

Tree Planting: A Veritable Strategy for Climate Adaptation and Disaster Risk Reduction in Nigeria

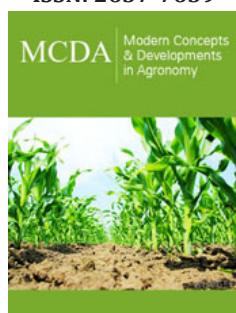
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ISSN: 2637-7659



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Submission:  February 07, 2025

Published:  April 11, 2025

Volume 15 - Issue 1

How to cite this article: Usang N Onnoghen, Uloma Onwuzurike and Benjamin Anabaraonye*. Tree Planting: A Veritable Strategy for Climate Adaptation and Disaster Risk Reduction in Nigeria. Mod Concep Dev Agrono. 15(1). MCDA. 000855. 2025.

DOI: [10.31031/MCDA.2025.15.000855](https://doi.org/10.31031/MCDA.2025.15.000855)

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Abstract

This study identified tree planting as a veritable tool for disaster risk reduction and climate change adaptation in Nigeria. Understanding the direction and magnitude of ecological responses caused by climate change allows human communities to better anticipate these changes and adapt as necessary. The concepts of disaster risk reduction and climate change adaptation are well discussed in this study showing disciplinary-based perspectives. It described tree planting as a Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) strategy for ecosystem restoration and environmental sustainability in Nigeria. It concluded with the clarion call for making disaster risk reduction a national priority and to extend tree planting education across various communities, cities and campuses in Nigeria.

Keywords: Adaptation; Climate change; Disaster risk reduction; Education; Sustainable development; Tree planting

Introduction

A disaster is a serious disruption of the functioning of a community or society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to human, material, economic and environmental losses and impacts [1]. Disaster risk reduction is defined as "The concept and practice of reducing disaster risks through systematic efforts to analyze and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events" [2]. Disasters, one of the main challenges facing nations of the developing world including Nigeria, do not only cause high mortality and suffering but also impede the stabilization of local economies and thwart development achievements [3]. The economic costs from disasters and climate extreme events have been on the increase, especially in developing and least developed countries where remediation funds are either lacking or limited [4]. This escalating cost of disasters and climate change events reflects the need to encourage disaster risk reduction, which according to [5-7] lies in the strength of effective disaster management and adaptation planning. Because of the close linkages between climate change and disaster risks, the international community is increasingly calling for integration of Climate Change Adaptation (CCA) and Disaster Risk Reduction (DRR) [8]. Climate change is the most significant challenge to achieving sustainable development, not only because it affects the global physical environment directly, but also because it affects all aspects of socio-economic development [9].

Climate change is already having an impact on biodiversity and is projected to become a progressively more significant threat in the coming decades. Loss of Arctic Sea ice

threatens biodiversity across an entire biome and beyond. The related pressure of ocean acidification, resulting from higher concentrations of carbon dioxide in the atmosphere, is also already being observed [10]. Biodiversity protection and maintenance are important for the elimination of poverty and sustainable development [11]. At regional level, Countries are also working towards closer integration between DRR and CCA, for instance in the case of the Joint National Action Plans on Disaster Risk Management and Climate Change of the Pacific Region [12]. With the establishment of the Green Climate Fund and other funding mechanisms for extreme climate events, multilateral organizations from all around the world are dedicating billions of dollars into projects aimed at disaster risk reduction in Africa [13,14]. Climatic hazards are the most frequent hazards impacting our communities and any negative change in the climatic system exacerbates disaster risk. In the last century, we have experienced virtually certain changes in climate, especially the warming of the climate system, according to the latest Intergovernmental Panel on Climate Change (IPCC) assessment report [6]. These changes are projected to continue with global increases in temperature, changes to precipitation patterns, intensification of extreme events and increasing sea level [15]. These alterations in the climate system are likely to increase disaster risk in many areas by changing hazard patterns and exacerbating drivers of vulnerability. The Hyogo and Sendai Frameworks, which are global calls for disaster reduction, emphasized the significance of making disaster risk reduction a national and a local priority and understanding disaster risk, respectively [16]. This study clearly identifies tree planting as a veritable strategy for disaster risk reduction and climate change adaptation for sustainable development in Nigeria.

Material and Methods

Data used for this study is derived from published works including academic articles, journals, conference papers, textbooks and internet materials. This paper examined current progress with "tree planting as a veritable strategy for disaster risk reduction and climate change adaptation for sustainable development in Nigeria" through existing literature review and data collection from relevant agencies. The main purpose of this research work was to survey theoretical backgrounds and previous studies on the subject matter.

Disaster risks in deforestation in Nigeria

Deforestation is an environmental problem in Nigeria, a country ranked as having the highest rate of deforestation of primary forest in the world in 2005 [17]. Furthermore, Nigeria is among countries with the highest deforestation rates globally, with about 450,000 to 600,000 hectares of forest lost annually [18,19]. Deforestation has both environmental and public health implications. Some of its environmental implications include desertification, soil erosion, fewer crops, flooding, increased greenhouse gases in the atmosphere, climate change and loss of habitat by plant and animal species [17]. According to the current estimate, deforestation is responsible for about 10 percent of all global warming emissions [20]. According to the United Nations' Food and Agriculture

Organization (FAO), about 7.3 million hectares (18 million acres) of forest are lost every year and roughly half of the earth's tropical forests have already been cleared [21]. Extensive planting of trees with large canopies will capture carbon dioxide from the atmosphere, thereby mitigating the rising atmospheric carbon dioxide levels [22].

The importance of tree planting cannot be over-emphasized which includes carbon sequestration, wind breaking, role in hydrologic cycle, prevention of soil erosion, provision of natural shelter, maintenance of sustainable biodiversity among others. Trees are also known as the "lungs" of the earth and serve in mitigation of climate change [22,23]. To achieve the clear goal of reducing the disaster risks associated with climate change, the United Nations, World Bank and other significant non-governmental organizations have continued to support reforestation and other initiatives that stimulate tree planting [24]. In climate change mitigation policies, attempts have been rife on dynamic solutions such as carbon crediting [25,26] in which tree planting is a necessity and an innovative approach. Different writers have suggested afforestation in a variety of ways to stop global warming that is escalating on a worldwide scale [27,28]. Gobir et al. [29] identified that poor understanding of climate change and its link with reforestation coupled with high use of fossil fuels and poor practice of planting trees in the community will have negative impacts on the environment and health of the population. Researchers have also identified tree planting as one of the strategies for enhancing soil fertility, reducing erosion and greening the environment in Nigeria [30].

Disaster risk reduction for sustainable development in Nigeria

Disaster risk reduction entails that people must learn how to manage disasters and their risks. "Disaster management is the systematic observation and analysis of disasters to improve measures relating to prevention, mitigation, preparedness, emergency response and recovery. It is a continuous and integrated multi-sectoral, multi-disciplinary process of planning and implementation of measures aimed at prevention and mitigation, preparedness, response and recovery in relation to natural and man-made disasters" [31]. The National Emergency Management Agency (NEMA) has advised Nigerians to engage in tree planting, saying this will prevent disasters arising from windstorms presently ravaging many communities in Nigeria [32]. According to the Agency, about 600 houses have been damaged by windstorm, while over 5000 persons in the Southwest geo-political zone of the country have been displaced in the first quarter of the year 2014. Also, major fire incidents have displaced about 250 secondary school children of Unity Secondary College, Ikire, Osun State [32]. Because catastrophic occurrences like prolonged droughts and heat spells have considerably more severe effects on tree development and survival than gradual changes in typical climate conditions, climate variability is particularly significant in relation to variations in precipitation [33].

The benefits of tree planting include

- a. Trees absorb odors and pollutant gases (nitrogen oxides, ammonia, sulfur dioxide and ozone) and filter particulates out of the air by trapping them on their leaves and bark.
- b. Trees provide oxygen.
- c. Trees conserve energy.
- d. Trees save water. Shades from trees slow water evaporation from thirsty lawns. As trees transpire, they increase atmospheric moisture.
- e. Trees help prevent water pollution.
- f. Trees help shield children from ultra-violet rays.
- g. Trees help to prevent soil erosion. On hillsides or stream slopes, trees slowly run off and hold soil in place [34,35].

Recommendation and Conclusion

There is therefore the great need for continuous climate change education by the Ministry of Environment and other relevant stakeholders in Nigeria. The campaign should extensively use both mass media (radio) and community channels (local health care workers and agricultural extension workers) and it should stress the importance of planting trees as an adaptation and mitigation strategy against climate change [29]. There is a great need for scientists, researchers, lecturers and students in the Nigerian Universities to conduct further research on tree planting strategies for disaster risk reduction and climate change adaptation in Nigeria. The effects and benefits of tree planting education in Nigeria are enormous and should be greatly appreciated and encouraged. Government, companies, institutions and even individuals can initiate activities which will lead to the planting of trees in strategic places to help green our environment, release more oxygen into the atmosphere and help create a sustainable environment in Nigeria [36]. Educational blogs, Television, Radio, Social media platforms such as twitter, Facebook, Instagram, etc. can also be employed in educating communities, cities and institutions about the benefits of tree planting and its vital role in disaster risk reduction and climate change adaptation in Nigeria.

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