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At the Frontline of Land Restoration and Sustainable Livelihood: An Analysis of the Implementation of Nigeria's Great Green Wall

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List of Acronyms

AU	African Union
AZAP	Arid Zone Afforestation Project
BCDA	Border Community Development Agency
FAO	Food and Agriculture Organization
FGN	Federal Government of Nigeria
GEF	Global Environment Facility
GGWI	Great Green Wall Initiative
GGWISS	Great Green Wall Initiative for Sahel and Sahara
ISS	Institute of Social Studies
IUCN	International Union for Conservation of Nature
MEA	Millennium Ecosystem Assessment
NAGGW	National Agency for the Great Green Wall
PAGGW	Pan-African Great Green Wall
RBDA	River Basin Development Authority
SER	Society for Ecological Restoration
UNDP	United Nations Development Program
UNCCD	United Nations Convention to Combat Desertification

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Abstract

Sahelian region Great Green Wall Initiative GGWI is a beacon of hope initiated by the African heads of state in 2007 to save the degraded Sahel region by restoring about 100million hectare of land, sequester 250million tons carbon from the soil, increase food security, create jobs and build the resilience of over 30million inhabitants by 2030. Eliciting from ecological restoration and sustainable livelihood approach, this study examines how Nigeria is implementing the regional initiative through the National Agency for the Great Green Wall to achieve land degradation neutrality and sustainable livelihoods of the affected inhabitants. To achieve the objectives of the study, a qualitative approach was adopted, and data was collected through primary (semi-structured online interview) and secondary (relevant academic articles, reports, and web) sources. The study revealed that the implementation process of the GGWI by the NAGGW Nigeria is foot-dragging and seemed inadequate to attain the regional target goal of restoring about 100million degraded land by 2030. The implementation programme needs a more holistic strategy that will integrate innovative solutions with inclusive participation of local institutions to guarantee sustainable development. Government priority should be on good governance and environmental action for effective restoration intervention and to meet the 2030 regional GGWI goal.

Relevance to Development Studies

Restoring degraded "arid" and "semi-arid" land is very essential because the ecosystem supports livelihoods and humanity. The United Nations Convention to Combat Desertification and Drought (UNCCD) through a recent publication by the Society for Ecological Restoration emphasized the importance of having an economically, socially, and resilient ecosystem because of over 2 billion world population dependent on it and the role of a functional and resilient ecosystem play in human wellbeing. The challenges faced by the inhabitants of the arid northern region of Nigeria due to desertification and the ripple effect these challenges have on the peace and unity of the country calls for urgent attention. The forced southward migration of the population has escalated conflicts between the original inhabitants and the settlers due to competition over resources. Empirical data on the operations and implementation process of GGWI in Nigeria will help policymaker device an effective action plan to reduce the vulnerability of the affected population, reduce migration towards the southern part of Nigeria regarded as the buffer zone, and reducing conflicts in the zone. Body of knowledge will also be enriched through this study.

Keywords

Great Green Wall, Desertification, Land degradation, Ecological Restoration, Livelihood sustainability, Ecosystem.

Chapter 1 Overview of the Research Problem

1.1 Introduction

This chapter focuses on the study motivation, the study's background, the study problem, contextual background concerning Sahelian ecological instability because of desertification and drought, and ripple effects of land degradation in the Nigerian frontline states. The study objectives, central question, and sub-questions the study tends to answer, the scope of the study, the researcher's positionality, limitations, and structure of the study are also discussed in this chapter.

1.2 Journey into the Study

This study draws strength from my postgraduate studies in environmental planning and protection programs, some baseline research works, and publications I did on the challenges of climate change, and background knowledge gained as a researcher working in a conflict situation at the frontline states in Nigeria. My directorate's ongoing project on climate change and livelihoods of Nigeria's border communities in my office back home shoved me deeper into the challenges in the Sahel and regional responses to the challenges. The challenges range from desertification and drought, causing land degradation with the resultant effect on the ecosystem and biodiversity loss, low agricultural productivity, water scarcity, forced migration, and social conflict. The global weather variability exacerbates the environmental challenges in the frontline states. Through its annual assessment reports, the International Panel on Climate Change IPCC stated that the African continent in which the Sahel region is located would be vulnerable to global weather variability. The climate change project in my organization and some of my research work raised my curiosity about the Nigerian government's strategies in tackling the challenges in the frontline states. Some policies such as "Arid Zone Afforestation Project" (AZAP) in 1977, the "River Basin Development Authorities" (RBDA) in 1987, "Federal and State Environmental Protection Agency" (FEPA/ SEPA), etc. and the Great Green wall" were introduced to combat the effects of desertification and drought in Nigeria's arid zone (Idris et al., 2019:19). The policies and programs are regarded as a 'sectoral approach' but a large-scale strategic policy and Program (Great Green Wall) (Olagunju 2015:197) that requires a paradigm shift from just an afforestation program to a more integrated approach is desired.

This study focused on the Great Green Wall Initiative in Sahel and Sahara region GGWISS, regarded as a more integrated strategy in combating the effects of "drought" and "desertification" in the Nigerian affected arid region regarded as frontline states. The initiative is a regional strategic approach that countries within the South Sahelian region like Nigeria domesticated for implementation processes in the region. I concentrated on the National Agency for the Great Green Wall (NAGGW) Nigeria, which the Federal government established as the organization implementing the GGWI intervention program in the frontline states. My focus on the NAGGW is in line with the regional signed convention of GGWI that demands implementation countries to establish such national institution for the implementation process. It is imperative to centre my analysis of the GGW initiative on the established institution for valid information to help me achieve the study's desired objective.

The Great Green Wall initiative is considered a beaming hope for a sustainable region after over 50 years of looking for a development initiative that will tackle the adverse effect of social and ecological challenges in the Sahel (Goffner et al., 2019:1417a). The challenges

have exacerbated water, food insecurity, and hunger, thereby endangering millions of Africans' lives and livelihoods in the region (Goffner et al., 2019:1417b). African heads of states adopted the GGWISS in 2007 for the South Sahelian countries to change the lived reality of millions of populations affected by the expanding deserts and shrinking biodiversity. Collective action by the African heads is regarded as an opportunity to restore and reverse the region's existential threat. An opening message by the UN Deputy Secretary-General, Mrs. Amina Mohammed, at the ministerial meeting on Great Green Wall achievements held in Bonn on 7th September 2020 acknowledged that the initiative would be a massive success through collective action. She stated that "Having an opportunity to act together through collective action will end poverty, hunger, fight climate change and create an economical pathway to affected people. Also, economical, and sustainable development to the millions of lives and community residing in the Sahel and beyond will be achieved" (UNCCD, 2020). The UNCCD Executive Secretary, Mr. Ibrahim Thiaw, reiterated the need for a solidarity action on GGWI that directly benefits the local communities and long-term international ecosystem benefits. He further stated that when countries dream, work and take the right steps towards nature, a harmonious, sustainable, and prosperous life will be achieved. (UNCCD, 2020).

My passion for environmental justice and peacebuilding spurred me into this research. My encounter with the reality of desertification during a UNICEF program in Borno state (one of the frontline states) raised my curiosity in the NAGGW Nigeria activities in Borno state. Also, an ongoing project in my organization back home in Nigeria on climate change adaptation and the livelihoods of the border communities has increased that curiosity on NAGGW operations and the type of interventions the Agency adopts to sustain the inhabitants' sustainable livelihood.

1.3 Historical overview of the Great Green Wall

The concept of building a wall with an intent to protect against invaders emanated when the Chinese emperors built a great wall against Mongolian forces invading the northern region (Monastersky, 1994:406a). When Mao Tse-tung took over after the Chinese revolution, he transformed the great wall built against the invading nomads into a green wall of trees against dust storm from the Gobi Desert. Over the years since 1950, China has planted over 300 million trees along the northern arid region's pathway to prevent invading dust storms from the Gobi forest and other arid regions (Monastersky 1994:406b). Environmental challenges have given rise to different strategic plans and approaches to overcome it, especially in the 21st century, with increasing global climate variability. In China, scientists applauded the Chinese great green wall and regarded it as an aggressive afforestation project that modified the Chinese climate in the 20th century (1994: 406c). The belt of trees is believed to have minimized dust and acts as windbreakers slowing down winds and preserving the soil moisture of the arid northern region (Ibid). The concept of a green wall or green belt is one of those approaches used mostly in arid or semi-arid regions. It involves using a strip of trees to build a wall against environmental challenges.

The European continent also acknowledged the significance of nature preservation and sustainable development by initiating the "European Green Belt" in 2004 for a transboundary ecological network (Strauss and Lang 2009:12). The green belt initiative has a regional diversity and runs through "Europe biogeographic" regions to conserve biodiversity in the sheltered areas. The European green belt initiative was structured into three regional sections; "Fennoscandia" and the "Baltic," "Central Europe," and South-Eastern Europe with a regional coordinator and overseen by the International Union for the conservation of Nature IUCN (2009:14a). The European green belt adjoins 23 countries and is created to transform

social division into nature conservation that will "contribute to building strong transboundary identities" (2009:14b).

The International Panel has identified the African continent on Climate Change IPCC as the most vulnerable to climate change. The IPCC third assessment report (TAR3) expressly indicated that Africa is hugely susceptible to the changing climate effects, particularly in water resources, food production, desertification, and coastal population due to alteration in temperature and precipitation patterns (IPCC, 2001:261). The African Union's (AU) decision to ease and reverse the effect of desertification and drought in the Sahara and Sahel region ravaged by climate variability adopted its green belt initiative in 2007 introduced by the former President of Nigeria Dr. Olusegun Obasanjo. Different global and regional measures have been adopted, and commitments made to halt and reverse degraded land and restoring ecosystems (UNCCD, 2017:113a). They include the Bonn challenge on forest landscape restoration, the African forest landscape restoration initiative, the great green wall initiative of Africa, etc. (2017:113b).

The "Great Green Wall" initiative GGWI which the African heads of states adopted in 2007 through declaration 137 (viii) at the 8th Summit of the African Heads of states held in Addis Ababa Ethiopia, was set up to curb the detrimental effect of "social," "economic," and "environmental effects" of land degradation in the region (Pan African Great Green Wall: 2018:32). The initiative is planned to grow about 8000km belt of trees to mitigate desert encroachment degrading the Sahara and Sahel region, increase food security, and enrich the livelihoods of the region's inhabitants (African Union, 2007 n.d.). The summit calls on member states and "Regional Economic Communities" (RECs) to facilitate the initiative's implementation at the national, sub-regional, and regional levels by setting up institutions to guide the implementation process.

The "Pan African Agency for Great Green Wall" (PAGGW) was established to collaborate with member states to implement a green belt of trees stretching about 8000km long and 15km wide from Djibouti in East Africa to Senegal in West Africa. African Union member countries were encouraged to domesticate the initiative and drive the implementation process. As a member country, Nigeria resumed the initiative's implementation process in 2012. Through the Federation of Nigeria's laws, the "National Agency for the Great Green (NAGGW) wall was established on 27th May 2015 under Act NO (3) of the Federal Government of Nigeria. The Act mandated the Agency to manage and reverse desert encroachment in Nigeria's frontline states through regional, sub-regional, and international collaboration. Strict adherence to the requirements of international conventions, treaties, protocols, and agreements relating to the implementation program is required.[1] The NAGGW has a vision and mission to stop desert encroachment that is causing land degradation, restore biodiversity loss, build ecosystem resilience to weather variability that will continue to improve livelihood, and end poverty in the arid northern part of Nigeria (National Agency for the Great Green Wall, n.d).

GGW initiative has been proposed in some continents such as Asia and Europe; in China, it is known as China Great Green Wall, to modify weather conditions across the northern arid region by planting several millions of trees to reduce dust storm, slow down winds, and moisturizes the soil (Monastersky, 1994:406). According to Lang and Strauss (2009:12), in Europe, a similar initiative was the "European Green Belt" aimed at conserving the natural environment for sustainable development and creating opportunities for local

[1] National Agency for the Great Green wall (establishment) Act no 3, 2015. Laws of the Federation of Nigeria. www.LawNigeria.com

socio-economic development. The implementation process of the GGWI in Nigeria is through the National Agency for the Great Green Wall Nigeria (NAGGW).

Before the Agency was established in 2015, it emerged from early information acquired by the researcher that the implementation process of the GGW initiative had already started in 2012. The Federal Ministry of Environment in Nigeria piloted the process through the department of Drought and Desertification Amelioration with a Great Green Wall Strategic Action Plan (GGWSAP) activity that focused on restoring the ecosystem and the degraded land and improve the livelihood of the affected people through the provision of sustainable land and water management.[2] The great green wall strategic action plan GGWSAP was developed in 2012 for GGW intervention programs supported by the African Union Commission. The European Union and Global Mechanism United Nations Convention on Combating Desertification (UNCCD) funded the program while the UN Food and Agricultural Organization (UNFAO) executed the program activities (FAO n.d)

1.4 National Agency for the Great Green Wall Nigeria in brief

The operations and implementation process of the GGW initiative by the NAGGW Nigeria began in 2015 with a take-off grant of Ten billion naira approved by the former president of the federal republic of Nigeria, Dr. Goodluck Ebele Jonathan. The take-off grant was utilized by NAGGW to continue with the implementation process and intervention programs until 2017, when the Agency became part of the federal government budget appropriation. The Agency is structured into five departments mandated to achieve the Pan-African GGW initiative through various operational units. They are Afforestation and Land Management Department, Finance & Administration Department, Planning, Policy, Coordination Department, Resource Mobilization and Partnership Building Department, Rural development, and extension services. Efficacy of the NAGGW Nigeria is structured in a way that there is a governing council that provides policy direction for the Agency, the state implementation committee that coordinates the programs in the frontline states, and the local government committee that takes the program at the local government and community level (NAGGW).

The NAGGW Act, No 3rd May 2015 that established the Agency, mandated it to implement the convention's provisions on the Great Green Wall Program in Nigeria in line with the Great Green Wall for the Sahara and the Sahel Initiative (GGWSSI) (NAGGW Establishment Act, 2015:77). The Act requests the Agency to formulate implementation strategy and coordinate the activities of other organisations responsible for desertification (2015:77). NAGGW Nigeria through the Act should targets the restoration of degraded land and ecosystem by creating mosaic green wall of trees or shelter belts from Kebbi State in northwest Nigeria to Borno State in northeast part, with a distance of 1,500 kilometers and 15 kilometres wide (Ibid). The process is to wedge the southward expansion of the Sahara Desert and improve land productivity (2015:78). Its objectives include to implement the Great Green Wall Program in the eleven (11) frontline states. Furthermore, the NAGGW Nigeria is mandated by the Act to capacity knowledge and skills at all governmental levels for the effective implementation of the Program (NAGGW Act, 2015:77-78).

Additional directives of the Act to NAGGW Nigeria includes ensuring active cooperation with the African Union Commission (AUC) and the Pan-African Agency of the Great Green Wall for compliance with the regional rules of engagement sustainable development in the affected areas. The Act, "which is to address land degradation and desertification in

[2] National Strategic Action Plan for the implementation of the Great Green Wall for Sahara and Sahel initiative (2012). A Federal Government of Nigeria Document

the Sahara and Sahel regions of Nigeria, is expected to enhance food security, help communities adapt to climate change, reduce rural poverty, minimize social conflicts, lead to the creation of alternative jobs, or jobs in general, and boost the rural economy" (National Agency for Great Green Wall Establishment Act, 2015:78).

This study focused on NAGGW Nigeria because the Nigerian government signed the GGW convention in 2010 for its implementation process, which has set up a national institution as one of the objectives and the first phase activities for the program. However, it is necessary to carry out this research through the operations and programs of NAGGW Nigeria for clearer knowledge of the GGWI and the efficacy of the implementation process.

1.5 Statement of Problem

Over 90 percent of the population of Nigeria Sahel region are intimately dependent on the natural resources in the region, and agriculture and livestock production are their primary source of livelihood activity (Goffner et al., 2019 citing FAO 2014). The agricultural activities are rainfed, and the region receives between 200-800mm of rainfall annually (Gadzama, 2017:280), rendering the region vulnerable to low precipitation with a significant crop reduction yield. The low precipitation or lack of rain has led to the disappearance of livestock and the destruction of crops in the region (Great Green Wall Nigeria).

Many factors are attributed to these changes, which are temporal and spatial, ranging from natural factors such as weather /climate variability, population growth, socio-economic factors, Institutional factors to human-induced as overgrazing, deforestation, poor agricultural practices (Gadzama and Ayuba, 2016:19). These factors exacerbate the already fragile region resulting in resource scarcity and forced movement of inhabitants to the north-central or middle belt part of the country that acts as a buffer zone and destination communities for the affected population. Gadzama and Ayuba (2016) provided empirical findings on this submission of forced movement into the north-central part of Nigeria, "the north-central or middle belt states acts as the buffer zone, they absorb the pressure of migrating human and animal population" (2016:19). Competition over limited resources in the buffer zone becomes inevitable and hence, confrontation and violent conflict. The violent conflict between farmers and herdsmen in the buffer zone escalated recently, and over 6,000 people are reportedly killed and about 62,000 becoming internally displaced in the north-central region of the country comprising of Benue, Nasarawa, and Plateau (Kwaja and Ademola-Adelehin, 2018:15). These three states are home to more than 12 million inhabitants, according to the Nigerian Bureau of Statistics (2017) projected population.

Extant literature and debates on the phenomenon had shown that the GGW program remains an effective strategy to tackle deforestation and drought that has indirect. O' Conor and Ford (2014) posited that the program is an effective strategy but argued that it needs some modification for an integrated approach for both ecological restoration and economic benefit. (O'Conor and Ford, 2014:7142a). A paradigm shift from just planting trees to shrubs that grow faster with multiple benefits, especially for "Silvo-pastoral" livelihoods that can provide alternatives for the frontline inhabitants, states that their livelihoods depend on agriculture and livestock. (O'Conor and Ford, 2014:7142b) The NAGGW restoration strategy of providing shelter beds and woodlots to combat desertification and land degradation needs to adopt the "Silvo-pastoral" system. The Silvo-pastoral system represents land use involving planting trees, forage, and livestock components on the same land (Cabbage et al., 2012:304a). It is the form of restoration that includes all elements of "alley cropping," "windbreaks and shelterbelts," "scattered trees" in the pasture with intensive management, and "rotational grazing" (2012:304b).

The United Nations Convention to Combat Desertification UNCCD posits that the "silvo-pastoral" system supports several purposes because "it aids land productivity with the establishment of fruit trees, supports land conservation by limiting livestock to certain areas, reduces water runoff, and improved soil moisture and water retention" (UNCCD, 2016). The alternatives in silvo-pastoral livelihood can be a turning point in managing the confrontation between farmers and herders in the buffer zone because it will reduce forced migration caused by desertification and land degradation to the zone. The existing gap that this study focused on in the implementation strategy adopted by the NAGGW Nigeria, which only addresses restoration strategy that only provides shelter beds, woodlots, orchard, and other alternative sources of livelihood, requires a holistic integration of silvo-pastoral alternative that will limit forced migration of the livestock breeders to the buffer zone that will reduce confrontation and conflict.

1.6 Scope of the Study

This study geographically covers Nigeria's dry land frontline states, where the GGW intervention programs are operationalized. They are regarded as the frontline states because the 11 states involved in the semi-arid northern part of Nigeria are ravaged by land degradation due to desertification (Kebbi, Sokoto, Zamfara, Kastina, Kano, Jigawa, Bauchi, Gombe, Yobe, Adamawa, Borno). The States share common boundaries, occupy about 40% of Nigeria's landmass in the Sudano-Sahelian West Africa located within Latitudes 10° to 14° N and Longitudes 3° and 14° East and have a population of about 35 million people (Gadzama and Ayuba, 2016:19). The dry frontline part of Nigeria's tropical topsoil is "ferruginous" in nature, with a large percentage embodied by sandy -fixed rippled landscape (Mortimore 1989 cited in Ministry of Environment, 2014:10a). The soil quality not fertile because of its low content in organic matter, "nitrogen," and "phosphorous" and can rapidly erode under intensive rainfall (2014:10b). The dry frontline region's annual rainfall is between 200mm-800mm (Gadzama and Ayuba: 2016:19). The Sahel belt, "a transition zone between the Sahara Desert and the tropical savannas" where the frontline states are located, is identified as the region with substantial variability of rainfall and predominantly prone to food insecurity due to the dependability of the agro-pastoralist population on rain-fed agriculture for their livelihood (Leroux et al., 2017:38).

1.7 Research Objectives and Questions

This study's central aim is to identify and examine the great green wall initiative implementation process through the operational activities of NAGGW Nigeria. The intervention programs by the NAGGW Nigeria will be explored to determine their implementation strategies and the effects on land degradation, and the livelihoods of the affected persons in the frontline states of Nigeria that are mainly farmers and livestock breeders. Also, assessing the target objectives of restoring degraded lands, resettlement of affected persons, provision of social and economic infrastructure to reduce forced migration, and social conflicts is expounded. To achieve these objectives, the study tends to answer the following questions,

Main Research Question

How has NAGGW Nigeria's implementation process curtailed land degradation and affected inhabitants' livelihoods in Nigeria's frontline states? The sub-questions that will enable me to dissect the main research questions are listed thus,

- What is the land restoration strategy adopted by the National Agency Great Green Wall in restoring degraded lands affected by desertification?
- What does NAGGW adopt the alternative livelihood strategies in building the resilience of the affected inhabitants in the frontline states"?
- What are the potentials of the GGW intervention program in addressing the vulnerability of the affected inhabitants concerning forced migration and conflict between the farmers and livestock breeders in the buffer zone?
- What are the challenges derailing the NAGGW in achieving a sustainable implementation Program in the frontline states?

1.8 Study Limitations and Researcher's Positionality

The challenges of the present global COVID-19 pandemic affected this study because it limited my data collection process. The pandemic created a geographical barrier to my study due to my inability to travel to Nigeria's study area due to measures adopted by the host country Netherland and the Nigerian government as the international borders were closed. I had to change my research topic to an option that would enable me to gather the study's required data. I planned to engage a reliable research assistant who is knowledgeable on the topic and the study area's geographical terrain. The COVID-19 measure to flatten the curve for the spread of the virus prevented me from engaging the research assistance services to avoid putting him/her at risk, which is against the ethics of "Do No Harm" in a research study. Kaplan et al. (2020) argued that the principle of "Do No Harm" should not only be applied to research participants but also both local and international researchers because they face challenges that involve their safety, such as conflict situation or challenges like COVID -19 (Kaplan et al., 2020:1). I relied on online interviews for my primary data collection and existing literature to bridge the existing gap on which this study is premised upon. The geographical barrier also limited my access to NAGGW because I could not physically approach the Agency for relevant materials and face-to-face interviews. Also, a physical assessment of the Agency's implementation program could not be obtained, which limited my data on the implementation program.

Furthermore, some sensitive documents that were not in the public domain could not be accessed because NAGGW Nigeria is a federal government agency, and an 'Oath of Secrecy' is administered for every public servant. Hence, the release of some vital information was not possible, such as total funds accessed by the NAGGW for the implementation Programs and the current document on the Agency's strategic plan. I could get relevant information from other civil society organizations that are not constrained in releasing information for a credible research study. Also, information from relevant secondary data was used in carrying out the study.

During my online interview, some identified participants for the online interview declined to inform the audience that they do not have the time and will not want to air their view on the GGWI. Still, my network as a researcher in Nigeria helped me to identify other knowledgeable participants for the interview. The language barrier was also a problem during the interview. I was referred to a participant who can communicate in English to help me with vital data collection information. Hitches in the digital communication network were encountered during the online interview because some frontline state communities do not have strong network coverage. This hitch was surmounted because my participants chose a

better time to have a smooth interview without network challenges. I also bought a data subscription for some of the participants for a successful online interview.

Therefore, the conclusions reached in this study need to be understood in the broader context of data collection constraints; however, these constraints do not constitute negative factors towards achieving the objectives of this study due to mitigating steps taken as obstacles were encountered. This research is complex and sensitive, especially where it concerns gathering sensitive information and documents (for example, on project financing and expenditure profile) in a federal government agency due to the policy on oath of secrecy.

Positioning myself as a public officer, just like the respondents and seeking information, helped me create trust with my participants. In embarking on this study as a public officer working in a government agency and studying another government agency's activities, I located myself as both insider and outsider.

A researcher's knowledge is based on his/her positionality (Dwyer and Buckle, 2009:60 citing Mullings 1999). First, I was an insider because of my privileged position as a public officer with which gave me additional insights into the researcher-researched relationship in this regional context. This 'insider' position also helped me gain participants' trust, "essential for a constructive qualitative research encounter" (Raheim et al., 2016:2). The participants in the National Agency for Great Green Wall Nigeria view me as a government worker like them, and that influenced my interaction during the online interview as they were ready to share their experiences and thought on the study topic. However, there are debates and dichotomy on the "insider-outsider" perspective to research study, the "space between" challenges this dichotomy of the insider-outsider status of a researcher (Dwyer and Buckle, 2009:60a).

Qualitative research creates an intimacy with the study, keeping the researcher in the space between the costs and benefits embedded therein (2009:60b). I did not separate myself from the study as an outsider neither did I qualify as a complete insider while carrying out this study because all the aspect of the research process is essential in achieving my aim and objectives. Raheim et al. (2016) reiterate that the individual researcher's views, reasoning, and experiences are bound to impact the overall research process and even the findings (2016:1).

1.9 Structure of the Research Paper

This paper is arranged into five chapters. Chapter one of this study highlighted the general research problem. It expounded on the study's motivation, the Great Green Wall Initiation's historical view, the implementation institution (NAGGW), objectives, scope, research questions, relevance, and limitations. Chapter two theorized and conceptualized the study highlighting the theoretical lens and concepts adopted with the analytical framework. Chapter three introduced the methodology and methods of data collection the researcher employed for empirical data gathering. Chapter four presented the findings and analyzed the implementation process of NAGGW Nigeria. Chapter five discussed the conclusions represented in the study.

Chapter 2 Theorising & Contextualising the Research Study

2.1 Introduction

This chapter contextualises and theorises the case study adopted, providing clarification on critical concepts and implementation-related issues around ecological projects like the Sahelian Great Green Wall. One critical theoretical lens used to examine the operationalization and implementation of the NAGGW initiative in Nigeria is ecological restoration theory.

2.2 Contextualising Sahelian Desertification in frontline states

The Sahel's ecological system is considered sensitive and delicate globally. Due to the protracted drought of about 20 years with anthropogenic activities, the intensification of desertification has made the land fragile and difficult for sustainable development (Gadzama and Ayuba, 2016:19). Desertification in the Sahel region extending to the frontline states (Bauchi, Gombe, Borno, Yobe, Kano, Jigawa, Katsina, Sokoto, Zamfara, Kebbi, and Adamawa) in the northern part of Nigeria is considered a substantial environmental challenge with severe threats to sustainable agriculture and land management. Sahelian states have been dubbed the most vulnerable region to the hazards of climate change, the impact of desertification, and population surge (Pan African Great Green Wall, 2018:15).

The recurrent challenges of drought and desertification in the Sahel region of Africa have resulted in land degradation, lack of food, conflicts over dwindling natural resources, and forced migration. These challenges are worsened by the climate variability witnessed in the region that results in desertification and drought, affecting the region's ecosystem stability. Desertification affects about 40% of the African continent (Great Green Wall, 2014:3a), and the UN Food and Agricultural Organisations report states that about two-thirds of Africa's arable land could be lost by the year 2025 (Great Green Wall 2014:3b). Several global and regional initiatives have been developed to abruptly stop and reverse the degraded land and restore degraded ecosystems (United Nations Convention to Combat Desertification 2017:113). Some of the regional strategies for ameliorating these challenges are the African Land Restoration Initiative (AFR100) and the "Great Green Wall initiative Initiative for Sahara and Sahel (GGWISS).

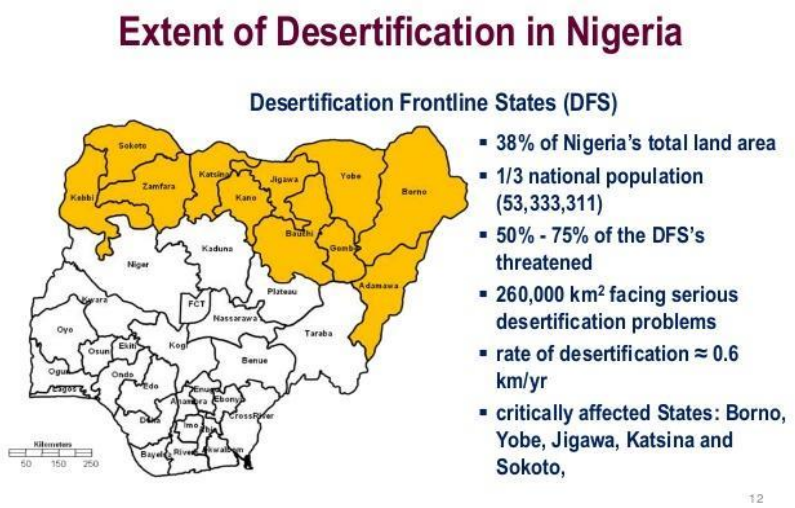
Nigeria lies in West Africa's Sudano-Sahelian region, where the arid northern part of the country is situated and occupying about 40 percent of the country's total landmass with over 30million inhabitants (Gadzama, 2017:280). The arid northern part of Nigeria is visibly affected by climate variability and other causative factors that result in desertification and drought. Desertification and drought are the effects of climate variability with causative factors that are both immediate and implicit. Direct factors include land-use practices and climate-related activities, while indirect factors are attributed to population pressures, socio-economic, and policy effects (Gadzama and Ayuba, 2016:19a). The phenomenon is affecting about 11 states in the north-eastern region of Nigeria regarded as "frontline states"[3]. There are also visible signs of vegetation shift in the frontline states (Bauchi, Borno, Gombe, Jigawa, Kano, Katsina, Kebbi, Sokoto, Yobe, Adamawa, and Zamfara). The extent of loss to varying degrees of desertification is estimated to amount to between 50 % and 75 % in the

[3] The northern arid region is known regarded as frontline states due to their location in the Sahelian environment. The states border Niger and stretch along the Sahel region of West Africa.

affected states (Olagunju, 2015:199). The frontline states affected by desertification problems cover about 42% of the total land area, with 35 million Nigerians vulnerable to the phenomenon (Gadzama and Ayuba, 2019:16b). The severity, extent, and progression rate of the desertification has not been well proven or documented but evidence has shown some vegetation shifts and mass migration of inhabitants towards the southern region (Federal Ministry of Environment, 2012:11).

The Lake chad region situated in the Sahel is exacerbating the communities' vulnerability in the frontline states, especially the northeast part sharing a border with Niger. This fragility being experienced in the Lake Chad and Sahel region has its origin in remote and immediate causal factors such as – climatic or weather variability, desert encroachment, depletion of soil fertility, drying up of riverbeds, and more in-depth sourcing of underground water. Murakami (2020) stated that the United Nations Analyst, Salkida Ahmad cited in 2012 that "As you approach the Lake Chad basin (…), the atmosphere of despair is telling. The air is dusty, the wind is intense and persistent, the plants are wilting, and the earth is turning into sand dunes. Withered trees and shrubs occasionally interrupt the sparse vegetation. The lives of herders, fisherfolk, and farmers are lurching on the edge as the lake dry out before them. vegetation and water, the traditional staples of livelihood for the Lake Chad community dwellers, are disappearing" (Murakami, 2020:6a). The UN Food Agricultural Organization also regarded the Lake Chad region as an "ecological catastrophe" (Murakami, 2020:6b). These visible climatic conditions in the Sahel region is threatening the Nigerian frontline states. Below is the extent of desolation caused by desertification in Nigeria's frontline states.

Figure 1. **Desertification in frontline states of Nigeria**



Source: Dogara Bashiru (2017:12)

Figure 1 shows the estimated extent of desertification as withered trees and shrubs occasionally break the sparse vegetation wail migration of the Sahara desert is 0.6km annually, and Nigeria losses about 351,000 hectares of arable and rangeland annually to desertification (Gadzama, 2017:280 citing Gadzama, 1995; Tiffen and Mortimore, 2002; Federal Government of Nigeria (FGN), 2004; Winslow et al., 2004). Affirming the situation is the former Nigerian Minister of State for Environment, Ibrahim Usman Jubril, while speaking on the occasion of the World Day to Combat Desertification in 2017, stated that: "desertification has negatively affected water resources, drives deforestation, food security; and contributes to environmentally induced migrations, and is, therefore, amongst the most critical sustaina-

ble development challenges in the north" (The Guardian, 2017). The desertification and depletion of arable and grazing lands in Nigeria's northern arid part negatively impacted inhabitants' dependence on those resources for their livelihood and has contributed to forced southward migration for survival. The forced migration also brings them in constant confrontation with inhabitants of destination communities as competition for locally available resources intensify; thus, fragility spreads southwards. The clashes in the frontline area are mainly related with competition over resources, water, land, and pasture (IOM:2019:20).

The spatial and temporal changes in land cover assessed by Nwilo P.C et al. (2020) between 1984-2016 in more than 50% of the frontline states (Borno, Yobe, jigawa, Kastina, Zamfara, and Sokoto) at the Sahelian border and lake chad revealed that there was rapid vegetation loss in the northern arid region (Nwilo et al., 2020:7) occasioned by natural and anthropogenic activities. They reiterated that one of the significant factors was desertification arising from temperature increase resulting in the region's dryness and aridity.

This situation has degraded the environment's biodiversity and disrupted the people's socio-economic livelihood (2020:8a). Going further, they postulated that degradation had exacerbated the conflict between farmers and herders in Nigeria (2020:8b). The international organisation on Migration (IOM) affirmed in their 2019 Displacement Tracking Matrix that about 19,206 individuals are currently displaced due to natural disaster issues such as desertification and drought (IOM, 2019:20)

However, going beyond the impact of desertification on the forced environmental movement and the struggle for scarce resources, the extant literature and empirical study on environmentally induced movement have experienced a drought in establishing a clear connection between interventions targeted at afforestation and their impact on desertification and ultimately the current arena of conflict. Existing literature has provided theoretical propositions for addressing desertification by enhancing initiatives targeted at afforestation through ecological recovery (Society for Ecological Recovery, 2004).

More so, the NAGGW Nigeria program has claimed that about 5million hectares of degraded land have been restored and about 20,000 jobs created (UNCCD 2020). should have clear implications for the landholdings of subsistence farmers and cattle breeders that predominate the frontline states. However, the import of these benefits has not been studied. Hence the need for empirical data to depict the impact or otherwise of its afforestation strategy. To this end, this research becomes ever more critical given the claim that approximately 20% of degraded areas (260,000km2) has been restored and begs the question if the pace of restoration is keeping up or farther ahead than degradation (0.6km per year).

2.3 UN and Nigerian/Sahelian GGW Initiatives

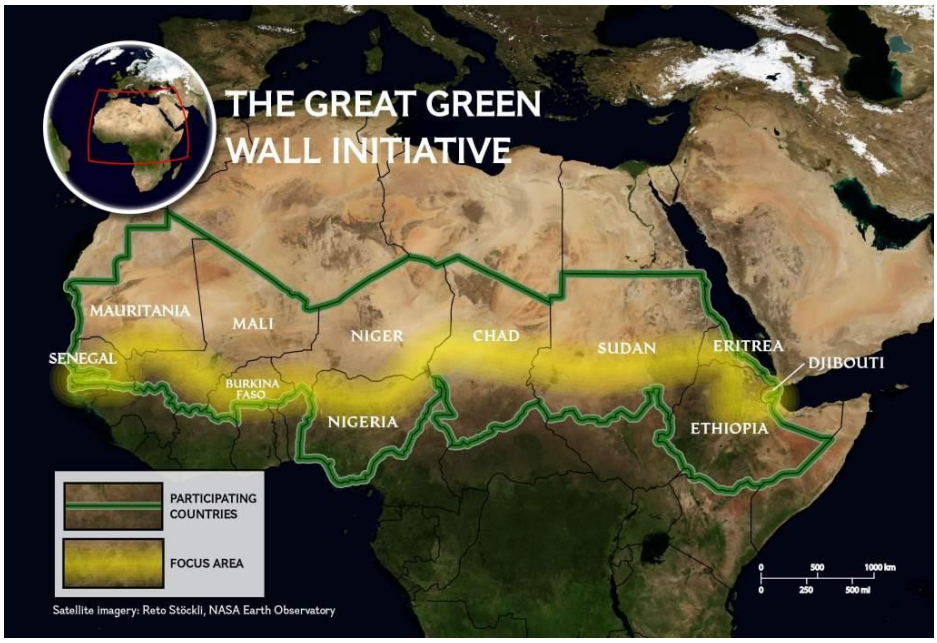
Regarded by United Nations Convention to Combat Desertification and Drought (UNCCD) as a symbol of hope and game-changing initiative for Africa's degraded landscape and the lives of millions of inhabitants in that region, GGWISS tends to build a strip of 8000km2 long, 15km wide of trees stop the southward advancement of desertification in Sahel-Sahara region (UNCCD n.a). The Pan-African Agency coordinates the initiative for the Great Green Wall (PAGGW) set up by the African Union on 17th June 2010 (PAGGW, 2018:33). The process and activities are expected to restore over 100million hectares of degraded land in the Sahel region and create about 10million jobs.

While international support has been leveraged for the GGWI, there are opposing views to the project at local and international levels. The argument is non inclusivity of the locals in decision making. They believe that the project is currently turning productive agricultural

land to tree monocultures, that will further increase the vulnerability of the inhabitants and may result in a loss of traditional livelihoods (Chechina, 2011: 464)

The regional GGWISS has been domesticated in many African countries; they are (Burkina Faso, Chad, Ethiopia, Eritrea, Mali, Mauritania, Niger, Nigeria, Senegal, Djibouti, and Sudan. These countries signed the convention and ratified it (PAGGW, 2018:33). There is a target of restoring 100million hectares of land, and by 2030 and the implementation, countries are expected to restore about 8.2million annually to achieve this goal. How possible can the implementation strategy of NAGGW Nigeria achieve the regional target goal by restoring 8.2 million hectares annually?

Figure 2. Great Green Wall Initiative Participating countries and the focus area.



Source: nationalgeographic.org

The Implementation Process in Nigeria began in 2012 by the Ministry of Environment through the Drought and Desertification unit. In May 2015, the National Agency for the Great Green Wall Nigeria was established for the full operation of the initiative with the operational area at the 11 frontline states of Nigeria ravaged by desertification and climate variabilities. The GGWI was proposed as an adaptive strategy for climate change; it could also have important benefits for mitigation by providing significant carbon sequestration through large-scale planting. The regional goal is to sequester over 250Mt of CO2 by the year 2030 (UNCCD, 2020:2). The additional argument concerning the implementation strategy to increase food supply and support the local communities, abundant food crop and silvo-pastoral areas should be created instead of just having a narrow strip of the wall. The addition will be holistic and enhance the community's wellbeing.

It can be argued that an absence of local buy-in by communities and regional decision-makers will significantly undermine the long-term sustainability of the Program (Dyer et al. 2014:138). Successful community participation creates an atmosphere of trust, equity, informed decisions, fairness, achievable outcome that can influence the project's impact (Ibid). Community participation can as well empower the community and grants a sense of ownership for sustainability. Other similar initiatives from Asian continents demonstrate that thriving local communities' buy-in is essential and that partnerships must be created between

government, local communities, and technical and financial partners (2014:138). Reiterating on the community engagement process as a catalyst for successful project outcome, Dyer et al. (2014) states that 'community engagement' offers inclusive views from stakeholder that when fulfilled, there are chances of realising 'successful' project outcomes(2014:139).

2.4 Theoretical Clarifications

This study is constructed around ecological restoration theory, which plays a vital role for policymakers aiming to restore or reverse the effects of environmental degradation. The concept integrates aspects of land, hydrology, biological conservation with the socio-economic and political frameworks of specific contexts (Aradottir and Hagen, 2013:174). Hobbs and Norton (1996) affirmed that ecological restoration for resilience building should have a paradigm shift of just being an ad-hoc intervention but a more situated large-scale project that will incorporate various aspects of restoration. Though some scholars are indifferent to ecological restoration due to the inability to restore the ecosystem composition, the focus should be on having a functional and stable ecosystem that, with specie composition, should be a goal and tool for restoration (Shackelford et al., 2013:297).

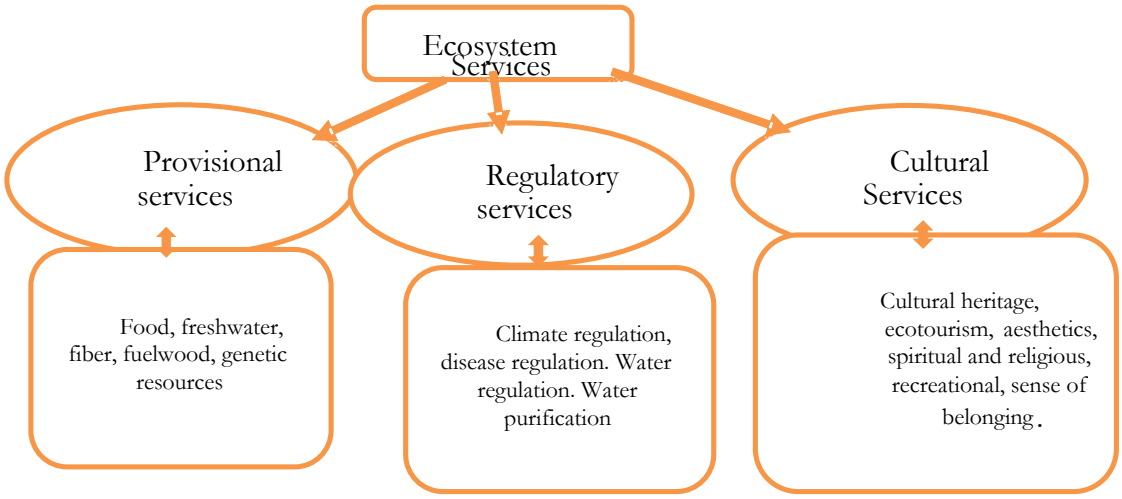
2.4.1 NAGGW: Ecological Restoration as Implementation Strategy

Ecological restoration theory is alluded to as the fastest means in applied ecology to providing existing ideas and opportunities when the issue of biological conservation and natural resource management arises primarily in a changing environment (Choi, 2004:75). It is regarded as the activities deployed in reversing land degradation and loss of biodiversity (Millennium Ecosystem Assessment, 2005). The Society for Ecological Restoration International (SER) views ecological restoration as "the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed," relating the recovery to ecosystem health, integrity, and sustainability (Aradottir and Hagen, 2013:174 citing SER, 2004).

Deploying ecological restoration activities and restoring ecological resources that include the ecosystem and biodiversity grants ecological security to human well- being for freedom and choice through ecosystem services (Millennium Ecosystem Assessment, 2005). The millennium ecosystem assessment of the United Nations Environment Program (UNEP) framework on ecosystem services and human wellbeing lists the benefits of these ecosystem services to humans and the environment in general for sustainable development and poverty reduction. There are arguments over the feasibility and possibility of attaining the desired reclamation of the historic ecosystem due to the non-availability of the knowledge on the components of the ecosystem due to land-use change, climate variability, and nutrient enrichment that can change the trajectory of the ecosystem as a result of new specie introductions (Choi: 2004:75). The process has been rising recently and remains vital for biodiversity conservation and sustainable development, as manifested in global and regional environmental policy to establish ecosystem services (Aradottir and Hagen 2013: 174 citing Bullock et al., 2011).

Furthermore, the ecosystem system services restored through the ecological restoration activities help improve the lives of the frontline states' affected population. The nexus between the ecosystem services and human well-being cannot be overemphasized due to the provisioning, regulation, cultural, and supporting services of the ecosystem that benefit human well-being. These services support security, health, necessary materials for a good life, and good social relations (MEA, 2003:75).

Figure3: Linkages of Ecosystem and Human wellbeing



Source: (Millennium Ecosystem Assessment 2003:78)

Figure 3 illustrates the linkages that exist between the ecosystem and human wellbeing. A healthy ecosystem with sustainable biodiversity reduces environmental stress that affects human wellbeing. Providing an alternative source of livelihoods by the NAGGW Nigeria to the affected communities in frontline states without a sustainable ecosystem that provides essential survival benefits is futile. The best practice to restore a degraded ecosystem and environment is the ecological restoration strategy.

Adopting the ecological restoration theory supports me in unravelling the main study question of the NAGGW Nigeria strategy in its implementation program to positively impact land degradation in Nigeria's frontline states. The agencies planned activities in implementing the GGWI in the frontline states from 2016-2020 were to achieve employment creation, boost food security, reduce social conflicts, reduce rural poverty, increase vegetation cover, encourage gender equality and strengthen climate change mitigation and adaptation (PAGGW 2018:177). What is the score card of the strategic action activities of the agency within the stated period (2016-2020) using ecological restoration?

2.4.2 Ecosystem and Human Wellbeing: Clarifications

The ecosystem and human wellbeing framework developed by Society for Ecological Restoration SER through Millennium Ecosystem Assessment (MEA) falls under this concept because it helps decision-makers to gather enough information on the nexus between ecosystem and human wellbeing (Reid, 2005). MEA focuses on how the ecosystem services and the changes have affected human well-being's future and the type of responses adopted at both local, national, and regional levels to improve such services and contribute to poverty alleviation of human well-being (MEA: 2003). Humans have always depended on the biosphere and the ecosystem services for survival (MEA, 2003:1) and any interference on the services becomes a threat to human survival. Hobbs (2007) enumerated critical processes involved in ecological restoration, such as identifying the causative factor(s) of the degradation or decline, developing a strategy for reversing or ameliorating the degradation, re-establish the functional ecosystem with recognized species taking into consideration socio-economic and cultural barriers. Furthermore, develop implementation techniques, monitor progress, assess successes and failures, and then adjust (Hobbs, 2007:355).

The ecological theory where the ecological restoration concept is embedded is adopted to ascertain if the NAGGW Nigeria's implementation process will operationalize the GGWI in the target area and its effectiveness in achieving the sustainable development goal of the Pan African Great Green Wall by 2030.

An ecosystem's concept provides an appreciated framework for analyzing and acting on humans' relationships and their environment (Millenium Ecosystem Assessment, 2003:10). Humans are an integral part of the ecosystem and benefits from the services provided to the ecosystem that includes "Provisioning," "regulating," "cultural," and "supporting services." Provision of the ecosystem includes (food, fuel, fiber, freshwater, and genetic resources); regulating services involves maintaining air quality, control of erosion, regulating the climate, human diseases, and water purification. Cultural services provided by the ecosystem are obtained by humans through "spiritual enrichment," "recreation," "reflections, and aesthetics," while the supporting services include the primary production, oxygen, and soil formation (MEA, 2003:8). All these services are beneficial to human well- being and when the adverse effect of desertification and climate variability erodes these services, it becomes a threat to life (2003:8)

Adopting the ecological restoration strategy to restore the degraded ecosystem is useful for this study through the historical composition of the ecosystem might not be fully restored. Still, a futuristic strategy will be ideal, as posited by Choi (2004). He stated that ecological restoration that tends to restore the ecosystem through the "historical construction" without taking cognizance of ever-changing and "unpredictability future environment" is not an ideal strategy but should instead incorporate the "futuristic approach" that recognizes sets of the realistic and dynamic environment. (Choi, 2004:75).

The Millennium Ecosystem Assessment Framework (2003) looks at human wellbeing as constituting materials necessary "for good life, freedom and choice, health, good social relation, and security" (Millennium Ecosystem Assessment, 2003:12). The ecosystem plays a vital role in maintaining human wellbeing through (provisioning, regulating, cultural, and supporting) services it provides that are beneficial to humans. Any changes in the ecosystem can be detrimental will likely erode the constituents of human wellbeing. Security will be affected by dwindling resources and food the ecosystem provides, leading to conflict over scarce resources. The ecosystem's regulating power will be affected, potentially resulting in droughts, desertification, floods, etc. Cultural factors that smooth social relations are also included and social trust erosion can negatively affect the population's livelihoods. Human wellbeing and livelihoods have a strong relationship with the ecosystem, and both (livelihoods and wellbeing) depend on sustainable human interactions with the ecosystem for survival.

2.5 Conceptualizing Sustainability and Sustainable Livelihood

In conceptualizing sustainability and sustainable livelihood on the study, there is a nexus between the concept and the challenges of desertification and drought, leading to land degradation and resource scarcity with the resultant effect of forced movement and social conflict. Sustainability is a resilience to the disorder of environmental change, economic system, and the society (McNamara and Morse 2013:5). McNamara and Morse (2013) further stated that sustainability is often associated only with the environment, but it is beyond that because it is about people and livelihoods, and when associated with just the environment, it loses grasp of the centrality of people within it (2013:3). The concept captures three essential elements or pillars that either intersect, overlap, or support each other when conceiving sustainability.

Figure 4. Three pillars of sustainability

Fig 4a

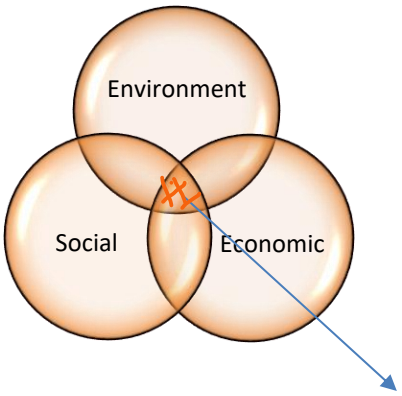
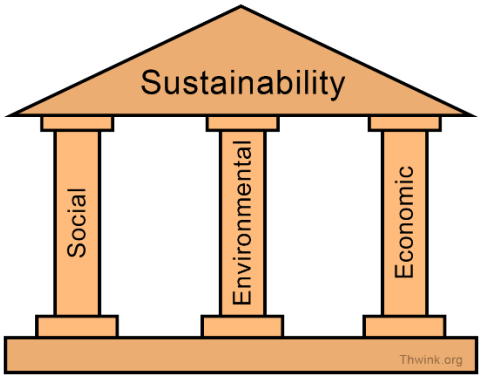
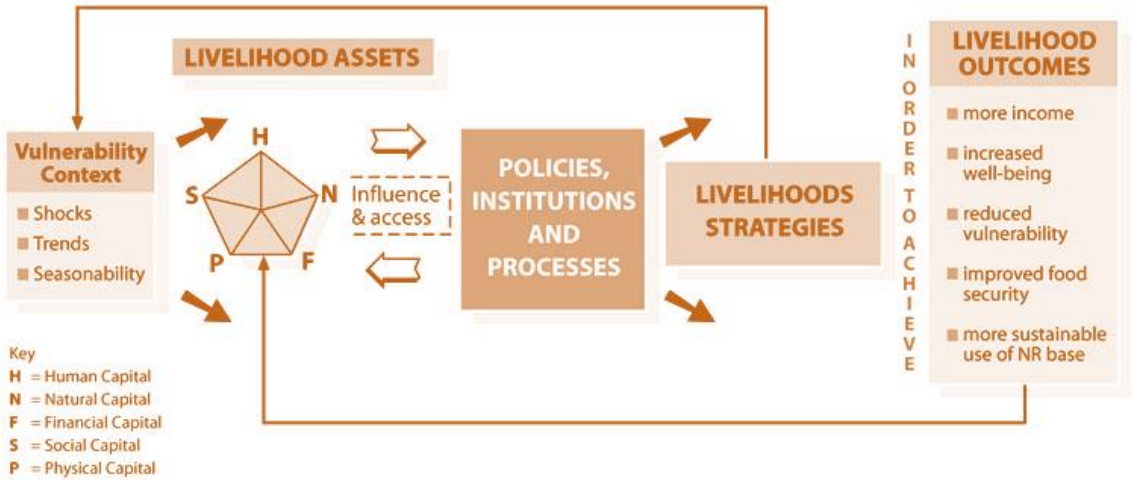


Fig 4b



Source: McNamara and Morse, (2013:4)

Figure 4a depicts the three elements of sustainability that intersect with each other, while fig 4b illustrates the three elements from a supportive perspective. In whatever angle that sustainability is viewed, the three elements must be represented either equally or by preference. In this paper, sustainability is viewed so that the three elements should be present, but the environment plays a vital role in achieving strong sustainability, and it is focused on livelihood. Bohle (2009), citing Chambers and Conway (1992), view livelihood as comprising "the capabilities, assets (including both material and social resources) and activities required for a means of living" (Bohle 2009:521). McNamara and Morse (2013) claim that achieving practical sustainability demands focusing on livelihood (McNamara and Morse, 2013:6); they posited that there is a clear connection between sustainability and livelihood because livelihood reinforces wellbeing or quality of life, a means of survival, and also provides resources that enrich life and wellbeing. This livelihood survival and means of enriching and enjoying life grants livelihood security. Livelihood security, according to (Bohle 2009), denotes to guarantee "ownership or access to, resources and income-earning activities, including reserves and assets to offset risk, ease shocks and meet contingencies" (2009:521). The sustainable livelihood approach is represented in figure 5.



Source: http://www.fao.org/3/y5083e/y5083e02.htm

The government or institutional policies or processes such as the implementation of the GGWI by the NAGGW should involve livelihood strategies that will reduce the frontline

communities vulnerability (shocks, trends, seasonal temperatures) to achieve livelihood outcomes that will increase wellbeing, reduced vulnerability, improved food security and more sustainable use of natural resources.

2.6 Conclusion

This chapter examined the theories and concepts adopted for the study. It captures the f the Sahelian ecology and initiative with the 11 countries implementing the GGWI. Ecological restoration theory was expounded as the strategy adopted in assessing the land restoration strategy of the NAGGW Nigeria. The nexus between the ecosystem services and human well-being encapsulates how useful the concept when confronting how the implementation strategy of the NAGGW Nigeria will affect the livelihood of the affected inhabitants of the Nigerian frontline states. The concept of sustainability and livelihood introduced in the study has a connection to a healthy ecosystem, environment, and livelihood sustainability. The implementation strategy through the restoration of the degraded land and ecosystem can make or mar the inhabit's sustainable livelihoods. They solely depend on the natural resources for their livelihood, and when the implementation process of the NAGGW, Nigeria should be people-centered to achieve a sustainable livelihood outcome.

Chapter 3 Methodology, Methods of Data Collection

3.1 Introduction

This chapter focuses on the methodology and method of data collection for this study. This research relied on primary and secondary data. The primary data involved the use of interviews and mini-survey questions sent through email. In contrast, the secondary data was sourced from existing academic works of literature, policy documents report from the Great Green Wall agency, and Pan African Great Green Wall (PAGGW) agency, United Nations Convention on Combating Desertification (UNCCD), web information, and other relevant documents. Qualitative methodology is adopted in this research because it is a "form of social action that stresses how people interpret and make sense of their experiences to understand individuals' social reality" (Mohajan, 2018:2). It is based on an "interpretive approach" to social reality where human beings' lived experiences are described. The social phenomenon of land degradation and desertification at the core of this research requires exploratory information on the study population's experiences. The GGWI process requires information from individuals who are knowledgeable and have experience in the implementation process.

3.2 Data Collection Methods

I relied on the qualitative methodology for rich qualitative data in conducting this research to gain a deep understanding of the participants for a rich engagement (O'Leary 2017:142). Qualitative methodology is regarded as a "range of data collection and analysis techniques that use purposive sampling and semi-structured, open-ended interviews" (Mohajan 2018:1 citing Dudwick et al. 2006; Gopaldas 2016). The methodology is "inductive in nature," where researchers explore a specific understanding into a situation or phenomenon (Mohajan 2018:1 citing Strauss & Corbin, 2008; Levitt et al., 2017). In this case, the Great Green Wall Initiative and its implementation process in Nigeria. A semi-structured question was administered through in-depth online interviews. Online interviewing makes qualitative research possible, including the types of questions researchers can ask due to expanding internet usage (O'Leary 2017: 250). The qualitative approach was adopted because it is an adequate standard that allows the researcher to gather information from participants with high-level knowledge and involvement in the actual experiences (Mohajan 2018:2 citing Cresswell 2009). The Great Green Wall implementation process's research study requires participants with high-level knowledge of the NAGGW Nigeria activities and the beneficiaries of the intervention program that are deeply involved in sharing their experience. Researchers depend on the participant's willingness not only to take part but to share their experiences and thoughts about the topic in question (Raheim et al., 2016:5 citing Karnieli-Miller et al. 2009).

The primary sources adopted an online qualitative interview using web-based technology, WhatsApp video calls, and email questions. Qualitative interviewing through web technology became commonly used as an alternative method of data collection due to internet usage, where there is a geographical distance between the participants and the researcher (Mirick and Wladkowski 2019:3062). My inability to travel to Nigeria, the study area, for data collection because of the global COVID-19 pandemic measures and closure of the Nigerian government's international border made me resort to online interviews as an alternative to gather my data. Conducting my interview online actually allowed me to reach

some of my participants that are residing in a "dangerous area" (O'Leary 2017:249). Most of Nigeria's frontline states are currently inaccessible due to the Boko Haram insurgent group's activities and the military operations to combat the terrorist activities. The vulnerability of the area will also restrict the physical presence of research assistance to those states for fieldwork.

The use of online qualitative interviewing is flexible to both the researcher and the participant because it accords both parties the opportunity for comfortability in terms of space, time, and privacy (Mirick and Wladkowski 2019: 3063). During the interview, I listened to my participants to gain the participants' trust because it is essential for a qualitative research encounter (Raheim et al. 2016:5). However, the online interview has some limitations since you cannot fully observe the participant's body language, especially when they only allow an audio interview. The participant's words and representing experiences are exact and lasing for qualitative information. Data generated from the qualitative technique was through a semi-structured online interview, and a purposive sampling technique was utilized in identifying the participants. Secondary data sources from the annual reports of the NAGGW Nigeria, Pan African Great Green Wall, UNCCD, IUCN, United Nations Food and Agricultural Organisations, web information, and relevant scholarly articles facilitated this study.

3.2.1 The Sampling Strategy

The purposive sampling selection is adopted because the participants have expert knowledge of the research purpose (O'leary 2017:210). I also selected key informants for credible information that will help me answer my research question. The informants are knowledgeable about the Great Green Wall Initiative, and they can confirm the information gotten from the National Agency for the Great Green Wall (NAGGW). During the interview, interviewees' snowballing came to the fore because the GGW initiative project is a large-scale development plan that involves a broader range of stakeholders that includes national governments, international organizations, civil societies, and local communities. My first 3 participants referred me to other participants through their contact phone numbers. Because I conducted an online interview without being at the study's location, it was challenging to locate likely participants, especially the local population in the frontline state, where the operational activities of the NAGGW Nigeria are taken place.

The total number of my interviewed participants for this study is fifteen (15). Four participants were interviewed at the NAGGW Nigeria, and an email questionnaire was forwarded to the Director-General of Niger Great Green Wall Agency because I was referred to the Niger Great Green Wall Agency by one of the NGOs (Both ENDS). My lecturer for SJP working on RP connected me with Both ENDS organisations here in the Netherlands. Both ENDS is an organization that identifies and develops alternative policies and laws, practices, and governance models that contribute to the sustainable use of forest, water, and land (Both ENDS, 2020). The organization has partners in Burkina Faso, Niger, and Senegal. After my first interview in NAGGW Nigeria, a piece of information on cross-boundary activity prompted further inquiry with the Niger Great Green Wall agency.

I also reached out to the Border Community Development Agency (BCDA) in Nigeria through information provided by a participant from the Centre for Peace and Studies, Modibbo Adama University of Technology, Yola[4]The BCDA is an agency of the FGN

[4]. Centre for Peace and Security Studies is in Modibbo Adama University in Adamawa state, one of the frontline states, for the GGW intervention program.

mandated to provide basic social and infrastructural amenities by implementing planned and sustainable projects in Nigeria's border communities (BCDA, 2020). Out of the 21 states in Nigeria that share international borders with other African countries, 11 states are the operational area of the NAGGW Nigeria initiative. The 11 frontline states share international borders with Chad, Niger, and Cameroon.

Furthermore, through my colleague's help in the Institute for Peace and Conflict Resolution Abuja, two gatekeepers from the Bolori community in Borno State and Damaturu in Yobe state were identified. They are community leaders and are knowledgeable about every activity in their communities and can communicate very well in English, so the language barrier's problem did not arise. My interview with the gatekeepers guided me into ascertaining the visibility of the intervention program by the NAGGW in their communities. I used a telephone interview for the gatekeepers, and it was very suitable because the participants are hard to reach respondents due to the operational area's insecurity. Telephone interviews allow for obtaining information from potential participants who can be difficult to access through a face-to-face interview (Sturges and Hanrahan 2004:109 citing Tausig and Freeman 1998). After my draft presentation, I conducted last-minute interviews with FUDECO (Fulbe Development and Cultural Organisation), an NGO working closely with the pastoral community in northern Nigeria to develop and improve their herds and milk production, economic empowerment, and lifestyle modification. This interview became very important as a follow up from previous interviews. It became necessary to balance primary findings on both the livelihoods of farmers and livestock owners.

Table 1: Summary of research participants through interviews and email survey

Age group	Female	Male	Total
18-25years			
26-35years	1		1
36-45years	1	2	2
46-55years	1	5	6
56-65years		5	5
Total	3	12	15

My sample frame might not adequately represent the target population (O'Leary 2017:210), especially the local women in the communities that are beneficiaries of the intervention program, such as skill acquisition programs due to geographical distance COVID 19 challenges.

In presenting and analyzing my qualitative data, I employed content analysis. It is a process of examining the content of data in detail to identify patterns, themes, or biases such material contains (Mohajan, 2018:15). I examined the data I gathered from interviews and reviewed the literature to identify words and phrases that frequently resonated; inductively, I formed the themes that helped me answer my research questions. O'Leary (2018) explained that thematic analysis in qualitative data entails following "generated data inductively to identify pattern and interconnectivity" (O'Leary 2017:384). Some narrative analysis of individual stories on the effects of desertification on their livelihood means is encapsulated in the findings and analysis. The use of triangulation to confirm some interview answers and documents from the NAGGW Nigeria and survey answers from Border Community Development Agency are adopted for data validity. Findings of data conducted through

online interviews from the mapped-out respondents were pitched into four thematic areas to answer my research questions.

3.3 Ethical Considerations

When carrying out this study, I adhered to ethical considerations, especially where it concerns my participant's "physical," "emotional," "intellectual wellbeing" (O'Leary, 2017:360). A letter of introduction was obtained from the TLST office, which I forwarded through email to the Director-General of National Agency for Great Green Wall Nigeria and the Executive Secretary of the Border Community Development Agency seeking consent and audience interview. I also attached a consent form that contains a participation and confidentiality agreement. The content of the form encompasses a brief introduction of my study and the objectives, procedure for interviewing if the participant gives his/her consent at her own time, permission to record the interview for accurate information and analysis, pledging my confidentiality with obtained information and flexibility of the participant's response. I also obtained respondents' "informed consent" to interview them, use the information provided for this research only, and commit to ensuring that "no harm" would come to them as a result of taking part in the study. My participants agreed to a follow-up interview for "elaboration" and "clarification" of information if the need arises. In representing their opinion, I would protect their identity anonymously and discard the interview information during the interview once the study was completed (O'Leary, 2018:70). The ethical consideration of anonymous representation is also considered for avoidable harm gaining knowledge from participants to avoid hindering new knowledge and creating intervention from such participants. (Wassenaar and Mamotte, 2012:279). Anonymity and confidentiality of participants' names and details were adhered to throughout to minimize or prevent any harm.

In conducting this research, the consciousness of my "professional ethics" is recognized and therefore, the ethical implication of "falsification of data," "plagiarism," and "conflict of interest" is very much prevented.

Chapter 4 Analysing Implementation of the NAGGW

4.1 Introduction

In this chapter, the data collected about the implementation Program of the NAGGW Nigeria is presented after interviewing 15 participants. The participants were from National Agency for the Great Green Wall Nigeria, Federal Ministry of Environment, Border Community Development Agency, Community leaders in Bolori LGA Borno state and Damaturu in Yobe State, an environment columnist with Punch Newspaper in Nigeria, an expert on peace and security studies and a fellow with United States Institute for Peace (USIP), Lecturer and researcher from the University of Yobe, Damaturu and a participant from Niger Great Green Wall.

Table 2. Research Participants Representation.

	Participants	Representation	Means of Interview	Date
1	NAGGW	N	Online WhatsApp call	20-8-2020
2	Environment Columnist	E	Online Call	25-3-2020
3	Ministry of Environment	M	Online video call	7-8-2020
4	Community Leader 1	C (1)	0n-line audio call	22-8-2020
5	Community Leader 2	C (2)	Online audio call	3-8-2020
6	Fulbe Development (FUDECO) NGO	F	Online video call	35-11-2020
7	Research Expert on Peace and Security Studies	P	Online video call	3-8-2020
8	BCDA	B	Survey question through Email	17-8-2020

The data obtained from the participants is based on the main research question and the sub-questions as represented here once again:

"How has the NAGGW implementation process curtailed land degradation and affected the livelihoods of the inhabitants in the frontline states, with the sub-questions, what are the land restoration strategy adopted by the National Agency Great Green Wall in restoring degraded lands affected by desertification, what are the alternative livelihood strategies adopted by NAGGW in building the resilience of the affected inhabitants in the frontline states, what are the potentials of the GGW intervention program in addressing the vulnerability of the affected inhabitants concerning forced migration and conflict between the farmers and livestock breeders in the buffer zone and what are the challenges derailing the NAGGW in achieving a sustainable implementation Program in the frontline states."

The above research questions were answered through a content analysis of the generated data. I then developed into themes due to words and phrases that resonated most with my participants. Exploration of primary and secondary data was used for the findings that gave answers to my research questions. Primary data came from my research interview participants. In contrast, the secondary data used were documents from the National Agency

for the Great Green Wall NAGGW, United Nation Convention for Combating Desertification UNCCD, International Union for Conservation of Nature IUCN, UN Food and Agricultural Organization UNFAO, Pan- African Agency Great Green Wall PAGGW and relevant articles from academic journals. The study data are presented below; research findings from primary and secondary sources is represented through the thematic areas and then analysis of the findings.

4.2 Data Presentation

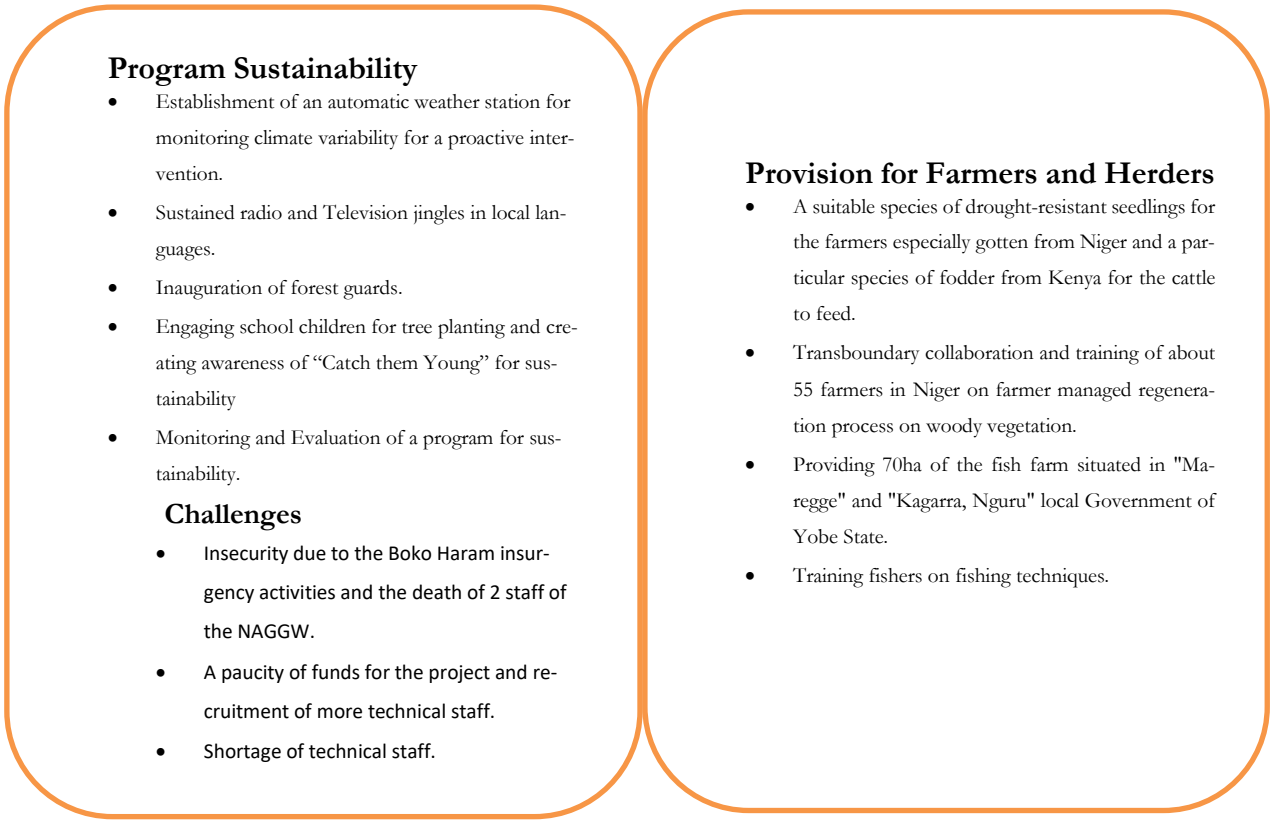
The data generated from both primary and secondary sources is presented following the research questions. Data obtained concerning the regional mandate of GGWI and how the implementation process by the NAGGW Nigeria is strategically done in terms of land restoration, livelihood sustainability (farmers and Herders), challenges, and program sustainability in the frontline states were represented.

Land Restoration

- of 7, 610,523 seedlings for the establishment of woodlots, shelterbelts, and Orchards.
- Establishment of 642km shelterbelts, 269.7 community woodlot, and 101.5 ha of community orchards in 11 frontline states
- Restoration of 5million hectares of degraded land.
- Training of selected community members on restoration technique, drought resistance seedling handling, and management.
- Establishment of local offices in 11 frontline states for bottom-up community-based strategic intervention.

Alternative Livelihood Sustainability

- Establishment of 5 skill acquisition centres for alternative livelihood support such as welding, knitting, carpentry, and other skilled jobs meant to train over 1500 youths and women for the affected communities.
- Construction of over 150 solar-powered boreholes in the affected communities to ease the problem of water shortage and minimal rainfall experienced in the arid region
- The provision of alternative household energy sources to reduce fuelwood use for cooking contributes to land degradation through deforestation. 2300 woodstove was distributed to women in Zamfara and Kebbi states.
- Profit utilization community development initiative through fishpond establishment in Yobe State.
- Organising women in cooperative societies and self-



Source: National Agency for Great Green Wall 2018 Annual Report

4.3 Developing thematic areas for findings and analysis.

These thematic areas were generated from both secondary and primary helped me expound more on the study and aided my research questions.

- The environment/land restoration
- Livelihoods and Survival strategy of the affected communities
- Sustainability of the GGW Initiative in Nigeria
- Challenges of NAGGW Nigeria implementation process (Administration, Funding, Security).

4.3.1 Land Restoration

The land supports basic human needs for livelihoods and wellbeing, including food supply, freshwater, and numerous ecosystem services, including biodiversity (UNCCD, 2020:6). Study findings from relevant documents and interviews depict that land degradation in the frontline states is not a hoax. Desertification in frontline states threatens 40 percent of

Nigeria's landmass, resulting in land degradation that has affected the affected community's sustainable environmental management, food security, and socio-economic life (Gadzama and Ayuba 2016:19). The frontline states lie within the Sudano-Sahelian region of West Africa. The Sahara's 0.6km southward shift every year has resulted in Nigeria losing about 350,000 hectares of crop and rangeland in the frontline states (Gadzama and Ayuba 2016:19a). The severity and extent of desertification in Nigeria has not been well documented. There is evidence of dunes that have covered agricultural farmlands and livestock grazing lands, including drying oasis and dead trees in the frontline states (2016:19b). The table below shows some data on the percentage of desertification in the 11 frontline states of Nigeria.

Table 3: Frontline states and the extent of desertification

States	km2	Percentage of Nigerian land	Population	Density/km2
Bauchi/Gombe	64,605	6.99	4,294,413	66
Borno	70,809	7.67	2,596,598	37
Yobe	45,502	4.93	1,411,481	31
Kano	20,131	2.18	5,632,040	280
Jigawa	23,154	2.51	2,829,929	122
Kastina	24,192	2.62	3,878,344	160
Sokoto/Zamfara	65,735	7.12	4,392,392	67
Kebbi	36,800	3.98	2.062,266	56
Adamawa	42,159	4.56	2,124,049	51
Total/Average	393,168	42.56	29,221,471	97

Source: (Gadzama and Ayuba, 2016:20)

The interviewees from some of the frontline states affirmed that winds bring sand dust from the Sahara into their farmlands and blow away the topsoil that contains nutrients out of their lands resulting in low crop yield. In the words of interviewee C (1):

> "We experience heavy winds that come with sand dust from the Sahara because our community is just 7km away from Niger. The wind blows off our roof, and our farmlands are not spared as most of us are farmers; our harvest these days is meager due to these winds. The challenges of the Sahara dust prompt some of the farmers to other communities not affected by the Sahara dust because we have to survive as most of our source of livelihoods is from farming" (Interviewee, C 1).

Having ascertained the effect of desertification in the frontline states and the confirmation through findings, the question of the land recovery strategy NAGGW and how the intervention programs have affected land degradation in the frontline states becomes apparent. As a country, Nigeria has put several measures in place to combat desertification and drought in the affected arid part of the country, such as the development of a national action plan to combat desertification and mitigate the effects of drought (NAGGW:2014).

In answering the question of a land recovery strategy and how the intervention program has affected the degraded land in the frontline state, the ecological restoration of the

ecosystem and wellbeing concepts comes in handy. The ecological restoration process assists in the recovery of "degraded," "damaged," or "destroyed" ecosystem's health and sustainability (for a continuous provision of beneficial services to human beings(Aradottir and Hagen, 2013:175 citing Society for Ecological Restoration 2004). The concept integrates land, hydrology, and biological conservation with the socio-economic and political framework (Aradottir and Hagen, 2013:174).

The study findings revealed that the strategy of ecological restoration adopted by the NAGGW Nigeria in the implementation program through tree planting had recovered about 5 million hectares of degraded land in the frontline states. The Agency distributed about 6million plants for shelter beds, woodlots, and orchards that now created 642.46 km of shelter beds, 269. 7hectares of woodlots for forest products. Also, 200,000 palm seedlings were distributed to the local farmers; 92 communities benefited from establishing vegetable gardens and nurseries (Pan African Agency of Great Green Wall 2018: 167). The 11 frontline states received; Neem**,** Eucalyptus, Mango, Cashew, Citrus, Date-palm, and Guava seedlings with the distribution to local farmers listed in Table 4 below:

Table 4: Distribution of seedlings to frontline states.

S/N	States	Quantity of seedlings distributed
1	Kebbi	153,871
2	Sokoto	866,74
3	Kastina	876,526
4	Jigawa	834,170
5	Yobe	818,756
6	Zamfara	392,812
7	Borno	647,687
8	Kano	849,133
9	Bauchi	350,494
10	Gombe	593.032
11	Adamawa	413,761
Total		7, 610 532

Source: Report of PAGGW (2018)

Table 4 shows that over 7 million seedlings were distributed to the frontline states by the NAGGW, indicating the intervention program on ecological restoration. Tree seed production is termed the best solution to the depleted forest, which acts as a fulcrum to a healthy environment and healthy livelihood to the rural communities ((Danjuma et al., 2014:74-75). The restored 5milliom hectares of land in the frontline states indicate the successful planting of the distributed seedlings but no information on how many hectares were restored from each state to assess the seedling distribution pattern. The seedlings are drought resistant, with economic benefits for land restoration and wellbeing. Acacias can fix atmospheric nitrogen that contributes to soil fertility with substantial economic value due to gum Arabic production (Goffner and Peiry, 2019:5). Sinare and Gordon (2015) provided an evidence of how investing in woody vegetation counters land degradation and improve livelihoods. Adopting the ecosystem services and human wellbeing, most of the species of

forest seedlings raised by NAGGW for ecological restoration generates, provisioning ecosystem services, medicinal use, livestock fodder contribution and human nutrition (Sinare and Gordon, 2015:187).

However, some farmers in Borno state revealed in the study findings, prefer food crops to forest crops and thereby travel across the border to Niger for drought-resistant food crops. Therefore, NAGGW Nigeria should invest more in food crops than forest seedlings, which directly benefits households for their survival.

Table 5: Establishment of Shelter beds and woodlots in frontline states 2013-2017

	States					
		2013	2014	2015	2017	Total
1	Kebbi	42	22	30	22	116
2	Sokoto	10	22	31	22	85
3	Zamfara	10	5	25	14	54
4	Kastina	34	10	30	20	94
5	Jigawa	28	22	30	20.5	100
6	Yobe	37	22	27	15	101.5
7	Borno	20	7	21.66	15.3	63.96
8	Kano	6	22	-	-	28
Total		187	132	194.66	128.8	624.46
	States	2013	2014	2015	2017	Total (km)
1	Adamawa	20	20	33	35	108
2	Gombe	15	10	20	15	60
3	Bauchi	-	20	4	35	59
4	Kano	-	-	17.5	25.2	42.7
Total		35	50	74.5	110.2	269.7

Source: Pan African Great Green Wall report 2018

The operational intervention of the NAGGW in terms of ecological restoration through the establishment of a shelterbelt and woodlot indicated from the table that 642.46km and 296.7 were achieved between 2013 and 2017. Primary data revealed different responses from the NAGGW Nigeria and participants in Borno and Yobe state. The participant from the Agency stated that experts' services were engaged in environmental impact assessment with the community leaders' participation to ascertain the type of seedlings needed at each frontline state for ecosystem restoration and economic benefit of the communities. According to Interviewee 'N':

> "We are doing a bottom-top project intervention approach. What the communities need was taking care of the trees they need that will be useful for them. We did not just go to the communities to plant trees. We ask them the type of trees that are normally needed in the area. We engaged researchers from Ahmadu Bello University, the University of Maiduguri, for need assessment and specie of crops and trees that can survive in the area" (Interviewee N).

The study findings from the NGO that works directly with the pastoral community in the northeast part of Nigeria and some farmers on the issue of need assessment revealed that

they were not aware of such an assessment showing that the NAGGW Nigeria's implementation process concerning need assessment is problematic. Strong sustainability of people-centered, according to McNamara and Morse (2013). Implementing such a large-scale project outside the beneficiaries' livelihood creates a considerable gap in the sustainability of such projects and the environment. Achieving livelihood outcomes and "improving wellbeing," "increasing food security," and reducing their vulnerability with sustainable use of natural resources becomes impossible. (FAO,2003)

4.3.2 Livelihoods impact of GGW Intervention program in Nigeria

One of the GGW initiative's objectives is to improve the living conditions of the affected communities residing in the Sahel region of Africa. (PAGGW, 2018:167) Nigeria is one of the countries that domesticated this initiative through NAGGW Nigeria is at the forefront of achieving this objective. Study findings disclosed that the NAGGW Nigeria carried out the need assessment of the communities to ascertain the type of intervention program that will improve the communities' living conditions. The participatory actions of the community leaders enhanced intervention activities. The NAGGW Nigeria provided 156 solar and wind-powered boreholes to various communities because of water scarcity peculiar to the arid region that alters their livelihoods' sustainability. The constructed boreholes serve as water supply sources to the people, farmers for irrigating their farms and livestock. "These boreholes in the frontline states provide water to over 40,000 people and 150,000 livestock" (PAGGW, 2018:172)

Furthermore, supporting the promotion of alternative livelihoods for the affected communities in frontline states, especially the women and youths, my findings revealed that the NAGGW had provided five skill acquisition centers to train unemployed youths and women. Some skill training such as carpentry, welding, knitting, sewing, baking, soap making, and other skill works are being given to the youths and women for self-reliance. Tricycles, grinding machines, and sewing machines have also been provided to the communities to diversify their income, lower rural poverty, reduce pressure on land resources, improve socio-economic life, and limit forced migration and conflict. (2018:173). Women were encouraged to start vegetable gardens to boost food security, and over 22hectares of vegetable gardens have been established in the frontline states.

> "Established acquisition centres in Sokoto's five states, in Daura Kastina, Kano, Sunade in Bauchi, Yobe have trained women. Recently, women are already extracting Balanite oils from indigenous trees, and they are sold in the market. The Kanuri women from Borno state now produce these oils, which people from across the borders like Burkina Faso come to purchase. What the women are doing with the extraction of oil is amazing" (Interviewee N).

This research established that 95% of the people within the dry region of Nigeria rely heavily on traditional biomass-based fuels such as fuelwood for meeting their energy needs (PAGGW, 2018:174). A large percentage of the population in the frontline states engage in fuelwood usage as their source of energy resulting in deforestation. Deforestation destabilized the ecosystem and surrounding environment and overwhelmingly contributed to desertification (Ogunwale, 2015:213). The study findings show that NAGGW Nigeria's attempt to reduce deforestation in the operational area promoted and provided about 2300 improved wood stoves and other household energy sources to women in some of the frontline states. The provision of an improved wood stove to women in the frontline states questions the sustainability of the land restoration strategy that provided woodlots at the frontline states' operational areas. In the long run, deforestation will still increase because the wood needed for the improved stove will efficiently come from the restored woodlots.

However, the sustainability of the forests and the intervention program is not guaranteed. An alternative source of household energy should be a better option.

4.3.3 NAGGW interventions, Farmers and Cattle Owners

Forced migration has been identified in the operational area of the GGWI, Sahelian region. Environmental change stressors such as desertification, drought, and floods undermine such populations' resilience, especially Northern Nigeria, Niger, Chad, etc., dependent on rain-fed agriculture, forest resources, and the Lake Chad for their livelihood. My research finding confirms that the NAGGW understood that the communities in the arid and semi-arid regions of Nigeria face forced migration due to land degradation caused by desertification and climate variabilities. The Agency's intervention program in the operational area stated that embarking on social infrastructure in the frontline states will reduce forced migration, poverty, and social conflict (PAGGW, 2018:167). According to Interviewee C1,

> "In my community, it a common occurrence, people migrate out of the community to other places to look for an alternative source of livelihood and three months in a year during the rainy season, they will come back home to cultivate some land, and during the rainy season about 8months, they migrate to other parts of the country to do other menial jobs" (Interviewee C1)

Focusing on the livelihoods of the population, mainly agriculture and livestock rearing, the NAGGW embarked upon farmer's assisted natural regeneration to improve land productivity, reinforce food security, mitigate against land degradation, and reduce rural poverty build resilience against climate change (2018:172). Five hundred and fifty farmers were considered for the project, and about fifty-five farmers traveled to neighboring country Niger for a tour of the natural regeneration program. Findings also revealed that the NAGGW has some intervention on herders in the operation area. The NAGGW stipulated that their afforestation program involves planting fodder species for the cattle to feed. According to Interviewee N:

> "The Agency is planting suitable species of fodder for the herders. We have a special species of fodder from Kenya and Niger to help the cattle owners. We are giving the herders great green reserves that will help them move back to their communities. Livelihood intervention programs that we provide for development to them will curb farmers-herders conflict" (Interviewee N).

The confrontation and conflict between farmers and herders in the buffer zone of North-central Nigeria have exacerbated the security certainties being witnessed in Nigeria. Empirical findings from Gadzama and Ayuba (2016) surmised that the north-central or middle belt states of Nigeria acts as the buffer Livelihood absorb the pressure of migrating human and animal population" from the arid part of northern Nigeria (2016:19). One of the interviewed participants stated that,

> "Yes, we know that there is a movement for the herders during certain times in the season, and sometimes they go and come back. However, mostly these days because of the desertification, some of them have moved permanently to feed their cattle, and they are probably in the north-central part of Nigeria" (Interviewee P).

In total, over 6000 people have reportedly been killed, and about 62,000 displaced due to the conflict between the two groups (Kwaja and Ademola-Adelehin, 2018:5). The intervention program by the NAGGW Nigeria through ecological restoration concerning the forced migration and the incidental effect in the buffer zone integrates restoration of the

grazing reserves. The study findings depict that the Agency provides fodders and solar-powered boreholes for drinking water to feed their cattle and restrict their movement to Nigeria's Northcentral part. This process is not enough to prevent migration and the indirect consequences witnessed in the north-central region's buffer zone. The integration of the "silvopastoral" practice will go a long way in providing livelihood security for the pastoral community and the farmers. A healthy restored ecosystem and human wellbeing are intertwined because humans depend on the ecosystem's survival services. Human wellbeing and livelihoods have a strong relationship with the ecosystem for a sustainable livelihood, and NAGGW Nigeria's implementation process that integrates every aspect of livelihood outcome will achieve desired livelihood sustainability.

4.3.4 Sustainability of the NAGGW Nigeria Operations

Sustainability is a sense of permanence, a durable plan for a project or program's future (Morse and McNamara, 2013:1). Study findings reveal a sustainability approach taken by NAGGW Nigeria for its implementation process of GGWI in the intervention area. The Agency set up forest guards by training and empowering the youths to guard the afforestation program that involved tree planting.

> "NAGGW, Nigeria has trained over 400 unemployed youths as forest guards and watch groups. We made the communities own the intervention program by recruiting youths for the afforestation process and field activities. Also, the school children were not left out because we believe in the slogan of 'catch them young". (Interviewee, N).

Establishing the culture of ecosystem conservation and management can be achieved by creating awareness and disseminating information and community participation. The NAGGW involved school children in their tree planting program. The process allows the children to gain knowledge of the importance of nature and their natural environment. My research findings in this area show that the NAGGW adopted a community-based conservation approach for the intervention program's sustainability. The community-based conservation approach is natural resource conservation that involves the local community's participation in decision making (Balal, 2012:42)

> "We are not just embarking on intervention programs, getting to the grassroots and involving communities is our top priority because it helps them to own the project, conserve the resources and build their resilience" (Interviewee N).

Embarking on ecological restoration activity that is people/livelihood oriented is assuring the inhabitant's livelihood security. As posited by Boyle (2009), livelihood security guarantees "ownership or access to, resources and income-earning activities, including reserves and assets to offset risk, ease shocks and meet contingencies" (2009:521). Restoring a healthy environment that is centred on livelihood enriches human wellbeing. Forced migration will be minimised, and conflicts reduced at the north-central part of Nigeria's buffer zone.

4.3.5 Challenges Derailing GGWI Implementation Process in Nigeria.

The implementation process of the GGWI by the NAGGW Nigeria with a vision to produce vigorous, justifiable, workable, and resilient rural communities in the frontline states come with certain glitches**.** The issue of insecurity caused by the activities of the insurgent group Boko Haram in the operation area reverberated with all the research participants.

> "The issue of insecurity such as the Boko Haram insurgency activities in Borno, Yobe, and Adamawa in Northeast and Banditry in Zamfara state Northwest is posing a serious obstacle

to the intervention program. The NAGGW Nigeria lost two staff in that region while others escaped with gunshot wounds"(Interviewee N).

My research findings also uncovered the paucity of funds and the great challenge this poses for achieving the target objectives of NAGGW Nigeria. The stated intention of the present Nigerian government to reduce the ecological funds accessed by the NAGGW from 15% to 5% will pose a bigger challenge. Though this intent has not been documented, one of my participants stated this during the online interview.

"The funding of the intervention programs through the federal government budget allocation does not come often, and the president plans to reduce the ecological fund from 15% to 5%. This will set the NAGGW Nigeria back with meeting their desired mandate" (Interviewee N).

The problem of insecurity in the GGW intervention frontline states may not be unconnected with the recent intention of reducing the ecological fund allocation to the NAGGW Nigeria because my research findings revealed that most farmers don't visit their farms due to the activities of the insurgent Boko haram group. During one of my online interviews on the challenges faced by NAGGW, one of the participants stated thus,

"The Nigerian government is faced with several border security challenges, and that many of these challenges that the government is faced with have impacted on government response. It has impacted on the government's inability to deal with the issue" (Interviewee P).

Collaboration and partnership can break the puzzle of funding challenges and reduce the NAGGW's complete dependency on the federal government allocation. I discovered from my research findings that the Food and Agricultural Organisation (FAO) of the United Nations with the European Union-funded an ₦9.3million project known as Action Against Desertification in 3 out of the 11 intervention frontline states. The states were Bauchi, Jigawa, and Sokoto state, and the NAGGW Nigeria recorded these achievements:

Training of about 38 community members on large scale restoration techniques, seedling production, and management.

Native species trees planted in the three states restoring about 484 hectares of degraded land.

Engaging about 191community members drawn from the three states for paid employment in native tree planting.

Formation of community Associations and groups in the three states on agriculture and livestock improvement for the livelihood support program. (PAGGW, 2018:176)

The study findings revealed that the funds were not enough to implement the designed intervention programs of the Agency because the funds were domiciled with the federal ministry of environment and demand long protocol for the release of the funds. This intently delayed the intervention programs of NAGGW. According to Interviewee N,

"The take-off grant was not enough for the Agency, and it was domiciled in the Federal Ministry of Environment, thereby delaying the release of the fund due to protocols involved. The program ran for over five before the approved ecological funds started trickling into the agency" (Interviewee N).

The Agency established a state implementation committee and local government implementation committee to coordinate the Agency's activities between the state, local government, and the affected communities. In furtherance to the operations of the agency and state collaboration, the Borno state government, one of the affected frontline, raised about 300,000 seedlings in 2017 to compliment the intervention program of the NAGGW and also intends to developed 10million seedlings to address the effect of desertification in the northern communities of the state (Abdullahi, 2020). Borno states' action illustrates that the trajectory of

ecological restoration by NAGGW Nigeria through the state and local government committee is yielding a significant result. The planting of over 300,000 seedlings is a long-term sustainable approach that will build a healthy environment for s sustainable livelihood and well-being.

Funds allocated to the NAGGW Nigeria from 2015-2020 for the intervention programs on land restoration and creating alternative livelihoods for the affected populations in the frontline states are presented below.

Table 6: Federal Government Budgetary allocation to NAGGW Nigeria 2015-2020

	2015 ₦	2016 ₦	2017 ₦	2018 ₦	2019 ₦	2020 ₦
Take off grant	**10,000, 000,000**	-				
Overall Budget **Capital Budget**	- .	-	1,115,061,365 1,050,322,265	1,149,517,512 805,780,370	980,649,302 651,161,343	699,369,961 488,307,675

Total Funding for NAGGW (2015-2020) Source: https://www.budgetoffice.gov.ng/

Analysis of table 6. indicates a dwindling figure from the federal government budget allocation in the overall budget and the capital budget. The issue of insufficient funding resonated mainly from the interviewees during the data collection stage of this research. Some of the research study participants stated thus**,**

> "I do not know their exact budget, but I know that it is not enough to carry out the intervention program (Interviewee E).
>
> "I found out that the ecological fund release is not consistent. I have an insider that revealed to me that the money the Agency receives is basically for personnel cost and not enough for capital projects like the implementation and intervention programs" (Interviewee P).
>
> "One of the key challenges is funds which can be said to be the strong motivator in the dispensation of all activities" (Interviewee P),
>
> "Despite the inconsistency release of the 15 percent ecological funds to NAGGW Nigeria, the presidents intend to reduce the ecological funds to 5 percent (Interviewee N).

Effective restoration efforts require policy and decision-makers' commitment through the provisions of appropriate policies, governing mechanisms, and financial incentives (FAO, 2015:19). When the government priority is on environmental action through good governance and relevant intervention programs such as the GGW Implementation process, sustainability of the environment and livelihood will be achieved. The three pillars of sustainability (environment, economic and Social) will also traverse for sustainable development.

4.4 key findings Summary

The implementation process of the GGWI by NAGGW Nigeria is through ecological restoration, and the NAGGW Nigeria had restored 5million hectares of degraded land in the frontline states. The Agency achieved this through the production of seedlings production. Establishment of shelterbelts, development of community woodlots and orchards, improvement of access to water (National Agency for Great Green Wall Annual Report, 2018:4). Also, the provision of fodder species from Kenya, a transboundary collaboration for the herders and their cattle, was revealed in my findings.

Implementation of projects supported by partners such as FAO Action Against Desertification in 3 frontline states (Jigawa, Bauchi, and Sokoto) and PAGGW supported project on Fish Farming in Nguru and Kasala local government in Yobe state (2018: 12-14). The NAGGW Nigeria is providing an alternative source of livelihood to the youths and women through skill acquisition programs such as Bead making, Tailoring, baking, etc. for women and Tricycle commercial business, carpentry, welding for the youth.

The NAGGW Nigeria created a sustainability measure in their implementation program by establishing forest guards in the communities, embarked on a school program with the children residing in the frontline states for training on techniques of tree planting to create a culture of environmental conservation and awareness on the young ones. The community-based - participatory approach adopted by the Agency gave the communities a sense of ownership on the intervention program for sustainability.

The study findings revealed funding and security challenges as an impediment to the implementation process. The under review of the allocated funds from the federal government's ecological funds, an unconfirmed government plan to reduce the 15 percent ecological fund to 5 percent, and insecurity being witnessed at the frontline states are challenges that will cripple the operations and implementation processes of NAGGW Nigeria.

4.5 Analysis of Research Findings

Empirical data from secondary sources concerning land restoration shows that the NAGGW has restored 5million hectares. The 5 million hectares is about 19.2% of 260,000km^2, the entire degraded land in the frontline states. The restoration rate is problematic because it has taken Nigeria about ten years for these 5million hectares to be restored; however, the location of this restored land is not available and cannot be ascertained.

Degraded land in frontline states = 260,000km^2 or 26milliom hectares

Restored land in frontline states = 5million hectares = 50,000km^2

260,000km minus 50,000km = 210,000km

$$\frac{50{,}000}{260{,}000} \times 100 = 19.23\%$$

The simple mathematical illustration shows that 19.2% of 260,000km2 of the degraded land was restored in 10years. The calculation was based on 10years because after the African Union adopted the GGWI in 2007, institutions such as the Pan African Great Green Wall that will oversee the implementation of the process was established in 2010. The 11 implementation countries also were setting up their own institutions for the process, and Nigeria, through the Federal Ministry of Education, established the Drought and Desertification Unit for the GGWI implementation process. This 19.2% restoration of the degraded land in Nigeria is very insignificant to the implementation process of the GGWI by the NAGGW.

Furthermore, during the report by environment ministers on the 7th September 2020 in Bonn, the 11 implementation countries were requested to target the restoration of 8.2million hectares of degraded land annually if the GGW regional target of 100million restored land by 2030 will be achieved. The year 2030 regional target can be a dilemma for Nigeria because if the country can only achieve 5million hectares in 10 years, it will take Nigeria over 80years to achieve this request. The rate of desert advancement in Nigeria is 0.6km annually, and the rate of coverage in terms of restoration of degraded lands is very slow. This call can be a mirage for Nigeria. If the country is recovering 500km2 annually from the 5million hectares in 10years and advancement of the desert is at 0.6km annually, then there is an insignificant impact of the recovery process to the challenges of desertification and land degradation. The ecological restoration strategy is advocated to stop desert advancement, restore degraded land, and build the affected inhabitants' resilience by providing alternative livelihoods. However, the achievement of the desired livelihood security is uncertain.

Creating alternative livelihood by NAGGW Nigeria as one of its objectives is not holistic and lacks proper coordination. The restoration rate is not commensurate with desertification, which entails slow ecosystem restoration for optimum provision, regulation, and supporting role that will be beneficial to humans for enriched wellbeing. This is indicative of unlikely achievement of livelihood outcome that guarantees "food security," "vulnerability reduction," "improved wellbeing," and "sustainable natural resource" use. However, the training on farmer managed restoring woody vegetation on agricultural land in Niger is a welcome development because the strategy has been adduced as successful in Niger and Burkina Faso (Sinare and Gorgon, 2015:187). The strategy will be beneficial to livelihood as well as an adaptation to climate change. (2015:187). The non-integration of agro silvo-pastoral restoration strategy creates economic development imbalance because milk, beef, leather, and vegetable products will be deficient (Ndiaye, 2016:4a). The NAGGW Nigeria can learn great lessons from one of the GGWI implementing countries, Senegal, that integrated "silvo - pastoral Area" and had achieved pastoral resilience and development and believed that GGW helped in attaining peace (2016:4b).

The dwindling ecological fund and the non-release federal government of Nigeria's budgeted allocation as at and when due is a huge impediment in the operations and implementation process of the GGWI by NAGGW Nigeria. The financial challenges result in a low rate of restoration and high desert advancement exacerbated by climate variability that keeps the global temperature above the expected 1.5 degrees Celsius. Lack of coordination and inadequate human resources mar the implementation process of GGWI by NAGGW Nigeria. Overlapping functions by agencies working in the desert prone frontline states creates a concentration of projects in some states and non-visibility of NAGGW Nigeria's interventions in others. There should be synergy between these agencies for a well-coordinated program that will be felt by all affected communities in the frontline states.

Relating to the analysis, a huge problem with the recovery is evident, and this will certainly manifest itself in the livelihood of the inhabitants of the frontline states. The livelihood sustainability security that entails "enriched wellbeing," "food security," "vulnerability reduction," and sustainable use of natural resources is unattainable. Over 80% of the population depends on the natural resources in this region, especially in agriculture and livestock, and earns their livestock income (McDermott et al., 2010:98). It will manifest into marginal crop yield that will affect food security, forced migration, and social conflicts as the north-central buffer zone.

4.6 Concluding Remarks

The above findings and analysis of the various implementation activities of the NAGGW towards achieving its target goals and objectives were able to capture the study

research questions. The NAGGW Nigeria embarked on afforestation and land use management through ecological restoration concepts involving ecosystem restoration and biological conservation that are beneficial for wellbeing. The implementation process by the NAGGW is not comprehensive enough. It requires a paradigm shift of reforestation and provision of shelterbelts, Orchards, and woodlots and a more integrated approach that will involve a Silvo-pastoral strategy. A land-use management system requires maximum land use and having trees, forage, and livestock components in the same piece of land (Cabbage et al., 2012:304). This system also involves elements of "alley cropping" windbreaks and shelterbelts with pasture, intensive management, and rotational grazing. The NAGGW implementation process did not capture an extensive activity that will positively impact the forced migration of herders and farmers to reduce confrontation and conflict in the buffer zone (north-central Nigeria).

Chapter 5 Research Conclusion

The regional GGWI domesticated by Nigeria and implemented through the National Agency for the Great Green Wall Nigeria is regarded as an audacious intervention program to ameliorate land degradation challenges caused by desertification and other anthropogenic actions. The initiative was explicitly targeted at arresting soil/land degradation, conserve biodiversity, improve agricultural productivity, and mitigate the impact of climate variability with a strategic action plan SAP. The SAP is aimed at transforming the degraded landscape in the Nigerian Sahel's dryland region through the restoration of the ecosystem and improving the livelihood of the inhabitants. 11 African countries signed into the initiative, and they are successfully driving the implementation process. Recorded successes of the initiative in these 11 countries reported by the PAGGW 2018 achievement report have spurred North and East Africa countries witnessing a similar decline of arable land to join the GGWI. Moreover, about 20 African countries are implementing the initiative. (UNCCD, 2020)

In trying to answer the research question of the ecological restoration strategy adopted by the NAGGW Nigeria in the implementation process to restore the degraded land and build the sustainable livelihoods of the affected inhabitants, the study established that land restoration process by the NAGGW though in phases for a period of 15years is moving in a snail-like mode and there was big a gap between the launch of the initiative and the implementation process. The GGWI was launched in 2007 at the regional level, Nigeria signed the convention for the initiative in 2010, and the strategic action plan was developed in 2012, and implementation programs commenced in 2013. The implementation programmed involved the establishment of 1500km distance by 15km wide of shelterbelts of trees from Kebbi state in the northwest to Borno state in the northeast (frontline states) devastated by land degradation due to natural and anthropogenic causes. The NAGGW Nigeria was established in 2015 as a national institution, and part of the GGW regional directives took over the implementation process from the Drought and Desertification unit of the federal ministry of Environment. It had restored 5million hectares (50,000km^2) of degraded land in the frontline states.

The study also established through findings that the ecological restoration strategy adopted by the NAGGW Nigeria through the creation of shelter beds, woodlots, orchards, and fodder for pastures to achieve land degradation neutrality and sustainable ecosystem services requires a paradigm shift. A strategy from just afforestation/reforestation and agroforestry to a more holistic approach that integrates "silvopastoral" technique. The silvo-pastoral area that involves animal health and breeding, forestry (reforestation soil restoration), and hydrology (boreholes and pastoral well), if created by NAGGW Nigeria, will help build the resilience of the livestock owners/pastoral population, reduce forced migration and conflict witnessed at their destination communities Buffer zone). Furthermore, the Agency provided alternative livelihoods for the frontline state's affected inhabitants through the establishment of 5 skill acquisition centres for training of youths and women in various skills.

NAGGW, Nigeria, is mandated to collaborate with regional, national, and local stakeholders to successfully implement the program. However, the study uncovered overlapping functions and activities between the NAGGW, the Federal Ministry of Environment, and the Border Communities Development Agency BCDA of Nigeria. Building synergies with relevant national agencies reduce double budgeting of the same project by these agencies and help expand the intervention activities to all communities in the frontline states with more priority projects needed in that community. In addition to collaboration with local stakeholders or institutions for effective and sustainable project implementation, such as the GGWI, empirical evidence from Food and Agricultural Organisation (FAO) (2003) shows the need

for a local network to achieve sustainable development. The local institutions, such as the community-based organisations, traditional authorities, etc., often create an enabling environment for a successful local development program and social capital (Marsh and FAO, 2003:3). The social capital is regarded as "*the norms [reciprocity, trust], networks and social relations embedded in social structures (local institutions) of society that allow people to organize action for desired goals/objectives"(Marsh, 2003:3).* Consequently, social capital is related to local institutions and collective action, which has linkages to sustainable livelihood outcomes (see figure 5). Effective collaboration and network with the local institution by NAGGW Nigeria regarding the implementation process of the GGWI will guarantee sustainable livelihood outcomes to communities in the frontline states of Nigeria. The livelihood security that provides access to sustainable natural resources, "source of income," "reduce vulnerability and social conflicts, and other outward shocks will be achieved.

Finally, the ecological restoration theory adopted at the national level of implementation by the NAGGW Nigeria is driving a remarkable change in the Sahel and achieving stability at the frontline states though it demands paradigm shift and government priority for effectiveness. Also, the sustainable livelihood approach has identified the gap in the implementation methodology for a better innovative solution that will enrich and guarantee wellbeing. The mainstreaming of green projects as a policy option from the Nigerian government will go a long way in mitigating environmental challenges.

Going forward, the GGWI in the Sahel region aims to achieve "land degradation neutrality" by 2030 in consonance with SDG 15:3 "life on land," a target to balance land degradation with land restoration, which will enhance ecosystem functions and benefits, including food security. I recommend further research on the GGW initiative's potentials as an effective climate change mitigation and adaptation strategy in the Sahel region that can transform the challenges in the region, such as migration, pastoralism, social-economic strife and poverty alleviation.

Appendices

Appendix 1.1 Semi structured interview questions for NAGGW Nigeria and other Participants

1) What is your age range?

2) What sex did you identify with?

3) In which department/unit are you?

4) Are you involved in the great green wall implementation program of the agency in the frontline states?

5) How involved are you?

6) Which area are you involved in?

7) How do you see the agency achieving its short- and long-term term target goals?

8) What are the challenges limiting the agency from achieving its target goals?

9) How do you think the agency can overcome these challenges?

10) What will you recommend as a possible option for an effective implementation process?

11) How is the Agency funded for this initiative?

12) How is great green wall impacting the livelihood of the affected community?

13) Was need assessment of the affected communities conducted?

14) Are the affected communities participating in the intervention programs?

15) How are the affected community participating in the intervention program?

16) How is the implementation program affecting the farmers and their livelihoods?

17) What intervention programs are mapped out for the cattle owners and their livelihoods?

18) How has the intervention program affected the livelihoods of the youth, and women?

19) What measures are put in place for the sustainability of the initiative at the affected communities?

20) Going forward, what is needed by the agency to effectively implement the intervention programs in the frontline states?

21) What is your age range?

22) Do you witness land degradation or the effect of a dissertation in your community?

23) Are you aware of the intervention program on land degradation by NAGGW Nigeria?

24) What are the challenges facing your community

25) How do you cope with the challenges of the desert encroachment?

26) Do you witness migration of people out of your community?

27) What alternative measures does the farmers and livestock owner embark on for survival?

28) What is the government doing to help your community?

Appendix 2.1 Survey questions sent to Border Community Development Agency BCDA.

Masters Dissertation Survey Questions

I am a master's student with the International Institute of Social Studies Erasmus University in the Hague. I am conducting a research on the "The implementation process of Great Green Wall Initiative and the impacts in Nigeria's frontline states". The questionnaire consists 10 questions that will not take longer than 10 minutes to answer. All response will be kept anonymous and no one will be identified in this research.

Tick in the box provided to show your consent for this research ☐

1. Sex: Male ☐
   Female ☐
2. Age group: 18 – 25 ☐
   26 – 35 ☐
   36 – 45 ☐
   46 – 55 ☐
   56 – 60 ☐

3.How Long have you worked with the commission? ☐

4. Are you familiar with the Great Green Wall implementation programme in Northeast and Northwest border communities?

☐

5. Does the commission have synergy with the National Agency for the Great Green Wall Nigeria implementing the great green wall intervention programme in the Northeast and Northwest border communities?

☐

6. What type of projects or programme does the commission provide for the border communities especially in the northeast and northwest border communities?

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7. Does the commission have intervention programmes on land degradation and desertification affecting the northeast and northwest border communities?

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8. What type of projects or programmes are provided for the northeast and northwest border communities on the effect of desertification?

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9. What other programmes or project does the commission provide for the livelihoods of the border communities in the northeast and northwest?

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10. How are these programmes or projects implemented?

Thank you for taking part in my research. If you wish your response to be withdrawn, please email me on this email address. (chiksora@gmail.com)

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