

THE NEED FOR A REGULATORY FRAMEWORK FOR GLOBAL WARMING IN AFRICA *

Introduction

The correct approach to take when faced with uncertainty as to the Possibility of an awesome and life-threatening, but not yet proven outcome: if someone Shouts "LION" in the dark you should be foolish to sit still and relax because you cannot tell the direction the beast is coming from. But how far would you run for fear of the Lion? Naturally you would run until dawn when it should become clear that the lion really exists. From a climate change perspective, it is now dawn. There is now overwhelming evidence of the adverse effects of climate change and one can say that the lion really exists, notwithstanding the continued posturing of governments, such as the United States.¹

By 2050, average temperatures in Africa are predicted to increase by 1.5 to 3°C, and will continue further upwards beyond this time. Warming is very likely to be larger than the global annual mean warming throughout the continent and in all seasons, with drier subtropical regions warming more than the moister tropics. It is estimated that, by the 2080s, the proportion of arid and semi-arid lands in Africa is likely to increase by 5-8%. Ecosystems are critical in Africa, contributing significantly to biodiversity and human well-being. Between 25 and 40% of mammal species in national parks in Sub-Saharan Africa will become endangered.

There is evidence that climate is modifying natural mountain ecosystems via complex interactions and feedbacks. There will also be major changes in rainfall in terms of annual and seasonal trends, and extreme events of flood and drought. Annual rainfall is likely to decrease in much of Mediterranean Africa and the Northern Sahara, with a greater likelihood of decreasing rainfall as the Mediterranean coast is approached. Rainfall in Southern Africa is likely to decrease in much of the winter rainfall region and western margins. There is likely to be an increase in annual mean rainfall in East Africa. It is unclear how rainfall in the Sahel, the Guinean Coast and the Southern Sahara will evolve. In the tropical rain-forest zone, declines in mean annual precipitation of around 4% in

* Gina Elvis-Imo, Lecturer, Faculty of Law, Niger Delta University, Wilberforce Island, Bayelsa State & Rowena Abissah Lecturer, Faculty of Law, Niger Delta University, Wilberforce Island, Bayelsa State.

¹ Omorogbe, Y "A Status Report on Climate Change Control and the Kyoto Protocol in Nigeria" [2006] 1 E.L.T.R Issue 2 Sweet and Maxwell pages 1-2

West Africa, 3% in North Congo and 2% in South Congo for the period 1960 to 1998 have been noted. By 2080, an increase of 5 to 8% of arid and semi-arid land in Africa is projected under a range of climate scenarios. Droughts have become more common, especially in the tropics and subtropics, since the 1970s. Human health, already compromised by a range of factors, could be further negatively impacted by climate change and climate variability, e.g., malaria in Southern Africa and the East African highlands. By 2020, a population of between 75 and 250 million and 350-600 million by 2050, are projected to be exposed to increased water stress due to climate change. Climate change and variability are likely to impose additional pressures on water availability, water accessibility and water demand in Africa. By 2020, in some countries, yields from rain-fed agriculture could be reduced by up to 50%. Agricultural production, including access to food, in many African countries is projected to be severely compromised. Projected reductions in yield in some countries could be as much as 50% by 2020, and crop net revenues could fall by as much as 90% by 2100, with small-scale farmers being the most affected. This would adversely affect food security in the continent and exacerbate malnutrition. Africa has close to 320 coastal cities (with more than 10,000 people), and an estimated population of 56 million people (2005 estimate) living in low elevation (<10-m) coastal zones. Towards the end of the 21st century, projected sea level rise will affect low-lying coastal areas with large populations. Sea-level rise will probably increase the high socio-economic and physical vulnerability of coastal cities. The projection that sea-level rise could increase flooding, particularly on the coasts of Eastern Africa, will have implications for health. Access to energy is severely constrained in sub-Saharan Africa, with an estimated 51% of urban populations and only about 8% of rural populations having access to electricity. Extreme poverty and the lack of access to other fuels mean that 80% of the overall African population relies primarily on biomass to meet its residential needs, with this fuel source supplying more than 80% of the energy consumed in sub-Saharan Africa. Further challenges from urbanisation, rising energy demands and volatile oil prices further compound energy issues in Africa.²

The picture from the Intergovernmental Panel on Climate Change Report is very gloomy and alarming for the African continent. This is particularly so because Africa's contribution to global greenhouse gas emissions is still negligible. Every region and every country in the global community is being affected by climate change but there is no doubt that some regions may be more affected than others. According to American statistics, Africa produces one ton of Carbon IV Oxide per person per year and about 4% of the total global greenhouse gas emission per person per year, and about 25% of the total global greenhouse gas emissions. Ironically, the African continent is one of the regions that would be most affected by the adverse impact of climate change. It is also true that the

² See generally The Intergovernmental Panel for Climate Change Fourth Assessment Report 2007 (Summary for Policy Makers) Chapter 11. Report on Regional Climate Projections and Chapter 9 on Africa.

African continent can ill-afford the finance and technology required for adequate climate change adaptation and mitigation measures. Nevertheless, it cannot stay back and do nothing. This paper therefore examines the African continent's climate change dilemma and discusses the need for the continent to develop policies to meet the climate change challenge through the implementation of climate change adaptation strategies as well as moving with the global community towards cleaner energy sources.

Climate Change and Global Warming

Climate change is 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.³ Factors that can shape the climate known as "climate forcings" include processes such as variations in solar radiation, deviations in the Earth's orbit and changes in greenhouse gas concentrations. There are also a variety of climate change feedbacks that can either amplify or diminish the potential impact of climate forcings. Some parts of the climate systems like oceans and ice caps respond slowly to the impacts of climate forcings, because of their large mass. Thus, it can take centuries for the climate systems to fully respond to new external forcings.

Nigeria's First National Communication, under The United Nations Framework Convention on Climate Change⁴ 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.

The terms climate change and global warming are often used interchangeably, although they are strictly speaking not the same, because climate change is the direct result of global warming. The latter is the increase in the average temperature of the Earth's near surface air and oceans, since the mid-twentieth century and its projected continuation. The global surface temperature increased $0.74 \pm 0.18^{\circ}\text{C}$ ($1.33 \pm 0.32^{\circ}\text{F}$) during the last century.⁵ According to the Intergovernmental Panel on Climate Change (IPCC), the greenhouse gas concentrations resulting from human activity such as burning fossil fuel like coal, oil and gas and deforestation caused most of the observed temperature increase since the middle of the twentieth century. Greenhouse gases such as water vapour, carbon dioxide, nitrogen oxide, methane, chlorofluorocarbons and ozone trap heat in the atmosphere instead of allowing it to radiate

³ Article 1 (2) of the United Nations Framework Convention on Climate Change 1992

⁴ Federal Republic of Nigeria (November 2003) 50

⁵ IPCC "Summary for Policymakers" 2007, Climate Change: The Physical Science Basis. Contribution of Working Group 1 to The Fourth Assessment Report of Intergovernmental Panel on Climate Change <http://ipcc-wg1.ucar.edu/wg1/report/ARW4G1> Assessed on December 20 2009.

back into space. Except chlorofluorocarbons, greenhouse gases are natural and the greenhouse effect is a natural phenomenon. Without it, the earth will be about 60% cooler than it is today and life as it is known now will be impossible.⁶

As already observed, Africa's contribution to global greenhouse gas emissions is still negligible, thus African countries are listed as Non-Annex 1 Countries⁷ 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 rest⁸

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 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,

⁶ L. Atsegbua et al *Environmental Law in Nigeria: Theory and Practice* Ababa Press, Lagos (2003) 194

⁷ 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

⁸ "Climate Change Threatens Africa's Livelihood" eAfrica, November 2005 volume3, quoted by Y. Omorogbe " A Status Report on Climate Change Control and the Kyoto Protocol in Nigeria" [2006] 1 E.L.T.R. Issue 2, Sweet and Maxwell p.1

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.⁹ 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 will decline (GDP) 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.¹⁰

It is reported¹¹ 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 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%.¹² 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

⁹ Pachler Klaus, "Nigeria in the Dilemma of Climate Change" Country Reports, July 19, 2007

¹⁰ Heinrich Böll Stiftung, Climate Change Governance in Africa: Adaptation Strategies and Institutions; A Synthesis Report by Masego Madzwamuse;

October 2010, based on Country Reports by Dr. Nick Hepworth

¹¹ European Commission, Brussels, 27.3.2013 COM (2013) 169 final " Green Paper: A 2030 framework for climate and energy policies"

¹² Supra note 10; Country Reports by Kulthoum Omari (Botswana)

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 recorded 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.

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

¹³ Ibid, Country Reports by Masego Madzwamuse (South Africa)

¹⁴ Heinrich Böll Stiftung, Climate Change Governance in Africa: Adaptation Strategies and Institutions; *ibid*

¹⁵ 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>

¹⁶ United Nations Development Programme, "Fighting Climate Change: Human Solidarity in a Divided World" New York; UNDP 2008, 1

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 Poverty not only makes people vulnerable, but also limits their choices, thus 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 Development Goal of halving the number of undernourished people by 2015 is becoming more difficult to reach as a result of the adverse impact of climate change.²³ Africa's food security situation is particularly worrisome. Of the 36 countries worldwide currently identified as food insecure, 21 are in Africa.²⁴ The impact of food security in Africa is two-fold: firstly, the failure of export crops such

¹⁷ United Nations Food and Agriculture Organisation <http://www.faostat.org/default.aspx> Assessed on June 4, 2010

¹⁸ United Nations, The Millennium Development Goals Report 2006, <http://www.unstats.un.org/unsd/mdg/Resources/Static/Progress2006/MDGReport2006>

¹⁹ Ibid

²⁰ Ibid

²¹ Inter Press Service News Agency (IPS), "Climate change and diminishing fish stocks" <http://www.ipsnews.net> Assessed on December 10, 2012

²² Robert Mendelsohn et al, *Climate Change and agriculture in Africa: Impact Assessment and Adaptation Strategies*, London: Earthscan. FAO, 2009

²³ Ibid

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, due to extreme climatic events, changes in patterns of infectious diseases, increased food insecurity, population displacement etc. 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. Coping with climate variability is a major challenge for the people of Sub-Saharan Africa. The high dependence of the economies and rural people of the region 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 rainfall 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 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

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

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

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.

Away from the impact of climate change on health and food security etcetera, perhaps what should be most worrisome is its overall impact 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 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

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.

chief culprit in the climate change phenomenon. An example is Nigeria, whose monocultural economy²⁸ 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.²⁹ 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

It is now apparent from a climate change perspective that the 'lion' does indeed exist, and it is now growling menacingly. The continent must take concrete steps to exterminate the lion or wait to be devoured by it. African countries are signatories to the United Nations Framework Convention on Climate Change and have ratified the Kyoto Protocol, but how they have fared in terms of taking practical steps to address the problem of climate change is another matter.

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 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 2008²⁹ 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.³⁰

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

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.³¹ 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 country's 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 Programme³² (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 wake may not have been early, but African countries have indeed woken to the realities of climate change. Their efforts so far cannot be said to be commensurate with the realities of the current climate change phenomenon, it is therefore crucial for the African Union to borrow a leaf from the European Union and bolster the efforts of these countries by acceding to the climate treaties.

The New Partnership for Africa's Development (NEPAD)³³

The New Partnership for Africa's Development (NEPAD), observed that Africa is threatened by rising poverty levels and environmental degradation, and that "throughout Africa, poverty remains the main cause

³⁰ Tanzania also has a National Adaptation Program of Action (NAPA) developed for implementation.

³¹ 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.

³² <http://www.rccp.org.za/>.

³³ NEPAD is the planning and coordinating technical agency of the African Union, which aims to eradicate poverty and create sustainable development.

and consequence of environmental degradation and resource 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."³⁴ NEPAD 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.³⁵ 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.³⁶ 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 2007.³⁷ 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

³⁴ 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>.

³⁵ *ibid*

³⁶ AU (African Union), Report on implementation of the AU Assembly decision on the African common position on climate change, Executive Council fift eenth Ordinary Session, Sirte, Libya, 24-30 June 2009.

³⁷ Hellmuth, Moorhea and Williams, *Climate risk management in Africa*, quoted in Debay Tadesse "The Impact of Climate Change in Africa" Institute for Security Studies Paper 220, November 2010.

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 show that Africa's political leadership is sufficiently aware of the threats of climate change.

African leaders are unanimous about the need for adaptation and mitigation strategies to cope with the effects of climate change on Africa's development. Thus at the Twelfth Ordinary Session of the Assembly of Heads of State and Government of the African Union held in Addis Ababa in 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.³⁸ 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).

It is now five years since the Copenhagen Climate Conference and it is yet to be seen what concrete steps African countries have taken to meet the climate change challenge. The continent cannot afford to kill time in some endless tea-party while climate change puts paid to Africa's hope of economic and human development. The Intergovernmental Panel on Climate Change (IPCC) Report had warned that Africa was not acting quickly enough to stem the dire consequences of excessive greenhouse gas emissions.³⁹

The First Conference on Climate Change and Development in Africa (CCDA-1) was held in Addis Ababa, Ethiopia from October 17 – 19, 2011. 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.

Nearly three years has passed since the CCDA-1, and so far, none of the recommendations of the conference, at least to the knowledge of the present writer has been implemented. So much has been said about climate change at the global stage in the annual Conferences of the Parties, since COP-1 in 1995. The devastating impacts of climate change are too eagerly unleashing themselves to allow policy makers in the African Continent the luxury of indulging in endless discussions. It is crucial that policy makers in Africa take a cue from the European Union and formulate a Regulatory Framework for Climate Change.

³⁸ Act on Copenhagen: African position on climate change. 2009. <http://actoncopenhagen.decc.gov.uk/en/global-action/africa/ethiopia/africaposition>

³⁹ Intergovernmental Panel on Climate Change Third Assessment Report 2001

Meeting the Climate Change Challenge

Emissions reduction commitments under the Kyoto Protocol to the Framework Convention on Climate Change 1997, apply only to developed countries listed in Annex-1 of the Convention. It is however, now apparent that to successfully limit emissions in order to achieve the objective of the convention, to stabilise atmospheric green greenhouse gas concentration would require the meaningful participation of all major emitting countries, whether classified as developed or developing.

The Organisation for Economic Co-operation and Development projected that if proper action is not taken, global greenhouse gas emissions would increase by 52% by 2050. This would in turn raise global mean temperature by 1.7°C – 2.4°C (at equilibrium, compared to pre-industrial levels) in 2050. Beyond 2050, temperature rise could be as high as 4°C – 6°C (compared to pre-industrial levels) and this could spell doom for the global community. And if proper action is taken, these trends could be slowed and limited overall. It projects the following three models:

The first model is if all major greenhouse gas emitters phased in over several years a tax of Twenty-five Dollars (escalating at roughly 2% a year) on every tonne of greenhouse gas produced, global emissions would be stabilised at 2000 levels by 2050; the second is if an immediate tax of twenty-five Dollars per tonne of carbon iv oxide equivalent is imposed by all nations today, global emissions will fall to about 21% below 2000 levels by 2050; the third model is a more ambitious scenario, reflecting a phased in tax set at the level necessary to limit atmospheric concentration to 450ppm of carbon iv oxide equivalent in the atmosphere in the long term. This would lead to a reduction in global emissions in the long term, by about 40% in 2050 compared to 2000 levels.⁴⁰

While The OECD simulations may make sense from an economic efficiency perspective, it is fraught with complexities. For instance, if a global tax policy is introduced, there is difficulty of how it would be distributed among the various countries. And such a global tax regime of greenhouse gases would result in larger emissions reduction from developing countries and the least developed countries and it is unlikely that these countries would accept such regulation. Again, such a regime would engender bigger GDP losses in developing countries than developed countries. Whichever model is adopted, Oil and Gas Producing countries would be worse hit by GDP loss, because of their economic vulnerability to taxing the carbon content of fossil fuel and their products.

Moreover, a global tax regime would justify the fears and reservations that have been expressed by developing countries, who see the Kyoto Climate Change Regime as a monster set to retard their development. It is

⁴⁰ See generally, " Climate Change: Meeting the Challenges to 2050" Policy Brief, Organisation for Economic Co-operation and Development, February 2008.

submitted that the principle of Common-But-Differentiated Responsibility remains the best option, because it would amount to manifest injustice to expect countries of the African continent, who contributed nothing to the present global warming phenomenon to take the same responsibility for solving it as the developed countries who are enjoying the proceeds of the industrialisation which is responsible for the current climate change, which the global community and in particular, the developing nations of the African continent and the Least developed countries are now paying.

Response Strategies

Response strategies to global climate change take the form of mitigation and adaptation measures. 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 involves reducing greenhouse gas concentration in the atmosphere either by reducing their sources or by increasing their sinks. Thus the United Nations Framework Convention on Climate Change 1992 and its regulatory instrument, the Kyoto Protocol to the Framework Convention on Climate Change 1997 set 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. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.*⁴¹

It therefore, gave binding emissions reduction commitments to developed countries listed in Annex 1 to reduce their greenhouse gas emissions by an aggregate of 5.2% below 1990 levels in the first commitment period

⁴¹ Article 2 of the UNFCCC 1992.

between 2008 and 2012 and 15% in the second commitment period, between 2013 and 2020. Developing countries listed as Non-Annex 1 Parties were not given any emissions commitments either in the first or second commitment periods because, the UNFCCC 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.⁴²

Thus, African countries being developing countries were not given the responsibility to mitigate global warming under the UNFCCC. They are however, required to implement adaptation measures as part of a response strategy.

Adaptation to Climate Change

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 the processes through which societies make themselves better able to cope with an uncertain future. 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.⁴³ The Intergovernmental Panel on Climate Change (IPCC) defines adaptation as "adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities".⁴⁴ Adaptation also involves learning to manage new risks and strengthening resilience in the face of change.⁴⁵

⁴² "The "Berlin Mandate" at the first Conference of the Parties (COP 1), held in Berlin in 1995.

⁴³ *Climate Change: Impacts, Vulnerabilities and Adaptation in Developing Countries*;

⁴⁴ Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change February 16, 2001.

⁴⁵ Ibid

Adaptation to climate change refers to measures taken to reduce the vulnerability of natural and human systems against climate change effects. Since it may not be possible to completely mitigate climate change, adaptation is therefore a necessary strategy to complement climate change mitigation efforts.

Adaptation measures will help people cope with the effects of climate change. For instance, defending against rising sea levels through better flood defences and changing patterns of land use like avoiding building houses on vulnerable areas.

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. The problem of drought can further be tackled by developing drought tolerant crop varieties and by channelling more resources towards irrigation.

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.⁴⁶ A new method being developed involves replicating the urban heat island effect, where cities are slightly hotter than the country side because they are darker and absorb more heat. This according to scientists creates 28% more rain 20 – 40 miles than wind from cities compared to upwind.⁴⁷ As technology continues to advance, new weather control techniques that would allow control of extremes, like hurricanes may become feasible.

The World Meteorological Organisation (WMO) through its Commission for Atmospheric Sciences (CAS) has issued a "Statement on Weather Modification" as well as "Guidelines for Planning of Weather Modification Activities" in 2007, stating among others that "Purposeful augmentation of precipitation, reduction of hail damage, dispersion of fog and other types of cloud and storm modifications by cloud seeding are developing technologies which are still striving to achieve a sound scientific foundation and which have to be adapted to enormously varied natural conditions."⁴⁸

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. This indigenous technology helps people to access water for domestic and agricultural use during the long dry seasons.⁴⁹

⁴⁶ "Spain goes hi-tech to beat drought" | Special reports | Guardian Unlimited

⁴⁷ Ibid

⁴⁸ WMO Documents on Weather Modification Approved by the Commission for Atmospheric Sciences Management Group, Second Session, Oslo, Norway, 24-26 September 2007.

⁴⁹ Joto Africa "Adapting to Climate Change in Africa ", Issue 2, November 2009.

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.

The Adaptation Fund

Recognising that developing countries do not have the financial and technical capacities necessary for adaptation to climate change, the UNFCCC also provides:

The developed country Parties and other developed Parties included in Annex II shall provide new and additional financial resources to meet the agreed full costs incurred by developing country Parties in complying with their obligations under Article 12, paragraph 1. They shall also provide such financial resources, including for the transfer of technology, needed by the developing country Parties to meet the agreed full incremental costs of implementing measures that are covered by paragraph 1 of this Article and that are agreed between a developing country Party and the international entity or entities referred to in Article 11, in accordance with that Article. The implementation of these commitments shall take into account the need for adequacy and predictability in the flow of funds and the importance of appropriate burden sharing among the developed country Parties.⁵⁰

Further, Article 4 (4) of the United Nations Framework Convention on Climate Change 1992 provides that:

The developed country Parties and other developed Parties included in Annex II shall also assist the developing country Parties that are particularly vulnerable to the adverse effects of climate change in meeting costs of adaptation to those adverse effects.

⁵⁰ Article 4 (3) of the UNFCCC

By these provisions the UNFCCC gave developed countries listed as Annex-2 countries the responsibility to provide financial and technical assistance to developing countries to help them adapt to the negative impact of climate change. Developed countries however often place modest limits on their willingness to assist developing countries, because some of them see climate change as a scheme for wealth transfer to the developing world. According to a recent study by African Development Bank, Africa has so far received 38% that is \$132m of adaptation funding of the approved (\$350m). Curiously, this approved sum is a far cry from the projected costs of adaptation in Africa, which data shows to be between \$30b and \$60b per annum in the period between 2010 and 2050.

An Adaptation Fund was established in 2001 at the 7th Conference of the Parties (COP7) in Marrakech, Morocco⁵¹ and officially launched by the 13th Conference of the Parties to the United Nations Convention on Climate Change (COP 13) in Bali on December, 2007. The Adaptation Fund was set up for the effective and transparent financing of projects and programs aimed at helping developing countries to adapt to the harmful effects of climate change.

It was thought that the Adaptation Fund would be primarily financed by a share of proceeds amounting to 2% of Certified Emission Reductions (CER) issued for clean development mechanism (CDM) project activities and other sources of funding. It was estimated that about \$950m will be generated from the sale of the two per cent CER share by 2012 but by September 30, 2013, the Fund had accrued US\$ 188.6 million in proceeds from CER sales.⁵² And by November 30, 2013, the Fund had US\$ 156 million available to allocate to climate adaptation projects.⁵³ By early November 2013, the Adaptation Fund Board had allocated approximately US\$ 200 million to support climate adaptation in 29 countries.⁵⁴

Following the collapse of the carbon markets, it became more critical to find other funding sources for the Adaptation Fund. By September 30, 2013, other funding sources including donations from Annex 1 countries amounted to US\$ 151 million.⁵⁵ In a major fundraising push, the Adaptation Fund Board and secretariat surpassed its goal for pledged donations by governments,⁵⁶ with over US\$ 100 million pledged and donated by the end of 2013, still a drop in the ocean, compared to the estimates, with the result that, providing the necessary financial and technical support for developing and most vulnerable countries to help them adapt to the impacts of climate change remains a tall order.

The Adaptation Fund is managed by the Adaptation Fund Board (AFB). At the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol (CMP) held in Bali, Indonesia from 3-14 December

⁵¹ Decision 10/CP.7: Funding under the Kyoto Protocol.

⁵² http://fiftrustee.worldbank.org/webroot/data/AF_TR_09_13.pdf.

⁵³ <http://fiftrustee.worldbank.org/index.php?type=fund&ft=af>.

⁵⁴ <https://adaptation-fund.org/page/rwanda-pacific-islands-benefit-adaptation-fundsupport>

⁵⁵ http://fiftrustee.worldbank.org/webroot/data/AF_TR_09_13.pdf.

⁵⁶ <https://adaptation-fund.org/media/adaptation-fund-surpasses-100-million-fundraisingtarget-COP19>;

2007, Parties in Decision 1/CMP.3 established the Adaptation Fund Board (AFB) as the operating entity to supervise and manage the Adaptation Fund, under the authority and guidance of the CMP. The AFB is fully accountable to the CMP, which decides on the overall policies of the Adaptation Fund.

The Global Environment Facility (GEF) provides secretariat services to the AFB upon invitation from the parties and the World Bank serves as trustee of the Adaptation Fund on an interim basis. The secretariat of the Adaptation Fund Board provides research, advisory, administrative, and an array of other services to the Board, and consists of an international staff based in Washington, DC.⁵⁷ The AFB is composed of 16 members and 16 alternates representing Annex I countries, Non-Annex I countries, Least Developed Countries (LDCs), Small Island Developing States (SIDSs), and regional constituencies. The AFB meets three times per year in Bonn, Germany.

A key feature of the Adaptation Fund is its direct access mechanism, which enables Accredited National Implementing Entities (NIEs) and Regional Implementing Agencies (RIEs) in developing countries to directly access climate adaptation financing. To ensure that developing countries can directly access resources under the Adaptation Fund the Adaptation Fund Board was conferred such legal capacity as necessary for the discharge of its functions with regard to direct access by eligible Parties.⁵⁸

While the Adaptation Fund is indeed laudable, it is apparent that it cannot as it is meet the challenge of funding adaptation projects in developing and least developed countries. For one, it is doubtful if its source can generate the requisite funds particularly with the collapse of the carbon market. It is thought that a Climate Change Trust Fund or a Climate Change Bank financed with resources accruing from the use of economic instruments, such as emissions charges, marketable permits, subsidies and other enforcement incentives. While payment of the funds would provide incentives for countries to reduce emissions, the funds so realised can be used to finance adaptation and geoengineering projects.

Although African countries are not obliged to implement climate change mitigation measures they cannot however afford to develop at the expense of the environment, without due consideration for the environmental effects of such development. The African continent must therefore in addition to developing adaptation strategies join the global community in developing and implementing effective response strategies to global climate change, in the form of energy efficiency; renewable energy; forest conservation; and sustainable land use.

⁵⁷ Adaptation Fund official Website.

⁵⁸ Decisions 5/CMP.2 and 1/CMP.3.

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 2020.⁵⁹ 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. A study by the McKinsey Global Institute determined that profitable investments in energy efficiency through 2020 could cut global energy demand growth in half.⁶⁰

Nineteen U.S. states have set energy efficiency resource standards,⁶¹ and if the United States would set a national efficiency resource standard, it could perhaps make up for its failure to take up its emissions reduction commitments under the Kyoto Protocol. The European Union has set a target of cutting energy demand of 20 percent by 2020, and China has a target of reducing its energy intensity (the ratio of energy use to economic output by 20 percent in five years).⁶² And leaders at the G-20 Summit in September pledged to phase out fossil fuel subsidies, which would lead to additional energy efficiency improvements in their countries as consumers and businesses respond to resulting increases in energy prices.⁶³ However, energy efficiency faces an array of market barriers that currently inhibit full deployment⁶⁴ and raising energy prices alone whether by reducing fossil subsidies or causing energy producers to buy carbon dioxide emissions permits or pay carbon taxes will not be sufficient to overcome these obstacles. Many countries have implemented innovative and effective policies to increase deployment of energy efficiency, such as building codes, appliance standards, and regulatory incentives for utilities to finance end-use efficiency improvements. These and other policies recommended by the International Energy Agency could rapidly

⁵⁹ Project Catalyst, "Towards a Global Climate Agreement: Synthesis Briefing Paper" (2009) available at http://www.project-catalyst.info/images/publications/synthesis_paper.pdf

⁶⁰ McKinsey Global Institute, "The Case for Investing in Energy Productivity" (2008) available at http://www.mckinsey.com/mgi/publications/investing_Energy_Productivity/

⁶¹ California, Colorado, Connecticut, Hawaii, Illinois, Maryland, Massachusetts, Michigan, Minnesota, Nevada, New Mexico, New York, North Carolina, Ohio, Pennsylvania, Texas, Vermont, Virginia, Washington. (see http://www.pewclimate.org/what_s_being_done/in_the_states/efficiency_resource.cfm)

⁶² China: Jiang Lin and others, "Taking Out One Billion Tons of CO₂: The Magic of China's 11th Five-Year Plan?" (Berkeley, CA: Lawrence Berkeley National Laboratory, 2007) available at <http://repositories.cdlib.org/cgi/viewcontent.cgi?article=6103&context=lbln> EU: "EU Climate Package Explained," BBC News, January 21, 2009, available at <http://news.bbc.co.uk/2/hi/europe/7765094.stm>.

⁶³ Juliet Eilperin, "G20 Leaders Agree to Phase Out Fossil Fuel Subsidies," The Washington Post, September 25, 2009, available at http://www.washingtonpost.com/wp_dyn/content/article/2009/09/25/AR2009092502453.html.

⁶⁴ Expert Group on Energy Efficiency, "Realizing the Potential of Energy Efficiency: Targets, Policies, and Measures for G8 Countries" (Washington: United Nations Foundation, 2007).

accelerate progress on energy efficiency if applied throughout the developed and emerging market economies.⁶⁵

Energy efficiency is currently improving globally at a rate of 1.25 percent per year, as measured by declines in energy intensity.⁶⁶ 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 dioxide 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.⁶⁷

Renewable Energy

Addressing the nagging problem of climate change has also brought to the fore, another pressing global challenge: 'energy poverty'. Approximately 2.5 billion people have little or no access to modern energy services, which are essential for economic development and poverty reduction.⁶⁸ 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. Renewable energy is constrained in the short to medium term because it is generally more expensive than competing and often subsidized fossil alternatives.⁶⁹ However, these prices are falling and are competitive with fossil fuels in some cases such as wind and solar applications off the grid.⁷⁰ 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.

⁶⁵ International Energy Agency, "Energy Efficiency Policy Recommendations," (2008) available at http://www.iea.org/G8/2008/G8_EE_recommendations.pdf

⁶⁶ Expert Group on Energy Efficiency, "Realizing the Potential of Energy Efficiency..." Supra note 48

⁶⁷ Ibid

⁶⁸ 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

⁶⁹ Geoffrey Heal, "The Economics of Renewable Energy," Working Paper 15081 (National Bureau of Economic Research, 2009) available at <http://www.nber.org/papers/w15081>

⁷⁰ Ibid

Renewable sources provide about 13 percent of global energy, mainly from fuelwood and other biomass sources.⁷¹ The European Union has set a target of obtaining 20 percent of its energy from renewable sources by 2020.⁷² China has set a target of 15 percent by 2020.⁷³ More than half of the U.S. states have adopted renewable electricity standards that require increased use of wind, solar, geothermal, and bio-energy.⁷⁴ Although some of that target could be met through increased energy efficiency.⁷⁵

The costs of renewable energy technologies are declining as technologies improve and larger volumes of production allow for greater efficiencies in manufacturing. Additional national performance standards that create larger-scale markets will accelerate this process even further. Still, the higher cost of renewable energy compared to fossil energy sources constrains private investment and limits the market share of renewable energy, especially in developing countries. 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.

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.⁷⁶ Taken together, these land uses and land use changes account for nearly one-third of all emissions.⁷⁷ 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.

These low-cost carbon mitigation strategies also provide compelling social and economic benefits. Protecting and restoring healthy natural habitats provides people with a range of valuable services, including

⁷¹ "Energy 2005," available at http://earthtrends.wri.org/pdf_library/data_tables/ene1_2005.pdf.

⁷² "EU Climate Package Explained," BBC News, January 21, 2009, available at <http://news.bbc.co.uk/2/hi/europe/7765094.stm>

⁷³ National Development and Reform Commission, People's Republic of China, "China's National Climate Change Program" (2007).

⁷⁴ See "Renewable and Alternative Energy Portfolio Standards, available at http://www.pewclimate.org/what_s_being_done/in_the_states/rps.cfm.

⁷⁵ "H.R. 2454: American Clean Energy and Security Act of 2009," available at <http://www.govtrack.us/congress/billtext.xpd?bill=h111-2454>

⁷⁶ Intergovernmental Panel on Climate Change, "Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment" (2007).

⁷⁷ Ibid

fresh water, fertile soils, crop pollination, pest control, flood prevention, food and tourism revenue. 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 in both developed and developing countries. Some countries are beginning to act. Brazil, for example, has announced a national plan to reduce deforestation by 80 percent below recent levels by 2020.⁷⁸ Several developed countries have made commitments to increase funding for tropical forest conservation, most notably Norway, which has pledged up to \$500 million annually.⁷⁹ Developing countries could feasibly use these programs to reduce the annual rate of tropical deforestation to 50 percent by 2020,⁸⁰ and all countries could significantly increase the amount of land under sustainable management through habitat restoration, and sustainable forestry, agriculture and livestock practices. Analysis by Project Catalyst shows that these improvements would reduce emissions in 2020 by over 50 percent from business as usual, at a net cost in 2020 of \$51 billion.

There have been concerted efforts at regional and national levels to address the climate change phenomenon, some of these efforts are indeed laudable and it is hoped that the African continent can take a cue from them. For instance, the European Union has developed a framework to steer its energy and climate policies up to 2020. This framework integrates different policy objectives such as reducing greenhouse gas emissions, securing energy supply and supporting growth, competitiveness and jobs through a high technology, cost effective and resource efficient approach. These policy objectives are delivered by three headline targets for GHG emission reductions, renewable energy and energy savings. The European Union has pledged to reduce emissions by 20 percent below 1990 levels by 2020 and with a 'comparable' effort by the United States, it would increase its goal to 30 percent. The European Union has also set targets to reduce energy consumption by 20 percent below projected levels in 2020 and to increase renewable energy to 20 percent of its overall

⁷⁸ Jacopo Crimi, "Brazil sets new deforestation target," *The Earth and Climate*, September 21, 2009, available at <http://www.emcc.it/blog-en/brazil-sets-newdeforestation-target/>

⁷⁹ "Norway's PM Attending High Level Event on REDD," *Norway.com*, September 24, 2009, available at <http://blog.norway.com/2009/09/24/%E2%80%9Dclimateagreement-should-include-reduceddeforestation%E2%80%9D/> ; "Forests Important Part of New Climate Deal," available at <http://www.sealthedeal2009.org/press-room/116-forests-important-part-of-any-new-climate-deal>.

⁸⁰ The Eliasch Review, "Climate Change: Financing Global Forests (2008) available at [http://www.occ.gov.uk/activities/eliasch/Full_report_eliasch_review\(1\).pdf](http://www.occ.gov.uk/activities/eliasch/Full_report_eliasch_review(1).pdf).

energy mix by 2020, including a minimum of 10 percent biofuels in overall fuel consumption. Internationally, European Union member states are providing bilateral assistance for forest conservation, clean-energy development, and adaptation. There are additional targets for energy used by the transport sector. In parallel, the European Union has put in place a regulatory framework to drive the creation of an open, integrated and competitive single market for energy which promotes the security of energy supplies.⁸¹

In addition, the European Union in January 2014 presented a framework for climate and energy for 2030. This proposed policy framework for climate and energy aims to make the European Union's economy and energy system more competitive, secure and sustainable. It seeks to drive continued progress towards a low-carbon economy. It aims to build a competitive and secure energy system that ensures affordable energy for all consumers, increases the security of the European Union's energy supplies, reduces dependence on energy imports and creates new opportunities for growth and jobs. In March 2014, the European Union leaders agreed to decide on the framework in October 2014. A vital aspect of this framework is the target to reduce the European Union domestic greenhouse gas emissions by 40% below 1990 level by 2030. This target will ensure that the EU is on the cost-effective track towards meeting its objective of cutting emissions by at least 80% by 2050. To achieve the overall 40% target, the sectors covered by the EU emissions trading system would have to reduce their emissions by 43% below 2005 level while emissions from sectors outside the EU ETS would need to be cut by 30% below 2005 level. This effort would be shared equitably between the EU Member States. It also proposes to increase the share of renewable energy to at least 27% of the EU's energy consumption by 2030.

Conclusion

It is now apparent that all African countries face the global climate change challenge, which threatens their development gains and prospects. What is needed is for Africa to include sustainable development in all its economic and environmental policies, including a rapid move towards a low-carbon economy. New green growth investment opportunities are necessary to respond to the urgent and growing need for climate change adaptation.⁸² Development that can be sustained in a world changed by climate must be enabled by building the adaptive capacity of people and defining appropriate technical adaptive measures.

Energy efficiency, renewable energy, forest conservation and sustainable land use, and adaptation are core elements for immediate action on climate change in developed and developing countries, as they provide

⁸¹ Supra

⁸² Supra note 25

substantial economic, security, and environmental benefits. It has become necessary to have a new international climate agreement which will provide urgently needed incentives and resources to scale up national action in these areas. At the same time, increased international support for the most vulnerable nations will help to shape an effective climate agreement over time. The United Nations Framework Convention on Climate Change held in Copenhagen in 2009, was to mark the beginning of a sustained international effort to address climate change by agreeing on a successor to the Kyoto Protocol. Sadly, this never happened, as the Kyoto regime would now run to 2020.

It is crucial to sustain the obligation for the financing and technology cooperation in developing countries. The carbon markets financed by cap-and trade programs and carbon taxes, would form a valuable source of finance in addition to other measures taken by developed countries. The African Continent 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. It should of necessity take into account international developments and spur stronger international climate action.