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Gender Impact of Climate Change in Nigeria

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Gender Impact of Climate Change in Nigeria

A Master's Thesis

Submitted to the Faculty

of

American Public University

by

Teresa Chandos Wilmoth

In Partial Fulfillment of the

Requirements for the Degree

of

Master of Arts

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Charles Town, WV

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DEDICATION

I dedicate this thesis to my husband, Jason, my children, Amy and Kyle, and to the other members of my family. It has been a long and arduous journey to a wonderful conclusion that would never have been possible without their unwavering support.

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ABSTRACT OF THE THESIS

GENDER IMPACT OF CLIMATE CHANGE IN NIGERIA

by

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American Public University System, July 15, 2015

Charles Town, West Virginia

Professor Randall Cuthbert, Thesis Professor

The world is experiencing a phenomenon called climate change. Climate change and its effects are found on every continent on the planet. Climate change affects men and women differently, depending upon the socio-economic status of the individual. The Niger Delta is the economic core of Nigeria. Men are treated differently than women in Nigeria which correlates as to how each gender deals with climate change. The purpose of the research was to discover whether or not climate change has a gendered quality. The selected strategy of inquiry used in this paper is the qualitative, archival analysis design method. The findings in the body of this paper support that climate change does affect women differently than men. Work is being conducted in the international community attempting to alter the gendered face of climate change. Women are being empowered around the globe in order to make their voices heard in the climate change arena.

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Gender Impact of Climate Change in Nigeria

Introduction

The Earth's total population currently stands at 7, 257,241,849 with a birth every eight seconds and a death every thirteen seconds (World Population Clock, 2015). The current human population is the largest the Earth has ever supported. This vast human population requires resources to sustain life which include clean water, and healthy food, along with shelter from the elements and predators. The natural resources supporting human existence are finite and there is great concern among environmental experts that these resources are reaching extinction.

Climate Change

Since the dawning of the industrial revolution, humans have developed an incessant desire for energy. Energy is needed to run the home heating and cooling components, electronic devices, and vehicles of all types, as well as to support commercial endeavors around the globe. Most modern day energy is derived from fossil fuels that can be processed to create gasoline, natural gas and other forms of energy. There is a concern by many experts that the Earth is reaching a tipping point that may decimate the modern way of life. The increased human population, combined with energy cravings, has created the phenomenon of global climate change. The United Nations Framework Convention on Climate Change (UNFCCC) defined climate change as, "A change in climate which is attributable directly or indirectly to human activities that alters the composition of the global atmosphere and which is in addition to the natural climate variability observed over a comparable time period" (Odjugo, 2009, p. 93). As climate change is presenting itself around the globe, many disasters, whether anthropogenic (caused by humans) or naturally occurring, appear to be increasing as well. Floods, earthquakes,

tsunamis, tornados, cyclones, hurricanes, wild fires, and drought are just a few examples of disasters that are increasing, not only in occurrence, but also in strength.

Climate change is considered a direct result of the global warming that extends far and wide with ramifications that threaten the loss of political, environmental, economic and social security; to an increase in poverty, to a collapse of infrastructure (Solomon, 2014, p.46). There will be no region around the globe that will be spared the negative impacts of climate change and those that will probably suffer the most will be the poorer nations located in tropical regions (Odjugo, 2010, p. 47). Moreover, tropical and subtropical nations regions located in a closer proximity to the equator appear to be experiencing extremes in climate change, and most of these are considered developing nations.

It is important to understand how climate change differs from global warming. Even though global warming is the area where most of the research has been conducted, it is critical to note that climate change is what is experienced by individual humans. Objugo (2010) stated: “While most of the available literature focuses on global climate change, the effects are truly seen at the local and regional levels” (p. 142). No one is exempt from climate change, as it affects every level on the socio-economic scale. Anthropogenic activities are a leading contributor to climate change. Driving motor vehicles, burning fossil fuels for heating, or burning wood for a bonfire at a family gathering, are a few examples of anthropogenic activities. Mass production facilities that run on coal power are major contributors to climate change and global warming. Multiply these types of activities by more than seven billion humans inhabiting the planet and one is able to recognize a pattern of weather change that most people living today have not previously experienced.

Greenhouse Gases

The overpowering need for energy in developed and newly developing countries is destroying the planet. Over the past century and a half, the industrial and agricultural activities such as oil exploration, the denuding of forests, and particular farming methods, have largely contributed to the increase in greenhouse gases or GHGs (Festus, Ekpete, and Ibor, 2014, p.23). GHGs are, “Any of the gases whose absorption of solar radiation is responsible for the greenhouse effect, including carbon dioxide, methane, ozone, and the fluorocarbons” (Webster’s College Dictionary, 2010). CO₂ is considered the most harmful of the GHGs. Everyday anthropogenic activities are contributing to the GHG emission levels. “...The human factors that emit large amounts of greenhouse gases include industrialization, burning of fossil fuels, gas flaring, urbanization and agriculture” (Odjugo, 2010, p. 47). When big corporations decide that natural resources such as forests may be sacrificed for industrial activities, they are assisting in raising the CO₂ levels on the planet. Most oil refineries practice gas flaring as a way to burn off the unwanted byproducts of oil production. Around the globe the activities that are harming the environment lay at the hands of the production of crude oil and all of the refinement procedures that accommodate that industry; they are the big culprits in the game of climate change.

More gas is flared in Nigeria than anywhere else in the world. Estimates are notoriously unreliable, but roughly 2.5 billion cubic feet of gas associated with crude oil is wasted in this way every day. This is equal to 40% of all Africa’s natural gas consumption in 2001, while annual financial loss to Nigeria is about US \$2.5 billion. The flares have contributed more greenhouse gases than all sub-Saharan Africa combined. And the flares contain a cocktail of toxins that affect

the health and livelihood of local communities, exposing Niger Delta residents to an increased risk of premature death, child respiratory illnesses, asthma and cancer (Friends of the Earth, 2015, p.4).

A variety of scientific groups have been studying climate change around the world for the last few of decades. One such group is the Intergovernmental Panel on Climate Change (IPCC), which was founded over 27 years ago. “The Intergovernmental Panel on Climate Change (IPCC), a body set up in 1988 by the World Meteorological Organization (WMO) and the United Nations Environmental Program (UNEP) to provide authoritative information about the climate change phenomenon” (Uyigue and Agho, 2007, p.1). In 1990, the IPCC released its first report on climate change and provided scientific data that supported the assumption that climate change was a direct result of anthropogenic activities. The report predicted that (GHGs), especially CO₂, would be the catalyst for increased drought in certain regions and increased flooding in other regions (Uyigue and Agho, 2007, p.1).

CO₂ emissions from fossil-fuel burning and industrial processes have been accelerating at a global scale, with their growth rate increasing from 1.1% y⁻¹ for 1990–1999 to >3% y⁻¹ for 2000–2004. The emissions growth rate since 2000 was greater than for the most fossil-fuel intensive of the Intergovernmental Panel on Climate Change emissions scenarios developed in the late 1990s. Global emissions growth since 2000 was driven by a cessation or reversal of earlier declining trends in the energy intensity of gross domestic product (GDP) (energy/GDP) and the carbon intensity of energy (emissions/energy), coupled with continuing increases in population and per-capita GDP. Nearly constant or slightly increasing trends in the carbon intensity of energy have been recently

observed in both developed and developing regions. The growth rate in emissions is strongest in rapidly developing economies, particularly China. Together, the developing and least-developed economies (forming 80% of the world's population) accounted for 73% of global emissions growth in 2004 but only 41% of global emissions and only 23% of global cumulative emissions since the mid-18th century (Raupach, Marland, Ciais, LeQuere, Canadell, Klepper and Field, 2007, p.10288).

Most Vulnerable Groups

The first IPCC report predicted that those living in the poorer developing countries would fare the worst due to an inability to cope with climate change (Uyigüe and Agho, 2007, p.6). Solomon (2014) asserted, “Climate change threatens to set back development efforts by decades, placing least developed countries and Sub-Saharan African countries, including Nigeria, and already vulnerable populations in an even more precarious position” (p. 46). To add salt to that open wound, these most vulnerable countries are the least studied and least understood to even begin to determine and adopt adaptation strategies that could effectively mitigate the risks (Leary, 2008, p.1).

Climate change is an issue that leaves no social group untouched. Those with higher socio-economic status fare much better in the face of disaster due to the fact that they have the resources to protect themselves; those that reside on the bottom of the socio-economic scale are often the ones that suffer or even die in the face of disaster. More specifically, Ackerly and Attanasi (2009) studied how, around the world, whenever natural disaster strikes, the mortality rate is higher for women than men (p. 543-544).

Natural disasters do not affect people equally. In fact, a vulnerability approach to disasters would suggest that inequalities in exposure and sensitivity to risk as well as inequalities in access to resources, capabilities, and opportunities systematically disadvantage certain groups of people, rendering them more vulnerable to the impact of natural disasters (Neumayer E. & Plumper, T., 2007, p. 551).

Neumayer and Plumper (2007) conducted a study of men and women from higher and lower socio-economic groups and discovered that higher status women fared much better than their lower status counterparts when disaster strikes. The authors discovered that when the socio-economic status is high, the death toll between men and women is pretty much the same. When the socio-economic status is low, more women than men will die. In other words, if a person has the resources beyond what is needed for basic survival, that person will be better able to cope with climate change. Those that occupy the higher-end of the socio-economic scale are typically better educated and have access to much needed resources and those in power. Educated people are able to access information for assistance in times of disaster. The folks that occupy the bottom end of the socio-economic scale are just trying to survive. Poor people are contributing to climate change and most often have no idea that there may be a better way to cook, provide heat for the home, or even to grow their food. This challenge needs to be researched, investigated and solved by those in political power.

Reid (2013) asserted studies that "...Highlight how race, class, and gender structure affect the disaster experience such that marginalized populations are most vulnerable to the negative consequences of a disaster and face significant challenges in recovery"(p. 984). It is imperative that everyone understands that those with the least amount of resources are the ones

doomed to face climate change head-on, without the benefit of a plan for recovery or adaptation. Many people believe that poverty is a man-made phenomenon. However, people should not be punished for living in poverty, especially when national, regional and local governments can provide training and assistance.

Current literature is a bit scant on studies that look directly at gender and the effects of climate change. The remainder of this paper will focus on the Sub-Saharan nation of Nigeria and the women living there. The writer will seek to determine if there is a gender component to climate change and attempt to add to that literature in hopes that changes for Nigerian women, at the lower end of the socio-economic scale, will be developed and implemented to assist them in their ongoing struggle of survival in the face of climate change.

Literature Review

Gender

The literature generally supports the assumption that men and women handle disaster results differently. The lack of significant studies relating to gender vulnerability to climate change made this project challenging. The risks associated with climate change are impacting humans around the globe and historically, men have used different coping strategies than women. Irene Dankelman, author and ecologist, has spent over 30 years studying the environment and sustainable development for different organizations at the national and international level, as well as for academia and the United Nations. Her specialty focuses on gender and the environment, and she has been widely published (Dankelman, 2010, p. xiii). In her book, *Gender and Climate Change: An Introduction*, Dankelman created an anthology of works by several authors who focused on the gender aspect of climate change. This work is a collection of case studies direct from the field, featuring first-hand experience with impoverished women in different countries around the world and how those women are dealing with climate change.

“For example, there are disproportionate effects on women’s mental health related to natural disasters, women often eat less in times of food shortage and suffer more health problems due to lack of clean water”(Dankelman, 2010, p. 108). In the 21st century, there is no reason for any human to not have access to clean and safe, life preserving water. The basic needs to sustain life are lacking for the vulnerable populations around the globe. The basic needs of clean air, clean food and drink, shelter, warmth and sleep that every man, woman and child deserves are basic human rights (McCleod, S., 2014).

When disaster strikes men typically assume first responder roles and are involved in search and rescue efforts and protecting the home, while women typically assume responsibility for domestic tasks such as gathering food and water and taking care of the young and frail (Dankelman, 2010, p. 109). These gender roles date back to the beginning of humankind, with men as dominantes and women as subordinates. The evolution of gender roles has been slow in changing. Unfortunately, many cultures embrace these stereotypical roles.

Women and girls are often considered weak and inferior, which results in generalizations about them as fragile and incapable in the face of disaster. This inaccurate portrayal of females results in barriers that preclude them from being part of the planning and decision-making process necessary when faced with disaster. Too often women and girls are looked upon as problematic when in fact, they can be an important part of the recovery process (McClellan, 2014, p.1).

There has been a lack of research into gender and climate change as Nelson, Meadows, Cannon, Morton, and Martin (2002) asserted:

Thus, it is not surprising that the gender dimension of climate change has been largely been neglected. This is despite the fact that the effects of climate change are very-likely gendered. It is possible to infer this because of the strong relationship between poverty and vulnerability to environmental change, and the stark fact that women as a group are poorer and less powerful than men (p. 51).

The United Nations International Strategy for Disaster Reduction (2009) reported that “...Within gender relations there are strong imbalances between men and women that are typically unfavourable towards women” (p. 3). This group postulated that in general, women are often subordinate in their communities, families and society in general. “Gender-based

relations, in particular power relations, and established social and institutional structures and attitudes effectively lead to the subordination of women, denying them opportunities and interfering with their rights as individuals” (United Nations International Strategy for Disaster Reduction, 2009, p. 3). “Just as gender is not sufficiently mainstreamed in many areas of development of policy and practice, so the potential impacts on gender relations have not been studied, and remain invisible” (Nelson et al., 2002, p. 51). Fothergill (1996) stressed “...Research shows that gender influences vulnerability in disasters and exposure to risk. The researchers argued that a woman’s heightened exposure results from their social class, their caregiving roles, and their relative lack of power or status” (p. 35).

The United Nations Development Programme (2010) considered gender as a determining factor. “Gender determines what is expected, allowed and valued in a woman or man in a given context. It determines opportunities, responsibilities and resources, as well as, powers associated with being male and female” (p. 1). Women are treated differently than men in almost all aspects of life, not just dealing with climate change and other risks associated with climate change. The reality of the matter is gender bias is not just an issue in developing countries. In the United States there has been little research conducted on gender issues and climate change.

Outside the narrow confines of disaster sociology, there is, of course, strong evidence of persistent, even growing, gender inequality both within the United States and globally that is linked to a large-scale economic and political processes in the capitalist world system (Bolin, Jackson, and Crist, 1998, p.2).

Discovering how gendered inequality effects vulnerability in the face of disaster is

lacking in the literature. If a major developed country such as the United States has not conducted much research into gender inequality how is it possible to believe that developing countries would consider such research? With this being the case, it should not be a big surprise that the gender dimension of climate change topic has been neglected in the literature. The work of Simavi, Manuel and Blackden (2010) is related to the scope of gender relations. These authors considered biases in rights and differences between males and females in regards to owning land, being considered credit worthy, being able to work outside the home, being paid a fair wage and in decisions about how labor is divided. There was also a discussion on who is given more power in terms of decision making. These components have impacts on the well-being for the entire household which in turn affects growth (p.5). In gendered biased communities, women are left at home to care for the young, the elderly, the crops, the livestock and lastly, themselves. This is not to say that women can only be caretakers. A plethora of women have proven to themselves and the world that women are very capable individuals outside the home. In fact, many women do not have the calling to take care of others. Being a woman should not be limited to caretaking. Many powerful women around the world are not necessarily caretakers and every woman should not be expected to fill gender specific roles. History is full of women that changed the world. A woman, just like a man, should be able to choose what life path they take.

Three key components attributed to women's vulnerability are economic insecurity, ideological constraints and male domination. Enarson (2000) asserted that placing women in a subordination role is the main cause of vulnerability in times of disaster. Economic insecurity for women, regardless of whether or not they are citizens in a developed or developing country, is linked to high rates of poverty. Women are often denied access to well-

paying jobs, credit and savings which places them at the front of the line when asking for post disaster assistance (p.2). In the United States, there is still the notion of a “glass ceiling” which prevents women from prime leadership positions. Based on that fact, it is easy to imagine what life must be like for rural Nigerian women. Rural Nigerian women are left in the dust of economic development where the high paying positions are for men only. This is unacceptable.

Ideological constraints hinder female mobility as they are often left in charge of the children, the frail, the elderly, and the livestock. When women are left at home after a disaster, they lose the ability to attain information that may indeed save not only themselves, but all their family and livestock. They lose out on access to shelters as well as to relief supplies (Enarson, 2000, p.2). Men are often given first access to relief aid and volunteers may be biased as to how that aid is divided among the family members.

The third key component contributing to women’s vulnerability during disaster is male dominance.

Male dominance in disaster decision-making undermines women’s greater willingness to mitigate the effects of known hazards (e.g. moving livestock, tools, or household goods to safer locations, making evacuation plans), may misdirect disaster relief from family needs to personal interests, and often leads to gender-biased relief and reconstruction programs (e.g. targeting funds to male heads of household, limiting women’s paid disaster recovery work.) (Enarson, 2000, p. 3).

These three key components can be applied to developed and developing nations. Limiting women’s potential is counterproductive to society at large, regardless of where women live. The United States of America has only recognized voting equality for women since 1920

(History.com, 2015). For a country that is 239 years old recognizing the value of women in the United States of America has been a long time coming. It is a situation not unlike the one women in Nigeria face daily.

Nigeria

Background. Nigeria is considered a Sub-Saharan nation that has experienced an ongoing population explosion since its inception. Nigeria's population was approximately forty-five million people when it gained independence from the United Kingdom in 1960. Since that time, the population has grown with an increase of almost 268% during the period 1960 to 2012, with a total of 178,000,000 people (World Population Review, 2014).

Nigeria, officially known as the Federal Republic of Nigeria, is located on the western coast of Africa. The country features 36 states and its Federal Capital Territory, which is known as Abuja. The country of Nigeria features over five hundred different ethnic groups and many different languages" (World Population Review, 2015).

With over five hundred different ethnic groups it becomes a bit clearer on why gender research is lacking in Nigeria. A recent United Nations analysis of world population trends indicates global population growth shows no signs of slowing, with current projections estimating a staggering 11 billion people could inhabit the planet by the year 2100, faster growth than previously anticipated. The majority of this surge in population is likely to occur in sub-Saharan Africa, with the population of Nigeria expected to surpass that of the United States before 2050, according to the statistical analysis (Chow, D. 2013).

With population growth like no other country, Nigeria is facing some difficult issues in

reducing vulnerability for a large percentage of its inhabitants, especially for women and girls. This type of population growth, associated with climate change, is putting a strain on the already dwindling natural resources found in Nigeria. The corrupt elite are being blamed for much of the climate change and inequities being put upon the non-elite of Nigeria. According to the Friends of the Earth Organization (2015), Nigeria is rich in crude oil and natural gas that has not shared this wealth with all Nigerians. The benefits of fossil fuel production have benefited the elite and multinationals for over half a century (p.4).

Niger Delta. The Niger Delta region of Nigeria "...Is at the heart of Nigeria's economic, environmental and geo-political significance."(Ajayi, 2014, p.3) This region contains only 20% of the national population and contributes over 80% of the revenue for the entire country. (Ajayi, 2014, p. 3). The Niger Delta also contains enormous crude oil reserves and gas that creates room for both local and foreign investments. The Niger Delta is also home to some of the richest diversity of flora and fauna that is not to be found anywhere else in the world. This region is also home to over 123 gas flaring sites which makes it one of the highest greenhouse gas emission sites on the entire continent of Africa (Ajayi, 2014, p.3). With those types of economic possibilities, one would imagine that all Nigerians live a comfortable, modern existence where water is piped into the home, houses contain lavatories, electricity can be used for cooking and heating the home, and food producers have plenty of water and nutrients to produce a bountiful harvest for all. However, this modern life style is a mere fantasy for most rural Nigerian women.

In 2011, there were approximately 600 million people in Africa that were living without access to electricity. That number represents approximately twice the population of the United States. In addition, those 600 million represented 43% of the 1.4 billion people worldwide that

live on a daily basis without access to electricity (The Globalist, 2014, p.2), a large number of people that are not able to access to modern sources of energy. Even though many citizens live within a mile away of an electrical transformer, only about 18% are connected (The Globalist, 2014, p.2). Pat-Mbano and Alaka (2012) stated that Nigeria ranks as the 30th poorest nation in the world based on the purchasing power parity. Ninety percent of Nigerians live in poverty despite the fact that their country holds some large stores of natural resources. The reasons for so many Nigerians living in poverty is attributed to corruption, misappropriation of funds and improper utilization. This series of events in turn affected goals targeted for electrical supplies, proper housing and employment (p.12). How can a man or woman rise above poverty when the powers in charge cannot be trusted? It is amazing that there is not more protests and riots in Nigeria.

In 2010, Nigeria's oil reserves were pumping out about 2.3 million barrels of oil on a daily basis. These reserves represent the tenth-largest in the world. Along with the crude oil reserves, Nigeria's natural gas reserves represent the ninth-largest in the world with a total of 5.110 billion cubic meters (Okonjo-Iweala, 2012, p.3). With all these valuable natural resources, it is astounding that so many Nigerians have so little access to these natural resources and water. There is evidence that Nigeria suffers and will continue to suffer from the impact of climate change especially "... in the areas of agriculture; land use, energy, biodiversity, health and water resources (Apata, Samuel, and Adeola, 2009, p.3). Gas flarings have been associated with an increase in respiratory ailments, premature death, asthma and cancer (Friends of the Earth, 2015, p.4). Add poverty to this volatile equation and the outcome is devastating.

In Nigeria, the social and cultural roles for men and women can be traced back over the years. Akinyode and Iyare (2005) stated:

These cultural roles determine the level of contribution and involvement in the areas affected by climate change. "...Women generally have less capacity to understand and participate in climate change discussions because of they are predominately illiterate, lack information and lack access to decision-making bodies" (Dankelman, 2010, p. 126). Climate change is very real in Nigeria.

Rural Nigeria. There is clear evidence that climate change is impacting Nigeria.

"... The Nigerian Meteorological Agency (NIMET) has data that shows a definite shift in rain patterns, massive increases in floods and erosion, temperatures rising to new records, an upsurge in dust haze occurrences and escalation in coastal erosion. The rainy seasons have shifted as well with an early onset" (Dankelman, 2010, p. 124).

These changes in seasons are affecting crops in Nigeria. Adebo and Sekumade (2013) studied the life of women in Ekiti State in Nigeria and discovered:

Rural Nigeria still depends largely on the dictates of weather for survival and sustenance. Supply of water for domestic and agricultural production is a preoccupation of the womenfolk. Findings shows that the women in rural Ekiti have no access to information on climate change and the technological options to manage climate variability are poor, have no plan, finance, technological or any institutional support to adapt to climate change (p. 386).

One might wonder how this could possibly be, especially in the information age that is the 21st century. Earlier it was noted that many Africans have not hooked up to existing power grids. Power grids exist in Nigeria however, these grids are not reliable. Women need to be given the opportunity and funding to be able to access the World Wide Web with a cell phone.

A simple touch of a touch screen smart phone could enable Nigerian women to access new and innovative means of farming that do not produce CO₂ emissions. While many women in developed countries enjoy cell phones for gaming and shopping, Nigerian women could use cell phones for survival in the face of a flood or drought. Nigerian women could use vital information that may not have been passed on to them from the men. Since most rural, Nigerian, women are responsible for housekeeping, livestock and food gathering and preparation, it makes sense to give them the tools necessary to survive a disaster.

The marginalized, primary source-dependent livelihood groups in Africa, Asia and Latin America, are particularly vulnerable to climate change impacts if their natural resource base is severely stressed and degraded by overuse or if their systems of governance are in or near a state of failure and hence not capable of responding effectively. The devastating effects of climate change in Nigeria are borne mainly by the vulnerable groups which consist of womenfolk, children and the aged (Adebo and Sekumade, 2013, p. 388).

In other words, Nigerian women, children and the elderly are vulnerable to climate change as a result of the high profit oil and gas production taking place in their country by those that occupy the higher socio-economic stations. Nigerian women and their charges need to be included in the climate change conversation and not looked upon as a liability but considered as potential assets. Adger (2006) stated the following regarding vulnerability:

The concept of vulnerability has been a powerful analytical tool for describing states of susceptibility to harm, powerlessness, and marginality of both physical and social systems, and for guiding normative analysis of actions to enhance well-being through reduction of risk (p. 268).

Nigerian women have been taught the ways of the women that came before them, from decades gone by. The rural Nigerian female farmers have a great need to be linked up with modern day farming practices that can be utilized to help maintain local farms supporting local families which can assist in reducing their vulnerability to climate change.

Adeoti and Osho (2011) asserted, “Efforts to mitigate climate threats should not exclude the household as a major driver of greenhouse gases (GHG) emissions through its consumption patterns” (p.133). Many rural Nigerian women still burn various types of biomass such as wood, animal dung and whatever else they can find in order to cook. This type of gathering can lead to deforestation that will lead to increase flooding when the rainy season begins. Nigerian women need to be taught sustainable methods for cooking. Apata, Samuel, and Adeol (2009) analyzed climate change perception and adaptation amongst farmers in South Western Nigeria and discovered a great need for “...Agricultural economists and other stakeholders in environmental management and agricultural sustainability in developing countries to come to terms with the negative impacts of climate change and likely positive and beneficial response strategies to global warming” (p.2).

Climate change impacts are already evident in Nigeria; and these impacts are different for men and women. Only by integrating a gender perspective can plans and actions become effective. Absence of gender perspective at the planning level will lead to programmes that are ineffective, inefficient, widen gender gaps and lead to frustrations at the implementation level as budgets do not match with strategic needs and interests. It is therefore necessary to integrate a gender perspective in climate change planning and action at the national level, but also at the states and at the local government level (Dankelmann, 2010, p. 128).

In other words, rural Nigerian women need to be included in local, regional and national discussions regarding climate change. These women can be very effective agents for change---if they are only given the tools necessary to do so. Tools that include smart phones or tablets, educational opportunities and the right to be considered equal to men in the political arena. Providing modern energy on a stable network would be a great help in the fight against climate change in Nigeria.

As primary resource managers and food producers, rural women and their families are directly affected by environmental stress and crisis; deforestation, for example, adds to the hours walked by girls and women to collect firewood each day in many parts of Africa (Enarson, 1998, p. 161).

In the 21st century, the technology exists that could assist the Nigerian women and other women around the globe that spend countless hours of the day gathering wood and water. These women deserve to be treated as equals with men in the pursuit of climate change mitigation and adaptation efforts. Women are considered valuable assets as Enarson (1998) asserted, “Researchers also find women’s environmental stewardship, their indigenous knowledge of local resources and their knowledge of family and community history to be significant assets when families and communities respond to degraded environments or environmental crisis” (p. 161).

Risk perception. The rural Nigerian women face challenges on a daily basis when dealing with contributing factors of climate change such the burning of solid biomass fuels that could include wood, brush, and animal dung. Opening burning of these types of materials produce great quantities of CO₂ which was earlier discussed a major contributor to GHGs which are linked directly to climate change. When these types of fuels are burned openly in a

home, the CO₂ can reach toxic levels which can in turn lead to respiratory problems for both adults as well as children.

Indoor air pollution resulting from the use of solid fuels [by poorer segments of society] is a major killer. It claims the lives of 1.5 million people a year, more than half of them below the age of five: that is 4000 deaths a day. To put this number in context, it exceeds total deaths from malaria and rivals the deaths from tuberculosis (Shah, A., 2013, p. 6).

Most daily activities in rural Nigerian life have been passed on from generation to generation. The uneducated women of Nigeria probably do not understand how burning wood in an open flame is contributing to climate change and to be honest they probably do not have reason to care, however who can fault them if they have not be taught differently? Risk perception needs to be included in the overall education of these women. These women are not reading journal articles on climate change and gender. It is a safe bet they really have no clue why their climate is changing as quickly as it is. Even as they survive crop failures, rising sea-levels and the increased mortality of their children.

Despite the losses and damages created by disasters, some individuals and communities do not attach much significance to natural disasters. Risk perception towards a disaster not only depends on the danger it could create, but also the behavior of the communities and individuals that is governed by their culture (Kalatunga, 2010, p. 304).

Since most of the rural Nigerian homes are not tied into the electrical grid, many still use kerosene lanterns for indoor illumination. Kerosene is a very dirty fuel that contributes to the overall CO₂ emissions in Nigeria. Adeoti and Osho (2011) conducted a study of Nigerians

households and discovered that kerosene creates more CO₂ emissions than a solar photovoltaic (PV) lighting system (p. 133). “A PV lighting system collects solar energy using one or more PV panels, stores that energy in a battery or series of batteries, and then releases the energy to power light sources at night” (Rensselaer Polytechnic Institute, 2006, p.1). A very common example of solar PV lights are the ones that many people in developed nations use for external illumination, such as those pictures below.



(Photo retrieved from http://energybible.com/solar_energy/outdoor_solar_lighting.html)

An Adeoti and Osho (2011) study concluded that by replacing kerosene lamps in Nigeria at the national level, between 0.4 and 0.124 tonnes of CO₂ could be avoided on an annual basis (p.133). Making the switch from kerosene to solar PV lighting comes with an estimated cost of \$356 in United States dollars at the household level, which for most Nigerian families, exceeds their entire annual earnings. The estimated costs at the national level outlay according to Adeoti and Osho (2011) is somewhere between \$1,138.265 and \$2,848 million in US dollars (p.133). As with any project, funding needs to be secured and who will pay for this transition? One might suggest the local, state and national governments. However, when discussing the rural Nigerian, it is important to remember that infrastructure is missing. This type of capital investment needs to come from the Nigerian government. Replacing kerosene

with solar PV lightening would decrease the amount of CO₂ emissions within the household and would provide cleaner air for the home. Relating back to how profitable the fossil fuel industry is in Nigeria, it is logical to suggest that funding for basic infrastructure should come from these assets.

Another solution that could help eliminate dangerous CO₂ levels from accumulating in the home would be the use of fuel free ovens. These fuel free ovens are solar powered and work independently of a grid. One example is the Gosun Sport™ which can produce a meal in about 20 minutes with temperatures over 550°F/290°C. The Gosun Sport™ retails for approximately \$269 and would make an excellent option for people in Nigeria and everywhere else in the world so that CO₂ emitting fuels could be eliminated.



(Gosun Sport solar stove; retrieved from <http://gosunsotove.com/products/gosun-sport>)

Water. Most everyone knows the importance of water to sustaining life: be it human, animal or plant. Over the past 38 years there has been a call to involve both women and men into water management around the globe at the international level. "...Starting from the 1977 United Nations Water Conference at Mar del Plata, the International Drinking Water and

Sanitation Decade (1981-90) and the International Conference on Water and the Environment in Dublin (January 1992), each which explicitly recognized the central role of women in the provision, management and safeguarding of water”(United Nations Organization, 2015, p.1).

It is estimated that humans use less than 1% of the available freshwater covering the earth. Approximately 97% is salt water and the remaining 2% is locked up in glaciers and ice caps (Diamandis and Kotler, 2012, p. 246).



(Water and gender fact sheet. Retrieved from <http://www.un.org/waterforlifedecade/gender/shtml>.)

Sanitation. Gender inequality makes its way into the area of sanitation. There is a lack of clean, safe and private sanitation facilities which results in physical pain and embarrassment for millions of women around the globe. “Cultural norms frequently make it unacceptable for women to be seen defecating---forcing many women to leave home before dawn or after nightfall to maintain privacy” (United Nations Organization, 2014, p.2). Just imagine what that

must be like to not be able to void or defecate when nature calls. Due to this reality, "... Many women do not drink much water during the day which can then lead into other health problems such as urinary tract infections" (United Nations Organization, 2014, p.2). That means millions of women are probably suffering dehydration, as well as dealing with all other types of health issues.

Where latrines are available, they are typically designed by male masons that lack the understanding that female latrines need to be designed differently, as well as separate latrines for males and females (United Nations Organization, 2014, p.2). It would be helpful to educate the Nigerian construction industry on the differences between what a male latrine needs to be and what a female latrine needs to be. Why not train women in the field of engineering so that these types of issues can be avoided? This information is available to those that want to know--- now it needs to be made available for those that need to know. In summary, the lives of Nigerian women are complicated to unbelievable lengths when it comes to dealing with simple, daily chores of cooking, gathering water and just going to the restroom for relief.

Farming. Previously, the issue of farming was referenced as a female responsibility. Farming practices have been handed down generation to generation and for the most part this information was good. Good, until global warming developed.

A natural consequence of the development of new agricultural innovations is the erosion of traditional farming and resource management knowledge. Previously, this knowledge was not considered a problem, but with recent environmental problems related to climate change, it is no longer considered unproblematic.

There is currently an increased interest in traditional agricultural knowledge due

to the fact that traditional agricultural system appears to be more sustainable than conventional ones” (Ofuoku and Albert, 2014, p. 402).

Climate change is threatening the farming industry in Nigeria.

Moreover, rain-fed agriculture practiced and fishing activities from which 2/3 of the Nigerian population depend primarily on foods and livelihoods are also under serious threat besides the high population pressures of 140 million people surviving on the physical environment through various activities within the 923,000 square kilometers (as (Apata, Samuel and Adeola, 2009, p.3).

Nigeria’s farming industry is directly tied to climate change and therefore vulnerable to natural disasters. As Ayode (2004) asserted “Climate change and agricultural processes are interrelated, since all stages involved in agricultural production such as sowing, crop growth and development, storage and others are dependent on climate” (as cited in Banmeke, Fakoya, and Ayada, 2012, p. 233). Farmers living in South West Nigeria carry the burden of not only supplying crops to local residents but to major food suppliers that serve the rest of the nation. These local farmers are feeling the effects of climate change in spite of the fact they have not considered the long term effects (Apata, Samuel and Adeola, 2009, p.3).

This is evidenced in the late arrival of rain, the drying-up of stream and small rivers that usually flows year-round, the seasonal shifting of the “Mango rains” and the fruiting period in the South part of Oyo State (Ogbomosho), and the gradual disappearance of flood-recession cropping in riverine areas of Odo state are among the effects of climate disturbances in some communities of South-Western Nigeria (Apata, Samuel and Adeola, 2009, p.3).

It is important to remember that it will take finesse when approaching these Nigerian farmers regarding climate change. “One must take into account local communities’ understanding of climate change, since they perceive climate as having a strong spiritual, emotional, and physical dimension” (Apata, Samuel and Adeola, 2009, p.3). These authors concluded that these farming communities have developed a knowledge of the area that is perhaps inbred in their DNA. This type of knowledge has allowed these Nigerian farmers to deal with high-stress and ecological and socio-economic conditions for decades (Apata, Samuel and Adeola, 2009, p.3)

Theoretical Framework

There is limited data available on rural Nigerian women and how climate change is impacting their lives differently compared to rural Nigerian men. This paper will attempt to partially fill the gap in the literature on this subject by proving the following hypothesis:

Climate change is increasing gender vulnerability for Nigerian women.

Research Design/Methodology

The selected strategy of inquiry used in this paper is the qualitative, archival analysis design method. Creswell (2009) defined qualitative research design as follows:

A means for exploring and understanding the meaning individuals or groups ascribe to a social or human problem. The process of research involves merging questions and procedures, with data typically collected in the participant's setting, data analysis inductively building from particulars to general themes, and the researcher making interpretations of the meaning of the data (p. 4).

Researchers that engage in the qualitative research method have a healthy respect for inductive reasoning, seek out individual perception and explain the complexity of a situation (Creswell, 2009, p.4). The increased vulnerability of rural Nigerian women facing climate change is the crux of this paper, as they are often held responsible for all things that surround and are included in the home. Many of these rural Nigerian women do not have the luxury of indoor sanitation, indoor access to clean water sources, are typically not empowered with education, are not "plugged in" to the world wide web, are responsible for growing food for their families, are tasked with keeping the livestock healthy and safe, are bound by dominate males that are free to leave the home in search of paying jobs and lastly, are important stakeholders in dealing with climate change adaptation in their country. The effects of climate

change are adding to the vulnerability of rural Nigerian women through the inequities that are being perpetrated upon them. These rural Nigerian women need education on how to adapt to climate change while decreasing their vulnerabilities.

The qualitative approach leans more toward the human experience rather than hard numbers. Regarding climate change research, the qualitative method attempts to truly listen and understand what people experience in times of disaster. Creswell (2009) stated:

If a concept or phenomenon needs to be understood because little research has been done on it, then it merits a qualitative approach. Qualitative research is exploratory and is useful when the researcher does not know all the important variables to examine (p. 18).

Therefore, it makes sense to use the qualitative approach to understand how rural Nigerian women are being impacted by climate change and whether or not gender increases vulnerability. Spencer, Ritchie, Lewis and Dillon (2003) add to the definition of the qualitative approach as follows:

Qualitative research aims to provide an in-depth understanding of people's experiences, perspectives and histories in the context of their personal circumstances or settings. Among many distinctive features, it is characterized by a concern with exploring phenomena from the perspective of those being studied; with the use of unstructured methods which are sensitive to the social context of the study (p. 3).

Therefore this research focused on one main question:

1. What are the differences between how Nigerian women and men cope with adapting to climate change?

Research materials consisted of peer reviewed journal articles, books, and online resources and databases that address the gender factor and its impact on climate change adaptation in Nigeria. The limits of qualitative research include a "...Broad explanation for behavior and attitudes, and it may be complete with variables, constructs, and hypotheses" (Creswell, 2009, p. 61). One of the main reasons why the qualitative approach was chosen for this work is the exploratory aspect of this study (Cresswell, 2009, p. 26). Researching climate change and its gender bias has been challenging. Rural Nigerian women are being marginalized by their own country, which is not acceptable. Many of these women have been placed at the lowest levels of their society due to no fault of their own. It is not their fault that they were born female. It is not their fault that they are seen as property and not as humans. Vulnerability to the effects of climate change need not be just a female issue---in fact, vulnerability to climate change is a human rights issue, not merely a gender issue. Since the literature supports climate change as a real phenomenon, mitigation is still required; however, adaptation is the key to survival for many rural Nigerian women.

Analysis

This qualitative archival analysis provided data supporting the hypothesis that a gender bias against women exists in rural Nigeria. More women than men are losing their lives in Nigeria as a result of climate change.

The Niger Delta region is suffering from large-scale environmental and human rights abuses evident in the oil spills and gas flaring and their consequential destruction of water sources and vegetation, destruction of livelihoods and damage to food supply, ill health, increase in incidents of conflicts and sexual vulnerability and exploitation (Dankelman, 2010, p. 247).

Gas flaring is a part of oil production that emits tons of CO₂ into the air which in turn degrades air quality. Nigerian citizens are exposed to this type of air to breathe which in turn leads to respiratory illness. Climate change is affecting the growing seasons in Nigeria with earlier monsoon seasons and rising sea levels which is leading to decreased harvests. Rural Nigerian women are often looked upon as part of the problem, instead of the important stakeholders they really are. Thus far the literature based on gender equality in the face of climate change has not been equitable.

Arora-Jonsson (2011) discussed the following:

The literature about climate change and gender has so far been written mainly to lobby for a gender perspective within international politics. It has been marred by a lack of data and evidence. Arguments about women's poverty and mortality are used to back up claims about the unequal effects of climate change on men and women. Arguments are built on dubious statistical claims which are taken as building blocks for future research or quoted as facts. Many reports and papers

frequently do not cite their sources or tend to cite each other. As a result of this, the credibility of gender research is undermined and met with skepticism within the larger research community (p. 748).

Rural Nigerian women have finally realized their oppressive state and have begun to demand justice for themselves and their land in the Niger Delta region (Denkelman, 2010, p. 247). Most of the literature on gender and climate change agrees with the hypothesis that rural Nigerian women face climate change with a distinct bias compared to rural Nigerian men. Nigerian men are allowed the rights to wage paying occupations, are often the ones that receive disaster aid that may or may not make it to those in need, are allowed credit and land owning opportunities and basically may do what they please. Rural Nigerian women are relegated to the homestead, are not allowed educational opportunities, are not allowed to leave home in order to seek wage paying jobs, are left to deal with all aspects of the home front from taking care of the young and elderly, to taking care of livestock and local farm lands, to hunt and fish for their families.

Solomon (2014) studied vulnerability and climate change and shared the following facts:

1. The effects of climate change are not gender neutral;
2. The gendered nature of vulnerability to climate change events;
3. New realities of a changing climate might change gender roles and relations and gendered access to resources and opportunities, potentially deepening already-existing inequalities;
4. The gendered differences in ability to adapt and the need to mitigate the circumstances through which inequalities in adaptive capacity materialize as well as to identify opportunities to empower the most vulnerable;

5. The potential for men and women, boys and girls to play different roles in adaptation, according to their different experiences and knowledge of the environment;
6. Local institutions being known to have shaped how rural residents responded to environmental challenges in the past (p. 46-47).

The first fact stated that the effects of climate change are not gender neutral. The point has been discussed with great detail in this paper thus far. Nigerian males are far more empowered to cope with climate change effects due to the fact that Nigeria policy is geared more toward men than women. Recall that Nigerian women do not have the right to vote therefore, they are exempt from taking part in the democratic processes established in Nigeria. This needs to change. Solomon's second point references the gendered nature of vulnerability, which is supported in the literature over and over again. Yet, gendered vulnerability still exists. The third point that Solomon references gives a clue as to what is going to continue around the globe unless there is a change. Changing gender roles could be the key to reducing gendered vulnerability. Solomon's fourth fact focuses on what needs to happen in order to empower the vulnerable. The vulnerable populations, in this case women, need to be educated on how to mitigate the effects of climate change and perhaps, most importantly to adapt to climate change. Fact number five relates to valuing each individual and the potential role each person can manifest in the face of climate change. Men and women are different and approach climate change differently however, the two need to work together and incorporate and appreciate those differences, which can lead to a more balanced outcome and reduce the vulnerability of women. Contrary to popular opinion, men do not have all the answers nor do women however, each group needs to be treated

equitably in order to face the struggles against climate change. Solomon's final fact focuses on local government and non-government institutions as these entities have great influence on local citizens. Climate change adaptations begin at the local level and need to include both male and female voices. These six facts directly support this paper's hypothesis---that Nigerian women experience climate change differently than Nigerian men.

Solomon (2014) discussed how local institutions need to collaborate with national interventions. This makes sense as most of these vulnerable women do not have direct access to local interventions.

Table 1, located below, represents the characteristics of the sample with the highest frequency (Solomon, A., 2014, p. 49).

Table 1. Characterization of local institutions

| Characteristics Contribution | Indicator | % |
|---|-------------------------|----------|
| Age of Institution | 3-5 | 28.00 |
| Male headed | 473 | 63.00 |
| Age of head | 31-50 years | 79.00 |
| Operational Hqts | City | 74.00 |
| Source of funding | Voluntary organizations | 57.00 |
| Freq. of funding | Occasionally | 45.00 |
| Ownership | Private individual | 73.0 |

Source: Field data, 2012; Sample size: 750

Table 2 represents how local institutions rate on gender awareness issues (Solomon, A., 2014, p.49).

Table 2. Local Institutions Level of Gender Awareness

| Level of awareness | Yes | No | % of no in total in total | % of yes in total |
|--|------------|-----------|----------------------------------|--------------------------|
| a Institutions that are aware of the gender policy of the federal government of Nigeria | 551 | 199 | 26.53 | 73.47 |
| b Institutions that mainstreamed gender policy into the thematic area of their operations | 163 | 587 | 78.27 | 21.73 |
| c Institutions that have gender focal person(s) | 107 | 643 | 85.73 | 14.27 |
| d Institutions that trained members of their organization on gender issues or gender related issues | 142 | 606 | 80.80 | 19.20 |
| e Institutions that attest to gender inequality in their operations | 85 | 665 | 88.67 | 11.33 |

Source: Field data, 2012; Sample size: 75

The notion that only 19.20% of local institutions train their members on gender issues paints a pretty grim picture for Nigerian women and appears as a negative. However, if looked at with a positive lens, there is plenty of room for improvement on gender issues at the local institution level. Since adaptation most often starts at the ground level, the Nigerian officials at all level of government need to get busy increasing the gender awareness in their own back yards. Solomon (2014) study concluded that local institutions “do not have the capacity to address gender issues in climate change scenery and advocated for training workshops for local institutions in the area of gender equality” (p. 51). Local institutions in Nigeria, as in the United States, need to be given the funding necessary to make the appropriate gender changes. It seems like any type of social change is tied to funding. Who will grant this funding? Who will implement funding for such projects? Those variables are unknowns which aligns with qualitative research. Obayelu, Adeppju, and Idowu (2013) studied the factors influencing

adaptation choices by farmers living in Ekiti State, Nigeria. The following chart shows the various adaptation methods used by these farmers.

Table 3 – Distributions of Farmers by Adaptation Methods

| Adaptation Method | Frequency | Percentage |
|--|-----------|------------|
| Water & soil conservation | 67 | 42.9 |
| Use of improved varieties | 12 | 7.7 |
| Mixed farming | 16 | 10.3 |
| Diversification to non-farm activities | 13 | 8.3 |
| Adjustments of planting period | 32 | 20.5 |
| Reduction in farm inputs | 16 | 10.3 |
| TOTAL | 156 | 100.0 |

The distributions of Obayleu et al. (2014) table 5 showed that most farmers favored soil and water conservation as their adaptive measures used in the face of climate change. As with any solution for climate change, one must not forget who is willing to pay for these adaptive changes. Funding in the form of loans from the Government is one way to conquer the barriers that Nigerian farmers face when adapting to climate change however, it is important to remember that female Nigerian farmers do not have access to loans. Adaptation is one key to survival as climate change is a force to be reckoned with at the local, state and nationally level. The key in Nigeria is to include more female voices on creating new strategies to face climate change.

Neumayer and Plumper (2015) studied the impact of life expectancy after natural disasters and discovered that “The human impact of natural disasters is never entirely

determined by nature, but is contingent on economic, cultural and social relations” (p. 551).

These authors focused on “...The gendered nature of disaster vulnerability as revealed by gender-specific disaster mortality” (p.551). Neumayer and Plumper (2015) studied the countries where most of the larger disasters occurred with the United States, India and China leading the list. The countries with the most casualties per disaster were Ethiopia with 311,286 deaths, Sudan with 158,252 deaths and Bangladesh with 149,225 deaths; during the study time period of 1981-2002 (p.557).

Table 4. Summary statistics on natural disasters in sample

| Disaster Type | Total no. of events | Total no. of deaths | Total no. of people affected |
|---------------------|---------------------|---------------------|------------------------------|
| Drought | 240 | 556,687 | 1,388,252,544 |
| Earthquake | 350 | 107,050 | 52,661,238 |
| Epidemic | 317 | 105,678 | 13,346,403 |
| Extreme temp | 108 | 16,897 | 6,120,497 |
| Famine | 36 | 11,524 | 57,332,711 |
| Flood | 938 | 119,707 | 1,731,081,382 |
| Insect infestations | 42 | 0 | 2,200 |
| Landslide | 182 | 14,228 | 1,122,215 |
| Volcano | 48 | 25,053 | 2,501,368 |
| Waves/surges | 12 | 2,724 | 12,919 |
| Wildfire | 103 | 624 | 3,523,398 |
| Windstorm | 1,121 | 87,029 | 340,100,574 |

Neumayer and Plumper (2007). The Gendered Nature of Natural Disasters: The Impact of Catastrophic Events on the Gender Gap in Life Expectancy, 1981-2002. *Annals of the Association of American Geographers*, 97(3), 551-566.

Neumayer and Plumper discovered that the data was skewed in their research. Most natural disasters cost few if any lives, but the three most severe disasters---the droughts of Ethiopia and Sudan of 1984 and the flood in Bangladesh in 1991---account for almost half of all fatalities in our sample...As a consequence, the distribution of the disaster strength variable is extremely skewed (p. 557). These researchers excluded large scale incidents in their study that were entirely anthropogenic in nature such as the industrial accidents of Bhopal or Chernobyl. "Natural disasters do not affect people equally as if by an arbitrary stroke of nature. Instead, the disaster impact is contingent on the vulnerability of the affected people, which can and often does systematically differ across economic class, ethnicity, gender, and other factors" (Neumayer and Plumper, 2007, p. 561). This study supports this paper's hypothesis that climate change affects women differently than men. The notion that disaster impact lessens for women when their socio-economic status rises is no mere coincidence. Neumayer and Plumper (2007) discovered:

"...On average, large natural disasters lower the life expectancy for women more than for men, and particularly so where women have a lower socio-economic statuses, implies that policy makers, nongovernmental organizations, and the academic community need to pay closer attention to the gendered nature of disaster vulnerability (p. 562).

Adaptation

In the emergency management field, five main mission objectives provide a concentrated effort in times of a disaster. They are prevention, protection, mitigation, response and recovery. There is growing evidence that adaptation needs to be added to this list. Nigeria

will need to include all stakeholders when addressing adaptation measures. One key stakeholder is the private sector.

Governments set the rules of the road in terms of economic incentives and regulations; they also oversee large-scale infrastructure projects such as building seawalls and upgrading health systems. But the private sector controls the vast majority of society's wealth, sets its overall economic direction, and provides goods and services vital for everyday life (Hertsgaard, 2011, p. 161).

One particular sector that is on board with climate change and the possible outcomes is the insurance industry. Hertsgaard (2011) stated:

One of the biggest players in the climate change arena is the insurance industry. No other industry has followed climate issue so closely for so long; no other industry has so much to lose; and no other industry is better positioned to persuade others of the need for action (Hertsgaard, 2011, p. 173).

It is absolutely essential that the business community be a part of adaptation efforts around the globe, especially in Nigeria since most of the CO₂ emissions are coming from oil production. Hertsgaard (2011) stated the following:

As important as strong government is, no society will avoid the unmanageable and manage the unavoidable of climate change if its business community does not get involved. The majority of adaptation (or maladaptation) will come from everyday decisions in the private sector (p.161).

Adaptation is something that most humans experience daily. Nigerian women need to be taught adaptive measures in order to decrease their vulnerability in the face of climate change. There is one main reason why Nigerian women do not practice adaptation on a large scale. “Lack of financial resources is commonly cited as a major obstacle to adaptation. The constraint is particularly binding on the poor and the very poor, who typically are amongst the most vulnerable to climate change” (Leary, 2008, p.5). Leary continued by acknowledging that when persons at risk are involved with the process of adaptation then effectiveness can be increased (p.5). Like most things, adaptation is a process. The process of adaptation includes learning about risks, evaluating response options, creating conditions that enable adaptation, mobilizing resources, implementing adaptations and revising choices with new learning”(Leary, 2008, p.6). In order for rural Nigerian women to learn about the risks associated with climate change, education on these issues needs to come to these women.

Professor Alan Kirschenbaum, one of the world’s most prominent experts in disaster management, has found that preparedness is composed empirically of four identifiable subcomponents, which he labels “provisions, skills, planning, and protection” (Lippmann, 2011, p. 70). Nigerian women could benefit from educational efforts that teach them how to manage provisions, enhance their current skill sets with technology, assist in planning efforts as well as educate them on personal protection issues. There are many countries that currently involve women and men actively in disaster risk management and planning by including a gender dimension into all phases of emergency management (McElroy, 2014, p. 1). Nigeria needs to follow suit. “There is little evidence of any pragmatic approach towards tracking climate change in order to develop an evidence base on which to formulate national adaptation strategies” (Onyekuru and Merchant, 2011, p. 585).

Adaptation is often the poor cousin of the climate change challenge---the glamour of international debate in metaphorically smoke-filled rooms is around mitigation, whereas the bottom-up activity of adaptation carried out in community halls and local government offices are often over looked (Palutikof, Parry, Smith, Ash, Boulter and Waschka, 2013).

Bottom-up activities ensure that all members are being heard and respected. Rural Nigerian women would probably appreciate a bottom-up approach where each woman is empowered and appreciated for what she may bring to the discussion table. Success is more probable when all members of a group are allowed to participate in decisions that will affect not just themselves but their families as well. In order to educate rural Nigerian women on the issue of climate change and proper adaptive measures, each woman needs to be included in the process.

“...Participatory democracy to be “bottom-up” or grass-roots based, then there is clearly a need for more of the latter in disaster mitigation and management throughout the world, for risks and emergencies cannot be tackled effectively without robust local organization.” (Perry and Quarantelli, 2005, p.35)

Renewable Energy Sources

Earlier in this paper there was a discussion on how rich Nigeria is in crude oil and natural gas. However, one caveat associated with fossil fuels is the CO₂ emissions expelled into the atmosphere. Nigeria is credited with producing more CO₂ emissions than any other country in Africa (Friends of the Earth, 2015, p.3). Nigeria has the potential to become a major player in the sustainable and renewable energy field. “...A study puts it that Nigeria, which lies in the

tropics, receives almost 16.7×10^{15} kj of solar energy each clear day”(Adeoti and Osho, 2011, p. 134).

Nigeria is endowed with abundant energy resources, both conventional and renewable, which provide her with immense capacity to develop an effective national energy plan. However, introduction of renewable energy resources into the nation's energy mix have implications on its energy budget. Despite the immense solar energy potentials available, solar electricity generation is attractive only under severe CO₂ emissions mitigation of the nation's energy supply system (Akinbami, 2001, p. 155).

Nigeria is in need of a shift from fossil fuel production that is directly attributing to climate change. Nigerian women need to be educated on the benefits of solar energy that could be used in the home and to support livestock and farming. The solar stove mentioned earlier in this work as a viable alternative to cooking by burning wood, biomass or animal feces. Solar energy could be one of the tools to assist women out of the dregs of poverty. Women could be trained in science, technology, energy and math (STEM) programs that would lead to cleaner and greener energy sources.

Access to clean modern energy services is an enormous challenge facing the African continent because energy is fundamental for socioeconomic development and poverty eradication. Today, 60% to 70% of the Nigerian population does not have access to electricity. There is no doubt that the present power crisis afflicting Nigeria will persist unless the government diversifies the energy sources in domestic, commercial, and industrial sectors and adopts new available technologies to reduce energy wastages and to save cost (Oyedepo, 2012, p. 1).

Nigerian women are bound by stereotypical archetypes that keep them from engaging with the modern world. Many Nigerian women live in/or below the poverty level which is a man-made condition. Poverty is linked with vulnerability in Nigerian and around the world. More women die when a disaster strikes whether it be anthropogenic in nature or naturally occurring. The call for more research in the area of gender disparity has been called out in the literature. There is a gap in the literature on how climate change is directly affecting women more severely than men and that needs to change.

As in any other sovereign nation, budgets are controlled by a select few. It only makes sense that major oil companies located in Nigeria are not the ones in favor of cleaner energy. The oil industry is a huge profit driven institution that does not favor extinction of itself. The literature supports that fossil fuels are attributing to climate change and global warming, however these oil giants have the funds and power to continue business as usual. "...Increases in atmospheric CO₂ concentrations in Nigeria and in some other parts of the world has been caused by the combined impact of population growth, increased fossil fuel use, industrial expansion, unsustainable soil use, urbanization and deforestation"(Adeoti and Osho, 2011, p.136).

Solar power

Solar power in Nigeria is making its way to the forefront in the energy portfolio.

The Middle East and North Africa (MENA) region could see more than \$50 billion worth investments made in its solar power sector by 2020 as regional governments increasingly push for the adoption of clean energy, new research has found. According to the MENA solar energy report, published jointly by Middle East Solar Industry Association (MESIA) and Meed Insights, new solar, wind and hydroelectric projects,

which will provide around 37,000MW of energy, are to be commissioned by the end of this decade in the region. Out of this, around 12,000MW to 15,000MW will be sourced from solar energy projects specifically. The report also forecasts a significant shift in the contribution of solar power towards the region's energy mix in the next seven years (Sophia, 2014, p.1).

Hopefully Nigerian women will be given the opportunity to be a part of this multi-million investment. This investment represents potential educational opportunities for women and men alike. It is important to remember that Nigeria's renewable energy landscape is still in its infancy.

Renewable energy in Nigeria is still in its developmental stage, the only source of renewable energy in the country currently being exploited is hydro-power and biomass; wind and solar energy have only been deployed in minimal amounts while solar energy in Nigeria is majorly used in urban areas for street lighting, and in rural areas it is used for irrigation project and water pumping. The Government of Nigeria is exploring renewable energy resources as potentials in enhancing its power generation and electricity supply by generating power from the readily available renewable sources most especially, Solar power which Nigeria has in abundance (Afanu, O.B., 2015, p. 254).

Solar power could be one solution in decreasing carbon emissions and creating a sustainable Nigeria. When CO₂ emissions are eliminated completely or at least drastically in Nigeria, then the effects of climate change will diminish. One must remember that CO₂ emissions are not the only contributor to climate change. Reducing CO₂ emissions is an excellent start, however adaptation efforts in Nigeria need to continue.

Nigerian women, as well as in other developing countries, play a huge role in sustaining their communities. “Women are the main actors in global food systems where they are credited with 60-80% of total food production in developing countries” (Sarrouy, C., 2014, p.2). Earlier in this paper the discussion on who is responsible for local crop production falls to the rural Nigerian women. This paper also provided support of how differently climate change affects Nigerian women differently than Nigerian men. All women in developing countries face many of the same problems that Nigerian women face regarding climate change. Education is a key component in creating a balanced, gender perspective for women as well as men. The opportunity to educate Nigerian women has never been more important than now.

Education and Empowerment

This paper focused on the hypothesis that climate change is indeed gendered, as well as pointing out how the education of women in developing countries is key to adaptation in the face of climate change. Women are the stakeholders in dealing with climate change as many of their day-to-day activities are contributing to climate change.

Women aren't the problem but the solution. The plight of girls is no more a tragedy than an opportunity. The United Nations Development Programme (UNDP) summed up the mounting research this way: Women's empowerment helps raise economic productivity and reduce infant mortality. It contributes to improved health and nutrition. It increases the chance for education for the next generation (Kristoff and WuDunn, 2009, p.xx).

In other words, educate the mother and chances are very good that their children will be educated. Nigerian women deserve the opportunity to be educated on how they can effectively

adapt to climate change in their country. These women need to be included in local, regional and national debates on climate change and disaster risk reduction efforts.

Disasters can also provide an opportunity to redress gender disparities. For example, during the recovery period following disasters, longstanding biases against women can be challenged by programmes that are sensitive to their needs and that involve them as equal partners in recovery work (United Nations Development Programme, 2010, p.1).

Nigerian women need to be seen as equals in the battle against climate change and this sentiment has echoed throughout the sparse literature on the topic. There are national and international groups that are addressing this disparity. One such organization is the United Nations International Strategy for Disaster Reduction (UNISDR) founded in 1999 that supports gender equality.

UNISDR facilitates mainstreaming gender perspectives in disaster risk reduction (DRR) by partnering and working closely with a diverse group of partners from Governments, Parliamentarians, UN System, Civil Society, Private Sector and the Media to support a gender-sensitive DRR agenda and the mobilization of women leadership for DRR (United Nations International Strategy for Disaster Reduction, 2015).

The literature has portrayed Nigerian women, as well as women in developing countries, as potential partners in battling climate change. Sarrouy (2014) discussed four key reasons why climate change adaptation and mitigation require a gendered approach which include why women are the main victims of hunger, main actors for global food

systems, spread the wealth and have untapped knowledge of sustainable food systems (p. 142).

Victims of Hunger

Even though the world can feed its 7.1 billion inhabitants, that fact does not stop one in eight people from going to bed hungry. “Of these 870 million undernourished people, 60% are women and girls” (Sarrouy, 2014, p.142). There is a cycle of malnutrition that occurs when a malnourished woman gives birth to an undernourished child that may or may not live to the age of five. Adapting to climate change and fight world hunger via improved agricultural practices need to include women or these adaptive efforts will be in vain (Sarrouy, 2014, p. 143).

Global Food Systems

The involvement of women in the global food systems is paramount to successful adaptation efforts. “Women are involved in sowing, weeding, applying fertilizer and pesticides, and harvesting and threshing of crops...Furthermore, rural women provide most postharvest labour, arrange storage, and take care of handling, stocking, processing, and marketing of the produce” (Sarrouy, 2014, p.143). Since women have all this responsibility for the agricultural affairs, it only makes sense to involve these women in the processes and procedures for adaptation measures.

Spreading the wealth

When women are the focus of investments, the returns are doubled due to the fact that by improving their lives, women share that improvement with their families and households. “Similarly, educating a mother will have a bigger correlated impact on the education of her children than educating the father” (Sarrouy, 2014, p. 143). This makes sense as most rural Nigerian mothers are solely responsible for the childrearing duties. Women are more likely to

spend a higher proportion of their income on food and education whereas men are more likely to spend a higher proportion of their income on items such as alcohol and cigarettes (Sarrouy, 2014, p. 143).

Sustainable Food Systems

Sarrouy (2014) noted: “Due to their role in food systems, women have a more all-encompassing approach to ensuring there is appropriate food for all household members (food security) and deciding the functioning of their food system (food sovereignty) (p. 144). Women farmers work very close with the land; in what could be called a holistic approach. These women farmers are credited with being more concerned with the entire approach to growing food that does not focus solely on yields. “Female farmers’ deep knowledge of crops, land, nutrition, climate and farming efficiency, is key to climate change adaptation and mitigation (Sarrouy, 2014, p. 144). Despite the work of Sarrouy and many others, the body of research and policy influence is still lacking on the value that women bring to the table regarding food systems and climate change adaptation. “Climate change is happening; it requires urgent action, a holistic approach to our food systems and, therefore, the acknowledgement of the key role that women play in them” (Sarrouy, 2014, p. 144).

Conclusions & Recommendations

Conclusions

Climate change is happening around the globe. Regardless of the causal agents of climate change, it is imperative that steps be taken around the globe, especially in developing countries such as Nigeria, to include women in the development of adaptive measures focused on climate change. The literature supports that women are more vulnerable to the effects of climate change than men. Most women on the lower end of the socio-economic scale are the ones most vulnerable to disasters and are often the ones that lose their lives in the face of disaster. Women comprise approximately one-half of the entire population and need to be included, not excluded, from policies that support adaptation efforts. Until the world goes entirely CO₂ emission free, which will not be a rapid occurrence, women need to be part of the dialogue that takes place in local, regional and national arenas. Too often women are treated in less than humane ways in developing countries such as Nigeria. Nigerian women need to be considered equals in creating solutions and not just considered part of the problem. Nigerian women can bring much value to the discussion and policy table; however these same women need to be educated in order to have a solid voice. Education is the key in creating subsequent generations of educated people. Literature supports that when an investment is made into education for women, the entire family benefits. The time for investing in women and alternative, cleaner forms of energy is now. Nigeria has been the subject of significant investment in the solar energy field which will assist in reducing CO₂ emissions in Nigeria as well as to provide energy sources for those several million Nigerians that are not hooked up to the 21st century. The road is less blurred on what needs to be done regarding climate change adaptation and including women is one key component. Women are drivers for change and need

to be supported through educational efforts. The international community has noted its involvement in ensuring that women have a voice in climate change policies. Climate change is real in Nigeria and rural Nigerian women are affected differently than men when dealing with climate change effects. Women need to be considered as part of the solution that is adaptation and not part of the problem. The time has come to discard old stereotypes that women are dumb and have no value or voice. The time is right for the voices of all women, especially those in developing countries, to be heard and to make the amount of noise necessary to see that their viewpoint is legitimized and valued. The world has no room for only male voices; it has room for all voices that are concerned with taking adaptive measures to deal with climate change or else the human species may become extinct.

Nigeria is a country sitting at a crossroads in light of climate change. Nigeria has a bounty of natural resources that are not shared by all inhabitants. Since its inception as a sovereign nation, Nigeria has had many struggles which are not uncommon amongst developing nations---struggles with gender equality, struggles with economic growth, struggles with corrupt local, regional and national governments. While most of the natural resources revolve around fossil fuel and its production, Nigeria stands at the forefront of becoming a solar energy giant if all the stakeholders can come to an agreement. Clean energy is paramount to creating an emission free landscape. Nigerian leaders have entered into agreements with international investors to begin solar energy production. This type of clean energy is what all developed and developing countries need in order to decrease the amount of CO₂ emissions. CO₂ emissions have greatly increased since the dawn of the industrial revolution and for decades countries were involved in exploiting the riches these fossil fuels provided. Solar energy can supply great opportunities for women to enter into the work force. Nigerian women need to be included in

the solar power industry in their country. Solar power can provide heating and cooling for homes, energy necessary for piping water into homes, and most importantly solar power can assist in decreasing the CO₂ load of fossil fuel production and usage. Nigerian women have been left in the dark ages in regards to education and equitable treatment. Nigerian women deserve to have access to sanitation in the form of latrines designed for women. Climate change is real and it is impairing water and air quality for millions around the globe. The climate change deniers need to take a back seat in order for the issue to be dealt with that benefits all not just the elite. Nigerian wealth is not fairly distributed which is not an uncommon occurrence however, the elite around the world have a responsibility to those less fortunate than themselves. Great power is accompanied by great responsibility. The literature is lacking in data that focuses on the gender inequalities in Nigeria. This does not mean that gender inequality is not important on the contrary, gender inequality is an issue that needs to be dealt with now. By recognizing the contributions of Nigerian women, Nigeria can move forward in the effort of decreasing women's vulnerability in light of climate change and its effects.

Recommendations

Women around the globe are lobbying to have their voices heard for the future of their families and themselves. Future research could focus on educational efforts geared toward Nigerian women and girls. Moving from fossil fuel production in Nigeria is paramount in mitigating climate change. The energy commission of Nigeria needs to study the effects of gas flarings currently in production and take action that will lead to their reduction. The health of any nation's citizens needs to be a critical concern. Health care costs are skyrocketing around the globe and those that occupy the lower socio-economic realm are the most vulnerable. A striving economy is critical for most countries, be they developed or developing. Developing

countries have the opportunity to study what has worked in developed countries and determine their paths. The production of fossil fuels have created much wealth for a select few however, it is those that labor under these elite that are suffering the most from CO₂ emissions.

Vulnerability is an equal opportunity condition and those that are educated and have access to resources are less vulnerable in light of disasters. Future research should concentrate on stiffer penalties for infringements of environmental issues. Human activities have caused most of the conditions that contribute to climate change. Mother Earth is ailing and every human needs to begin at home to take steps to eliminate CO₂ emissions. This may mean lowering the thermostat a few degrees in colder months and raise it a few degrees in warmer months. Nigerian women can take steps to eliminate CO₂ emissions by investing in new methods of heating, cooking and providing illumination. Providing stable energy sources to all African citizens may assist in lowering CO₂ emissions. By educating Nigerian women on the benefits of not burning biomass or animal feces, the move toward a healthier Nigerian population is closer. CO₂ emissions are part of the entire carbon cycle that includes fossil fuels, land use changes, atmosphere and land sinks. CO₂ emissions are credited with having the most impact on climate change and global warming. Future research needs to focus on climate change at the local levels around the world. Even though many countries around the world have mitigation strategies in place to deal with climate change, the focus now needs to move toward adaptation. Future research could focus on adaption methods that assist the most vulnerable groups which happens to be women. The literature supports that even though most people know or have heard the concept of climate change however, there are many with their heads in the sand. Nigeria's coastlines are extremely vulnerable to rising sea-levels which are a result of climate change. Corporations headquartered in the Niger Delta need to take steps to mitigate risks associated with rising sea-levels. Future

research could focus on advancing climate protection initiatives. There is only one Earth and it is imperative [it] be protected from individuals, the business community and all governmental and non-governmental organizations. Cleaning up the Earth's environment is paramount for the continuation of the human race. Large global corporations need to be taken to task on their day-to-day operations and make corrections wherever CO₂ emissions are generated. Attempting to get big oil on board with mitigation and adaption efforts is a gigantic task that needs to happen through legislation. Strict environmental guidelines need to be enforced. No more slaps on the hands of those perpetrating environmental atrocities. Severe economic consequences are needed for the offenders or else nothing will change and it will be business as usual. Everyone, individuals as well as businesses, needs cut CO₂ emissions in order to move toward a cleaner environment. The Nigerian government and private sector are responsible for creating the right investments for a healthier environment for its citizens.

Many consider adaptation as a new idea and it can take years for people to accept new ideas. Established organizations usually function under a hierarchical system which means that new ideas would mean change and these types of organizations do not like change. They see change as a threat to how things have always been done. Younger organizations operate differently and can see the benefits of change. Climate change is an issue affecting every human, organization, government, and non-governmental organizations as well as every other living entity that inhabits planet earth. Along with climate change there is an increase in disasters around the world and women are the most vulnerable group. Nigerian women are experiencing real struggles on a daily basis without much help from local, regional and national governments. Nigerian women lack educational and business opportunities which could be solved with the proper training and funding. Nigerian women are standing on the threshold of a

real revolution---a revolution that honors and supports women. Climate change and its affects can be slowed and possibly eliminated if the voices of women can rise above the din of the male dominated world.

This paper has taken a critical view of the existing literature on the topic of climate change and its gendered effects. Those in power in Nigeria, as well as in the rest of the world, need to step up to the plate and accept that climate change is real. Accept that while individuals can take small steps to decrease CO₂ emissions, it is up to large industries to take larger steps in creating less CO₂ emissions. It is up to every nation around the world to consider climate change and create vital programs that will decrease CO₂ emissions. This is not just Nigeria's problem; it is everyone's problem. There is no more time to put off dealing with climate change. The time is now. This paper referenced how solar investments in Nigeria can make a huge difference in the burning of fossil fuels which are credited with increased CO₂ emissions. Sustainable farming methods in Nigeria can assist with the issue of deforestation. The Earth has a limited supply of natural resources that mankind can exploit. Exploitation of these vital natural resources is one key reason why the Earth is experiencing climate change. Nigerian women can help in the fight to halt climate change by using solar ovens for cooking which will eliminate the burning of wood. Nigerian women can also be taught to operate pv solar lights for illumination within the home. There are many ways that women can be a part of the solution to climate change and not be considered part of the problem.

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