

ASSESSING AFRICA'S RESPONSES TO ITS ENVIRONMENTAL CHALLENGES*

ABSTRACT

Until comparatively recently, environmental consciousness in Africa was at a low ebb. Even today, in spite of the global call for environmental sustainability, wealth creation possibilities still prevail over the need for environmental protection in our continent. One reason for this, is the North-South dichotomy and developed and developing worlds interests. The developing countries believe that the developed countries have historical responsibility for the global environmental problems, being as it were beneficiaries of the industrial revolution, evidenced by high consumption patterns and standard of living. They must therefore make whatever sacrifices that are necessary, including the utilization of the financial and technological resources at their disposal to address the resultant environmental problems. They are also obliged to provide financial and technical assistance to developing countries to enable them cope with the impacts of environmental degradation. The greatest environmental challenge facing the African continent presently is the global climate change phenomenon. This paper therefore examines Africa's response to its environmental challenges in a climate change context and observes that although Africa's contribution to the global greenhouse gas emissions is still negligible, yet the continent is one of the regions that would be most affected by the adverse impacts of climate change. The African continent is in a dilemma of climate change and cannot afford to do nothing because, just as it faces dangers from the direct impacts of climate change, so also would it be affected by measures adopted by the global community to address the problem of climate change. The paper examines also the collective efforts as well as the efforts by the various nations within the African continent to address its climate change dilemma.

INTRODUCTION

Global warming and climate change phenomenon is perhaps the greatest challenge facing mankind presently; the evidences are there for everyone to see- flooding of the coastlines, severe storms, changes in precipitation patterns and widespread changes in ecological balance. The catastrophic flood that hit parts of 26 states in Nigeria, between the months of August and

*Elvis-Imo, Iziengbe Gina, LL.B, B.L, LL.M, Ph.D, Senior Lecturer and Head of Department, Jurisprudence and Public Law, Faculty of Law, Niger Delta University, Bayelsa State, Nigeria. Email: ginaelvisimo@gmail.com

November 2012, threatening to wipe out entire communities was attributed to the menace of climate change. About the same period, ‘Super storm Sandy’¹ also hit parts of the United States: New York, New Jersey, West Virginia, Connecticut and a number of other states causing damage estimated at \$75 Billion. The ‘near winter’² experienced in Nigeria, from late December 2014 to early January 2015 and the intense heat that followed immediately afterwards are strong evidences that the globe is indeed warming. While this was going on in Nigeria, catastrophic floods hit Malawi and Mozambique, leaving in its wake over 200 deaths, rendered thousands homeless and destroyed crops.³ On December 7, 2014, it was reported that Typhoon Hagupit rendered over a million persons homeless in the Philippines.⁴ Again on Saturday, April 25, 2015, a 7.9 magnitude earthquake hit Nepal, occasioning over 6,000 deaths, over 12,000 injuries and damaging over 500 buildings. Hundreds of thousands of tents and tarpaulins had to be provided for victims in dire need of shelter. According to the United Nations, over eight million people from 39 districts were affected by the quake.⁵

Since climate change is a global problem it must be met by joint co-operative action, requiring global and regional partnerships and the promotion of alternative sources of energy internally on a country by country basis. The responsibility for climate change has therefore been allocated to the global collective: to nations, the economic sectors and individuals. The allocation of responsibilities to nations is vital because the climate change regime is based on national actions with variations in the assignment of responsibilities.

Climate Change and Global Warming

Climate change is a change in the usual weather found in a place. This could be a change in how much rain a place usually gets in a year. It could also be a change in usual temperature of a place for a month or season. Climate change is also a change in Earth's climate, or a change in Earth's usual temperature. It could also be a change in where rain and snow usually fall on Earth.⁶

Article 1 (2) of the United Nations Framework Convention on Climate Change 1992 defines climate change as:

A change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.

¹Hurricane Sandy (a powerful tropical cyclone that hit parts of the United States in late October 2012)

² The weather during this period was so cold that many likened it to winter

³AIT News Report, January 13, 2015. It was reported that this flood became a slow Tsunami

⁴CNN News December 7, 2014

⁵CNN News, April 30, 2015. The Nepal earthquake is reported to have affected other areas outside Nepal, such as India, China, Bangladesh and Bhutan.

⁶ The National Aeronautics and Space Administration: NASA Knows (Grades K-4) Series

Nigeria's First National Communication, under The United Nations Framework Convention on Climate Change⁷ defines climate change as:

A global climatic shift that is attributed directly or Indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods.

Africa's contribution to global greenhouse gas emissions is still negligible, thus African countries are listed as Non-Annex 1 Countries⁸ under the United Nations Framework Convention on Climate Change 1992 and therefore do not have emissions reduction commitments under the Kyoto Protocol to the Framework Convention on Climate Change 1997. However, it is certain that the continent's greenhouse gas emissions would increase as the countries of the continent begin to industrialise. But they do not have the luxury of developing without due consideration for the environmental effects. While seeking to develop, African countries must ensure that such development is sustainable. They must therefore seek to eliminate environmentally harmful practices, while promoting environmentally acceptable practices. There is also a dire need to develop adequate climate change mitigation and adaptation measures, since it is projected that the continent is one of the regions that would be most affected by the adverse impact of climate change.

IMPACTS OF CLIMATE CHANGE IN AFRICA

*In fifteen years the snows of Kilimanjaro will have passed into folklore. Africa's tallest mountain has lost 85% of its ice-caps since 1920, and global warming is melting the rest.*⁹

The African continent is highly vulnerable to the impacts of climate change as it threatens the continent's development objectives. The agricultural sector is extremely vulnerable to climate change, which is already compromising agricultural production and food security because, subsistence agriculture in Africa is rain fed and climate change is already altering the precipitation pattern. And these impacts are projected to increase as the menace of climate change continues. Higher temperatures would worsen water scarcity and make it harder to rear animals and grow food crops, while encouraging weed and pest proliferation. Thus climate

⁷ Federal Republic of Nigeria (November 2003) 50

⁸ Non-Annex 1 Countries are made up of developing countries without emissions commitment under the Kyoto Protocol and are entitled to financial and technical support to help them adapt to the impact of climate change

⁹ "Climate Change Threatens Africa's Livelihood" *eAfrica*, November 2005 volume3, quoted by Omorogbe, Y. "A Status Report on Climate Change Control and the Kyoto Protocol in Nigeria" [2006] 1 ELTR, Issue 2, Sweet and Maxwell p.1

change would affect crop production, livestock, fisheries and agro-forestry production, pest control and water resources and irrigation. On a general note, climate change threatens global food security. It is predicted that mean rainfall may decline in most parts of Sub-Saharan Africa, especially in Southern Africa, while increasing in parts of Eastern and Central Africa, where the growing periods of crops would also be shortened due to high temperature (in Eastern and Central Africa).

Forty percent of African Gross National Product is obtained in agriculture and 70% of all African labour is employed in the agricultural sector.¹⁰ Ninety-six percent of the sub-continent's population is directly dependent on rain-fed agriculture. It is predicted that agricultural production will fall by 50% by the year 2050 due to reduction in rainfall and increase in temperatures. Major parts of the continent will experience water scarcity and water stress by 2050. Arable land in the continent will be reduced by 6% and the sub-continent's Gross Domestic Product (GDP) will decline by 9%. This would impact negatively on rural livelihoods and incomes due to large dependence on natural resources sensitive to climate change and this would lead to a decline in economic growth, worsen poverty and undermine the achievement of the Millennium development Goals.

In Eastern Africa, there have been reports of increased soil erosion and crop damage. United Nations Environment Program (UNEP) reports that climatic conditions may become unsuitable across most of Uganda's coffee growing areas. Coffee is a leading export commodity, and the loss of coffee within 30 – 70 years could lead to a loss of approximately Two Hundred and Sixty-six million dollars (US\$266m) in export, corresponding to 40% of Uganda's export revenue and 3% of its GDP. This, according to the report is in excess of the entire national health budget.¹¹

It is reported¹² that over the past three decades, Ethiopia has experienced countless localized drought events and seven major droughts, with five resulting in famines. These have been compounded by unsustainable practices such as over-cultivation, overgrazing, erosion, and deforestation. The majority of Ethiopia is arid, semi-arid, or categorized as dry sub-humid, all areas which are prone to drought which is the single most important climate related natural hazard impacting the country. Another climate related hazard that often affects Ethiopia is floods, resulting in huge loss of life and property, and migration of people.

In Southern Africa, the agricultural sector is one of the most vulnerable to climate change, as it would impact negatively on a variety of crops, livestock and reduce the available land for arable

¹⁰Paehler Klaus, "Nigeria in the Dilemma of Climate Change" Country Reports, July 19, 2007

¹¹ Heinrich Boll Stiftung, Climate Change Governance in Africa: Adaptation Strategies and Institutions; A Synthesis Report by MasegoMadzwamuse; October 2010; based on Country Reports by Dr. Nick Hepworth

¹²European Commission, Brussels, 27.3.2013 COM (2013) 169 final "Green Paper: A 2030 framework for climate and energy policies"

and pastoral agriculture. It would also shorten the growing season for agricultural products and therefore decrease in yields. A hotter, drier climate will also reduce yields for the major crops – sorghum and maize by 30%.¹³ It is projected that climate change would affect water supply. For instance, it is reported that by 2025, Southern Africa will have reached high levels of both water stress and scarcity. It is expected that climate change would alter the present hydrological resources in Southern Africa and add pressure on adaptability of future water resources. Predicted water shortages will have devastating effects on the agricultural sector which in South Africa is by far the largest water user, accounting for 62% of national water allocations.¹⁴ All these will have the effect of reducing the contribution of agriculture to the Gross Domestic Product (GDP), which is already on a decline. For instance, it is reported that in 1998, agriculture and forestry contributed 4% to the GDP. This is significantly lower than the 9.1% recorded in 1965.¹⁵

Botswana is a landlocked and arid to semi-arid country, with unreliable and unevenly distributed rainfall. The country is highly vulnerable to seasonal variations in climate. About two-thirds of the country are covered by the Kalahari Desert sands, and are unsuitable for agricultural production. Botswana's economic performance is linked to its natural resources such as minerals, land for agriculture and pasture, and wildlife tourism. Mining is associated with greenhouse gas emissions and environmental pollution; while other persistent environmental problems such as land degradation, water scarcity and depletion of wood and forest products are linked to unsustainable agricultural and livestock practices, tree-felling and the growing human population.¹⁶ It is predicted that climate change will lead to the increased incidence of both floods and droughts in Botswana. Furthermore, higher water temperatures and changes in extremes due to climate change may exacerbate many forms of water pollution. Water supply reliability, health, agriculture, energy and aquatic ecosystems will feel the impact of these changes to the water cycle. There are limited sources of surface water (in the form of rivers, lakes and ponds) and over 60% of the Botswana population relies on groundwater. The rural poor are most vulnerable as they rely on groundwater for all their water needs. In Botswana, 45% of households rely on livestock for their livelihoods and over 70% are involved in arable rain-fed agriculture. According to the government of Botswana, the welfare of the people, the state of the environment and the performance of the economy are all very closely linked to the impact of climate change.

¹³ Heinrich Boll Stiftung, Climate Change Governance in Africa: Adaptation Strategies and Institutions; A Synthesis Report by Masego Madzwamuse; October 2010; based on Country Reports by Kulthoum Omari (Botswana)

¹⁴ Ibid; Country Reports by Masego Madzwamuse (South Africa)

¹⁵ Heinrich Boll Stiftung, Climate Change Governance in Africa: Adaptation Strategies and Institutions; ibid

¹⁶ A Policy Brief on Botswana commissioned by SIDA:

<http://www.sida.se/Global/Countries%20and%20regions/Africa/Botswana/Environmental%20policy%20brief%20Botswana.pdf> and an IIED research paper on Botswana's Parliamentary Climate Change Capability: <http://www.pubs.iied.org/pdfs/G03023.pdf>

The United Nations Development Programme (UNDP) warns that the progress in human development achieved over the last decade may be slowed down or even reversed by climate change, as new threats emerge to water and food security, agricultural production and access, and nutrition and public health. The UNDP estimates that the impacts of climate change, such as sea-level rise, droughts, heat waves, floods and rainfall variation could by 2080 push another 600 million people into malnutrition and increase the number of people facing water scarcity by 1.8 billion.¹⁷ Changes in precipitation pattern have resulted in floods and droughts, compromising food production and supply across the African continent and the globe in general. This has resulted in hike in global food prices, causing severe hardship for poor and vulnerable people, particularly in the developing world. It is reported that between 2005 and 2008, world prices of rice, wheat and maize doubled, pushing more than 100 million people into poverty, including nearly 30 million people in Africa.¹⁸ According to a United Nations report on development in Africa, the region is failing to keep pace with the rest of the world in terms of development.¹⁹

Africa also has the highest proportion of people living in extreme poverty, with a total of 330 million people in this situation in Sub Saharan Africa.²⁰ And climate change would exacerbate the problem of poverty in Africa. In addition, natural disasters such as floods can overwhelm poor households, destroying their ability to cope, and if crops fail, subsistence farmers have few or no alternative means to provide food for their families. Over 70 per cent of the people of Sub Saharan Africa survive by subsistence agriculture and their livelihoods depend on natural resources.²¹

Severe and prolonged droughts, flooding, loss of arable land due to deforestation, overgrazing and fuel-wood gathering that has led to soil degradation are reducing agricultural yields and causing crop failures and loss of livestock, which endangers rural and pastoralist populations. The Horn of Africa's pastoralist areas (Ethiopia-Kenya-Somalia border) have been severely hit by recurrent droughts, causing livestock losses that have plunged approximately 11 million people who are dependent on livestock for their livelihoods into crisis and triggering the mass migration of pastoralists out of drought-affected areas.²² Agriculture is important for food security both in terms of producing food that people eat and providing the primary source of livelihood for over 80 percent of Africa's total workforce. If agricultural production in the low-income developing countries is affected severely by climate change, the numbers of rural poor people that will be put at risk due to vulnerability to food insecurity will surge. The Millennium

¹⁷ United Nations Development Programme, "Fighting Climate Change: Human Solidarity in a Divided World" New York; UNDP 2008, p1

¹⁸ United Nations Food and Agriculture Organisation <http://www.faostat.org/default.aspx> Assessed on June 4, 2010

¹⁹ United Nations, *The Millennium Development Goals Report 2006*, <http://www.unstats.un.org/unsd/mdg/Resources/Static/Progress2006/MDGReport2006>

²⁰ Ibid

²¹ Ibid

²² Inter Press Service News Agency (IPS), "Climate change and diminishing fish stocks" <http://www.ipsnews.net/> Assessed on December 10, 2012

Development Goal of halving the number of undernourished people by 2015 has become a pipe dream due to the adverse impact of climate change. Africa's food security situation is particularly worrisome because of the 36 countries worldwide currently identified as food insecure, 21 are in Africa.²³ The impact of food security in Africa is two-fold: firstly, the failure of export crops such as cocoa, flowers or coffee causes trade imbalances that greatly restrict African access to international agricultural markets; and, secondly, subsistence agriculture becomes less capable of catering to local demands for food, particularly as populations increase. Moreover, advanced agricultural producers can adapt more quickly to the impact of climate change, producing new crops that may crowd out African exports to developed nations.

Climate change also poses real threat to biodiversity resources which are not only important for national economies but also have significant global value. Climate change will occasion loss of ecosystem which would have significant consequences for local communities as well as national economies that utilize biodiversity resources for economic development such as ecotourism.

Climate change would also adversely impact the health sector, as extreme climatic events would occasion changes in patterns of infectious diseases. The fact that most communities in Africa harvest natural resources for medicinal use will exacerbate the problem of health security in Africa.

Climate change would negatively impact economic growth and sustainable development in Africa which would in turn simultaneously limit the ability of African countries to cope with climate change and the continent's priority for the coming decades would be jeopardised. The high dependence of the economies and rural people of Sub-Saharan on rain-fed agriculture, the prevalence of poverty and food insecurity, and the limited development of institutional and infrastructural capacities in this region make coping with natural climate variability a recurrent challenge. In the past several decades the number of extreme weather events in particular sub-regions and the number of people affected by droughts and floods have grown dramatically. The socio-economic impacts of droughts may arise from the interaction between natural conditions and human factors such as change in land use, land cover, and the demand for and use of water. Excessive water withdrawals can also exacerbate the impact of droughts. The challenge is being magnified by global climate change in most of Sub-Saharan Africa. Mean rainfall is predicted to decline in many parts of the region, especially in Southern Africa, while rain fall is more likely to increase in parts of eastern and central Africa and more extreme weather events are predicted.²⁴ According to the World Bank's Development Report for 2010, the need is for Africa to ensure

²³ Robert Mendelsohn et al, *Climate Change and Agriculture in Africa: Impact Assessment and Adaptation Strategies*, London: Earthscan, FAO, 2009

²⁴ United Nations Environment Programme (UNEP), "Climate change and water", IPCC technical paper VI, New York: UNEP, 2008, 33.

that the current development impacts of climate change on its economies and populations are recognised and that a development agenda is integrated into climate negotiations.²⁵

Climate and environmental disasters that threaten human security can induce forced migration and produce competition among communities and nations for water and basic needs resources, with potential negative consequences for political stability and conflict resolution, an instance is where communities and nations struggle to access scarce water resources or when forced migration puts previously separate groups into conflict over the same resources. Given the history of resource and political conflicts in Africa, climate change could aggravate territorial and border disputes and complicate conflict resolution and mediation processes. Constraints on water availability are a growing concern in Africa, and climate change will exacerbate this situation. Conflicts over water resources will have implications for both food production and people's access to food in conflict zones.²⁶

Declining water resources and diminishing arable land are already intensifying competition for these resources and creating tensions among displaced populations. Armed conflicts and intensified national security concerns minimise the capacity to cope with climate change. An estimated one billion people worldwide could be forced from their homes by 2050, with 250 million of them permanently displaced by the effects of climate change.²⁷ Climate change threatens to exacerbate existing trends, tensions and instability. The core challenge is that climate change threatens to overburden states and regions that are already fragile and conflict prone. It is important to recognise that the risks are not just of a humanitarian nature; they also include political and security risks that directly affect African governments in particular and the global community in general. Moreover, in line with the concept of human security, it is clear that many issues related to the impact of climate change on international security are interlinked, requiring comprehensive policy responses.

There is on the other hand, the overall impact of climate change on the economies of African countries, and this threatens to further worsen their adaptive capacities and increase their vulnerability. The developed countries and emerging economies worry about the climate change regime's emissions cut strategy, which they see as a hindrance to industrial activities and continuous economic boom. African countries on the other hand, are at a risk of total economic disintegration: if and when African countries start to industrialise they are expected not to spew carbon as did their developed world counterparts, as this may exacerbate the nagging problem of global warming. Climate change has been shown to destroy arable lands in Africa and thereby

²⁵ World Bank, *World Bank development report 2010: development and climate change*, <http://www.ameinfo.com/211919.htm/> (accessed 11 July 2010.)

²⁶ P H Gleick, *Water in crisis: a guide to the world's fresh water resources*, New York: Oxford University Press, 1993, 15.

²⁷ Richard Black, *Environmental refugees: Myth or Reality? New Issues in Refugee Research*, Working Paper No. 34, Geneva: United Nations High Commissioner for Refugees, 1–19.

hindering agricultural activities which is the mainstay of most African economies. Worse still is that countries in the African continent whose economies are no longer mainly dependent on agriculture are now dependent on fossil fuel, which is the chief culprit in the climate change phenomenon. An example is Nigeria, whose monocultural economy' is heavily dependent on the petroleum sector, accounting for about 80% of government revenues, 90-95% of export revenues and over 90% of foreign exchange earnings. As the global community continues to switch from the use of fossil fuels to cleaner energy sources, Nigeria's monocultural economy would suffer a devastating blow.²⁸ Thus, whichever way one looks at it, the climate change phenomenon is a loose-loose situation for the African continent.

AFRICA'S RESPONSE TO CLIMATE CHANGE

Africa's response to the global climate change phenomenon will be gleaned from two perspectives:

- The international obligation on the continent to address climate change; and
- How the continent is addressing its climate change dilemma.

Africa's Obligation to Address Climate Change

The first international effort to address the problem of climate change was the United Nations Framework Convention on Climate Change 1992²⁹. Article 2 spells out its objective as follows:

The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system....

By Article 4 paragraph 2, industrialised countries are to take the lead in reducing emissions. The UNFCCC therefore included a legally non-binding voluntary pledge that major industrialised and developed countries would reduce their greenhouse gas emissions to 1990 levels by the year 2000. It became apparent that these nations would not meet the envisaged stabilisation target by their voluntary pledges by the year 2000. Therefore at the first Conference of the Parties (COP-1), held in Berlin in 1995, the parties to the Convention decided to enter into negotiations on a protocol to establish legally binding commitments on reductions of greenhouse gas emissions.

²⁸ It is projected that Nigeria's crude oil could fall as low as Twenty Naira per barrel (Channels News Report, September 23, 2015)

²⁹ Hereafter the UNFCCC

The G-77³⁰, representing 133 developing countries successfully pushed for a mandate, tagged the ‘Berlin Mandate’ which recognised that:

- Developed nations had contributed most to the concentration of greenhouse gases in the atmosphere;
- Developing countries emissions per capita (average emissions per head of population) were still relatively low; and
- That the share of global emissions from developing countries would grow to meet their developmental needs.

Thus the legally binding commitments agreed upon would be only for developed countries listed in Annex 1 to the UNFCCC.

Since 1995, the parties to the Convention have met annually in Conferences of the Parties to assess progress in dealing with climate change.

The Kyoto Protocol

The agreement known as the Kyoto Protocol is the Protocol to the Framework Convention on Climate Change 1997. The United Nations Framework Convention on Climate Change was adopted at the Earth Summit in Rio de Janeiro in 1992. As already observed, the UNFCCC itself did not set any legally binding limitations on emissions nor did it provide any enforcement mechanism for such limitation. It left these matters to be resolved at subsequent Conferences of the Parties to the UNFCCC. The Kyoto Protocol was adopted at the third session of the Conference of the Parties (COP 3) in Kyoto, Japan in 1997. Only parties to the UNFCCC can become parties to the Kyoto Protocol.

The Kyoto Protocol established binding obligations for developed countries to reduce their greenhouse gas emissions by a combined aggregate of 5% in the first commitment period between 2008 and 2012, and 15% in the second commitment period between 2013 and 2020.³¹ It however did not give any reduction commitments to developing countries. Negotiation on this issue was tense in view of the large potential for growth in developing countries’ emissions³² and this issue has been a sore point in the Kyoto Protocol and the reason the United States did not ratify the protocol. It was also for the same reason that Australia did not ratify the treaty until December 3, 2007 and the reason for withdrawal by countries like Canada, Russia, Japan,

³⁰ The G-77 at this time was made up of 133 developing countries and China was then not a member but an Associate but has since become a member.

³¹ Article 3 (1) of the Kyoto Protocol

³² The United States observed and rightly so that the emissions of some developing countries like China were set to meet their own and therefore all must be made to share the responsibility now. It is interesting to note that this prediction has since come true and China has surpassed the United States as the largest emitter of carbon dioxide, the chief culprit in the global climate change phenomenon.

Belarus and Ukraine, who indicated that they would not commit to a second Kyoto period. This is perhaps the greatest set back to the Kyoto Protocol.

Although the protocol did not give binding emissions commitments to developing countries, but to ensure the participation of developing countries, a market based flexibility mechanism, the Clean Development Mechanism (CDM) was introduced. The CDM was designed to limit emissions in developing countries, but in such a way that developing countries do not bear the cost of such emissions reduction. The Kyoto Protocol envisaged that developed countries would meet their first round commitment, while developing countries would face quantitative commitments in later commitment periods.

There are basically two measures by which climate change can be addressed: preventive measures which tend to lower or mitigate the greenhouse effect, and adaptive measures which deal with the consequences of the greenhouse effect and trying to minimize their impact. The countries of the world were therefore required to develop mitigation and adaptation measures to climate change. Climate change may be moderated by mitigation and its impacts may be reduced by adaptation. Scientists have also suggested Geo-engineering as a technique for reversing the process of global warming. Article 4 (1) (b) of the United Nations Framework Convention on Climate Change 1992, commits parties to:

Formulate, implement, publish and regularly update national and, where appropriate, regional programmes containing measures to mitigate climate change by addressing anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol, and measures to facilitate adequate adaptation to climate change.

Mitigation of global warming generally involves reduction in anthropogenic emissions of greenhouse gas concentration in the atmosphere either by reducing their sources, through emissions reduction or by increasing the capacity of carbon sinks through reforestation. Mitigation is a preventive measure which reduces emissions of greenhouse gases, either by reducing the level of emissions-related economic activities or by shifting to more energy-efficient technologies that would allow the same level of economic activity at a lower level of Carbon (iv) oxide emissions.

African countries being developing countries do not have any emissions reduction commitments under the UNFCCC and as such are not obliged to put up mitigation measures for the current climate change phenomenon. They are however required to implement adaptation measures as part of a response strategy. Article 4 (1) (e) of the UNFCCC 1992 provides that:

Parties are committed to co-operate in preparing for adaptation to the impacts of climate change; develop and elaborate appropriate and integrated plans for coastal zone management, water resources and agriculture, and, for

the protection and rehabilitation of areas, particularly in Africa, affected by drought and desertification, as well as floods.

Adaptation is adjustment in ecological, social, or economic systems in response to actual or expected climatic stimuli and their effects or impacts. This term refers to changes in processes, practices, or structures to moderate or offset potential damages or to take advantage of opportunities associated with changes in climate. It involves adjustments to reduce the vulnerability of communities, regions, or activities to climatic change and variability³³.

Adaptation is important in the climate change issue in two ways— one relating to the assessment of impacts and vulnerabilities, the other to the development and evaluation of response options. Adapting to climate change entails taking the right measures to reduce the negative effects of climate change (or exploit the positive ones) by making the appropriate adjustments and changes.³⁴ Adaptation to climate change refers to measures taken to reduce the vulnerability of natural and human systems against climate change effects. Adaptation is therefore a necessary strategy to complement climate change mitigation efforts. Thus adaptation is primarily concerned with how to protect society and ecosystems against the impacts of changes in the climate. Even if emissions are dramatically reduced today or in the next few years, the impacts of climate change resulting from historic greenhouse gas emissions would inevitably be felt for generations to come and these impacts would be more severe in some places than others and some of such impacts may be irreversible. It is therefore necessary that the world, both at the national and global levels prepare for and take concrete steps to protect against the multifarious impacts of climate change.

Climate change adaptation is especially important in developing countries since they would be worse hit by the adverse impact of climate change.³⁵ Climate change would adversely impact agriculture, biodiversity, ecosystem and water. And the livelihoods of majority of the world population, particularly in Africa are dependent on these sectors, and as such their vulnerability to climate change would be worsened.

Adaptation measures will help people cope with the effects of climate change. For instance, construction of dikes and seawalls to protect against rising sea level and extreme weather events such as floods and hurricanes as well as changing patterns of land use like avoiding building houses on vulnerable areas. Another adaptation measure is shifting cultivation patterns in agriculture to adapt to changed weather conditions in different areas, and relocating people away from low-lying coastal areas. A very crucial part of adaptation is creating institutions that can

³³Smit, B and Pilifosova, O *Adaptation to Climate Change in the Context of Sustainable Development and Equity* http://www.smit_pilifosova2007_adaptationtoce Retrieved on July 25, 2013

³⁴*Climate Change: Impacts, Vulnerabilities and Adaptation in Developing Countries*; Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change February 16, 2001

³⁵Cole, Daniel A. "Climate Change, Adaptation, and Development", 26 UCLA J. ENVTL. L. & POL'Y 1, 3 (2008)

mobilize the needed human, material, and financial resources to respond to climate-related disasters.

While climate change threatens development and more specifically, the achievement of the MDGs in the African continent, adaptation represents a practical means of achieving sustainable development in the long-term. Adaptation is dependent on the adaptive capacity of an affected system, community or region to cope with the impacts and risks of climate change.

Adaptation strategies are ways in which individuals, households, communities and institutions modify their rules and alter their productive activities in response to vulnerabilities, in order to meet their livelihoods. Adaptation measures or strategies usually have the potential to moderate climate change impacts.

Suggested adaptation strategies for the agricultural sector would include:³⁶ Changing the topography of land; Using artificial systems to improve water use/availability; Changing farming practices; Changing timing of farm operations; Using different crop varieties; Governmental and institutional policies and programs; and Research into new technologies.

Suggested adaptive measures for some anticipated health outcomes of global climate change would take the form of Administrative/legal, Engineering and Personal behaviour.

Engineering: Insulate buildings; Install high-albedo materials for roads; Install window screens; Release sterile male vectors; Construct strong seawalls; and Fortify sanitation systems.

Personal Behaviour: Maintain hydration; Schedule work breaks during peak daytime temperatures; Use topical insect repellents; Use pyrethroid-impregnated bed nets; and Heed weather advisories.

Methods of Adaptation

Local Planning:

Local land use and municipal planning are important methods of adapting to the impacts climate change. These methods of adaptation are fundamental to avoiding the impacts of climate related hazards such as floods, heat waves, planning for demographic and consumption transition, and plans for ecosystem conservation.³⁷ This method of adaptation differs from the National

³⁶ Smit, B and Pilifosova, O “Adaptation to Climate Change in the Context of Sustainable Development and Equity” http://www.smit_pilifosova2007_adaptationtoCC Retrieved November 20, 2010

³⁷ Tompkins EL, Adger WN (2004) Does adaptive management of natural resources enhance resilience to climate change? Ecology and Society 9(2):10 [online] <http://www.ecologyandsociety.org/vol9/iss2/art10/>

Adaptation Programs of Action (NAPAs) which aims at providing a framework for prioritizing the adaptation needs of various groups.³⁸ Communities adapt to climate change impacts in the forms of inundation, bushfires³⁹, heatwaves and rising sea levels through local planning.

At the state, municipal and community levels, adaptation through local planning can take the form of projects such as changing to heat tolerant tree varieties, changing to water permeable pavements to absorb higher rainfalls and adding air conditioning in public schools. The New York Times highlighting Chicago's adaptation initiatives, reports that cities are already planning for adaptation to climate change.⁴⁰

Adaptation through local planning can also take the form of land-use planning, which focuses on the allocation of space to balance economic prosperity with acceptable living standards and the conservation of natural resources. There are however a number of constraints to adaptation through planning, and these include: limited resources, lack of information, competing planning agendas and complying with requirements from other levels of government.⁴¹ Adaptation methods can take the form of, defending against rising sea levels through better flood defences, and changing patterns of land use like avoiding more vulnerable areas for housing. A fundamental challenge for local planning in response to climate change is defending against rising sea levels.

Enhancing adaptive capacity

Enhanced adaptive capacity would reduce vulnerability to climate change. Activities that enhance adaptive capacity are essentially equivalent to activities that promote sustainable development.

Agricultural Production and Drought Tolerant Crop Varieties

Among the multifarious impacts of global climate change is changes in precipitation patterns, which has significant effect on the agricultural sector. For one, rain-fed agriculture constitutes 80% of global agriculture, while on the other hand, flooding that may be occasioned by climate change would also have adverse impact on agriculture. This is particularly worrisome because the majority of Asia and Africa populace depend on rain-fed agriculture. As the global

³⁸Tompkins EL (2005) Planning for climate change in small islands: Insights from national hurricane preparedness in the Cayman Islands: adaptation to climate change: perspectives across Scales. *Glob Environ Change* 15 (2):139-149

³⁹Preston, B.L., Brooke, C., Measham, T.G., Smith, T.F., Gorddard, R. (2009) Igniting change in local government: Lessons learned from a bushfire vulnerability assessment. *Mitigation and Adaptation Strategies for Global Change*, 14 (3) pp. 251-283 <http://dx.doi.org/10.1007/s11027-008-9163-4> retrieved September 20, 2013

⁴⁰City Prepares for a Warm Long-Term Forecast *New York Times* May 22, 2011

⁴¹Measham T.G., Preston B.L., Smith T.F., Brooke C., Gorddard R. Withycombe G., and Morrison C. (2011) Adapting to climate change through local municipal planning: barriers and challenges, *Mitigation and Adaptation Strategies for Global Change*, online: <http://dx.doi.org/10.1007/s11027-011-9301-2> retrieved September 20, 2013

population continues to soar, more food will be needed to cater for the populace, but climate variability would seriously hinder farming and food production. Extended drought is already compromising the yields of small and marginal farms with resultant economic, political and social disruption. Availability of water is vital to agriculture. Changes in precipitation pattern will cause moisture stress. It is therefore necessary to develop drought tolerant crop varieties.

Spending on Irrigation

There is naturally a higher demand for water for irrigation purposes as well as industrial purposes. Thus climate change is projected to occasion, increased competition between the agricultural sector, which is already the largest consumer of water resources in semi-arid regions and urban as well as industrial users. There is an urgent need for additional strategies to make the most efficient use of water resources. For example, the International Water Management Institute has suggested five strategies that could help Asia address the problem of food security occasioned by the climate change phenomenon as follows:

- modernising existing irrigation schemes to suit modern methods of farming
- Supporting farmer's efforts to find their own water supplies, by tapping into groundwater in a sustainable way
- Looking beyond conventional 'Participatory Irrigation Management' schemes, by engaging the private sector
- Expanding capacity and knowledge
- Investing outside the irrigation sector.⁴²

It is thought that the above suggestions would be equally viable for the African continent.

Rainwater storage

Crop failures resulting from drought can be prevented by providing farmers with access to a range of water stores. Studies have shown that small-scale water storage could be effective for irrigational purpose. Coping with global rainfall patterns, extended drought and resultant food shortages is made possible by global trade and effective distribution network by which surplus food in one country can be delivered to another country where it is needed.

Weather control

It is reported that in the past, Russian and American scientists have tried to control the weather by seeding clouds with chemicals to try to produce rain when and where it is needed.⁴³ A new method being developed involves replicating the urban heat island effect, where cities are

⁴²Mukherji, A. "Revitalising Asia's Irrigation: To sustainably meet tomorrow's food needs" 2009, IWMI and FAO
⁴³ "Spain goes hi-tech to beat drought" | Special reports | Guardian Unlimited

slightly hotter than the country side because they are darker and absorb more heat. This method, according to scientists creates 28% more rain 20 – 40 miles than wind from cities compared to upwind.⁴⁴ As technology continues to advance, new weather control techniques that would allow control of extremes, like hurricanes may become feasible.

Addressing Africa's Climate Change Dilemma

In line with the UNFCCC requirement for nations to develop adaptation strategies to global climate change, there have been collective efforts by policy makers in the African continent to meet the continent's climate change challenge. There have also been efforts by the various nations making up the African continent to adapt to the adverse impacts of climate change.

In the Kitui District of eastern Kenya, the Sahelian Solution Foundation (SASOL), a local Non-Governmental Organisation has helped to increase the adaptive capacity of smallholder farmers and communities to climate change by making them less vulnerable to drought, by helping communities to build small-scale sand dams.⁴⁵

In Cameroon, Green Care, a local Non-Governmental Organisation, has been running tree planting workshops with communities in the highlands with the aim of restoring native forests around village catchments to protect water supplies. Reforestation is a climate change mitigation measure; because trees are carbon sinks which store carbon iv oxide, a greenhouse gas that would otherwise be released, causing increase of carbon iv oxide in the atmosphere and thereby worsening climate change. It is therefore understandable why there have been global efforts to control deforestation and to pay developing countries to protect their remaining forests.

In Botswana, there is no dedicated policy or strategy that addresses climate change mitigation or adaptation. Actions taken so far for climate change mitigation and adaptation include: consultation on energy policy and energy master plan, aggressive plan to diversify energy production options to include renewables (solar and biofuels), promotion of energy efficiency/management, rural electrification (solar home systems) to reduce stress on wood and vegetation for energy purposes.

Ethiopia in 2011 developed the Climate-resilient Green Economy. In addition, a number of national policy initiatives, programs and strategies that may directly or indirectly address climate change adaptation have been developed. These include Plan for Accelerated and Sustainable Development to end Poverty (PASDEP), Environmental policy of Ethiopia, Agriculture and Rural Development Policy and Strategy, Water resources Management Policy, Health Sector Development Policy and Program and the National Policy on Disaster Prevention and Preparedness. Furthermore, the National Adaptation Program of Action (NAPA) is a mechanism

⁴⁴ Ibid

⁴⁵JotoAfrica "Adapting to Climate Change in Africa." Issue 2, November 2009

within the UNFCCC, designed to help the Least Developed Countries (LDCs) (among which is Ethiopia) to identify their priority adaptation needs to climate change and to communicate these needs to the Conference of Parties (COP) of the UNFCCC and other concerned bodies. The Government of Ethiopia finalised its NAPA in 2008⁴⁶ under the leadership of the National Meteorological Services Agency (NMSA) and is mobilising financial resources for its implementation. Ethiopia is one of the few African countries that have developed a comprehensive NAPA, primarily because of its status as a Least Developed Country.⁴⁷

Kenya and Nigeria are the only two countries so far, which have a specific Climate Change Act in draft form, although none of these have been passed into law.⁴⁸ Kenya has developed a National Climate Change Response Strategy, the primary focus of which is ensuring that adaptation and mitigation measures are integrated in all government planning, budgeting and development objectives. Perhaps Kenya's most laudable achievement yet in addressing the climate change dilemma, is the development of a National Climate Change Action Plan for 2013 to 2017. Nigeria and Egypt have submitted national climate change communications, describing the countries' level of adaptation and preparedness for climate change.

The Southern African Region has developed some programmes to address climate change, the most active of which is the Southern African Regional Climate Change Programme⁴⁹ (RCCP). The RCCP aims to contribute to the achievement of Southern Africa's climate change adaptation needs, socio-economic development and poverty alleviation objectives, including the Millennium Development Goals. The countries covered under this programme are Angola, Botswana, DR Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe.

Perhaps the most giant stride yet in addressing Africa's climate change dilemma was taken by Tunisia, when on January 27, 2014 it became the third country in the world to entrench the importance of climate change into its constitution, joining Ecuador and Dominican Republic. Tunisia also has a vast potential for the production of solar energy. It plans to raise the share of renewable energy in its electricity mix from five percent in 2014 to twenty-five percent in 2030.

The adverse impacts of climate change and climate change induced disasters far outweigh the capacity of any country to singlehandedly address. It therefore requires co-operation and partnership at global regional and domestic levels.

⁴⁶<http://www.unfccc.int/resource/docs/napa/eth01.pdf>

⁴⁷ Tanzania also has a National Adaptation Program of Action (NAPA) developed for implementation.

⁴⁸ Kenya's draft Climate Change Bill, 2010 was intended to provide directions on how Kenya will mitigate and adapt to climate change, but this Bill was rejected by parliament in 2012. Nigeria's Climate Change Commission Bill 2011, was introduced in Parliament in 2007, although passed by both Houses, yet it has to date not been passed into law.

⁴⁹<http://www.rccp.org.za/>

At the regional level, the New Partnership for Africa's Development (NEPAD)⁵⁰, initiated Environmental Action Plans to reduce the effect of climate change in Africa. The action plan emphasizes local, national and sub-regional responses to environmental degradation, improved environmental monitoring and research, and more effective international partnerships to promote green technology transfer, improve disaster preparedness and early warning systems and ease the consequences of climate change on the most vulnerable. NEPAD aims to make the African Continent contribute to slowing global temperature rise by significantly increasing carbon sinks through the preservation of its forests. It is reported that Africa contains 17 percent of the earth's remaining forestland and a quarter of its dense rain forests, which clean the atmosphere of emissions caused by polluters thousands of miles away. The forest supports an astonishing diversity of plant and animal life, which provides sustenance for millions of people.⁵¹ In May 2007, the NEPAD Secretariat announced that detailed climate change responses for each of the Continent's sub-regions had been developed by a consortium of 800 African Environmental Conservation and Economic Experts for consideration by African Environment Ministers. These studies formed a substantial part of African Heads of States' Presentation at the 13th Conference of the Parties to the UNFCCC (COP 13) in Bali in 2007.

The African Union Commission (AUC) supported the Environment Initiative of the New Partnership for Africa's Development (NEPAD) and its related Action Plan, acknowledging the economic importance of climate variability and change by including a programme area on combating climate change in Africa. In addition, the African Union Commission-supported NEPAD Africa Regional Strategy for Disaster Risk Reduction, recognises the importance of coordination across agencies for proactive disaster prevention and response strategies.⁵² In addition, the African Union Commission in partnership with the United Nations Economic Commission for Africa and the African Development Bank is supporting a major new initiative, the Global Climate Change Observing System-Africa Climate for Development, which began in 2007.⁵³ The programme is designed to integrate climate information and services into development in support of Africa's progress towards the Millennium Development Goals. A major objective is to mainstream climate information in national development programmes, focusing initially on the most climate-sensitive sectors. Moreover, the establishment of the African Centre on Climate Policy shows that Africa's political leadership is sufficiently aware of the threats of climate change.

In order to address the continent's climate change dilemma, at the Twelfth Ordinary Session of the Assembly of Heads of State and Government of the African Union held in Addis Ababa in

⁵⁰ NEPAD is the planning and coordinating technical agency of the African Union, which aims to eradicate poverty and create sustainable development

⁵¹ *ibid*

⁵² AU (African Union), *Report on implementation of the AU Assembly decision on the African common position on climate change*, Executive Council Fifteenth Ordinary Session, Sirte, Libya, 24–30 June 2009.

⁵³ Hellmuth, Moorhea and Williams, *Climate risk management in Africa*, quoted in DebayTadesse "The Impact of Climate Change in Africa" Institute for Security Studies Paper 220; November 2010

February 2009 it was decided that the annual climate change negotiations should give Africa an opportunity to demand compensation for the damage caused to its economy due to global warming.⁵⁴ A first step towards bringing this to bear was forging a common position and forming a single negotiating team for all African Union member states at the Copenhagen Climate Change Conference in 2009 (COP 15).

The First Conference on Climate Change and Development in Africa (CCDA-1) was held in Addis Ababa, Ethiopia from October 17 – 19, 2011. The Climate Change and Development in Africa (CCDA) conference is the flagship event of ClimDev-Africa. It provides a forum where stakeholders such as Non-Governmental Organisations (NGOs) and Civil Society Organisations (CSOs) from across the continent engage on climate change issues. The event is in recognition that the end users of ClimDev-Africa results are rural and urban communities whose livelihoods, health and security are affected by climate change. The theme was: “Development First: Addressing Climate Change in Africa”. The following sub-themes were discussed and recommendations were made:

- Climate science, data, information and service delivery;
- Climate resilient development and adaptation;
- Climate resilient and low carbon development in Africa; and
- Economics and finance of climate change.

Since the first Conference on Climate Change and Development in Africa (CCDA-1) in 2011, there have been five other Conferences on Climate Change and Development in Africa: The Second Annual Conference on Climate Change and Development in Africa held in Addis Ababa, Ethiopia on October 19-20, 2012 with the theme, “Advancing Knowledge, Policy and Practice on Climate Change and Development”. The CCDA-II had following sub-themes:

- Climate Service Delivery for Development
- Sustainable Energy Access for All Africans by 2030
- Outstanding Issues in Climate Negotiations: Relevance for Africa.

The Third Conference on Climate Change and Development in Africa held in Addis Ababa, Ethiopia 21-23, October 2013 with the theme, “Africa on the Rise: Can the Opportunities from Climate Change Spring the Continent to Transformative Development?” The CCDA-III had the following sub-themes:

- Climate science, data and service for Africa’s adaptation and mitigation
- The role of policy in building Africa’s resilience to climate change impacts
- Climate Finance: What are the unexplored options?
- Green economy: Which way for Africa?

⁵⁴ Act on Copenhagen: African position on climate change, 2009, <http://actoncopenhagen.decc.gov.uk/en/global-action/africa/ethiopia/africaposition>

- Is the global climate change framework working for Africa?

The Fourth Conference on Climate Change and Development in Africa held in Marrakech, Morocco 8-10, October 2014 with the theme, “Africa Can Feed Africa now: Translating Climate Knowledge into Action”. The CCDA-IV had the following sub-themes:

- Climate data for food security
- Agriculture opportunities for renewable energy development
- Climate finance and investment for agricultural transformation
- Innovation, technology transfer and deployment to enhance agriculture transformation in a changing climate.
- Transformation towards a green economy and low-carbon development as Africa feeds itself.

The Fifth Conference on Climate Change and Development in Africa held in Victoria Falls, Zimbabwe 28-30, October 2015, with the theme, “Africa, Climate Change and Sustainable Development: What is at stake at Paris and beyond?” The CCDA-IV had three sub-themes:

- Global governance of Climate Change
- Climate Change and Sustainable Development in Africa
- The State and Africa’s Prospects for Sustainable Development under Climate Change.

The Sixth Conference on Climate Change and Development in Africa held in Addis Ababa, Ethiopia 17-20, October 2016, with the theme, “The Paris Agreement: What next for Africa?” The CCDA-VI had Four sub-themes:

- Unpacking the Paris Agreement and emerging challenges and opportunities for Africa
- Integration of the Paris Agreement into Africa’s Development agenda and other global governance frameworks
- African initiatives in support of the implantation of the agreement
- Linkages between climate change and migration

SHORTCOMINGS OF AFRICA’S RESPONSE

Laudable as these efforts appear, the reality is that they are only on paper, as there is at present no comprehensive legal framework for climate change in Africa. Generally, environmental legislations at the regional and national levels are often uncoordinated, with weak legal and institutional frameworks for enforcement. Regional and national programs on climate change have lagged behind in Africa, being as it were stuck at the formulation and planning stage.

Closely related to the foregoing is the absence of a comprehensive policy on adaptation to climate change in Africa. This lacuna is due largely to:

- Sluggish political systems;
- Weak institutional capacity and framework;
- Poor coordination and implementation of existing legislations;
- Absence of foresight in national development planning and climate resilience;
- International abandonment and unfavourable global settings to enhance Africa's capacity to develop climate change adaptation and mitigation.⁵⁵

There is in addition an overlap and conflict of sectoral policies, duplication, insufficient institutional capacity and unclear mandate on who implements which policy. There is also the problem of corruption, which is a cankerworm in Africa's development. These factors increase the vulnerabilities of natural and human systems to the adverse impacts of climate change; like flooding, drought and food insecurity. It is reported that the African continent is lagging dangerously behind on climate adaptation strategies and implementation.⁵⁶

The African continent as well as the various nations lacks the requisite financial and technological capacity to adequately address its climate change dilemma. Although Article 4 (3) and (4) of the United Nations Framework Convention on Climate Change obliges the developed countries listed under Annex II to provide financial and technical support to help developing countries adapt to the adverse impact of climate change, but the developed countries however place very modest premium on this obligation.

Another shortcoming is the high level of poverty and ignorance prevalent African. Policy makers as well as the common man in Africa are yet to appreciate the need to reconcile their economic needs with the need for a healthy environment. They would therefore not sacrifice development and economic growth at the altar of environmental protection, as they must feed their teeming population and eradicate poverty. Poverty does not only make people vulnerable, but it also limits their choices, thus you cannot ask a starving man to preserve the tree that would put food on his table today, for the immense benefits that the same tree could bring him in the future. Poverty and ignorance is largely responsible for the ineffectiveness of the REDD+⁵⁷ in Africa. The New Partnership for Africa's Development (NEPAD)⁵⁸, observed that Africa is threatened by rising poverty levels and environmental degradation, and that "throughout Africa, poverty remains the main cause and consequence of environmental degradation and resource

⁵⁵ R. Mburia, "Africa Climate Change Policy: An Adaptation and Development Challenge in a Dangerous World" (Climate Emergency Institute 2015) 3

⁵⁶ Ibid

⁵⁷ Reducing Emissions from Deforestation and Forest Degradation. The 'plus' stands for "Enhancing Carbon Stocks, Sustainable Forest Management and Forest Conservation".

⁵⁸ NEPAD is the planning and coordinating technical agency of the African Union, which aims to eradicate poverty and create sustainable development

depletion.... For African countries, alleviating poverty is the overriding goal and priority of their development policies.... Without significant improvement in the living and livelihoods of the poor, environmental policies and programmes will achieve little success.”⁵⁹

Like other developing countries, African countries believe that the developed world has historical responsibility for the present anthropogenic global warming as the development they now enjoy was achieved by spewing carbon without any consideration for the environment. They argue that it was the industrialised West, the United States and Europe in particular, that is responsible for 70% of the greenhouse gas emissions over the past sixty years and which is responsible for the current global warming. Therefore they should take responsibility to fix the problem by making whatever sacrifices that are necessary to solve the problem and allow the developing world the chance they deserve to develop and improve their standards of living. The developing world concern on global environmental issues was captured by Mahittir Mohammed, then Malaysian Prime Minister, at the United Nations Conference on Environment and Development in Rio in 1992 in these words:

It is claimed that one of the causes of environmental degradation is the size of the population of some developing countries. We dispute this assumption. However, we note that rich developed communities tend to have low birth rates. If we want to reduce population growth then we must help poor communities to become developed. Yet we hear from the rich, proposals which would result in stopping development of poor countries in order to reduce population. We know that 25 percent of the world population who are rich generate 85 percent of its waste ... (but) the rich will not accept a progressive and meaningful cutback in their emission of carbon dioxide and other greenhouse gases because it will be a cost to them and retard their progress. Yet they expect the poor people of the developing countries to stifle even their minute growth as if it will cost them nothing.... The other issues before us is biodiversity, the poor countries have been told to preserve the forest and other genetic resources on the off-chance which might prove useful to humanity... now we are told that the rich will not agree to compensate the poor for their sacrifices. The rich argue that the diversity of genes stored and safeguarded by the poor are of no value until the rich, through their superior intelligence release the potential within: it is intellectual and must be copyrighted and protected... Obviously, the north wants to have a direct say in the management of forests in the poor south at next to no cost to themselves. The pittance they

⁵⁹ Michael Fleshman, “Climate Change: Africa Gets Ready, Planning how to deal with higher temperatures, Shifting Weather” available @ <http://www.un.org/africarenewal/magazine/july-2007/climate-change-africa-gets-ready>

*offer is much less than the loss of earning by the poor countries and yet is made out as a generous concession.*⁶⁰

THE WAY FORWARD

Although African countries are not obliged to implement climate change mitigation measures they cannot however afford to develop at the expense of the environment. The African continent must therefore in addition to developing adaptation strategies join the global community in developing and implementing effective response strategies to global warming, in the form of energy efficiency; renewable energy; forest conservation; and sustainable land use.

Energy Efficiency

Energy efficiency is the most immediate and cost-effective opportunity to reduce global greenhouse gas emissions. A recent assessment by Project Catalyst concluded that improving energy efficiency could provide roughly one-third of available, cost-effective emissions reductions in 2020.⁶¹ It is one of the few large-scale mitigation options that yield a positive economic return while providing a wide range of other social, environmental, and security benefits. Energy efficiency is attractive in all nations and especially in developing countries because it allows existing energy sources to serve a larger population and facilitates universal access to modern energy services, a key requirement for poverty reduction and sustainable development. It is thought that reducing fossil subsidies, causing energy producers to buy carbon (iv) oxide emissions permits or pay carbon taxes will help improve energy efficiency. A study by the McKinsey Global Institute determined that profitable investments in energy efficiency through 2020 could cut global energy demand growth in half.⁶²

Energy efficiency is currently improving globally at a rate of 1.25 percent per year, as measured by declines in energy intensity.⁶³ Project Catalyst reports that increasing this rate to 2.0 percent by 2015 would reduce emissions by 12 percent below business as usual in 2020, or 5.4 billion tons of carbon (iv) oxide equivalent, and would yield a net savings in 2020 of \$98 billion. Analysis by a United Nations Forum-Convened Expert Group suggests that a more ambitious goal of doubling the rate of improvement to 2.5 percent in major economies is achievable and would yield greater benefits.⁶⁴

⁶⁰ Ajai, W. "Achieving Environmental Protection Through the Vehicle of Human Rights: Some conceptual, Legal and Third World Problems" (1995) U.B.L.J. Vol 2, No 1, 54

⁶¹ Project Catalyst, "Towards a Global Climate Agreement: Synthesis Briefing Paper" (2009) available at http://www.project-catalyst.info/images/publications/synthesis_paper.pdf.

⁶² McKinsey Global Institute, "The Case for Investing in Energy Productivity" (2008) available at http://www.mckinsey.com/mgi/publications/Investing_Energy_Productivity

⁶³ Expert Group on Energy Efficiency, "Realizing the Potential of Energy Efficiency...." Supra note 48

⁶⁴ Ibid

Renewable Energy

‘Energy poverty’ is a global challenge which could be exacerbated by the adverse impact of climate change. Approximately 2.5 billion people have little or no access to modern energy services, which are essential for economic development and poverty reduction.⁶⁵ Reducing greenhouse gas emissions while, extending energy access will require a transformation of the world’s energy economy. A wide range of low-carbon energy sources and technologies must be harnessed, including natural gas, wind, solar, biomass, geothermal, hydro, and nuclear, as well as new technologies to reduce and sequester emissions from coal and other fossil fuels.

Renewable energy technologies are the most compelling alternatives to fossil fuels in the long run, as they rely on inexhaustible, domestic resources; they are environmentally friendly if appropriately sited and designed; and their production can create domestic economic development and jobs in all countries. A major constraint to renewable energy in the short to medium term is that it is generally more expensive than the often subsidized fossil alternatives. However, these prices are falling and are competitive with fossil fuels in some cases such as wind and solar applications off the grid.⁶⁶ If the G-20 leaders pledge to phase out fossil fuel subsidies, is implemented, it will help to make renewable energy technologies more economically attractive by raising the price of fossil fuels.

The costs of renewable energy technologies are declining as technologies improve and larger volumes of production allow for greater efficiencies in manufacturing. Policy incentives are needed to develop and deploy renewable energy technologies at a much greater scale to accelerate innovation and reduce costs. A global goal of providing universal access to modern energy services and deriving 20 percent of the world’s electricity from renewable sources by 2020 would help meet the challenges of climate change and energy access for the poor at the same time. Analysis by Project Catalyst indicates that achieving this renewable energy goal would reduce emissions in 2020 by 10 percent below business as usual. It is crucial that the African continent taps into these laudable objectives.

Forest Conservation and Sustainable Land Use

Tropical deforestation produces over 17 percent of global carbon (iv) oxide emissions. Agriculture and livestock generate another 14 percent.⁶⁷ Taken together, these land uses and land

⁶⁵ Amie Gaye, “Access to Energy and Human Development” (New York: United Nations Development Program, Human Development Reports, 2007) available at http://www.hdr.undp.org/en/reports/global/hdr2007-2008/papers/gaye_amie.pdf

⁶⁶ Geoffrey Heal, “The Economics of Renewable Energy.” Working Paper 15081 (National Bureau of Economic Research, 2009) available at <http://www.nber.org/papers/w15081>

⁶⁷ Intergovernmental Panel on Climate Change, “Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment” (2007)

use changes account for nearly one-third of all emissions.⁶⁸ Greenhouse gases cannot be held to safe levels in the atmosphere unless developed and developing countries reduce deforestation, adopt sustainable agricultural practices, and restore vegetation on degraded lands. Sustainable practices for low-carbon forestry, agriculture, and livestock management can boost farm productivity and rural incomes, enhance soil health, conserve water, save energy, reduce pollution and stimulate economic development, job creation, poverty reduction, and food security.

Sustainable land management is also an important strategy for adaptation to climate change, as healthy ecosystems protect watersheds, maintain regional weather patterns, and provide a buffer from extreme weather events caused by climate change. National policy commitments, targeted financial incentives, and extension services to landowners and communities are needed to scale up sustainable land management. These programs can be used to reduce the annual rate of tropical deforestation in Africa.

CONCLUSION

The African continent is indeed in a dilemma of climate change, which threatens the continent's development gains and prospects. Policy makers in the African continent must summon the political-will to meet its environmental challenges, by adopting the twin concepts of sustainability and development in all its economic and environmental policies.

Africa must formulate and develop a framework which must draw on the lessons from the current international framework: the successes, the failures and the areas needing to be improved upon.

A move towards a low-carbon economy is also crucial to addressing Africa's climate change dilemma. New green growth investment opportunities are necessary to respond to the urgent and growing need for climate change adaptation.⁶⁹ We cannot continue to wait for the West for solution, it is time to take our destiny in our own hands. Africa must define and develop appropriate technical adaptive measures that are affordable and suitable for the peculiar needs of her people, while building the adaptive capacity of the people.

⁶⁸ Ibid

⁶⁹ World Bank, *World Bank development report 2010: Development and Climate Change*, <http://www.ameinfo.com/211919.htm/> (accessed 11 July 2010.)