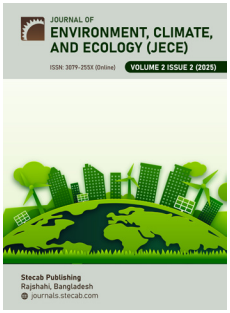

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Research Article

The Preservation of 'Wanted Trees' and Felling of the 'Unprotected Ones' by Residents in States Most Threatened by Climate Change

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About Article

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ABSTRACT

The mere mention of the words 'tree' and 'climate change' might sound to some as 'here we go again'. However, as scholars, we shall continue to remind ourselves that these trees have been in existence long before mankind sets his foot on earth and will continue to be there long after our very existence. This paper, like most probably thousands of others written before it is mostly concerned with the act of specifically taking out of nature certain trees and not replacing them in multitudes, or at least, allowing them to regenerate by themselves. While it is seen as an act of survival by some, it is perceived as an act that leads to environmental degradation, which also exacerbate the effects of climate change by many others. The identification of the 'wanted' and 'unprotected' trees has been made by the authors, through mixed research methods, surveys and interviews over the years. The States most threatened by extreme weather occurrences due to their proximity to the Sahara Desert are aware of activities that leads to environmental degradation. Why then do the residents still prefer to cut down certain trees and preserve others? Consistent and sustainable regeneration of degraded lands which has been adopted by many regions with a new vigour can be achieved at the study area. This paper can also rekindle the interest of so many people towards sustainable restoration practices. The authors have highlighted the importance of adopting clean cooking methods, Land Degradation Surveillance Framework (LDSF) model and Farmer Managed Natural Regeneration (FMNR) technique as solutions for reducing, controlling and managing environmental degradation.

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1. INTRODUCTION

Throughout history, man has lived through challenging period or phases. Nature, being nature can sometimes or most at times become not easily predictable. Nonetheless, several breakthroughs had been made in the academic world that has made nature to be understood. To be more precise, we have to keep reminding ourselves that the subject of this research, that is, trees have been in existence long before mankind sets his foot on earth and will continue to be there long after our very existence. This paper, like most probably thousands of others written before it is mostly concerned with the act of specifically taking out of nature certain trees and not replacing them in multitudes. While it is seen as an act of survival by some, it is perceived as an act that leads to environmental degradation, which also exacerbate the effects of climate change by many others.

Numerous studies have demonstrated a strong connection between poverty and environmental degradation, frequently resulting in a detrimental cycle where impoverished individuals depend heavily on natural resources for their survival. This reliance leads to overexploitation and harm to the environment, which subsequently worsens poverty by diminishing available resources and affecting livelihoods. In essence, those in poverty often find themselves as both the instigators and the sufferings of environmental degradation due to their restricted choices for sustenance (Amoako-Asiedu, 2016; Rai, 2019) in (Ssekibaala & Kasule, 2023).

2. LITERATURE REVIEW

Environmental deterioration is generally thought to result from human actions including poverty, urban growth, industrial development, deforestation, pollution, increasing population, natural events, climate change, economic influences, soil degradation, rising energy consumption, transportation, unsustainable farming practices, and landfills (Ali & Rahman, 2024). Deforestation refers to the total clearance of forest cover in a specific area, while forest degradation denotes the considerable decline in the structure, functions, and processes of a forest. Both phenomena arise from the interplay of multiple direct drivers that frequently work together (Berenguer *et al.*, 2021). The clearing of forests and the deterioration of forest quality trigger a variety of environmental shifts that greatly diminish essential provisioning services while also impacting biodiversity on both local and global scales (Kumar *et al.*, 2022). Over time, the deterioration of the environment can result in the annihilation of ecosystems, loss of habitats, and the endangerment of various animal species. The destruction of habitats affects more species than all other dangers put together (Hogue & Breon, 2022). Natural habitats serve as fundamental environments where diverse species of animals, plants, and other organisms exist, develop, give birth, and reproduce (Radić & Gavrilovic, 2021). Hence, the need for a sustainable restoration and regeneration practices.

3. METHODOLOGY

The Sahel region, often referred to as the Sahelian acacia savanna, is a large, semi-arid area located in Africa. It serves as a transitional zone between the dry Sahara Desert to the north and the more humid savannas found to the south. Extending from the Atlantic Ocean in the west to the Red Sea in the east, it encompasses several countries, including Senegal, Mauritania, Mali, Burkina Faso, Niger, Nigeria, Chad, and Sudan. While geographic definitions may differ, the United Nations Strategy (UNISS) characterizes the political region to include Senegal, Gambia, Mauritania, Guinea, Mali, Burkina Faso, Niger, Chad, Cameroon, and Nigeria. The Sahel is characterized by a hot, semi-arid climate with considerable seasonal fluctuations in rainfall, primarily occurring during the monsoon season from May to September. The terrain consists of semi-arid grasslands, savannas, and isolated trees. The region grapples with serious environmental challenges, particularly the effects of climate change, which are causing temperature increases that far exceed the global average. This results in heightened instances of drought, desertification, and flooding. Furthermore, the area is susceptible to land degradation and a decline in biodiversity. The Sahel also contends with major socio-economic issues,

Figure 1. The Location of the Study Area – The States most threatened by extreme weather occurrences
Source: Political map of Nigeria (edited by the authors); Google Earth

such as political instability, insecurity related to food and nutrition, and migration driven by environmental degradation and scarcity of resources (IFAD, 2025). This paper has limited the study area to the eleven frontline states of Nigeria that are most threatened by the impact of emerging climate risks.

The States, that is, Borno, Yobe, Jigawa, Kano, Katsina, Zamfara, Kebbi, Sokoto, Bauchi, Gombe and Adamawa are most threatened by extreme weather occurrences such as drought and desertification in Nigeria due to their proximity to the Sahara Desert, are aware of these activities that leads to environmental degradation. Why then do the residents still prefer to cut down certain trees and preserve others? Some of the reasons that leads to that particular choice had been studied. Such as: access to the trees, availability, faith, fear/superstition, insecurity, poverty, sabotage, survival, weak regulations or laws protecting the trees.

3.1. Identification of the 'Unprotected' Trees

The 'known' loggers and illegal loggers at the study area tend to cut down the trees listed in table 1 because most of them are unprotected indigenous trees. Some of these trees have been in existence for decades. They can be seen by the roadside, within communities, at cemeteries, schools, institutions, forest reserves, along cattle route, and other places where people carry out their activities. Some of these trees have regrown on cleared farmlands. Nevertheless, they are easily been cutdown with impunity because of the believe that they have been provided by nature.

Table 1. The 'Unprotected' Trees

English Name	Common Name (at study area)	Botanical Name
Desert Date	Ádúwà	Balanites Aegyptiaca
Shea tree	Káɗányà	Vitellaria Paradoxa
Camel's Foot	Kálgó	Piliostigma Reticulatum
Locust-Bean Tree	Ɗóráwà	Parkia Biglobosa
West African Ebony	Kányà	Diospyros Mespiliformis
African Birch	Márké	Anogeissus Leiocarpus
African Mesquite	Kirya	Prosopis Africana
Marula	Danya	Sclerocarya Birrea
African Blackwood	Jalahe	Dalbergia Melanoxylon
Indian Rosewood	Madobiya	Dalbergia Sissoo
Paperbark Thorn	Farar Bagaruwa	Acacia Sieberiana
Umbrella Thorn	Kandili	Acacia Tortilis
Gum tree	Bagaruwa	Acacia Nilotica
Gum Arabic	Dakwara	Acacia Senegal & Seyal
African Kino	Madobia	Pterocarpus Erinaceus
Christ's Thorn	Kurna	Ziziphus Spina-Christi
Indian Jujube	Magarya	Ziziphus Mauritiana
White Acacia	Gao	Faidherbia Albida
Black Plum	Dinya	Vitex Doniana
Sweet detar	Taura	Detarium Senegalense
Faidherbia	Gawo	Faidherbia albida

Source: Abubakar et al. (2018); Roger and Dendo, (2007); Forman (2014) and the authors.

2.2 Identification of the 'Wanted' Trees

The wanted trees are the ones found in most residences, and also in commercial areas, public places, religious institutions, roadsides, and cemeteries. They are very easy to propagate, and most at times planted or grafted. They bear edible fruits or pods, mostly medicinal and serves other purpose like providing shade. Their examples can be seen in table 2 below.

Table 2. The 'Wanted' trees

English Name	Common Name (at study area)	Botanical Name
Heart-leaved fig	Dúrùmí	Ficus polita
Strangler Fig	Chediya	Ficus thonningii
Mulberry Fig	Báúré	Ficus sycomorus
Broadleaf Fig	Gamji	Ficus platyphylla
Baobab	Kuka	Adansonia digitata
Tamarind	Tsámíyá	Tamarindus indica
Neem	Dogon-Yaro/ bishiyan Maina	Azadirachta indica
Manna Gum	Bishiyan turare/ 'Yaro ba kunya'	Eucalyptus viminalis
Teak	Teak	Tectona grandis
Gmelina	Malena	Gmelina arborea
Java Plum	Malmo/ 'blackcurrant'	Syzygium CUMINI
Karaya Gum	Kukuki	Sterculia setigera
Indian Almond	'Umbrella tree'	Terminalia catappa
Siamese Senna	'Doctor Jalo'	Senna siamea
Doum Palm	Goruba	Hyphaene thebaica
Kapok	Rimi	Ceiba pentandra
Mahogany	Mádàcí	Khaya senegalensis

Source: Abubakar et al. (2018); Roger and Dendo, (2007); Forman (2014) and the authors.

4. RESULTS AND DISCUSSION

As discussed earlier in this research, the indiscriminate cutting down of trees, or deforestation, has serious repercussions for both the environment and human communities. These repercussions encompass climate change, loss of biodiversity, erosion of soil, disruption of the water cycle, and adverse effects on human livelihoods. Deforestation accelerates global warming by releasing carbon dioxide that was previously stored and decreasing the Earth's ability to absorb it. It also leads to the destruction of habitats, putting many plant and animal species at risk. In addition, deforestation can result in soil degradation, which complicates crop cultivation and increases the likelihood of flooding and landslides (Panchama Alliance, 2025; Arcadia, 2017; CIP, 2024; NCI, 2025).

4.1. Legal Frameworks and Policies for The Protection of Trees and Forests in Nigeria

Nigeria has multiple legal frameworks and policies aimed at safeguarding trees and forests; however, their effectiveness is compromised by various challenges. In spite of having these laws and policies in place, Nigeria's forests continue to face serious threats, such as rapid deforestation and degradation. The legal and policy frameworks for forest protection in Nigeria include the Forestry Act, the National Forest Policy, and the National Agency for the Great Green Wall (NAGGW) Act. These regulations and initiatives are designed to protect forests, enhance forest cover, and address climate change (Rigasa, 2021; Adejo, 2019; FAO, 2025). Similarly, several states have come up with their policies for environmental protection, climate change adaptation and mitigation. Few states even went further to rename their ministries of environment to become 'Ministry of Environment and Climate Change'. A laudable transformation that will likely motivate policy makers and residents to take action on the impact and effects of climate change in their states.

4.2. Adoption of Clean Cooking Methods for Regions Experiencing Land Degradation

Studies have been carried out on the trade of fuelwood and timber, highlighting several key factors that drive these activities, especially in developing nations. These studies have shown that the extraction of fuelwood and timber is vital for the livelihoods of individuals in developing countries, particularly those residing close to forested areas. They noted that resources from forests generate income and job opportunities, aiding in poverty alleviation and enhancing economic well-being. Furthermore, they elaborated that many rural populations depend on fuelwood for cooking, heating, and various domestic and commercial needs. The research also indicates that harvesting fuelwood and timber can serve as a crucial income source, particularly in regions with few alternative job options. However, reliance on these resources may result in overexploitation and degradation of forests, which affects the environment and long-term sustainability (Ullah *et al.*, 2021).

The implementation of clean cooking methods is essential for areas facing land degradation, offering numerous advantages

that benefit both the environment and human health. Clean cooking contributes to tackling land degradation by reducing the strain on forests. Traditional cooking practices that depend on fuelwood and charcoal play a substantial role in deforestation and forest deterioration, worsening land degradation. By transitioning to clean cooking alternatives such as improved cookstoves or Liquefied Petroleum Gas (LPG), the need for fuelwood diminishes, thereby conserving forests and their essential ecosystem functions, which include carbon storage and biodiversity preservation. Adoption of clean cooking methods also lessens environmental impact because the inefficient combustion of biomass in conventional stoves emits harmful substances and greenhouse gases, intensifying climate change. Clean cooking technologies, including improved cookstoves, biogas systems, and solar cookers, significantly diminish these emissions, resulting in better air quality and aiding in the fight against climate change. More so, adoption of clean cooking methods promotes sustainable land management because a decreased dependence on wood fuel can foster more regenerative land management techniques. For example, the reduced pressure on forests encourages natural recovery, while waste products such as animal manure can be harnessed for biogas production, which subsequently offers a valuable organic fertilizer enhancing soil health and boosting crop yields (Carbonibus, 2023; CCA, 2025; WWF, 2025).

The adoption of clean cooking methods in degraded regions offers several additional advantages, including improved health, due to the fact that clean cooking minimizes indoor air pollution, a significant factor contributing to respiratory diseases and early mortality. This is especially critical for at-risk groups such as women and children, who typically take on the primary cooking responsibilities. Adoption of clean cooking methods also provide enhanced livelihoods, mostly due to the time conserved from fuel collection and lowered fuel costs which can empower women and girls to seek education, engage in income-generating activities, or participate in community projects, thus promoting economic empowerment and better livelihoods. Adoption of clean cooking methods also promotes and supports sustainable development. This can be clearly understood after studying the various Sustainable Development Goals (SDGs), more especially those focused on good health and well-being (SDG 3), clean energy (SDG 7), and life on land (SDG 15). Ultimately, adopting clean cooking techniques in areas suffering from land degradation creates a mutually beneficial situation, yielding substantial advantages for both the environment and the communities that rely on it. This is a vital step toward advancing a more sustainable and equitable future (Carbonibus, 2023; CCA, 2025; WWF, 2025).

4.3. Adoption of Land Degradation Surveillance Framework (LDSF) for Land Restoration

The adoption of the LDSF model is vital for promoting and enhancing global land restoration efforts. LDSF aids land restoration by providing baseline assessments, thereby offering a standardized approach to evaluation of existing condition of land health and degradation in a given area, creating a benchmark for monitoring restoration advancements. LDSF model provide an opportunity for Monitoring and Evaluation (M&E), by serving as a framework for tracking the effects and success of land management practices over time, which further facilitates evidence-based decision-making and adaptable management. LDSF model also ensures Targeted Interventions, by delivering comprehensive data on soil characteristics, plant health, and indicators of degradation, the LDSF model assists in prioritizing and directing restoration efforts towards areas that require the most attention and are likely to be most effective. The model also makes it easy to understand the degradation processes. For example, the data acquired through the LDSF allows researchers and practitioners to gain insights into the different factors and dynamics that contribute to land degradation, including both biophysical and socioeconomic elements. The LDSF model also supports capacity development, because it encourages capacity building by educating stakeholders, such as field technicians and local communities, in the procedures for collecting, analyzing, and interpreting land health indicators. LDSF model also provides evidence for policy making. The information obtained through LDSF surveys can provide valuable insights for decision-makers and policymakers at various levels, which also supports the development of policies and initiatives for land restoration grounded in evidence (Waswa *et al*., 2013; Kyei, 2017; Dubovyk, 2017; Bourne, 2019; Vågen & Winowiecki, 2023; FAO, 2025).

The LDSF is being applied in various land restoration initiatives, including those aimed at rangelands in East Africa. Numerous stakeholders, such as government bodies, NGOs, researchers, and local communities across more than 40 countries, have embraced it, encompassing a wide range of ecosystems and land uses. The framework supports the UN Decade on Ecosystem Restoration (2021-2030), a worldwide initiative to revive degraded ecosystems and achieve global environmental objectives. The LDSF evaluates a variety of essential indicators to measure land health and degradation, which include: vegetation cover and structure; diversity of tree, shrub, and grass species; current and past land use; soil characteristics (such as soil organic carbon, total nitrogen, infiltration capacity, texture, pH); and the prevalence of soil erosion. The LDSF serves as a crucial framework for comprehending land degradation, directing interventions, tracking restoration efforts, and encouraging evidence-based decision-making. Its implementation enhances the effectiveness and sustainability of global land restoration initiatives (Waswa *et al*., 2013; Kyei, 2017; Dubovyk, 2017; Bourne, 2019; Vågen & Winowiecki, 2023; FAO, 2025).

4.4. Adoption of Farmer Managed Natural Regeneration (FMNR) Technique for Land Restoration

The FMNR technique is an efficient and economical method for restoring land, especially in areas of agricultural degradation. It entails selecting and trimming existing shoots from tree stumps or wild saplings to promote their growth into mature trees, instead of depending on conventional tree planting methods. This technique has been effectively implemented in several areas, such as Niger Republic, where it has led to a notable increase in tree cover and enhanced local livelihoods. The main features of FMNR adoption include affordability because FMNR is much less expensive than traditional tree planting since it

does not necessitate nurseries, seedlings, or protective fencing. FMNR is also easy to expand, or to be scaled up, spreading from farmer to farmer and beyond specific project locations, as evidenced in Niger Republic, where it has extended across more than five million hectares. Community engagement is also one of the essential aspects of FMNR because it is typically embraced through a grassroots initiative, with leading farmers educating others within the community, thereby promoting knowledge exchange and peer learning (IUCN, 2017; World Vision, 2019; Westerberg *et al*., 2019; Chomba, 2020; Hoffner, 2022; Kandel *et al*., 2022; Rinaudo *et al*., 2025; Chesire *et al*., 2025; Suuk *et al*., 2025; FAO, 2025; Bayala *et al*., 2025; FMNRHub, 2025; Marà, 2025).

FMNR offers numerous advantages beyond just increasing tree cover, such as enhanced soil fertility, windbreak creation, greater availability of firewood, and contributions to climate change mitigation. FMNR addresses land degradation and is particularly more effective in dryland areas where conventional tree planting tends to have low success rates due to unfavorable conditions. FMNR encourages policy formulation, in such a way that if government officials acknowledge farmers' rights to harvest resources from trees cultivated on their land, it can motivate them to adopt the technique much easier. FMNR integrate easily with most current practices, that is it can be seamlessly be integrated with existing agricultural practices, as illustrated in Niger Republic where it is utilized to enhance both crop production and livestock grazing (IUCN, 2017; World Vision, 2019; Westerberg *et al*., 2019; Chomba, 2020; Hoffner, 2022; Kandel *et al*., 2022; Rinaudo *et al*., 2025; Chesire *et al*., 2025; Suuk *et al*., 2025; FAO, 2025; Bayala *et al*., 2025; FMNRHub, 2025; Marà, 2025).

The study area can learn tremendously from the examples of FMNR implementation in Niger Republic, as mentioned earlier. FMNR has been embraced there on an average of 200,000 hectares every year for the past 25 years, resulting in a notable rise in tree density and biomass. Another notable example can be seen in Nakuru County, Kenya, where a project by World Vision has resulted in the adoption of FMNR by farmers, which has led to improved crop yields, more diverse income sources, and enhanced milk production. Similarly, efforts have also been made for the adoption of FMNR in Uganda by the International Union for Conservation of Nature (IUCN) to rehabilitate farmlands, with farmers observing favorable outcomes such as increased tree cover and better crop protection from storms (IUCN, 2017; World Vision, 2019; Westerberg *et al*., 2019; Chomba, 2020; Hoffner, 2022; Kandel *et al*., 2022; Rinaudo *et al*., 2025; Chesire *et al*., 2025; Suuk *et al*., 2025; FAO, 2025; Bayala *et al*., 2025; FMNRHub, 2025; Marà, 2025).

World Vision has played a significant role in promoting FMNR worldwide, having trained nearly one million farmers and restored almost one million hectares of degraded land. However, expanding and sustaining FMNR efforts necessitates continuous support and policy frameworks that uphold farmers' rights to manage their natural resources. Additionally, further investigation is required to comprehend the long-term effects of FMNR on various land restoration objectives and to determine the best strategies for different scenarios. Raising awareness and knowledge of FMNR among stakeholders, including farmers, policymakers, and researchers, is essential for its broad adoption (IUCN, 2017; World Vision, 2019; Westerberg *et al*., 2019; Chomba, 2020; Hoffner, 2022; Kandel *et al*., 2022; Rinaudo *et al*., 2025; Chesire *et al*., 2025; Suuk *et al*., 2025; FAO, 2025; Bayala *et al*., 2025; FMNRHub, 2025; Marà, 2025).

5. CONCLUSION

The importance of adopting a sustainable regeneration technique for a resilient future cannot be overstated. The findings in this manuscript highlight the critical necessity for a thorough and sustainable approach to reviving degraded lands. Tackling land degradation is not solely an environmental issue but also a societal and economic necessity. Adopting Sustainable Land Management (SLM) strategies can mitigate degradation and offer numerous benefits for a more resilient future. This paper has highlighted the scope of the issue, and has now been clearly understood that land degradation poses a major global problem with serious repercussions for biodiversity, ecosystem services, and human well-being. Initiatives like FMNR in Niger Republic has demonstrated how land degradation affects livelihoods and food security while showcasing the potential for positive change through regeneration efforts. Moreso, the potential of sustainable regeneration has also been highlighted in this paper. By restoring degraded lands sustainably, through methods such as Assisted Natural Regeneration (ANR) and regenerative agriculture, it provides a cost-effective route to rejuvenating ecological health, thereby boosting biodiversity, and enhancing ecosystem functionality. Another vital point highlighted in this paper is a comprehensive approach, because a successful regeneration requires combining ecological restoration with the active engagement and traditional insights of local communities, who are frequently the most affected by land degradation. This collaborative effort encourages a sense of ownership and guarantees long-term success. Similarly, more diverse benefits have also been clearly defined in this manuscript, such as funding land restoration, which generates both considerable ecological and economic benefits. SLM practices also aid in climate change mitigation by sequestering carbon and enhancing climate resilience. However, let us not forget that challenges and possibilities also exist. Although there are obstacles to scaling up sustainable regeneration, such as securing necessary funding, improving market access for products from restored lands, and tackling knowledge gaps, these challenges also create opportunities for innovation and cooperative efforts. Nevertheless, when looking ahead, achieving broad acceptance of sustainable regeneration demands collective action from all stakeholders. Investing in research, skill development, and supportive policy structures, including incentive programs and secure land tenure rights, are vital next steps. The UN Decade on Ecosystem Restoration underscores the urgency of immediate action to counter the effects of land degradation and pave the way for a sustainable future (DBG Group, 2023; Rural, 2017; Santini & Miquelajauregui, 2022; CEM, 2021).

It has been said by Geoff Lawton in 2020 that; 'Nature demands a gift for everything that it gives, so what we have to keep doing, is returning [leaves & compost materials] back to the

soil, then we're continuously giving the gifts to nature, because we have a return cycle'. Another vital point made by Charles Eisenstein in 2018 emphasises that; 'Regenerative agriculture represents more than a shift of practices. It is also a shift in paradigm and in our basic relationship to nature'.

The scientific community, policymakers, and local communities need work together to prioritize and invest in the sustainable regeneration of degraded lands. Doing so can restore ecosystems, enhance biodiversity, improve livelihoods, and contribute to a more resilient planet for present and future generations. The time for inaction has passed; the time for widespread, sustainable regeneration is now.

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