International Journal of Research in Civil Engineering and Technology

E-ISSN: 2707-8272
P-ISSN: 2707-8264
IJRCET 2022; 3(2): 21-27
Received: 11-04-2022
Accepted: 13-05-2022

Benjamin Anabaraonye
Institute of Climate Change, Energy and Environment Studies, University of Nigeria, Nsukka, Nigeria

Charles C Anukwonke
Chukwuemeka Odumegwu Ojukwu University, Uli, Nigeria

Samuel IC Dibia
Department of Human Kinetics and Health Education, University of Nigeria, Nsukka, Nigeria

Uloma Onwuzurike
Department of Social Science Education, University of Nigeria, Nsukka, Nigeria

Nzemeka C Olisah
Department of Physics and Industrial Physics,Nnamdi Azikiwe University, Awka, Nigeria

Jecinta C Ezeukwu
Chukwuemeka Odumegwu Ojukwu University Uli, Nigeria

Corresponding Author:
Benjamin Anabaraonye
Institute of Climate Change, Energy and Environment Studies, University of Nigeria, Nsukka, Nigeria

Leveraging multi-stakeholder partnerships to combat climate change in Africa

Benjamin Anabaraonye, Charles C Anukwonke, Samuel IC Dibia, Uloma Onwuzurike, Nzemeka C Olisah and Jecinta C Ezeukwu

Abstract
The challenge of addressing climate change in Africa cannot be overestimated. It will require a substantial transformation of the present economic development model and multi-stakeholder partnerships to mitigate and adapt effectively to its impacts in Africa. Researchers increasingly suggest that climate change has intensified the frequency of droughts, floods, and other environmental disasters across sub-Saharan Africa. In response to the resulting array of climate induced challenges, various stakeholders are working collectively to build climate resilience in rural and urban communities and trans-continentally. This paper examines key climate resilience-building projects that have been implemented across sub-Saharan Africa through multi-stakeholder partnerships. It uses a vulnerabilities assessment approach to examine the strategic value of these projects in managing the mitigation of climate shocks and long-term environmental changes. There are still many challenges to building climate resilience in the region, but through multi-stakeholder partnerships, sub-Saharan African nations are expanding their capacity to pool resources and build collective action aimed at financing and scaling up innovative climate solutions. This paper concludes that multi-stakeholder partnerships are increasingly being utilized for pooling the economic and technical resources needed to finance and scale up innovative climate resilience projects in developing countries in Africa.

Keywords: Africa, climate change, education, partnerships, sustainable development

Introduction

Africa faces a serious challenge when it comes to attaining the Sustainable Development Goals due to climate change. The severe effects of temperature increase exceeding 1.5°C were underlined in the 2018 Intergovernmental Panel on Climate Change (IPCC) assessment, particularly for Africa (World Bank, 2016) [13]. The impact of climate change is greatly felt on soil fertility in Nigeria, one of countries in West Africa (Anabaraonye, Okafor, Ewa & Anukwonke, 2021) [10] and also on her biodiversity which affects the sustainable development and economic growth of the nation and continent either positively or negatively. Under all climatic scenarios with a temperature increase of 1.5 degrees Celsius, Africa is the continent most susceptible to the effects of climate change. Africa systemic risks to her economy, infrastructure investments, water and food systems, public health, agriculture, and livelihoods, threatening to undo its modest development gains and slip into higher levels of extreme poverty despite having contributed the least to global warming and having the lowest emissions (ADB, 2022) [3]. The impacts of climate change are expected to exacerbate the impacts of human pressure on biodiversity. The need for conservation of biodiversity in Nigeria and in Africa in response to changing climate is also very urgent. There is therefore an urgent need to educate farmers and fishermen in Nigeria and in Africa especially in rural areas on the impacts of climate change and ways to adapt and mitigate for sustainable development (Anabaraonye, Okafor & Hope, 2018; Anabaraonye, Okafor, & Ikuelogbon, 2019) [12, 13].

Challenges of climate change in Nigeria and Sub-Saharan Africa

The following elements make Africa more vulnerable to the impacts of climate change:
First, 95% of all rain-fed agriculture worldwide is practiced in Sub-Saharan Africa: While in sub-Saharan Africa, over 95% of the food production is rain-fed agriculture, rain-fed agriculture accounts for 60–70% of food production globally (Falkenmark and Rockström, 2004) [45]. A significant portion of GDP and employment in Africa is devoted to agriculture, and other weather-sensitive sectors like herding and fishing also contribute to susceptibility.

This results in decreased income and an increase in food insecurity (ADB, 2022) [3]. Poor access to electricity has vastly affected development of Africa as a continent. Reports show that 935 million (85%) of people in the world today that are without access to electricity live in Africa (International Energy Agency [IEA], 2017). Paris Climate Agreement raised concerns on the need to adopt green energy as a strategy to salvage the debilitating ecosystem and biomass. More than 2.8 billion people without electricity do not have access to clean forms of energy for cooking (IEA, 2017). Green technologies have been receiving much attention globally for the past three decades, driven mainly by ever increasing demands for more efficient and sustainable uses of resources. These demands call for the ability to develop technological innovations and responsible practices that are more environmentally friendly, to address barriers and challenges arising from the over-exploitation of resources and environment (Show, Lau & Foo, 2018). The 21st Century development pathway in Africa is facing a challenge between climate change mitigation, sustained economic prosperity and energy security (Sarkodie & Owusu, 2021). Africa has seven of the ten nations that are most at risk from climate change. Four African nations made up the top ten most impacted nations in 2015: Mozambique came in first, followed by Malawi in third place, Ghana, and Madagascar (joint 8th position). (ADB, 2022) [3] The scenario is glaring and manifest as follows:

A. Agriculture

African agriculture could be negatively impacted by climate change in a variety of ways, resulting in a drop in GDP of between 2 and 7 percent in the Sahara and 2 to 4 percent in Western Africa by 2100 (Mendelsohn, 2000; Boko, *et al*., 2007) [69, 22]. The Northern Sahel region which makes up 26.6 percent of Nigeria's land area today is projected to see a reduction in food production as a result of desertification and the loss of Lake Chad as a significant supply of irrigation water (Boko *et al*., 2007) [22]. The impact of climate change will also be seen in Southern Nigerian agriculture. In fact, due to its low height, Southern Nigeria is vulnerable to saltwater incursion as sea levels rise.Even highland water is already exhibiting signs of rising salinization, which will ultimately render agriculture unprofitable and drive inhabitants to evacuate (Moefrn, 2003) [73].

B. Crop Production

Nearly 94 percent of Nigeria's agricultural economy is made up of crops, and certain regions have already noticed a 20 percent reduction in the number of growing days. The growth of maize, guinea corn, millet, and rice are all slowed by temperature increases. For individuals without access to refrigeration, warming trends make it harder to store vegetables and root crops. An increase in the amount and timing of rainfall variability would have a negative impact on Nigerian agriculture. Food insecurity is contingent on farmers' long-standing capacity to anticipate when to sow their crops (CGIAR, 2008) [32]. Due to harvest failures brought on climate change impacts in Africa, farmers are forced to start over with their planting. In addition, severe weather conditions like storms, strong winds, and floods can destroy agriculture and result in crop loss. Pests and agricultural diseases are also increasing in response to changes in the climate (NEST, 2008).

C. Livestock

As a result of cattle being forced to make lengthy journeys in search of grass and water, the present warming trend reduces animal weight increase and dairy yield, impeding the production of animals. Nearly a million animals died during the worst of the drought in the 1970s and 1980s, which had an impact on Nigeria's supply of meat and dairy (Nkomo, *et al*., 2006). The impacts of climate change also led to increase in the Fulani herdsman clashes in the middle belt regions of Nigeria and other Sub-Saharan African countries.

D. Mining and Quarrying

Increased rainfall in the south regions of Nigeria mixed with erratic rainfall events have caused floods which have a negative impact on the mining activities there. Offshore drilling will also be put in danger by extreme weather occurrences along the coast. The Niger Delta faces a $13 billion damage potential due to sea level rise (Moefrn, 2003) [73].

E. Manufacturing Sector

The manufacturing sector will suffer losses from reduced potentials to produce output requiring agricultural produce as inputs. Sea level rise may lead to flooding which can inhibit transportation and other infrastructure as well as engineering plants and industrial layouts which can hamper productivity and efficiency in the sector (DFID, 2009) [37].

Some climate resilience-building projects that have been implemented across Sub-Saharan Africa through multi-stakeholder partnerships.

According to studies commissioned by UNEP, if the increase in global temperature is not reduced to less than 2 °C over pre-industrial levels by 2050, the cost of adaptation to climate change in Africa might exceed $50 billion annually (ADB, 2022) [3]. All nations committed to working together to combat climate change under the Paris Agreement adopted at COP 21, which limits global temperature increases to no more than 2°C above pre-industrial levels. In their Nationally Determined Contributions (NDCs) to the Paris Agreement, African nations set forth ambitious goals for developing low-carbon economies and economies that are climate resilient (ADB, 2022) [3].

These are covered under the following headings

A. Climate Resilience and Projects

The ability of a socio-ecological system to withstand pressures and continue to operate in the face of external challenges brought on by climate change is known as climate resilience (Folke *et al*., 2010; Moench, 2014; Shamsuddin, 2020) [47, 74, 95]. It also includes an ecosystem's capability to adapt, re-organize, and develop into more aesthetically pleasing configurations that increase system sustainability and make it more resilient to the effects of the future climate (Carpenter al., 2001; Folke, 2006) [26, 46]. An integrated framework for creating climate resilience is helpful in this respect since it considers all the contributing components and auxiliary variables that affect climate change and its effects (Gallopn, 2006; Tambo, 2016) [101]. The resources and institutions required for the execution, co-ordination, and sustainability of solutions are identified using an integrated approach, which takes into account all aspects of the issue (Hölscher *et al*., 2019) [59]. The goal of integrated climate resilience-building is to develop climate-intuitive communities for those who are most at risk while also increasing ability to adapt to periodic climate shocks, such as floods (Tambo, 2016b). Additionally, it encourages participants to focus more intently on the effects of pre-existing structural weaknesses including conflict, insufficient governance, and degree of development (Hölscher *et al*., 2019; Tacoli, 2009) [59, 100]. In developing countries in Africa, a comprehensive multi-stakeholder strategy appears to be frequently required to increase climate resilience and reduce the likelihood of disasters (Biagini and Miller, 2013; Pinkse and Kolk, 2012) [20, 84]. Some Sub-Saharan African countries, like other developing nations, frequently lack the financial boom in their national budgets to offer the extra personnel and technical resources required to undertake and scale up climate resilience programs (Denton, 2010; Naess *et al*., 2015) [36]. Governments have gradually partnered with research scientists, local farmers and landowners, business executives, non-governmental organizations (NGOs), regional and international organizations (IOs), and civil society groups to overcome this (Holler *et al*., 2020; Mikulewicz and Taylor, 2016) [58, 72]. Governments are typically the main actors in national-level climate governance. As a result, there have been several multi-stakeholder collaborations that act as venues for social innovation on climate change during the past ten years in Africa (Rodima-Taylor, 2012; Selsky and Parker, 2005) [88, 94]. These partnerships provide possibilities and synergies for information exchange, idea development, issue resolution, and the funding necessary to launch, scale up, and maintain climate-smart activities nationally and regionally (Mulgan *et al*., 2007) [76]. The expansion of multi-stakeholder partnerships in sub-Saharan Africa which is mostly made up of developing nations underscores their strategic relevance in boosting climate resilience in those nations.

B. Thriving Multi-Stakeholder Partnerships

Around the world, both industrialized and developing nations have rather effective multi-stakeholder partnerships for enhancing climate resilience (Bäckstrand, 2006; Elia *et al*., 2020) [14]. There is still much to learn about the particular factors that differentiate certain partnerships from others in terms of achieving their declared aims and objectives (Buckup, 2012; McNamara & Buggy, 2017) [25, 67]. Traditional intergovernmental approaches tend to be abandoned in thriving multi-stakeholder partnerships. An increasingly decentralized and participative structure is favored, where all stakeholders are held to the same standards of responsibility and are involved throughout the whole project lifecycle (Brancalion *et al*., 2016; Geekiyanage *et al*., 2020) [49]. Partnerships also prosper in environments with clear project goals, objectives, deliverables, and time constraints, as well as when anticipated results are at least proportionate to the resources committed. In these circumstances, stakeholders are better able to keep track of and assess project progress, change resources as needed, foster trust, and lessen coordination issues (Sun *et al*., 2020) [99]. Another essential element of strong partnerships for constructing climate resilience is a high level of community ownership (Biekart and Fowler, 2018) [21]. When the project's main beneficiaries feel accountable for the project's success, this is known as community ownership. Assuring that project goals reflect the aspirations, values, and requirements of the various communities is one of the primary strategies to increase community ownership. (Marschütz *et al*., 2020) [65]. For instance, several climate resilience building initiatives launched in rural African communities include regional and indigenous understanding of environmental stewardship and preservation into project objectives (Melore & Nel, 2020) [68]. More effective partnership arrangements also appear to feature some type of adaptive governance mechanism. This largely consists of policies, procedures, and institutional flexibility that permit the inclusion of new participants, concepts, and innovative methods for constructing climate resilience, such as climate justice (Fazey, 2007; Smucker & Nijbroek, 2020) [42, 96]. This methodology for learning and adapting helps to maximize project outcomes and meaningful stakeholder participation. Taking into account these elements, multi-stakeholder partnerships developed to tackle climate change may eventually develop into highly complex organizational structures with a wide range of functions.

Recommendations and conclusion

Finally, multi-stakeholder collaborations are shown to be a viable tactic for enhancing climate resilience in sub-Saharan Africa. Infact, further research is required to systematically assess the viability of various climate resilience programs being carried out throughout the continent. In spite of this, evidence indicates that African nations are improving their ability to respond to frequent climate shocks like floods, droughts, and storms as well as possibly addressing long-term environmental changes like desertification at a continental level by creating these co-operative partnerships and frameworks. The efficient execution of these cutting-edge initiatives helps to protect the lives and financial security of communities dispersed over some of the region's most disaster-prone regions. These partnerships' potential to increase climate resilience in other regions, which are primarily composed of developing countries, as well as the intricate dynamics involved in international efforts to manage the socio-ecological impacts of climate change, are highlighted by their increasingly multi-scale and multi-stakeholder formats in sub-Saharan Africa (Christopher, 2020) [31]. Key climate resilience-building projects are being implemented across sub-Saharan Africa through multi-stakeholder partnerships and there is need for greater collaboration among stakeholders in the future to achieve sustainable development in Africa. The vulnerabilities assessment approach is recommended to be used in examining the strategic value of these projects in managing the mitigation of climate shocks and long-term environmental changes in Africa. There are still many challenges to building climate resilience in the region, but through multi-stakeholder partnerships, sub-Saharan African nations are expanding their capacity to pool resources and build collective action aimed at financing and scaling up innovative climate solutions. It is popularly known that team work makes the dream work. Multi-stakeholder partnerships are therefore increasingly being utilized and very vital for pooling the economic and technical resources needed to finance and scale up innovative climate resilience projects in Africa.

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