Contributions of Small and Medium Scale Enterprises in Climate Change Adaptation in Sub-Sahara Africa

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Abstract

Sub-Saharan Africa (SSA) contributes very little to overall global climate change. Yet the region is likely borne with the highest consequences of climate change, with substantial percentages of the global disability adjusted life years (DALYs) attributable to its effects. The impacts of climate change are likely to be more prevalent in poor communities in the region where capacity to adapt and address vulnerabilities is limited. This study examines the strategies that are available for Small and Medium Scale Enterprises (SMEs) in contributing to climate change adaptation in SSA. Based on review of several studies of practices that boost SMEs' ability to reduce the vulnerability of expected climate change conditions in twelve SSA countries, the study argued that through their involvement in corporate social responsibility (CSR) initiatives, SMEs could be the central pivot in which the fight against climate change can be achieved. The study concludes that government policies should complement SMEs' independent response to climate change through the provision of financial incentives, improvement of infrastructure and policies that enhance local governance and harmonize SMEs' CSR activities for achieving sustainable development in Sub Sahara Africa.

Key Words: Climate Change, Adaptation, Small and Medium Scale Enterprises, CSR, Sub-Sahara Africa

Introduction

Several reports concerning the devastating effects of climate change and climate variation have indicated that Sub-Sahara Africa (SSA) will be one of the world's most vulnerable to climate change and climate variability in no distant time (WHO, 2014; Smita et al., 2011; IPCC, 2007). The reports maintained that agricultural production which is the main stay of the region; including access to food will likely be severely compromised by climate change and climate variability (Oxfam, 2015). The reports argued that climate change will aggravate the water stress currently faced by some communities in the region; while communities not prone today, will be susceptible to water stress in the near future (Serdeczny et al, 2015). Human health already compromised by a range of factors such as malaria and diarrhea will further be negatively impacted by climate prone diseases such as Lassa fever, Lershmaniasis and African trypanosomiasis among others (Serdeczny et al, 2015).

The reports further stressed that the highest regional burden of climate change would likely to be borne by SSA with 34% of the global disability adjusted life years (DALY) (Kula et al, 2013). The reports emphasized that physical, human and socio-economic consequences of climate change are dreaded to increasingly contribute to significant conflicts in the region (IPCC 2014).

It is important to see that these reports are coming at the time when small and medium scale enterprises (SMEs) tend to be portrayed in literature as essential backbones of healthy economic growth and vitality in the region. It is estimated that they account for 90% of business globally and 50% to 60% of employment (Luetkenhorst, 2004). SMEs have been recognized to contribute significantly to job creation and poverty alleviation in SSA, given their labor-intensive production processes and significant employment growth rates (De Kok, et al, 2013; Jamali, et al, 2009). With this, it is imperative that more attention needs to be accorded to understanding their potential specificities and contributions in relation to corporate social responsibility (CSR) in the region. This understanding is all the more important in SSA, given that the enterprise structure and the characteristic features of SMEs in the region often differ from what is normally encountered in industrialized countries. They must not be left out in contributing to the fight against climate change (James, 2015).

Purpose of the Study

While several climate change adaptation studies have focused on households and agricultural production in SSA communities, little research has been conducted on the role the private sector particularly the SMEs play in climate change adaptation in the region (Canales et al, 2017). This is in spite of the fact that SMEs play a critical role in contributing to the sub-region's growth and development efforts. The World Bank (2017) estimated that they constitute more that 95% of registered indigenous firms and are accounting for more than 65% of employment and about 35% of gross domestic product (GDP) through manufacturing, agriculture, livestock and trade in the region.

Again, in as much as there is the need for increasing recognition of the importance of climate change adaptation in the region (WHO, 2014), there have been little research examining how to stimulate and assimilate SMEs into climate change adaptation policies (Brown et al, 2012, Copper et at, 2013, Florence et al, 2016). In particular, there has been little emphasis on how governments and the private sector can create enabling environment to motivate and incentivize domestic CSR strategies in the region. It is in this light that this study examined how SMEs through CSR initiatives together with government support can contribute to climate change adaptation in SSA and in removing the barriers and constraints they face (James, 2015).

The central questions that guided this study were: What are the climate change challenges affecting SSA and what are the adaptation strategies which SMEs can adopt in contributing to mitigating these impacts? The aim is to offer policymakers and SMEs entrepreneurs with relevant strategies, which could be pursued through CSR initiatives in the escalating climate change situations in the region. This will assist in the development and broadening policies on climate change for the sustainable development of the region.

Literature Review and Theoretical Framework

There is no doubt that the need for adaptive responses to the challenge of climate variability has increasingly gained attention among divergent sectors in SSA (Amuzu et al 2018, Idowu et al, 2011, UNFCCC, 2013; UNISDR, 2013; UN, 2014; Oginni & Omojowo, 2016). Reports from organizations offering humanitarian assistance in the region have noted that climate change viability is becoming a major disruptive factor in the achievement of economic growth and

sustainable development in the region, despites its little contribution to overall global climate change (Sayne, 2011; WHO, 2014; Webersik & Wilson, 2009; IPCC, 2007).

Reports have emphasized that for the covariant mix of climate stresses and its resultant effects on SSA, adaptation is not an option, but a necessity. Reports emphasized that the private sector and particularly the SMEs, which have greater numbers of employees in SSA should be the pivot point in which adapting to climate change should revolve (Creech et al, 2014; James 2015).

The concept of adaptability

Adaptability to climate change refers to the adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities **(**IPCC, 2007). The term denotes the ability of human society to develop the practices, culture and livelihoods suited to various climate change conditions. According to Gasbarro and Pinske (2016), climate change adaptation strategies can be categorized into four. The first is the pre-emptive strategy, which denotes the ability for a community to have knowledge concerning the risk of climate change in terms of both occurrence, intensity and frequency of the extremes, and the resulting direct and indirect impacts and are readily prepared to tackle them before they occur (Gasbarro & Pinske, 2016).

The second category is the reactive strategy, which indicates the ability for a community to be aware of the ecological impacts of climate change, in relation to their available resources, but have not set any proactive measures for adaptation, until they occur. The third category of adaptation strategy is the continuous adaptation strategies where a community perceive climate change as usual occurrence and already have resilient structures and processes, implemented measures to deal with them. The last category is the deferred adaptation strategies where a community has low responsiveness of climate changes based on the conviction that it is located in area less affected by climate extremes or that physical impacts are not likely to occur within a period of time (Gasbarro & Pinske, 2016).

Why are Small and Medium Scale Enterprises Important in Climate Change Adaptation?

Finding a universal definition for SMEs has always constituted a sharp argument amongst institutionalists, economists, academics and industrialists. The shortcoming has always been on the differences in financial reporting practices, the difference in inflation and exchange rates between nations, the recognition of cash flow rather than turnover as a relevant indicator for monitoring the progress of businesses, which make comparisons over time difficult among others (Berista & Pula, 2015). Gibson and van der Vaart (2008) in trying to resolve the deficiency in the definition of SMEs proposed a criteria which asserts that an SME is a formal enterprise which have no less than ten employees, and an annual turnover in United States dollar terms of between $10 and $1000 times the mean per capita gross national income (GNI), at purchasing power parity (ppp) of the country in which it operates. This definition is appropriate as it falls within the standard, which SMEs in SSA can be recognized.

Spread across the region, SMEs comprise the potential innovators including entrepreneurs found in SSA, which possess the attitudes and impetus required to launch and build up successful ventures, researchers (scientists and academics) who are discovering new technologies or developing new commercial applications for existing ones; community-based social enterprises who use local initiatives and are targeting at monetizing the need for basic services such as waste management, utilities including water, power, and cooking fuel among others. (Fjose et al., 2010).

Others include small-scale manufacturers such as supply chain partners, who are utilizing their potentials to apply industrial capabilities to technology production, retail distributors, who have the competence to organize technologies across the expansive geographical network. They also include importing and exporting firms who currently rely on foreign partners for sourcing, manufacturing and delivery of technology solutions across the region (Fjose et al., 2010). The vitality of these becoming climate-resilient and given more priority in climate discussions and adaptation in SSA is not questionable.

Creech et al (2014) emphasized that they are the best in preparing the most vulnerable communities in the region already ravage with the worst social and economic effects of climate change to be more resilient to climate change impacts; since, they are closer to the people and have been engaged in defining the way in which goods and service are produced, stored, processed and distributed across the region.

Corporate Social Responsibility as a Way Forward

Today's society is placing increasing emphasis on what role SMEs could play in impacting positively on the economic life of their host community, the environment and the society generally (Adeyanju, 2012; Colbert & Kurucz, 2014). Among what SMEs adopt in fulfilling this, is corporate social responsibility (CSR). The European Foundation for Quality Management, EFQM (2010) refers to the concept as a whole range of fundamentals that organizations are expected to acknowledge and to reflect in their actions. These fundamentals include, taking responsibility for a community's sustainable future, adding value for customers, inspiration and integrity, succeeding through people, nurturing creativity and innovation, building partnerships and conservation of the natural environment, among others (EFQM, 2010).

Corporate social responsibility involves the transformation of enterprises from profit making motivated entities into corporate citizens, who promote ethical principles and responsible practices, which regenerates and sustains the society (James, 2015). EFQM (2010) sees CSR as not only morally and ethically desirable ends in themselves, but also as key drivers in ensuring that organizations are allowed to survive in the long term, as society benefits from their activities and behaviors.

Theoretical Framework: The triple bottom line

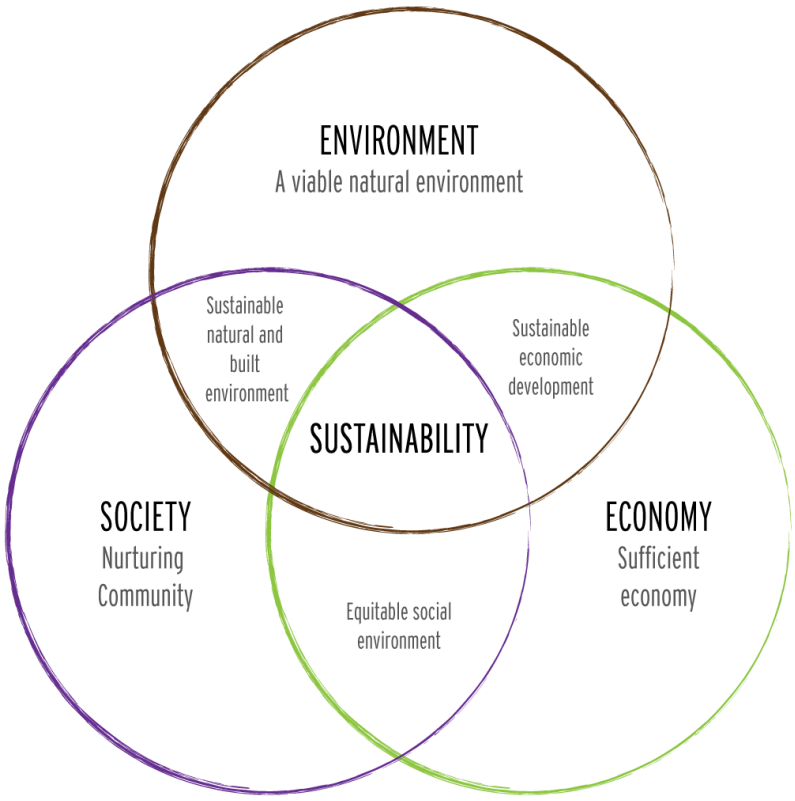

Figure 1: Source: Sustainability Assessment and Reporting for the University of Michigan's, 2002, p.8).

Two theoretical frameworks anchored this study to achieve its objective of involving SMEs in climate change adaptation in SSA. The first is the stakeholder theory. Stakeholder theory is based on the perception that beside enterprise's shareholders, there are several stakeholders, which have impacts and interest in the actions and decisions of an enterprise (Freeman, 1998). These stakeholders include employees, customers, NGOs, communities, government and the environment among others, whose activities are believed to be influenced, either directly or indirectly by the activities of enterprises. Stakeholder theory proclaims that enterprises have a social responsibility that requires them to consider the interests of these parties in their decision-making (Branco & Rodriques, 2007).

The second framework is the triple bottom line (TBL). This theory calls for the extension in the traditional role of enterprises to take into account the interest of the social (people), planet (environment) and the economy (profit) in its day to day business (Bahadur & Waqqas, 2013). Coined by John Elkington in his effort to contribute to the concept of sustainable development in 1988, firstly, according to this theory, the social (people) responsibility of the enterprise comes from the premise that the society is an interdependent system, where there are communal interaction among individuals, groups, and organizations, or among the subsectors of the society of which SMEs are a part of. To fulfill its social (people) responsibility for instance, an SME should be concerned with the provision of educational services, sporting activities, agricultural services, care for women and children's right, wellbeing of the workers and should seek not to exploit the community and its customs, but should naturally desire to give back to the community what it gains from them by contributing to community's growth and development among others. If enterprises fail to do so, they may be vulnerable to the actions or events that occur in the society (Asemah et al., 2013). As indicated in Fig. 1, the social-environmental relation is about adherence to environmental justice, natural resources stewardship at the local level and globally.

The secondly concept in TBL is the environment (Planet). Bahadur and Waqqas (2013) maintain that this is a situation whereby SMEs conduct sustainable environmental practices that benefits natural environment or as much as possible to cause least or no harm to limit environment pollution on air, water and land. Emphatically, SMEs need to exhibit the right actions while realizing that businesses' action on climate change is not to get competitive advantage, but because their enterprising motive is fundamentally defeated, if they do not care about the environment, which they draw their resources from. As indicated in figure 1, environmental-economic relation covers energy efficiency, subsidies or incentives for use of natural resources to be sustainable and usable by the next generation.

Lastly, the profit (economic) aspect of TBL refers to both the tangible profit, which is, distributed and shared among the shareholders, which nevertheless remains an essential starting point for accounting computation including the economic value created by organizations after deducting the cost of all inputs, including the cost of the capital tied up. Within a TBL

framework, the "profit" aspect is seen as the real economic benefit enjoyed by the host society. It is the real economic impact the enterprise has on its economic environment (Okanga & Groenewald, 2017).

As indicated in figure 1, when economic aspect is integrated with the social aspect, they come up with business ethics, fair trade and worker rights (Bahadur & Waqqas, 2013). As indicated in the same figure, the interrelatedness of these three are indivisible and where attempted are meant to do that, leads to unsustainable development.

The Role of the Government

It is imperative to emphasize that the role of governments cannot be ruled out in the fight against climate change in SSA, because they are the ones saddled with the responsibility to draw the realistic picture of adaptability framework in which SMEs must adhere to. Governments have to incorporate adaptation policies into national development plans including mobilizing resources to increase investment in adaptation through public-private-partnership (PPP) and increasing local participation (Jamali and Karam, 2016).

Governments provide information concerning climate change in public domain, especially in the rural areas. Financing basic research in this area is also one of the fundamental tasks of the governments (Allen and Craig, 2016). They also have to provide regional regulatory structure for addressing the impacts of climate change by setting up of institutions responsible for adaptation planning regulation and coordination. They have to make provision of insurance and compensation that will cover citizens and enterprises' loss due to implications of climate change. The economic consequences of natural disasters can be so enormous that ordinary citizens cannot manage. Cushioning through insurance and compensation modalities can be beneficial to citizens (Aminu et al., 2016).

Lastly, fostering economic growth helps in coping with the consequences of climate change and facilitates adaptation in SSA. Reports have shown that poor societies with low levels of education such as the ones in SSA have the highest exposure to climate change impacts. Hence, economic growth, properly measured, and education should not be laid off easily as they act as

powerful self-insurance devices against the uncertain future challenges of climate change (Smita et al., 2011; Amobi & Onyishi, 2015).

Research Methodology

The research design adapted for the study was content analysis. Mugenda and Mugenda (2003) assert that content analysis is the systematic qualitative description of the composition of the objects or materials of study. It is a research tool, which centers on obtaining the actual contents and internal features of literature to determine the presence of certain words, concepts, themes, phrases, characters, or sentences within texts or sets of texts in order to quantify their presence in an objective manner. Texts can be generally described as books, book chapters, essays, discussions, newspaper headlines and articles, historical documents, speeches, among others. The results are then used to make inferences about the messages within the text(s), the writer(s), the audience, and even the culture and time of which these are a part (Carol et al., 2012).

The research process was carried out in combination with the following elements used in conducting a content analysis: deciding on the unit of analysis, sampling the content to be analyzed, coding, data analysis and compiling result and interpretation (Mugenda & Mugenda, 2003). The approach adopted in data collection to identify existing literature concerning strategies that can be adopted by SMEs in SSA for adapting to climate change in this study was secondary (desk) research. Purposive sampling was used to identify relevant information in twelve countries in SSA (Nigeria, Cameroon, Ghana, Gambia, Zambia, Ethiopia, South Africa, Rwanda, Senegal, Zimbabwe, Botswana and Tanzania) which relate to the purpose of the study. Neuman (2003) noted that purposive sampling is used in identifying primary participants in a study from a special population or group of people who are difficult to access.

In accordance with discourse theory and following guidelines concerning content analysis, the data gathered was critically analyzed following the principles of content and textual analysis (Mugenda & Mugenda, 2003). The interpretative framework adopted was built on the perception that social phenomena are investigated and interpreted in qualitative inquiry in an attempt to make sense of the meanings people attach to phenomenon. This research analyzed the impacts of climate change on the sustainable development of SSA. The study made collections of adaptation strategies through contents analysis of literature and concludes that if incorporated into practice, they will enhance the fight against climate change in Sub-Sahara Africa.

Table one: Impacts of Climate Change on different sectors and references of adaptation strategies, which can be effectuated by SMEs' through CSR initiative in the process of mitigating the impacts of climate change in Sub-Saharan African communities.

S/N 1	**Climate change impacts on SMEs' management**	**Adaptation strategies, which can be effectuated by SMEs through technology and management decisions in the process of mitigating the impacts of climate change in Sub-Saharan African communities.**
	a) Impact of climate change on raw materials, which obstruct production and availability of funds for high production (Brown et al., 2012). b) Unfavorable climatological conditions, which have brought about depletion of machineries, acclaim wastes and loss of capital (Brown et al., 2012). c) Climate change affects, which compromise energy development, especially hydro-electric power generation, which hampered manufacturing activities (Idowu et al., 2011). d) Harsh climatic conditions such as erosion, landslides, which have reduced land use, cause migration, and conflicts in the society (Cooper et al., 2013).	a) Provision of waste dumping facilities such as containers for dumping of waste in their offices and communities (Pauw, 2015). b) Facilitating the production and sale of energy efficient electricity gadgets such as electric bulbs, blenders, electric iron, solar panels among others. (Joshua et al., 2018). c) Provision of adequate knowledge base within which to embed on practical, low cost and sustainable climate change solutions in their offices and communities (Onu and Ikehi, 2016). d) Assisting in conducting research on energy and climate change or green technology to contribute to a new low-carbon economy (Onu and Ikehi, 2016). e) Provision of awareness campaigns in communities to stop practices that hamper the environment such as bush burning, among others. (Pauw, 2015). f) Provision of mobile technology for the dissemination of information, which are critical in adaptation to climate change in their offices and communities (Adeyanju, 2012). g) Assisting in the provision education to cover technology gap between SSA and other developed regions in the world (Onu and Ikehi, 2016). h) Conducting campaigns to encourage innovative and sustainable ways of coping with burgeoning effects of climate change (Onu and Ikehi, 2016). i) Provision of information communications gadgets in communities which would enable the prediction of weather patterns, collect data, communicate coping strategies and initiate quick and effective responses to climate change effects (Canales et al., 2017). j) Selecting to work with upstream and downstream clients and suppliers who incorporate climate change polities and strategies in the operations (Adeyanju, 2012).
2	**Impacts of climate change on Educational institutions**	**Adaptation strategies, which can be effectuated by SMEs in educational institutions through CSR initiatives in the process of mitigating the impacts of climate change in Sub-Saharan African communities.**

	a) Extreme weather conditions such as drought, flood, storms and fires disaster affecting environment, which cause loss, or depleting of school infrastructure. These sometimes have caused loss of school days, unavailability of school materials and basic arrangement for students (Adeyanju, 2012). b) Extreme whether condition which affect communities have caused pupils' absence in school, due to ill health, migration of parents to alternative locations in search of livelihood. This has also resulted to conflicts in communities, dearth of resources and malnutrition amongst students (Adeyanju, 2012).	a) Encouraging the provision of environmental based knowledge for students to enable them have adequate knowledge about the environment and impact of climate change (Florence et al., 2016). b) Organizing of environmental sensitization program such as about the recycling of waste materials planting of trees, use of mosquito net among others to students and parents (Amuzu et al., 2018). c) Provision of educational instructional materials in schools in order to promote widespread use of innovations in climate change adaptation and mitigation (Webersik and Wilson, 2009). d) Organizing educational guidance counseling in schools, aim at promoting knowledge, skills, attitudes and values necessary to shape a sustainable future and develop responsible and green habits in students (Florence et al., 2016). e) Help in providing solar panels in schools to reduce greenhouse gas emissions and contribute in mitigating climate change impacts (Amuzu et al., 2018). f) Provision of educational software for teaching and learning in schools to strive toward greenhouse technology (Webersik and Wilson, 2009). g) Provision of infrastructures facilities such as seats, decks, boards, vehicles, information communications equipment among others. in schools for students (Adeyanju, 2012). h) Organizing of campaigns in schools to promote healthy life styles and to stop the spread of diseases such as Cholera, Ebola, Laser fever, Tuberculosis, HIV/Aids, Polio, among others. (Mboera et al., 2014). i) Sponsoring and organizing fieldtrips, workshops, picnic, and tourism among others, where students will have direct acquaintance with natural settings and develop affection for the environment (Adeyanju, 2012). j) Provision of waste disposal facilities in schools (Adeyanju, 2012).
3	**Impacts of climate change on agricultural practices**	**Adaptation strategies, which can be effectuated by SMEs to farmers through CSR initiatives, in the process of enhancing agricultural practices thereby mitigating the impacts of climate change in Sub-Saharan African communities.**
	a) Climate change have caused drought, flooding erosion, pest	a) Help in measures to prevent the spread of sector-borne diseases and pests (Brown et al., 2012).

	and diseases that affect food production in the society (Brown et al., 2012). b) Changes in temperature and precipitation and a result of global warming and climate variability which cause water unavailability and carbon dioxide fertilization, crop failures and livestock deaths, imposing significant economic losses and food security in the society (Brown et al., 2012, Canales et al., 2017). c) Soil erosion and nutrient depletion, which cause constrains on agricultural productivity and food production, threatening and eliminating important environmental services, including agricultural extension services (Cooper et al., 2013). d) Extreme weather conditions which causes a decline in ecosystem productivity and related loss of species and biodiversity which will dramatic impacts on key economic sectors including	b) Promotion of campaigns to encourage ranging against animals grazing by farmers in the communities (Onu and Ikehi, 2016). c) Involvement in the development of local plans that prioritize local resources, knowledge, skills, which safeguard local ecosystems and people from the harshest impacts of climate, change (Brown et al., 2012). d) Campaigning to encourage the growing of crops, which are mostly sensitive to fugal disease during seasons with low rainfall and dry seasons (Canales et al., 2017). e) Campaigning to safeguard certain local species of crops and trees in communities and by incorporating them into agroforestry (Pauw, 2015). f) Campaigning and providing value-added storage and postharvest techniques and facilities for agriculture products to farmers (Canales et al., 2017). g) Campaigning to encourage avoidance of bush burning, encourage minimal or zero tillage, crop rotation system, terracing and planting of cover crops in communities (Onu and Ikehi, 2011). h) Campaigning to encourage afforestation, retaining green cover and discouraging over use of chemical and oil spillage on the environment and water bodies in the society (Creech et al., 2014). i) Sponsoring and participation in carrying out research on new varieties of crops and livestock which are resistant to the effects of climate change (Cooper et al., 2013 and Canales et al., 2017). j) Encouraging research in renewable farming practices which will help conserve soil moisture and nutrients (Brown et al., 2012). k) Intensify research in agricultural to provide seeds for staple cereals and indigenous crops that are better adaptive to drought conditions, irregular rainfall and higher salinity (Canales et al., 2017). l) Campaigning for the protection of wildlife corridors and dispersal areas to enable multiplication of animal species in extinction (Cooper et al., 2013). m) Take up campaigns for afforestation and conservation to preserve the present forest cover, protect existing carbon sinks and facilitate shade-grown agricultural practice in the region (Creech et al., 2014).

	agriculture; poultry, fisheries, tourism among others. (Cooper et al., 2013).	n) Sponsoring of research or providing control mechanism on pests and other crop and animal diseases threating famers at all seasons (Cooper et al., 2013).
4	**Impact climate change on public health**	**Adaptation strategies, which can be effectuated by SMEs through CSR initiatives, in the process of enhancing public health activities in mitigating the impacts of climate, change in Sub-Saharan African communities.**
	a) Extreme climate conditions, which brought about the emergence of some neglected tropical diseases (NTDs) which have impaired the physical and intellectual capacities of the some people (Odjugo, 2010). b) Climate change has increased the cases of vector-borne diseases such as Malaria, Filariasis, Dengue fever, Yellow fever, Leishmaniasis, Lyme disease, Tick-borne encephalitis, African trypanosomiasis, Onchocerciasis, among others. cause by Mosquitoes, sandflies, Ixodes, Ticks, Tsetse flies which are sensitive to Climate Change (Brown et al., 2012, Kula et al., 2013). c) Climate change impacts which worsened the case of allergic diseases such as asthma and hay fever (Serdeczny, 2015)	a) Providing enlightenment campaigns to encourage capacity building for health system in the society (Kula et al., 2013). b) Provision of preventive facilities to restrict malaria transmission such as mosquito nets (Kula et al., 2013). c) Campaigning and collaborating with the government in planning health policies and laws for the sustainability of the society Brown et al., 2012). d) Contributing in provision of building guidelines and urban planning to reduce heat and improve air conditioning in the society (Amuzu, et al., 2018). e) Contributing in enlightening the public on appropriate healthy lifestyle and habits to adopt in the face of climate change (Kula et al., 2013). f) Contributing in providing vaccines or sponsoring vaccination programs in communities (Adeyanju, 2012). g) Contributing to health education and awareness in schools and communities (Kula et al., 2013). h) Contributing to improving water quality regulations and provide water storage facilities (Kula et al., 2013). i) Provision of facilities to improved water treatment and sanitation in the society (Kula et al., 2013). j) Provision of wash hand basins and enlightening communities on hygienic behaviors (Pauw, 2015). k) Encouragement or provision of the digging and usage of pit latrines in communities where they are not available (Adeyanju, 2012). l) Contributing to water supply and sanitation, or health-care infrastructure in communities (Kula et al., 2013). m) Assisting in setting up of traumatic stress disorders centers in communities (Adeyanju,

	d) Climate change has worsen air pollution through increased tropospheric ozone production, or indirectly, through greater human activities as they generate power to meet daily demands, among others. (Odjugo, 2010).	2012). n) Helping in the provision of free medical care to further mitigating the adverse impact of Climate change on health in communities (Idowu et al., 2011). o) Helping in sponsoring research on effective treatment strategies on heat stress, allergic diseases, and many infectious diseases transmitted through climate change (Odjugo, 2010).

Findings and Discussions

The study revealed a number of climate change challenges affecting SSA and pointed out several adaptation strategies, which can enhance SMEs' contributions to climate change adaptation in the region. The literature review realized a large number of climate change adaptation practices that exist around SMEs. The number of strategies obtained differs from one practice to as many as forty-nine diverse options. The strategies address a wide range of adaptation measures that SMEs could assent to and if incorporated into the aforementioned sectors through CSR initiatives, great strides would be achieved. They include fundamental actions, which were classified into four adaptation strategies not mutually exclusive. Those that could be utilized by SMEs through innovative technology, management and their influence thereof; those that could be utilized by SMEs through wielding health and risk reduction strategies; those that could be utilized by SMEs through assistance in education and those that could be utilized by SMEs through assistance in agricultural practices.

	Table two: Percentages of adaptation strategies, which can be effectuated by SMEs through CSR initiatives in different sectors in Sub-Saharan African communities.	**Percentage (%)**
1	Adaptation strategies, which can be effectuated by SMEs through technology and management decisions in the process of mitigating the impacts of climate change, in Sub-Saharan African communities.	20.41
2	Adaptation strategies, which can be effectuated by SMEs in educational institutions through CSR initiatives in the process of mitigating the impacts of climate change, in Sub-Saharan African communities.	20.41
3	Adaptation strategies, which can be effectuated by SMEs to farmers through CSR initiatives, in the process of enhancing agricultural practices thereby mitigating the impacts of climate change in Sub-Saharan African communities.	28.57
4	Adaptation strategies, which can be effectuated by SMEs through CSR initiatives, in the process of enhancing health activities in mitigating the impacts of climate change in Sub-Saharan African communities.	30.61

As indicated in table two, the categories of adaptation options which could be effectuated by SMEs through health and risk reduction strategies seems to offer more strategies (30.61%), followed by those which could be effectuated through agricultural practices (28.57%). This was followed by those which could be effectuated through technology, management and their influence thereof (20.41) and lastly education (20.41) respectively.

Nonetheless, this ranking is for descriptive purposes only and is not an indication of the relative significance of these practices for two most important reasons. First, the ranking was derived from a qualitative analysis that does not precisely allow quantification or effects of interactions. Secondly, the relative importance of adaptation strategy is likely to differ by their perspective, given the different limitations in those areas and the distinctive effects of climate change, among many factors. What is important in this classification is that it reveals a considerable number of strategies for climate change adaptation which adoptions shall ameliorate the Sub-Saharan communities from the vulnerabilities of climate change.

Adaptation on health and risk reduction strategies ranged from contributing in the enlightenment of communities to participation in capacity in the health sector. Those of agricultural practices include encouraging research in renewable farming practices, which will help conserve soil moisture and nutrients to taking up campaigns for afforestation and conservation to preserve the present forest cover among others. Those of technology, management and their influence ranged from helping in conducting research on energy and climate change while encouraging new low-carbon economy, to assisting in providing education to cover technology gap between SSA and other developed regions of the world. Those on assisting in education dissemination in schools, ranged from providing environmental based knowledge to students to enable them have adequate knowledge about the environment, to the provision of facilities in schools among others.

Conclusion and Policy Implications

This study is concerned with the devastative impacts of climate change in SSA. The study has shown that the regions shall be the most affected by the impacts of climate change despite its fewer contribution of greenhouse gas in the world. The study also affirms that SMEs are indeed the pivot point for the fight against climate adaptation to be effective in the region.

The study unveiled several adaptation strategies, which SMEs can adopt through CSR, in contributing to communities' fight against climate change.

These include adaptation strategies which can be effectuated by SMEs through technology and management decisions, those which can be effectuated by SMEs in educational institutions, those which can be effectuated by SMEs to farmers in the process of enhancing agricultural practices and those which can effectuated by SMEs in the process of enhancing health activities in mitigating the impacts of climate change in Sub-Sahara African communities.

SMEs are regarded as significant in this regard because, as asserted by World Bank (2017), they constitute more than 95% of registered indigenous firms in SSA and accounting for more than 65% of employment, and more than 35% of Gross Domestic Product (GDP) in the region. They are closer to the people and have often provided unwavering, practicable livelihood for people in the region; providing a strong labor force, access to markets and steady income generation (James, 2015).

Spread across the region, majority of population in SSA rely on them for their means of livelihood, therefore, the effectiveness of them becoming climate-resilient and given more priority in climate discussions and adaptation in the region is significant. As accentuated by Creech et al (2014), they are the best in preparing the most vulnerable communities in the region to fight against climate change, because they have been engaged in determining the direction in which SSA societies proceed.

This cannot be achieved unless the governments of the region back the effort up with policies and regulations. It is important that the policies should be made to complement SMEs' independent response to climate change through the provision of financial incentives, improvement of infrastructure and policies that enhance local governance and harmonize SMEs' CSR, so that sustainable development can be achieved in the region. It is up to the policy makers and entrepreneurs in SMEs in the region to make use of the recommendations proffered therein to bring sustainable development to the region.

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