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Tree planting as a climate change adaptation strategy for sustainable development in Nigeria

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Abstract

Climate change is now recognized as a true global emergency that requires concerted efforts by all countries, businesses, and even individuals to achieve the Paris Agreement goals aimed at addressing the crisis. These goals include holding the rise of average global temperatures to well below 2 degrees Celsius (2 °C) above pre-industrial levels and pursuing actions to limit the temperature increase to 1.5 °C above pre-industrial levels. Tree planting has been discovered as one of the veritable tools which can be used to achieve the Paris Agreement goals in Nigeria. This study presents an up-to-date assessment of selected tree planting activities in Nigeria. It describes tree planting as a climate change adaptation strategy for ecosystem restoration, sustainable economic growth and development in Nigeria. It further highlights the strategies and numerous benefits of tree planting activities in Nigeria. This study further recommends tree planting as a climate change adaptation strategy for sustainable development in Nigeria. It concludes with the need for tree planting education across various communities, cities and institutions in Nigeria.

Keywords: Adaptation, climate change, education, sustainable development, tree planting.

Introduction

The Intergovernmental Panel on Climate Change (IPCC) defines climate change as statistical variations that persist for an extended period, typically decades or longer. Similarly, they define adaptation as the "adjustment in natural or human systems to a new or changing environment. Adaptation to climate change refers to natural or human systems adjusting to actual stimuli or their effects that reduce harm or exploit beneficial opportunities. Various types of adaptation can be famed, including anticipatory and reactive adaptation, private and public adaptation, and autonomous and planned adaptation (IPCC, 2001) ^[19]. Climate mitigation is any action adopted to reduce the long-term risk and hazards of climate variations to human life, property and society. The Intergovernmental Panel on Climate Change (IPCC) described mitigation as: "An anthropogenic intervention to suppress the causes or enhance the sinks of greenhouse gases "(IPCC 2001 ^[19]; GGW, 2018). Climate resilience is the capacity of a socio-ecological system to absorb pressures and maintain function in the face of external stresses resulting from climate change (Folke *et al.*, 2010; Moench, 2014 ^[23]; Shamsuddin, 2020 ^[30]). It also includes the ability and capacity of an ecosystem to adapt, reorganize, and evolve into more desirable configurations that improve the system's sustainability, leaving it better prepared for future climate impacts (Carpenter *et al.*, 2001 ^[12]; Folke, 2006 ^[15]). Climate change has been described as an existential threat to human well-being. Globally, it affects the social and environmental determinants of health: clean air, safe drinking water, sufficient food and secure shelter. The effects of climate change are far-reaching and include heat waves and severe weather, deteriorated air quality, displacement and migration of vectors resulting in increase of a range of diseases related to water and ecological factors. Increasing incidences of mental health issues are being recorded and identified as a consequence of environmental change (Lu, 2016 ^[22]; PAHO, 2013) ^[28]. Climate change is a global challenge which we must of necessity tackle with urgency for our sustainable development in Nigeria (Anabaraonye, Okafor & Hope, 2018) ^[4]. The impacts of climate change in Nigeria are profound and tree planting has been discovered as one of the climate change adaptation strategies for sustainable development in Nigeria (Anabaraonye, Okafor, Ewa & Anukwonke, 2021) ^[9]. Tree cutting for use as fire wood is a common practice in many rural communities in Nigeria where most farmers reside. When trees are cut down (deforestation) and burned or allowed to rot, their stored carbon is

released into the air as carbon dioxide, thereby contributing to global warming. Planting trees is crucial for the ecosystems they support and keeps the ability to counteract the negative effects of climatic factors on various terrains. Promoting healthy forests will consequently result in the absorption of carbon dioxide and assist to mitigate the effects of carbon emissions. Although planting trees and maintaining existing forests won't completely eliminate excess carbon emissions, they can contribute to greenhouse gas emissions reduction, and drastically eliminate the threats that climate change poses to other sustainable development goals (Badmus, 2019^[10]; Anukwonke *et al.*, 2022)^[18].

Methodology

This paper examined current progress with “the tree planting activities as a climate change adaptation strategy for sustainable development in Nigeria” through existing literature review. The main purpose of this research work was to survey theoretical backgrounds and previous studies on the subject matter.

Results and Discussion

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 (Aba *et al.*, 2017^[1]; Chukwuji *et al.*, 2020)^[14]. In order to achieve the clear goal of reducing the consequences of 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 (Smith *et al.*, 2014^[31]; Gainat, 2019). Climate change awareness level needs to greatly increase across Sub-Saharan Africa. This will help communities, cities and institutions in Africa to better understand the role of tree planting as a climate change adaptation strategy for sustainable development. According to recent research, Globally, Sub-Saharan Africa has the lowest climate change awareness level (44%) while Europe has the highest (88%). In Mpumalanga province of South Africa, only 17.1% of farmers were aware of climate change (Oduniyi, 2014). In Nigeria, awareness level is higher in the urban areas (84.2%) than in the rural areas (66.6%) and it is poor especially among vulnerable groups such as women, children and rural dwellers (Beyioku, 2016)^[11]. Current estimate shows that deforestation is responsible for about 10 percent of all global warming emissions (UCS, 2019)^[36]. 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 (UNEP, 2012)^[37]. Extensive planting of trees with large canopies will capture carbon dioxide from the atmosphere, thereby mitigating the rising atmospheric carbon dioxide levels (Aba, Ndukwe, Amu & Baiyeri, 2017)^[1]. In climate change mitigation policies, attempts have been rife on dynamic solutions such as carbon crediting (Anukwonke and Abazu, 2021) in which tree planting is a necessity and an innovative approach. Different writers have suggested afforestation in a variety of ways as a way to stop the global warming that is escalating on a worldwide scale (Badmus, 2019^[10]; Akanwa *et al.*, 2019^[2]; Kreidenweis *et al.*, 2016).

Case study of strategic tree planting activities in selected states in Nigeria

Different agencies and parastatals in Nigeria have keyed into tree planting programs at various occasions and environmental celebrations/events. For example, the majority of organizations, including the Federal Ministry of Environment, Abuja, State Ministries in various states, and Environmental protection agencies, have continued to show strength and leadership in tree-planting campaigns and practices. More crucially, in support of World Environment Day (June 5) and World Earth Day (April 24) festivities initiated by the United Nations Environment programme (UNEP). Environmental stakeholders and other youth leaders from many states in Nigeria have planted trees during their forestry conservation awareness program in line with the global objective of climate action. Similar to this, there are publicized case studies of tree planting initiatives in some Nigerian states. For example, The Seplat Energy Limited announced her “Tree 4 Life Initiative,” a pledge to plant five million trees over the course of five years in an effort to reduce climate change and carbon emissions (Anokam, 2021)^[7]. The tree planting campaign claimed that the novel “Tree Planting and Carbon Sequestration” program which consists of 75% economic trees will reduce Nigeria's carbon footprint while promoting food security, preserving biodiversity, and advancing the goal of net-zero emissions. The program is focused in five states: Edo, Delta, Imo, and two Northern states (Anokam, 2021)^[7]. In addition to that, Sen. Margery Okadigbo, Chairman of the Nigerian National Petroleum Company (NNPC) Board, and Chief Timipre Sylva, State Minister of Petroleum Resources, the tree planting involved women, youths and communities. Two main strategies were developed for the present action, consisting of encouraging citizen responsibility and tree planting, as well as a pledge to plant one million economic trees each year to increase food security and climate action (Seplat Energy, 2021)^[29]. In a similar line, as part of the Presidential Trees Planting Campaign to combat climate change in Nigeria, the Women Environmental Programmed (WEP) received 3000 tree seedlings from the Department of Forestry, Federal Ministry of Environment (WEP, 2020)^[38].

The tree seedlings have been sent to various towns and organizations around the nation for planting. As part of Nigeria's attempts to implement the Paris Climate Change Agreement, the President promised to plant 25 million trees in Nigeria to increase the nation's carbon sink. This organization is carrying out his promise through its tree-planting initiative (WEP, 2020)^[38]. With the help of the following organizations - Green Mobilization Initiative, Angel Support Foundation, Environment and Climate Change Amelioration Initiative, Community Links and Human Empowerment Initiative, Joy Best Ladies Cooperative Farm, the tree planting exercise was successfully completed (WEP, 2020)^[38]. The following areas are among those where trees have been planted by WEP: Dobi Settlement, Gwagwalada, Pagadna Settlement, Government Day Secondary School, Dutsen Alhaji; Government Day Secondary School Zuba; Government Secondary School TunganMaje in the Federal Capital Territory, Abuja; Rice Mill, Gboko; Fidel Polytechnic, Gboko Government Residential Area; Igumale Local Government; Welfare Quarters Extension; Makurdi; and Utu Layout (WEP, 2020)^[38]. Additionally, the Federal

Capital Territory Administration project to plant trees around the nation's capital as a way to mitigate climate change has been tapped into by Jedo Investment Company Abuja (Ukpe, 2020) ^[34]. The corporation started by planting 500 trees in its estate in Lugbe, Abuja, while the Federal Capital Development Authority launched its program to plant 25 million trees in Karshi, Abuja Area Municipal Council. According to Ramatu Aliyu, the Minister of State for the FCT, the move would allow environmentally friendly housing that might lower the greenhouse impact throughout the FCT (Ukpe, 2020) ^[34]. According to General Manager Toni Obi, the initiative launched by the Abuja-based real estate firm was a proactive step taken by the company's Chief Executive Officer, Aliyu Orijii Wamakko, to key into the goals of the FCT Abuja in protecting the planet from greenhouse gas effects and accelerated climatic change (Ukpe, 2020) ^[34].

Similar to this, Yobe State youth in Nigeria have organized and launched a campaign to raise awareness of the devastating effects of deforestation and the need to begin tree planting as part of efforts to conserve and save the environment from further degradation brought on by shifting climatic conditions in the Sahara sub-region, which have resulted in declining food production, decreased rainfall, and an increase in temperature in the Yobe State (Muktar, 2021) ^[24]. The youths who gathered in Damaturu under the auspices of "Youth For Nature" claimed that the state had experienced a drastic decline in rainfall for a few years, which has affected farming and put people's livelihoods in danger because the majority of residents, who are primarily farmers, are unable to engage in farming activities because of the insufficient rain and excessive flooding that destroyed their farm produce (Muktar, 2021) ^[24].

Muktar claims that in 2021 ^[24], more than 2000 seedlings were made accessible to people in a few chosen Local Government Areas (LGAs), in Yobe South, including Jakusko, Nguru, Postikum, Gashua, and Fika. In addition to these LGAs, the youth in Yobe State's major towns have started a tree-planting campaign in homes and streets. They contend that since the vast majority of people live in these large towns and cities, it is important to protect them by making sure that trees are planted to provide a green atmosphere (Muktar, 2021) ^[24]. Federal, State, and municipal governments have made efforts to stop deforestation activities in rural regions while supporting tree planting in urban areas (Oromakinde & Soladoye, 2013) ^[32]. A cooperative initiative by the state government, local government authorities, and local council development areas, together with business organizations, non-governmental organizations, and others, launched a tree planting campaign in Lagos in July 2009. It was designated as "Plant a Tree Today Day" and is commemorated on July 14 each year. According to official data for Lagos State, a total of three million, five hundred and twenty-five thousand (3,525,000) trees have been planted throughout the whole state from the program's beginning until 2013 (Oromakinde & Soladoye, 2013) ^[32]. Soladoye and Oromakinde (2013) ^[32] revealed that seven types of trees had been planted in the research area at Lagos State. Each tree had unique characteristics that made it unique. It was anticipated that the Lagos State Parks and Gardens Agency's (LASPARK) lobbying efforts would result in the planting of roughly 5.9 million trees throughout Lagos state before the year 2030.

According to the agency's instruction, it is crucial for people, business entities, community leaders, religious organizations, NGOs, and all levels of government to provide adequate attention to tree planting in light of the different environmental calamities being faced across the world (Ganiat, 2019) ^[17]. Tree planting has indeed been an all-embracing advocacy projects for climate action in Lagos State, Nigeria amongst others.

The benefits of tree planting in combating the adverse effects of climate change in Nigeria

Tree planting has been discovered by researchers and scientists in recent times as an adaptation strategy to the impacts of climate change for sustainable development in Nigeria (Okon, Okolo, Dibia & Anabaraonye, 2022) ^[27]. Here are some of the benefits of tree planting:

1. 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.
2. Trees provide oxygen.
3. Trees conserve energy.
4. Trees save water. Shades from trees slow water evaporation from thirsty lawns. As trees transpire, they increase atmospheric moisture.
5. Trees help prevent water pollution.
6. Trees help shield children from ultra-violet rays.
7. Trees help to prevent soil erosion. On hillsides or stream slopes, trees slow runoff and hold soil in place (Charles, 2012 ^[13]; Treepeople, 2017) ^[33].

Conclusion

Creating awareness about the right attitudes, skills, and talents needed among people and social groupings in order to achieve a better environment will be necessary for mitigating climate change (Juana *et al.*, 2013). 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 (Anabaraonye, Okafor & Eriobu, 2019) ^[5]. Poetry has been discovered and identified as a valuable tool which can be used in tree planting education for sustainable development in Nigeria (Okon *et al.*, 2022). 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 combating the negative effects of climate change in Nigeria.

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