread degradation in the Sahel (Herrmann and Sop, 2016). However, it is observed that, due to lack of obstinacy and high limitations in the methodology of the research employed in the survey a lot of misinformation has been generated by the assessment. It is acknowledged that the assessment of global land degradation employed in both editions of *the World Atlas of Desertification* relied heavily on GLASOD (Prince, 2016).

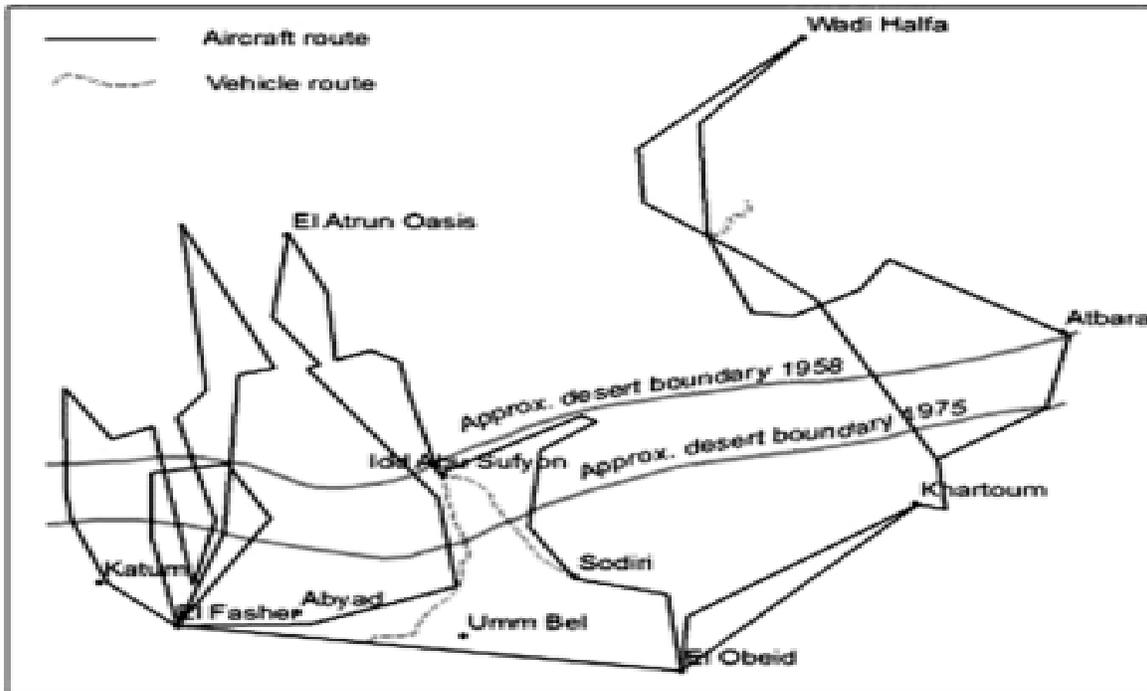


Fig. 3.1 Lamprey’s report on desert encroachment in the northern Sudan

Sources: Lamprey (1988); Herrmann and Sop, (2016)

Prince (2016), maintained that despite commissions studies on land degradation which were expected to shed light on the conception of desertification, however, little has changed: desertification remains ‘a nebulous, all-encompassing concept’ that ‘is not a single phenomenon and is therefore incapable of simple measurement’. Correct assessments, he noted, are essentially dependent upon proper, objective data, but conducting the required measurements has proved difficult. Scaling-up local data to larger areas is often impossible because some phenomena are restricted to particular scales (Prince, 2002). This also prompted Behnke and Mortimore, (2016) to categorically state that if desertification denotes an environmental crisis consisting of irreversible degradation on a sub-continental scale, then the most significant thing about desertification in the Sahel is that it never happened. They acknowledge that in the 20th century there was a Sahelian crisis, but not one of desertification. Localized, even severe land degradation certainly exists in the region. Widespread and long-term degradation of some components of ecological environment (such as trees) have occurred (Herrmann and Sop, 2016), or did not

occurred on herbaceous and shrub vegetation in the northern Sahel (Hiernaux *et al.*, 2016). GLASOD concluded that soil degradation affected 224 million hectares of drylands and categorized the order of degradation in four levels according to extent of severity viz; light, moderate, strong and extreme (see Table 1). According to Middleton and Thomas (1997: 71), “the main causes of soil degradation in the Sahel are: overgrazing (118.8 million hectares), agriculture (34.8), “overexploitation” (54.2), and deforestation (16.3 million hectares)”. As shown by figure 3.2, GLASOD provided a new official perspective on the extent of degradation, in which the entire Sahel region was erroneously classified as severely degraded (Brandt *et al.*,2020), Also the concern of Le Houerou, that the term desertification has been misused for decades to describe the degradation of vegetation and soil conditions in arid, semi-arid and even humid zones is apparent in the map.

Table 3.1 GLASOD data on the Sahel (millions of hectares)

	Water erosion	Wind erosion	Soil nutrient depletion	Physical deterioration	Human induced soil degradation
Light	97.5	156.2	25.6	18.7	109.8
Moderate	24.7	99.5	8.8	8.7	80.3
Strong	18.2	4.9	5.0	3.1	30.8
Extreme	2.2	0.8	0	0	3.1

Source Middleton and Thomas (1997)

Note Figures relate to the continental Sahel and include Sudan and parts of eastern Africa (total 802.3 million hectares)

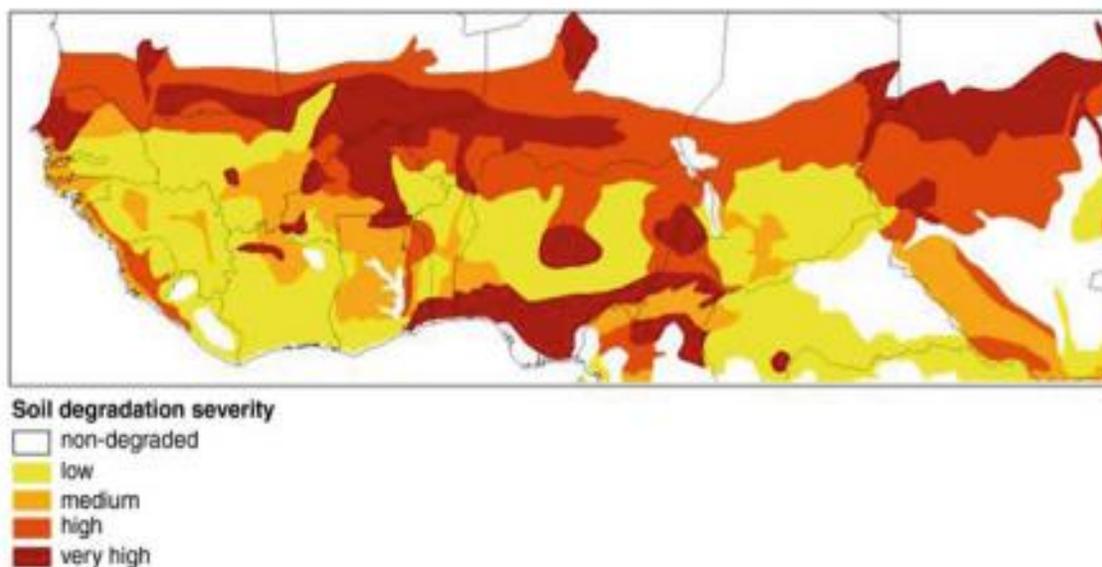


Fig. 3.2 Map of the severity of soil degradation as an indicator of desertification, compiled by the Global Assessment of Soil Degradation (GLASOD)

Sources: Oldeman et al. (1991).

After so many years of research and despite the existence of bodies of UNCCD, such as the Committee on Science and Technology (CST), the Group of Experts (GoE), National Action Programmes (NAP), Action Programmes for Sub-regional (SRAP), the Regional groups (RAP), a large and accelerating output of scientific journal and popular articles, and particularly unpublished “grey literature”, there is a paucity of reliable observations and assessments on the spatial extent, location and severity, and this therefore resulted that up-to-date monitoring of desertified areas is manifestly inadequate for sub-national to global needs (Verón *et al.*, 2006; Lobell, 2010; Herrick *et al.*, 2010). It has been observed that the existing global maps of desertification are often based on subjective assessments by experts and they cannot be replicated or used for monitoring. Moreover, there is no general agreement between different global map sets and there are no strong correlations between the levels of desertification depicted in the maps and the environmental variables that are generally thought to cause degradation, Because of that unsupported or exaggerated statements about the extent and severity of desertification abound (Prince, 2016),

The foregoing state of the research and policy implementation of desertification has tremendously impacted on the Nigerian governments perspectives on desertification as noted by Umaru-Baba, (2015). Federal and State Governments in the country subscribed to the crisis doomsday narrative view of the environment which put much emphasis on human causes. This view as earlier explained is among the popular conceptions of environmental degradation characterized with oversimplifications in its approach and insufficient empirical support. However, because of their public legitimacy, these views influence policy (Lambin, *et al* 2001). And subsequently, scientific evidences of these views emerge after the entrenchment of the narratives into policy (Wood and Lenne 2005). Milligan and Binns, (2007) explored how such orthodoxies have become legitimized in policy documents and frameworks especially pertaining farmer- pastoralist conflicts in Northern Nigeria. They noted that the persistence of crisis and doomsday narratives in Nigerian environmental policy has its origins in colonial and post-colonial discourses and more recently, from the impact of development partners and donor agencies like the UN and its affiliates. This trend has been noted to run among environmental policy making in Africa. In northern Nigeria, Mustapha, (2003) notes that environmental policy is dominated and influenced by a ‘colonial mentality’ which he believes is often at odds with the real situation at the local level context. This colonial mentality has also been observed to shape environmental policies in other African countries such as Uganda (Carswell, 2003). Evidence based policy making in Nigeria is highly limited, lacking facts and suffering inadequacies of quality data and to ensure effective policy making process there is the need for more investment in generation of technical and financial resources in the collection and reconciliation of data (Tang, *et al.* 2016).

The foregoing explained problem has been the main reason why “desert encroachment”, “advancing sand” and “encroaching Sahara” are still an important part of the desertification expression among Nigeria’s official and NGO circles. It was reported that in the desertification frontline states, visible signs of desertification through gradual shift in vegetation from grasses bushes and dotted trees to expensive areas of desart-like sand was observed between 1976/78 and 1993/95 (FGN, 2000, 2012, Umar and Adamu, 2019), There has neither been a peer reviewed empirical research that yet established the exact extent and severity of desertification in the drylands of Nigeria, nor is there a documented rate of progression of desertification (if

scientifically it progress). However, the National Action Programme to Combat Desertification in Nigeria estimates a rate of 0.6 kilometres per year (Nigeria, 2000). This information is ubiquitous in the literature. This, a part from being unclear how it is arrived at, its trend is also extremely difficult to explain. As noted by Umaru-Baba, (2015) this figure appears in all the documents she analysed and is also mentioned by government officials and is often reported in the media as well. So also reports that overgrazing and over-cultivating are converting 351,000 hectares of land into desert each year or that about 50 percent and 75 percent of desertification frontline states are seriously affected by desertification. Here Federal Government's reports assert that entire villages and major access roads had been buried under sand dunes in the extreme northern parts of Katsina, Sokoto, Jigawa, Borno and Yobe states (FGN, 2007a; FGN 2000; FGN 2007b) and that desertification threatens about 10–15 percent of the land in the buffer states such as the Federal Capital Territory (FCT), Plateau, Taraba, Niger, Kwara and Kaduna (Olawumi, 2009). These observations and assessments however, do not appear to be based on quality scientific data and rigour analysis (Umaru-Baba, 2015).

Conclusion: There are variations in the conception of desertification, so also the cause and effect theories explaining it. Desertification, depending on the severity, may be worst form of land degradation that threatens livelihoods even in some desert landscapes. It has been acknowledged that degradation can result from various factors including climate variations (aridity and drought) and human activities (overgrazing, overcultivation, etc). Scientific views of desertification entail human causes on the one hand and climatic causes on the other. The process is measured and quantified through measurements of vegetation productivity and cover. It involves the loss of or decline in biological and/or economic productivity and diversity of cropland, pasture, wetlands, forests or woodlands due to depletion of the plant cover, the exposure of the soil to wind erosion, decline of the soil organic and nutrient content, deterioration of the soil structure and its capability of moisture retention. A great deal of the confusion or deliberate obfuscation about desertification reflects a poorly defined or incorrect use of terms, a failure to identify the various combination of processes at different time and space scales and ignorance or lack of data. And this confusion may even be politically, economically, socially and scientifically motivated. The powers of major actors, with common interest influence the existence and persistence of the desertification crisis

narrative. Federal and State Governments in Nigeria have subscribed to the crisis doomsday narrative view of the environment which put much emphasis on human causes. This view is among the popular conceptions of environmental degradation characterized with oversimplifications in its approach and insufficient empirical support. However, because of their public legitimacy, these views influence policy. All these call to the need for re-discovering conceptions, theories and dimensions of desertification in Nigeria with a view having a precise bearing and reference point in both science and policy implementation of desertification in the Country,

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