

Moving towards climate adaptation policy in Africa

A CEI study Report

2015



ROBERT MBURIA

Acknowledgment

The author is extremely grateful to all persons and entities that have made this simple report a success.

Mr. silvester Kimeu; ACREC, Kenya for editing and proofreading the work,

Ayalneh Bogale; AU Commission, Rural Economy and Agriculture Department for your prompt and resources response on AU climate Policy

Peter Carter; Climate Emergency Institute

Published by Climate Emergency Institute (CEI), May 2015

Trademark names and symbols are used in an editorial fashion with no intention on infringement of trademark or copyright laws

Copyright © CEI 2015

TABLE OF CONTENTS

| | |
|--|-----------|
| Table of contents | 2 |
| Abbreviations | 3 |
| Executive summary and recommendations | 4 |
| Introduction..... | 7 |
| Impacts of climate change in africa..... | 8 |
| Projected climate change impacts | 16 |
| Climate change instruments and their responsiveness to climate adapatation in africa..... | 18 |
| Weakness of existing climate change policies..... | 22 |
| Need for climate change adaptation policies | 30 |
| Conclusion | 33 |
| References | 34 |

ABBREVIATIONS

| | |
|---------|--|
| LDC | least developed countries |
| UNFCCC: | United Nations Framework Convention on Climate Change |
| UNEP: | United Nations Environmental Programme |
| FAO: | United Nations Food and Agriculture Organization |
| AU: | African Union |
| EU: | European Union |
| AMCEN: | African Ministerial conference on Environment |
| IPCC: | Intergovernmental panel on climate change |
| NEPAD: | New Partnership for Africa's Development |
| ASAL: | Arid and semi-arid lands |
| UN: | United Nations |
| UNECA: | United Nations economic commission for Africa |
| WFP: | World food programme |
| EAC: | East African commission |
| REDD+: | Reducing Emissions from Deforestation and Forest Degradation |
| ILO: | International Labour Organization |
| MDG: | Millennium development goals |
| COP: | Conference of Parties to Kyoto Protocol |
| DRR: | Disaster risk reduction |
| IMF: | International Monetary Fund |
| EACCP: | East Africa Community Climate Change Policy |
| SSA: | Sub Sahara Africa |
| WMO: | World Metrological Organization |
| IFPRI: | International Food Policy Research Institute |

EXECUTIVE SUMMARY AND RECOMMENDATIONS

Climate change adaptation policy in Africa is insufficient to tackle adverse affects of climate change impacts. Sluggish political systems; weak institutional capacity and framework; poor coordination and implementation of existing environmental legislations; absence of foresight in national development planning and climate resilience; international abandonment and unfavorable global settings to enhance Africa's capacity to develop climate change adaptation and mitigation continue to undermine continent's adaptation strategies.

Existing policy is scattered, conflicting and incoherent rendering it insufficient to give the continent a survival chance under adverse climate change impacts. Consequently in a business as usual Africa; adverse effects of climate related disasters will far outweigh the capacity of any given country to recover.

Puny implementation of climate change adaption and other environmental policies: Very few countries have specific climate change policy or legislations. NAPA implementation by LDC's is also slow owing to lack of sufficient political commitment.

Institutional failure: absence of a regional institution for monitoring climate change adaptation policy developments or enforcement of environmental regulations, data collection, and dissemination for policy development and scientific communication.

Information scarcity: Climate data exists in some countries; however, this information is not availed internationally, or incorporated into national/regional development planning or in disaster reduction strategies. Limited human resource to produce, analyze and interpret and disseminate climate data as a result of poor investment into scientific research on climate change impacts, adaptation, and mitigation; biodiversity and ecosystems; and weak governance and surveillance of natural resources especially forests weaken the region's capacity to adapt to climate change.

Recognizing that global interventions are not substitute to national or regional strategies the report recommends the following:

1. Uphold African Union's commitment to limiting warming below 1.5°C above the preindustrial levels ahead of the Paris COP21. Climate Action Network calls a phase out of fossil fuel emissions as soon as possible but not later than 2030 if adaptation and mitigation costs will remain manageable. A strong political commitment is needed from the developed countries and all nations to make a binding agreement in the coming negotiations.
2. Develop a clear; targeted climate change adaptation/mitigation policy as well as framework for low carbon development technology in the region. Develop political momentum for climate adaptation policy formulation into specific national states; develop a regional monitoring body under African Union/ AMCEN.
3. Paradigm shift in management of natural resources, land and water as well as food security policies. Political momentum to safeguard these resources and develop ecosystems based adaptation strategies is paramount in the region. Key areas of interest include soil, forest, water, land, agriculture and incorporation into national development strategies.
4. Role of science in planning remains unappreciated in the region; a marriage between science and policy development is nigh. Investment into research, agricultural development, policy formulation, food security is imperative for climate change adaptation strategy in Sub Sahara Africa.
5. States take advantage of UNFCCC framework on policy develops and formulate/implement national climate change adaptation policies and legislations that encourage low carbon technology growth by incentives and other risk reduction strategies; inversely discourage use of GHG by imposing levies; address environmental and ecosystems degradation that impede ecosystems based adaptation which is largely unexplored in Africa.
6. Develop a responsive environmental governance system by building capacity of environmental institutions with clear mandates and power to enforce legislations. If environmental governance in the region is fully functional current adaptation levels

would be higher compared to crippled configuration currently experienced in comparison to other regions.

7. The international community has an obligation under Kyoto Principle of common but differentiated responsibility to aid Africa should climate change adaptation burden not under philanthropy but in responsibility to anthropogenic climate change. Pledges made under UNFCCC in GEF and LDC Fund as well as other international commitments if honored adequately can enhance environmental as well as global security.
8. Technology transfer to developing nations and small islands, capacity building of these countries by their developed counterparts to access the Green fund, removal of barriers to accessing and utilization of the GEF and other internationally availed funds and investing into Africa's scientific path is imperative in the COP 21 and other multilateral agreements on environmental and climate change if adaptation capacity in Africa is to improve. Even the best of policies will fail if funding is limited. However, priority areas of funding such as structural changes and channels of accessing the funds, as well as research levels must be scaled u speedily.
9. Strengthening UNFCCC and expanding its role as a global body to build developing nations climate change adaptation and mitigation capacity; monitor and evaluate in keeping track with emissions from different countries with a legal mandate.
10. Climate change policy vacuum in Africa is large and calls for attention alongside sound environmental and economic policies. Delay in this section is a dangerous precedence and implications are catastrophic. Specific states need to harmonize their environmental policies, natural resource management and legislations as well as institutional capacity development.

“Africa is a “vulnerability hot spot” for the impacts of climate change. Its adaptation challenge will grow substantially, even if the 2020 “Emissions Gap” is closed and global-mean warming held below a 2°C increase above pre-industrial temperatures.”

(UNEP)

INTRODUCTION

Climate change is happening and affecting the planet and when all the impacts are considered, everyone regardless of their geographical location or social status or economic wellbeing will be affected. However, according to the Intergovernmental Panel on Climate Change (IPCC) the climate is changing in Phenomenal manner and the effects of climate change will be felt more among the developing countries particularly in African owing to her vulnerability due to high poverty levels which highly limits their capabilities. Weak policy framework aggravates the continent’s vulnerability and significantly reduces climate resilience.

The Africa’s economy by any measure lags behind in comparison to any other continent. Further, Africa hugely depends on agriculture as her main economic sector despite the immense of challenges facing the sector. Subsistence agriculture provides most of the food needs in Africa and employs over 70 percent of the population in Africa. Further the change in climate possesses a unique change to Africa’s agriculture owing to the fact that African agriculture depends overwhelmingly on direct rainfall making the continent to be exceptionally vulnerable to climate change. This coupled with dependence on primary agricultural commodities, poverty, natural disasters, over reliance on raw natural resources and foreign aid and debt burden, diseases, illiteracy, conflicts; uncompetitive commodities at the international markets expose the vulnerability of Africa to climate change.

Africa is the most vulnerable continent to the impacts of climate change despite her been the least contributor to the ever changing climate. Various reports such as The World Bank Series on *‘Turn Down the Heat’* **convey benefits accrued from developing low emission technology and development paths are far higher than the costs involved to keep warming below 2°** (World Bank, 2013). Yet such reports are least appreciated or factored into national or international policies so far. In contradiction under business as usual scenario; the cost of adaptation will be far greater than any African nation can bear even with the help of international community.

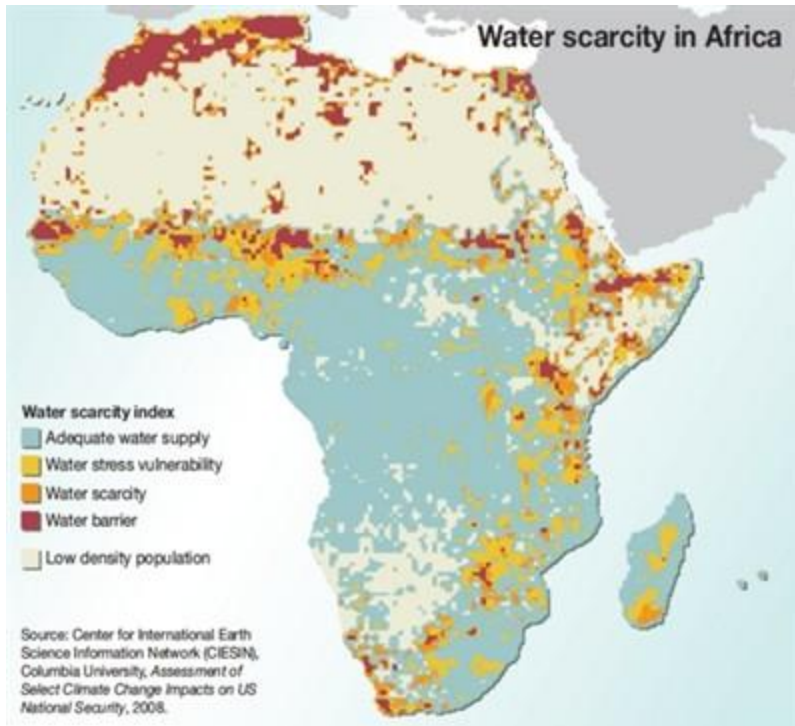
IMPACTS OF CLIMATE CHANGE IN AFRICA

Africa's social and economic development is now even more in danger because climate change threatens to undermine the integrity of the continent's source of livelihood.

Home to 24% of world's biodiversity hotspots, it carries more than 50,000 plants, 1500 bird species and 1000 mammal species (NEPAD, 2003, as cited in UNEP, undated). **Africa is rich in biodiversity and natural resources.** However, desertification; poverty, food insecurity, malnutrition and hunger, HIV/AIDS, appalling environmental degradation, forest depletion and degradation, land degradation, invasion by foreign species, loss of habitats, waters scarcity is eating into this natural richness due to weak policies, corruption and weak governance. There is a neglect of biodiversity integration into national planning and development as well as local poverty reduction strategies in many developing nations (UNEP 2014).

Water

Africa is the second driest continent with ASALs covering approximate 66% (UN 2014). Water stress will affect between 75-250 million persons, 50% reduction on rain fed irrigation, loss of coastal lands, and ASALs increase by 8% while adaptation costs swallowing up to 10% of GDP (IPCC, 2007). With FAO, (2009) predicting a 40% increase in water demand across Africa, trans-boundary water governance will pose significant challenges in affected states within Africa ecological zones by 2030. Increased water scarcity, increase water demand for agriculture and industrial development within the region coupled with insufficient land and water management policies; weak institutions; climate change; poor land use patterns; forest depletion and other water recharge grounds; market volatility will have profound effects in sub Saharan Africa like conflicts, increased poverty levels, high mortality rates, loss of biodiversity and arable land. However, with a visionary and willing political good will and commitment enactment of environmental policies can shield African states from the emerging threats posed by climate change and population pressure.



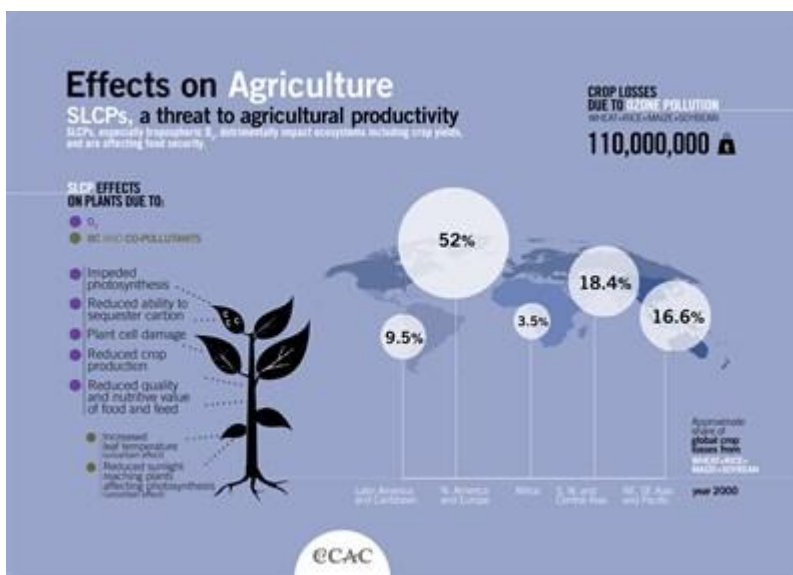
UNECA, (2011b) observes that groundwater is abundantly distributed across SSA. This water resource is resilient to climate variations offering the region integral part of climate change adaptation. **Nonetheless ground water in the region is majorly unutilized and developed** (Foster et al, 2006, UNECA et al, 2000). Lacking scientific data and existing knowledge gaps of ground water resources and uncertainties on climate change impacts on the groundwater as well as the ecosystems depending on them prevail (UNECA, 2011b).

Emerging policy issues: as climate change harsh realities settle in the region, adaptation efforts will affect water availability and quality. Water management policies in the region remain ill equipped to tackle increased urban and rural, demand and supply; water quality will be affected by agricultural activities with possible effects as pollution and reduced availability. Land and water management practices and policies need to adjust to the challenge by development of clear cut land and water best practices, conflicts and gaps between non-domestic consumers and commercial/industries, catchment conservation, and agro-forestry. Formulation of crosscutting sound policies and stakeholder involvement will significantly reduce water scarcity conflicts, ensure access rights and promote sustainable water/land management.

Food security

Sub Saharan Africa is marked as the most food insecure region in the world (UNDP 2012). WFP, (2011) notes risk of hunger will increase by 10-20% by 2050; out of 24 million malnourished children 10 million located in Sub Saharan Africa among other climate related variables will affect Africa.

Eastern, Central, Southern and western Africa regions rank second on global hunger index. This is attributed to weak political ownership; limited private and civil society involvement as well as insufficient programmes to respond to food insecurity which requires integrated cross-sectoral approaches (UNECA, 2013).



Source: UNEP, GRID-Arendal 2014

In 2014, 26 African countries were in need of external food assistance due to conflict, unaffordable food prices and crop failures, this has spilled into 2015 (FAO, 2014). Kenya food security policy has faced huge challenges over time. Crop failure experienced in the state for the period 2014/2015 was due to failure in short rains has led to reduction in crop production 10% lower than last five years in average, with the major affected crops been Affected crops are wheat, maize and rice.(FAO, 2015).

| Kenya | | | | |
|-------------------|----------------------|--------------|------------------|---------------------|
| Cereal production | | | | |
| | 2009-2013 average | 2013 | 2014 estimate | change 2014/2013 |
| | 000 tonnes | | | percent |
| Maize | 3 255 | 3 391 | 2 750 | -19 |
| Wheat | 385 | 486 | 450 | -7 |
| Sorghum | 146 | 139 | 120 | -14 |
| Others | 235 | 292 | 285 | -2 |
| Total | 4 021 | 4 308 | 3 605 | -16 |

Note: percentage change calculated from unrounded data.
Source: FAO/GIEWS Country Cereal Balance Sheets

Source (FAO, 2015).

Countries like Nigeria, Botswana, Burkina Faso, DRC Congo, Malawi, experienced above average cereal production owing to favorable rainfalls however, high food importation is persistent in some states others still depending on emergency food supplies. Conflicts, floods, rain failure have been cited as key reasons for declined food supply (FAO, 2015).

As IPCC (2014) notes, climate change involves complex interactions and changing likelihoods of diverse impacts hence difficult to predict but not impossible to plan and prepare for. This technical report calls for food security policies with a focus on maximizing sustainable agricultural output; technological and innovation growth within the agriculture sector; meaningful incentives and training capacity of farmers with keen focus on removing gender based barriers would directly empower 66.67% of Africa's population deriving its livelihood on land.

Reductions in crop yields over several regions have been recorded as well as increased food demand (IPCC, 2014, WFP, 2014, FAO 2014). Adopting agriculture to climate change remains Africa's big challenge as food production is hampered by poor farming practices, land degradation and other challenges facing the sector.

FAO, (2014) notes that **agriculture, forestry and fisheries sectors** offer great mitigation opportunities accompanied by the adoption of low emission strategies as well as carbon storage in forests, and aquatic ecosystems. Such opportunities are relevant owing to the fact that Africa is well endowed with these features although forests and aquatic resources are dwindling at

unprecedented levels due to ineffective policies, poor enforcement, weak institutional infrastructure and governance coupled with corruption. It is therefore imperative for decision makers and enforcers to rise to climate challenge of the day in environmental stewardship.

Armed conflicts have ravaged many parts of Africa like Congo forest complex, Somalia waters and many other countries (Emmanuel et al 2007; UNEP 2006).

Agriculture accounts for approximate almost half of the entire GDP in Africa. UNEC (2013) attributes policy failure to food insecurity in the continent. The fact that food emergencies have more than tripled since 1980s reflects poor planning and governance and lack of sufficient policy and institutional gaps over this period.

Emerging food security policy issues: food security remains an illusion in sub Sahara Africa. Policy failures, insufficient government investment, poor agricultural methods, slow embrace of technology, land degradation, conflicts and poverty. Cross cutting food security policies must redress inequalities, ensure land rights, and build connecting infrastructure and market links and accessibility, agricultural development through research and cooperation, provide latest technology and best water and land practices.

Mountain ecosystems

According to IPCC (2007), Mt. Kilimanjaro has lost most of its ice cover by over 80% while remaining cover is likely to fully disappear by between 2015 and 2020 largely to climate variability, fire, human modifications and vegetation changes. IPCC points evidence of changing mountain ecosystems due to complex interactions and feedbacks (IPCC, 2007).

Shrinking glaciers translate to reduced downstream water resources increasing the ever present water scarcity issues; thawing and permafrost warming as a result of climate change in high regions and latitude areas. Mt. Kilimanjaro ecosystem is forced to undergo ecosystem shifts due to climate change owing to interchanges and feedbacks like solar radiation micro-scale procession (IPCC, 2007). Previous studies (Thompson et al, 2002) as cited in IPCC (2007) indicate that ice caps on the mountain ecosystem might become extinct by 2020.

Biodiversity

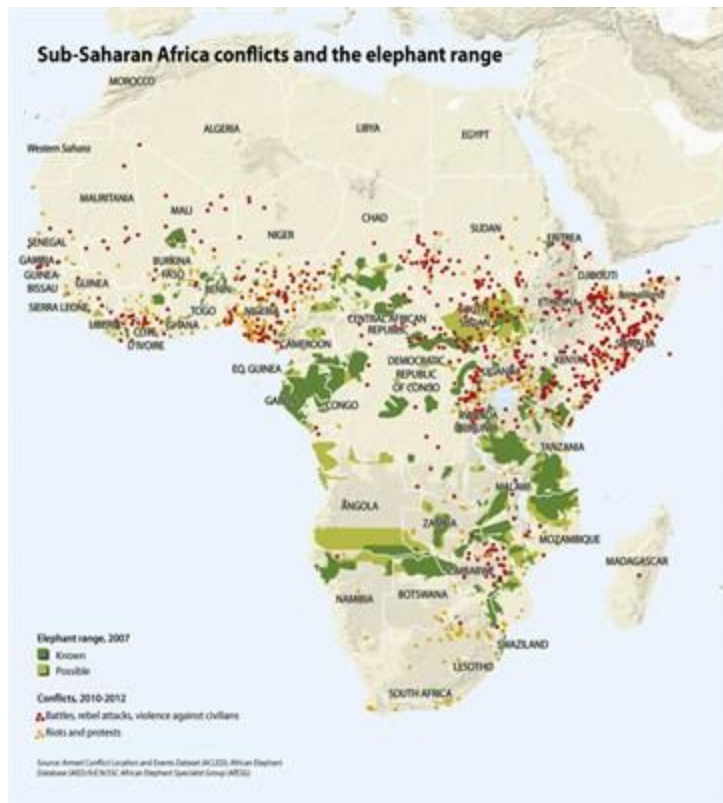
‘IPCC projection: “There is a high confidence probability that the resilience of many ecosystems will be undermined by climate change, with rising CO2 levels reducing biodiversity, damaging ecosystems and compromising the services that they provide.”

UNDP (2007)

Africa rich biodiversity offers income to communities, governments and international community. However, these priceless bio-riches face multiple complex threats ranging from shifts in land use and land conversion for development, agriculture or settlement, mining etc have huge impacts on the biodiversity in Africa (IAASTD, 2009). As ASALs increase by 5-8% by 2080; approximate 24-40% of sub Saharan mammal species will join the endangered club affecting populations and ecosystems vastly (AMCEN Secretariat, undated).

The United Nations REDD+, (2009) notes **deforestation and forest degradation as a result of agriculture expansion, conversion to pasture land; infrastructure development; logging accounts for approximately 20% of global greenhouse emissions**. Forests are unique carbon storage tanks that can lower the carbon in long term although far more benefits can be accrued from REDD+ such as biodiversity conservation, species and inter-species conservation, offer improved ecosystem services such as water recharge, and reduce soil degradation by minimizing erosion. Countries such as DRC and Nigeria are waking up to the benefit of REDD+ as carbon stocks and biodiversity conservation points. (Dickson et al, n.d.).

MDG 2013 report showed 0% data on land covered by forest in Africa (UN, 2013); however, there was evidence of massive deforestation and forest degradation. Ford (2012) notes that above 50% of Liberia forest have been handed to logging companies and DRC clearers forest cover to pave way for mining activities (cited in UN, 2013). Such national policies, lack of institutional capacity, poor governance, and lack of surveillance and data collection strategies hamper credible efforts for Africa to build resilience to impacts of climate change, adapt against such disasters. It also paves way to the continent to acquire clean energy and poverty alleviation in light of sustainable development.



Current Africa strategies seem to follow ‘pollute now and pay later’ which is detrimental for the continents sustained development. Formulation of clear cut effective policies that promote environmental sustainability and development must be drawn as a sustainable development goal under MDGs and in climate change ecosystems based adaptation. UNFCCC framework provides Africa with huge benefits for developing low carbon technologies, green energy production and a green development

path if national policies, planning and implementation take advantage of present international agreements and funding.

Land use changes and climate change pose greater threat to ecosystems and species. Combined effects of climate change and land use changes might lead to species extinction whereas those areas experiencing slower land use changes may allow ecosystems time to adapt (Alejandro et al, 2014).

Emerging issues: africa biodiversity is at risk, climate change exerbates the complex situation further. Biodiversity conservation policy is weak in many countries. Community participation hasn't fully taken root and alleation has oftend mirrored confclits. Climate change adapation policy must tackle issues such as encroachment into protected areas, riparian ecosystems, forest conservation and community resource management. Crosscutting comprohensive climate adapation policy must address issues like water availability to wild anaimals, reduce huma-wildlife consflicts, natural resource management and governance, increase transparency, survailance, international cooperation ovr conservation of wetlands, endangered species and mountain ecosystems. Policies need to be effective, clear, cost effective, attainable and ambitious.

Health implications

“It is well known that the health of a population, if it is to be sustained, requires clean air, safe water, adequate food, tolerable temperature, stable climate, and high levels of biodiversity (WHO, 1995; IPCC, 2007)”. (Cited in UNECA (2011c))

Climate change has had profound health impacts in Africa in recent years. UNECA (2011c) notes a strong interaction among economic health, environmental health and population health. Climate change does not directly lead to increased disease but acts as a driver and exacerbate prevalence. Africa health policies require a different approach in addressing health issues in the region in expectation of climate change. Weak health institutions and poor infrastructure, armed conflicts and poverty limit Africa’s capacity to proactively tackle health issues leaving many populations vulnerable. WHO (2009) points that poor health of slum dwellers in Africa is as a result of poor access to clean water and sanitation. Further, open defecation accounted for 33% population practice in eastern Africa (ibid).

Adaptation and mitigation policies in Africa should have a focus on improving population health by re-examining health care approaches and infrastructure.

PROJECTED CLIMATE CHANGE IMPACTS

According to the WGCCD, (2005) Climate change is expected to intensify Africa's increasingly critical water situation. Southern Africa being one of many water-stressed regions which could see a further decrease in the flow of streams flow and the ability of groundwater to 'recharge'.³⁸ reduced annual average rainfalls and its run-off would worsen desertification in southern Africa. Africa, like everywhere else, relies on water for its social, economic and environmental well-being. But the fact that so many have subsistence livelihoods means that prolonged drought represents a serious climate related hazard for the continent.

Disaster

"... 1980 TO 2012, disaster related losses amounted to US \$ 3800 billion worldwide. Some 87% of these reported disasters (18,200 events), 74% of losses (US\$2800 billion) and while 61% (1.4 million) lives lost due to extreme weather events" (Munich Re 2013, as cited in World Bank 2013).



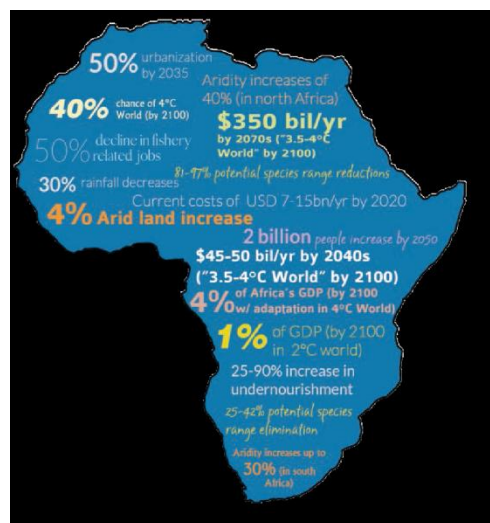
".....record-breaking temperatures are occurring more frequently, rainfall has increased in intensity in some places, while drought-prone regions are getting dryer. In an overview of social vulnerability, the poor and underprivileged, as well as the elderly and children, are found to be often hit the hardest. There is growing evidence, that even with very ambitious mitigation action, warming close to 1.5°C above pre-industrial levels by mid-century is already locked-in to the Earth's atmospheric system and climate change impacts such as extreme heat events may now be unavoidable.1 If the planet continues warming to 4°C, climatic conditions, heat and other weather extremes considered highly

unusual or unprecedented today would become the new climate normal—a world of increased risks and instability. The consequences for development would be severe as crop yields decline, water resources change, diseases move into new ranges, and sea levels rise. The task of promoting human development, of ending poverty, increasing global prosperity, and reducing global inequality will be very challenging in a 2°C world, but in a 4°C world there is serious doubt whether this can be achieved at all ’’(World Bank, 2013).

Extreme weather events like floods; droughts; heat waves; sea level rise; decreased agricultural production and decline in fisheries; increased disease incidences especially communicable diseases; increased proportion of undernourished people and under nutrition; loss of livelihoods and homes in informal settlements (AMCEN, undated; WFP, UNEP 2008) .

Geographical range shifts by many terrestrial, freshwater and marine species; evident migration pattern shifts; species abundance and species interactions; extinctions, triggered by anthropogenic climate change.

IPCC fourth report sets incidences of extreme weather events as highly unusual projected to increase in magnitude and frequency. 20% drop in precipitation in North Africa and a 30% reduction in South Africa if a 4 degrees warming is achieved by 2100. ASAL’s cover half of current Africa land; this will increase by 4% under a 4 degrees warming and 2 degrees will see an increase of just one (UNEP, n.d.).Sea level rise in Africa will rise 10% higher than the average global sea level rises as projected by the IPCC.



Source: UNEP (undated)

CLIMATE CHANGE INSTRUMENTS AND THEIR RESPONSIVENESS TO CLIMATE ADAPATATION IN AFRICA

UNFCCC

Under UNFCCC framework great strides have been accomplished in the COP to Kyoto Protocol negotiations in the last 20 sittings. Therefore UNFCCC remains the greatest hope for Africa in terms of climate adaptation and mitigation and for a better future free of global warming and GHG. UNFCCC present challenge is to provide a framework to tackle climate change that is effective and legally binding. Widening the mandate of the Convention to adequately combat climate change, build capacity for African states to adapt to climate change and long-term climate change mitigation globally is long overdue. Consequently, Shift in international aid from just emergency responses to structural adjustments and policy formulation; strengthened environmental institutions, transparent governments and a strong civil society and private sector involvement would enable Africa cope with climate change impacts in terms of adaptation, mitigation and development of green growth economy.

Africa's global environmental governance role has been limited with less significance voice at COP's under the UNFCCC (Roger 2013). Knowledge gaps among the negotiators has contributed to lack of coherent, clear vision for the Africa nations as evidenced at Lima, a factor that need to be addressed by investing in scientific research and forming a marriage between science and politics. At global level, Africa Growth Initiative (undated) observes that,

“African delegates are often marginalized, underrepresented, uncoordinated and ineffective in influencing policies favoring the continent (Anesu 2013). The implication is that African interests are not adequately taken into account.”

Professional input has always conflicted with political interests hampering substantive progress in most of the COP previous talks, however, with a strong political commitment this deal can be signed in the upcoming Paris climate change conference. Challenges notwithstanding; Africa nations ahead of Paris COP 21 have reaffirmed call to limit emissions to below 1.5°C above the preindustrial period.

UNFCCC negotiations have largely been shaped by strenuous exchange process often victim/perpetuator approach takes center stage. Developed nations which primarily constitute large emitters disadvantaging the African nations which bear the brunt of climate change.

However, in the recent UNFCCC COPs this has began to shift and the Africa Group of Negotiators tend to gain more ground and play a more significant role in pursuit of ambitious goals.

Global governance is critical in forming effective local and international climate change policy. Currently UNFCCC is the key platform for international climate change policy. The Conference of Parties have in the past achieved huge strides in environmental dialogues though not sufficient enough to adequately tackle carbon emissions which are all time high. Yet UNFCCC remains the greatest hope for Africa and other developing nations.



Countries in green have ratified Kyoto protocol (source: UNFCCC)

UNFCCC plays a critical role in though faced with huge challenges and lack of commitment from super powers nonetheless milestones in building momentum for legally binding environmental treaties have been entered since the Copenhagen 2009. The world is committed to a 2.5 ° warming if present emission trends continue unabated. Developed countries under the guidance of UNFCCC agreed to implement quantified economy-wide emission targets for 2020 (UNFCCC 2014), however, as noted by Greenpeace (2012) such targets were too low and there was no legal ramification if they failed to reach the targets.

The Bali Action Plan committed to long term full effective and sustained implementation of UNFCCC by cooperation factoring in economic and social conditions inter alia factors. The Bali Road Map identified 3 major areas:

- A decision on deforestation and forest management;

- A decision on technology for developing countries;
- The establishment of the Adaptation Fund Board
- The review of the financial mechanism, going beyond the existing Global Environmental Facility (UNFCCC, 2014).

However, there has been limited carbon reduction targets by several countries although the EU has done tremendous work in trying various facets of Kyoto Protocol and GHG reductions; funding remains little and inconsistent; policy agreements remain a challenge; technology breakthrough for low carbon emissions mechanisms remains elusive; and evaluation and measurement of emissions, reporting and verification hampers commitment among developed countries (Ricardo et al, 2011).

Kyoto convention leading principle:

“Parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and common but differentiated responsibilities and respective capabilities” source, AMCEN

Major environmental treaties include:

1. Convention on the law of the sea (1982)
2. Vienna convention for the protection of ozone layer (1988)
3. Montreal protocol on substances that deplete ozone layer (1989)
4. Convention on biological diversity 1992
5. Framework convention on climate change
6. Convention to combat desertification (1994)
7. Kyoto protocol to the convention on climate change (1997)
8. Cartagena protocol on biosafety (2000)
9. Stockholm convention on pop (2001)

Source: ILO (2011)

The structure of CDM

Africa states face many complex challenges including persistent debts and inability to crawl out of poverty due to unfavorable policies imposed by lending institutions like World Bank and IMF (Global Issues 2014), poor governance, corruption, unfavorable markets and trade, etc.

International financial flow and technological support for green technology is fairly scarce in developing countries. Developed countries pledge to ‘*take all practicable steps to promote, facilitate, and finance, as appropriate, the transfer of, or access to, environmentally friendly sound technologies*’ has failed in delivery (UNDP, 2007). Although there has been substantive progress in measuring carbon storage technology, Africa is still unable to acquire such instruments owing to high prices and funding required to sustain REDD+ is above reach of many African states (Makhado et al, 2011). REDD+ financing deadlocks at UNFCCC has profound implication on the communities around forests who during its inception had great hopes raising many questions over its long-term financing hence mitigation and biodiversity conservation. Although Africa has contributed little to GHG emissions; its rich biodiversity is a powerful tool that the planet can take advantage of in terms of carbon sequestration.

Sustainability of REDD+ largely depends on shift from GHG emissions to clean technology (Kissinger, 2012).

WEAKNESS OF EXISTING CLIMATE CHANGE POLICIES

Africa climate change adaptation policies at a glance: From theory to practice.

Lack of implementation of laws and policies remains a huge threat to Africa natural resources management and climate change adaptation. While there is a clear push for clean/renewable energy development at global level, Africa nations such as Kenya and South Africa have set goals at coal use, expansion and increased production which adds to GHG emissions. Climate change policies implementation remains weak and vague while traditional sector based management strategies overburden climate governance at national levels.

Kenya climate change policy

With almost all Africa nations ratifying Kyoto protocol and UNFCCC 1994 the African commitment to developing low carbon technologies is guaranteed in theory. However, decades after few countries have national climate change policy adopted and rely on sectoral plans and strategies.

The ambitious policy allows for scientific data collection with established resources hubs nationally and at county levels while climate governance is boosted by establishment of a high level cabinet committee to coordinate climate change and national development mainstreaming, among other key considerations of the policy (Ministry of Environment and Natural resources 2014). However, the policy does not establish the relevant institution or body to implement the proposed institutional and legislative framework or methods to hold the government, private sector and other stakeholders accountable.

Kenya climate change Bill 2014 proposes establishment of a Climate Change Council as a government advisory body on impacts, adaptation and mitigation strategies as well as guide the Kenyan government on the implementation of national and international conventions on which Kenya is a party to (Heinrich 2014). Worth noting is the thorny issue in Kenya where conflicting laws and policies have continued to conflict and remain sectoral. Such disharmony on agriculture, forest, trade and industry hinder the country's response to climate change.

By 2012 only 2 African countries had draft climate change legislation: Kenya and Nigeria (Sustainability Institute 2012). Notably most of Africa environmental and climate change policies remain incoherent and contradictory.

This report agrees with Heinrich Boll (undated) that a policy refers to strategy, organizational mandate, service delivery activity, funding, and implementation capacity. Ethiopia has fully developed a comprehensive NAPA while all other African countries are at different levels in formulating climate change policies either as stand alone or sectoral; institutions and other frameworks for operation.

ERITREA

- ✓ No legislation specific to adaptation: multiple sectoral statutes relevant to adaptation legislation
- ✓ Absence of specific adaptation tool or policy: existence of several guidelines on sustainable development planning and goals
- ✓ Human resource; absence of coherent coordination in implementation of projects and MEAs; huge policy gaps nationally or in the regional bloc;
- ✓ No regional environmental institution/body coordination legislation and regulations on resources like water
- ✓ Funding shortage at national and international levels.

East Africa Climate change policy

The east Africa community developed a climate change policy founded on three pillars namely adaptation, mitigation, and climate research. Adaptation is guided by National Adaptation Programmes of Action (NAPAs) and National Adaptation (NAPs). The policy puts adaptation as a critical priority while mitigation comes in second. EACCP seeks to mainstream climate change adaptation into national and regional development plans by sector: water resources; agriculture and food security; energy; and ecosystem services (EAC, 2011).

Low capacity institution; lack of sufficient clear and effective legal framework; monetary challenges; insufficient scientific data and research constraints due to technology; coupled with extremely vulnerable ecosystems and human populations due to poverty, weak infrastructure, poor and uncoordinated environmental governance continue to ravage the region.

African Union Climate Change Policy

The African Union does not have a ‘stand alone’ climate change policy nevertheless has various strategic working climate change papers integrated into agriculture and climate change adaptation notably the AU-NEPAD ACTION PLAN OF THE ENVIRONMENT INITIATIVE 2003. The effectiveness of climate mitigation, adaptation and clean technology development in Africa is highly dependent on sound political structure that is keen on poverty alleviation and sustainable development. At present Africa and parts of Asia battle climate change as victims of greenhouse emissions but keeping in tandem with current development strategies taking place in these continents they will soon join the emission cohorts. AU notes that political will and good governance is important in combating effects of climate change in Africa; this has made some progress but the gaps still remain to be covered.

Policy challenges for Africa

Studies show huge adaptation challenges and gaps in Africa. Climate change coupled with degraded ecosystems and poor land use due to over exploitation and poor management; weak institutions and incoherent environmental policies weaken the region’s ability to adapt sufficiently to climate change effects. Healthy ecosystems largely depend on existing policy frameworks and legislation enforcement. Land management laws, natural resource management and conservation laws, biodiversity, soil conservation, water management, and forest legislations continue to pose huge problems to many Africa states.

Environmental policies in most of countries are poorly developed and incoherent and implementation is uncoordinated. Climate change policies virtually remain non-existent and their incorporation into national planning and DRR is often vague or neglected. Nonetheless there has been a growing effort among many Africa states to develop effective climate change policies, resilience poverty reduction and improve environmental governance.

‘The planet is on a committed path to climate change and warming even if GHG emissions were halted’ (IPCC 2007).

Africa has been caught up in this environmental quandary when her house is not yet in order in terms of policy, infrastructure, governance, natural resource management, institutional capacity

and low scientific research development. UNEP & UNDP (2013) underpins that **states legal framework aid or hinder development of green, low-emission and climate resilient development citing vast absence of adequate legal framework as key impediment to private investments in developing countries.** Policy makers in Africa need to formulate legal framework that encourages private investment in low emission development by creating risk reduction environment.

Most of the Africa climate change policy and programmes rely on external funding stemming from UNFCCC processes; whereas these international interventions are necessary, national and regional programmes have lagged behind in formulation and implementation. Regional efforts for climate change adaptation and mitigation have taken root with AU and AMCEN in collaboration with UNECA formulation relevant policies for the region. However, programmes such as climate for Development in Africa Programme (ClimDev) with funding from AU, AFDB, and UNECA have not been operationalized yet having been stuck at planning stage (University of Gothenburg, undated).environmental legislations often are uncoordinated and insufficient regional, and national institutional and legislations; absence of legal enforcement; low capacity and human development at all implementation; weak and sluggish policy implementation; limited funding

The Inability of policy makers to solve sub Saharan food insecurity problems has been linked to be the core reason as to why the region fails to achieve food security with food emergency cases more than tripling since 1980s despite the fact that the region sees some of the countries growth taking upward trajectories (UNCEA, 2013). Climate change and poorly developed agriculture only make the acute problem worse. Habtzion (2009) cites limited capacity of LDC's to employ tools and methods designed by UNFCCC process to access, understand, and apply climate data to design relevant adaptation policies legislations and strategic pathways.

Kyoto protocol is designed to limit further emissions hence mitigating climate change on the planet and not necessarily tackle SSA vulnerability or economic resilience (GIGI, 2009). Africa's slow adjustment to tackle GHG impacts on environment and economy were cited by IPCC (2007) report owing to crippled capacity. UNECA (2009) marks that Africa only holds 3% of registered CDM projects, a factor that has made it benefit way less from the clean development mechanism as provided for in the Kyoto protocol.

UNDP (2007) Human Development Report asserts the critical role government action plays in removing barriers to climate mitigation by policy regulations, energy subsidies and information.

Developing countries policy formulation is significantly influenced by international communities like World Bank and IMF and other relevant international stakeholders. These multilateral institutions often with well meaning intentions shape policies in unprecedented manners. However, questions linger as to why developing nations surrounded by so vast crown of advisors, role models, and technical expertise still linger below the poverty line and environmental degradation continues unabated.

Worth noting is the fact **that many Africa nations have lagged behind in formulating a comprehensive climate change policy**, Kenya is in the process of drafting such a policy after decades of participation in environmental forums.

Present Africa configuration offers low adaptive capacity inter alia depreciating ecological base, land degradation and increased population pressure. Ironically the region is rated as one of the fastest growing regions in the world due to foreign investments and increased markets. Noting the urgency for Africa to implement climate change adaptation strategies into key development planning stages this report concurs that climate change adaptation is a process with links to past, present and future (Habtezion, 2009) and calls for full consideration of the World Summit on sustainable Development (2014) of Agenda 21.

Global Kyoto protocol negotiations have struggled with strategies for implementation of support for low carbon technologies in developing countries and small islands; often viewed as acts of charity (UNDP, 2007) and not as legal obligation or investment into global clean energy. This approach has left little room for coherent global finance and technology transfer or development in bid to spun Low carbon emission technologies which are way beyond SSA capacity to acquire.

Under UNFCCC developed countries have an obligation to aid developing countries in adaptation. Adaptation strategies in developed countries continue at accelerated pace while there is neglect on developing countries assistance as required by the UNFCCC (UNDP 2007)

A. Huge environmental policy gaps

Effective climate change policy entails vision, persistent commitment, multi-sectoral/dimensional and inclusiveness (OXFAM, 2014). Basically a policy is as good as the willingness to implement or uphold; a can do attitude coupled with strengthened institutions, citizens participation can catapult Africa to environmental leadership.

IFPRI (2013) underpins that **policy decisions are mostly done in hurry and haphazard manner with conflicting desires, outcomes and huge gaps**. Consequently policy and governance constraints continue to devastate Africa's rich biodiversity and vast natural resources. Decisive confrontation of underlying governance issues with the envisioned future in mind. Policy that is inclusive, sound and directional is required to address the linkages that limit growth and development, environmental issues and climate change (UNEP, 2007). Ecosystems restoration in areas greatly degraded and useful tools for climate adaptation needs to be carried out expeditiously to increase SSA adaptation capacity. While such ecosystem restoration is critical there lacks policy formulation on natural resource management that sufficiently addresses climate related present and future risks

UNEP further notes that although policy formulation is complex and follows not a fixed pattern five steps strike out any credible policy formulation: identification of key problems; identify and analyze policy options and come up with the best policy option; adopt the policy and implement.

B. Lack of specific environmental and resource management policies

A beep through most Africa states reveal a lack of specific environmental policies touching on land management, climate change, food security, water management laying huge stress on the agro-ecological zones in the region. **Adaptation efforts have been localized in various community projects without a national span (UNECA 2011)**. Sectoral policies often overlap and conflict substantially with vast amounts of duplication, insufficient institutional capacity and unclear mandates on who implements which specific policy not only destroy the capacity of Africa ecological systems and natural ecosystems to adapt to climate change sufficiently but increase vulnerability of these populations and ecosystems to adverse effects of climate change like flooding, drought and food insecurity.

Current land and water management policies in most of the African states apart from persistent incoherency fail to address root issues in these sectors and their implementation

remains a challenge due to weak institutions, conflicting legislations and breaks; lack of clarity and corruption. Forest degradation deforestation in Africa is taking away REDD+ benefits as stipulated under the UNFCCC framework and contributing to biodiversity loss.

C. Undeveloped climate change data collection, research, storage and dissemination facilities

Sub Sahara region faces acute scientific data availability (UNECA, 2011a, Parker et al 2011 as cited in UNECA,) limiting the amount of accurate information in the region on climate variability. Global efforts have been put in place to mitigate these gaps for effective management of climate variability but national efforts are crucial to this process.

Africa weather and climate monitoring is deteriorating as per WMO (2006) observations and lacks the capacity to tackle the present challenges of climate change. Other studies have cautioned the use of meteorological data gathered and assimilated in Africa owing to their weak capacity. National meteorological stations have also shown little or no collaboration with WMO on data sharing at international level. There is limited use of climate data gathered from the meteorological institutions in national planning in most African nations due to low supply and demand of these services (UNECA, 2011a). The implications are blind spots in national planning for risks, climate mitigation and adaptation particularly in agriculture, health as policy makers lack access to crucial climate information.

UNECA (2011a) shows very few stations within Africa with spatial data spanning for 30 years or more. Cited is lack of sufficient technical expertise, poor funding, climate data processing largely limiting policy makers and development planners to anticipate/plan or manage risks.

Scientific research to set out adaptation strategies in relation to climatic changes is limited in SSA. This correlates to insufficient climate/environmental data collection and employment in policy formulation in the region reducing resilience capacity and mitigation of adverse climate risk.

D. Food security/ agriculture and poverty reduction policies

Food security remains elusive for most Sub Saharan countries especially the Horn of Africa. Food security policies fail to adequately cater for growing food demand as a result of

population boom; degraded soils; poor land management; low intake of technology; insufficient national investments on agriculture; climate change; and poor national planning. Specific countries such as East Africa Community and AU have begun ambitious plans to boost food security in the region. Such programmes include: Comprehensive Africa Agricultural Development Programme in IGAD. However, this programme is less well known among concerned ministries owing to very little information sharing; perception that CAADP is not sufficiently suited to tackle livestock and pastoralist challenges that are worst hit by drought and famine; absence of adequate knowledge of specific steps taken after the Nairobi Summit (European Center for Development Policy Management, 2012).

With better planned and executed development plan; a commitment to end poverty and improve livelihood standards of the African population; combating environmental degradation, ecosystems destruction and habitat loss; building of climate resilient agriculture will shield Africa from most devastating climate related hazards. Agriculture accounts for 33% forest loss/degradation in Africa owing to increased demand for timber products, fuel wood, insufficient policies and weak institutions.

NEED FOR CLIMATE CHANGE ADAPTATION POLICIES

ROLE OF GLOBAL ENVIRONMENTAL GOVERNANCE AND REGIONAL IN FORMULATION OF CLIMATE ADAPTATION POLICY

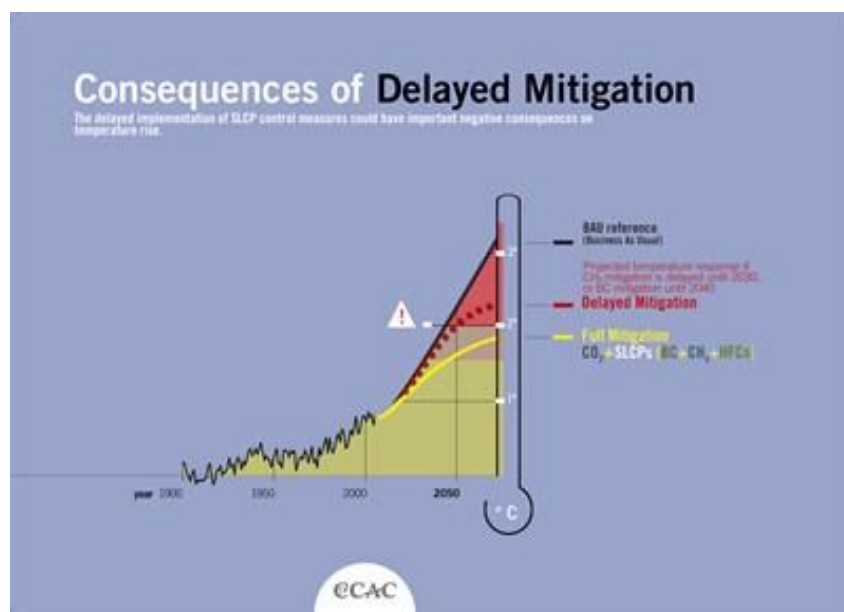
The future places huge demand on strong, effective visionary environmental leaders' not just environmental managers. Africa policy makers, scientific community, academia and civil societies haven't fully wakened up to the reality of the huge environmental and socio-political challenge and opportunity at hand. Fixation on the old growth models and patterns, Africa is still determined to follow the developed nation's traditional growth path like coal exploitation and expansion. However, Africa is in positional, infrastructural and policy disadvantage to cope with long-term effects of climate change on its ecosystems, livelihood, population and economic development even if it is responsible for approximate 7% of total global greenhouse production.

A strong, committed leadership Africa can frog jump into clean non-emission economy by evading the path taken by the predecessors and role models and embrace new, promising clean development path with huge benefits. Current policies fail to provide institutional, legal, scientific and infrastructural capacity in climate change adaptation, food security and green growth. International climate change policies consequently fail to rise to demand of the century as none of them is legally binding leaving nations at the mercy of their moral convictions.

“In facing ever increasing complexities regarding our planet, people everywhere view environmental rights, environmental law and jurisprudence and environmental governance as becoming increasingly central to resolving problems of environmental justice.”(UNEP 2012)

Can Africa adapt to climate change without much external funding? What strategic areas do require fundamental funding to catapult Africa to meaningful adaptation and climate mitigation? Africa is highly vulnerable to climate related risks/hazards with very little capacity to adapt to such impacts (UNDP 2015). Such vulnerability greatly limits Africa's natural and human ecosystems to grow and develop. Priority of most African governments rightly is in job creation, poverty alleviation and little consideration is given to present environmental issues or climate

change. Such approach that ignores critical role climate change plays in poverty alleviation, achievement of food security has led to massive policy failures as evidenced by MDGS status report of mixed developments (AFDB, 2013).



Source: UNEP, GRID-Ardenal.

Africa adaptation capacity is largely dependent on the amount of funding it receives (UNEP, n.d).

“Estimated adaptation costs reach USD 50 billion by 2050 and USD 350 billion by the 2070s. Adaptation helps to reduce damages, but does not eliminate these. Under full adaptation effort, total estimated adaptation costs plus “residual damages” reach 4% of African GDP by 2100 in a 4°C world (1% in a 2°C world), compared to an estimated 7% of African GDP in damages without adaptation to a 4°C world.” (UNEP, ND.).

As presently constituted the green fund lacks finance flow structure to monitor if the pledges made meet the adaptation cost in LDC and Small Islands. There are also huge gaps between the amount pledges and amount delivered in the context of GFF. LDC and Small Island developing states called for warming to be kept below 1.5 ° which would substantially reduce adaptation cost but would not stop climate related damages.

Ecosystem Based Adaptation policies

Ecosystem ranges are bound to shift as a result of global warming with profound effects on species. Bird migratory patterns have begun to alter while breeding seasons and periods are affected. The terrestrial as well as aquatic ecosystems resilience in the region is fairly low and vulnerable. UNEP (2010) ecosystems and ecosystem services have dwindled in the last five decades more than the former times in human history (MA, 2005). **Ecosystems based adaptation is heavily dependent on the health and the capacity of various ecosystems to sustainably offer ecosystem services.** Ecosystem based adaptation is highly efficient and affordable for the African region. Forests, mangrove forests can more often than not protect populations against disasters along the coastal lines; however, **these ecosystems have suffered huge losses in the recent past** (UNEP 2007) due to logging, clearing of mangrove for development or settlement. Mangrove ecosystems are least included in national development plans or poverty reduction strategies despite the role played by such ecosystems in provision of livelihoods. Provision; regulation; support and cultural value of ecosystem services have more capacity to protect Africa's vulnerable populations as compared to man engineered structures.

CONCLUSION

Climate Action Network International has called out phasing of fossil fuel emissions and phasing in renewable energy future as early as possible as but not later than 2050. The Paris agreement must be binding, ambitious yet environmentally sound. The European Union has spearheaded global transition into clean energy by committing to reduce GHG by 40% by 2030 in preparation for COP 21. However, EU commitment to Africa has not been addressed. Developed countries clean energy development and climate adaptation must go vis-à-vis funding commitment to developing countries and small islands adaptation strategies.

Adaptation gaps in Africa are huge. Imperative is mainstreaming adaptation policies into national development goals and policies; building capacity of relevant institutions; removal of obstacles cited in various reports that slow or impeded SSA adaptation capacity speedily. The outcomes of major COPS under the UNFCCC continue to provide capacity for Africa to adapt to climate change. Such outcomes do go at a pace that's higher than Africa's response hence need for more flexible African policies, investment on technology and scientific resources at national, regional and continental levels. Africa cooperation at continental or sub-regional level remains fairly limited.

The international community can do better for its nationals and the people of Africa. At the COP negotiations under the principle of common but differentiated responsibility must not be viewed as 'us versus them' by developed and developing countries. Governments have primary responsibility of protecting citizens which is inclusive of habitat within which citizens live. Destruction of such habitations amounts to government's inability to protect its citizens at national or international levels. As such environmental protection, reducing greenhouse emissions and curbing warming below 1.5° is in the interest of all governments.

REFERENCES

Kissinger, G., M. Herold, V. De Sy. Drivers of Deforestation and Forest Degradation: A Synthesis Report for REDD+ Policymakers. Lexeme Consulting, Vancouver Canada, August 2012.

De Merode, Emmanuel et al. “The Impact of Armed Conflict on Protected-Area Efficacy in Central Africa.” *Biology Letters* 3.3 (2007): 299–301. *PMC*. Web. 5 Feb. 2015.

Ricardo et al (2011) A New Role for UNFCCC: The Matchmaker of Global Climate Governance, Shaping a globalized World, Bertelsmann Stiftung, Germany.

Makhado RA, Saidi AT, Mantlana BK, Mwayafu MD. (2011) Challenges of reducing emissions from deforestation and forest degradation (REDD+) on the African continent. *S Afr J Sci.*;107(9/10), Art. #615, 3 pages. doi:10.4102/sajs. v107i9/10.615

European Center for Development Policy Management (2012) Regional approaches to food security in Africa: The CAADP and other relevant policies and programmes in IGAD, Discussion paper, No. 128e, October 2012, www.ecdpm.org/128e

Kissinger, G., M. Herold, V. De Sy. (2012) Drivers of Deforestation and Forest Degradation: A Synthesis Report for REDD+ Policymakers. Lexeme Consulting, Vancouver Canada.

(UNEP undated) Africa’s Adaptation Gap: Climate-change impacts, adaptation challenges and costs for Africa, Technical report.

FAO (2010) analysis of climate change and variability risks in the smallholder sector: case studies of the Laikipia and Narok Districts representing major agro-ecological zone in Kenya, Rome Italy.

GOK (2014) Sessional Paper No. ** of 2014 on National Climate Change Framework Policy; Ministry Of Environment, Water And Natural Resources, Nairobi, Kenya.

UNDP (2006) Climate Change Futures Health, Ecological and Economic Dimensions,

AMCEN (n.d.) FACT SHEET CLIMATE change in Africa - what is at stake? Excerpts from IPCC reports, the Convention, & BAP Compiled by AMCEN Secretariat

IPCC, 2013: Summary for Policymakers. In: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

IPCC, 2014: Summary for policymakers. In: *Climate Change 2014: Impacts, Adaptation, and Vulnerability*.

Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 1-32.

UNDP (2014) Human development report: Sustaining Human progress: reducing vulnerabilities and building resilience, 1 UN Plaza, New York, NY 10017, USA.

UNEP (2007) Africa environmental outlook: policy analysis guidelines for integrated environmental assessment and reporting, Nairobi, Kenya

UNECA (2011) climate science, information, and services in Africa: status, gaps and policy implications, working paper 1, <http://www.uneca.org/acpc/publications>

WFP (2012) climate change impacts on food security and nutrition: a review of existing knowledge. UK.

Institute for Poverty, Land and Agrarian Studies (2012) International and regional guidelines on land governance and land-based investments: an agenda for Africa states, policy brief 77, September 2014

FAO (2014) post 2015 and SDGs: nourishing people, nurturing the planet, FAO and the post2015 development agenda papers, www.fao.org/post-2015-mdg/

Greenpeace (2012) climate protection between hope and despair: 20 years of the UNFCCC, Amsterdam, The Netherlands.

IFPRI (2013) East African agriculture and climate change: a comprehensive analysis, IFPRI Issue brief 76. 2033 K Street, NW, Washington,

University of Gothenburg (2009) Africa environment and climate change policy brief 1.

African Development Bank (2004) African Development Bank Group's policy on the environment,

UNECA (2011) Climate Change and Water in Africa: Analysis of Knowledge Gaps and Needs, Working paper 4. <http://www.uneca.org/acpc/publications>

UN (2013) a regional perspective on the post-2015 United Nations Development Agenda, E/ESCWA/OES/2013/2 13-0077

IPCC. 2007. Summary for policy makers. In M. L. Perry, O. F. Canziani, J. P. Palutikof, P. J. Vander Linden, & C. E. Hanson, *Climate change 2007: Impacts, Adaptation and Vulnerability. Contribution of working group II to the fourth assessment report of the Intergovernmental Panel on Climate Change* pp. 7-22. Cambridge: Cambridge University Press.

IPCC, 2007: Summary for Policymakers. In: *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. vander Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, UK, 7-22.

Boko, M., I. Niang, A. Nyong, C. Vogel, A. Githeko, M. Medany, B. Osman-Elasha, R. Tabo and P. Yanda, 2007: Africa. *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge UK, 433-467.

MDF Report (2013) Food security in Africa: Issues, challenges and lessons: Assessing Progress in Africa toward the Millennium Development Goals.

Sustainability Institute (2012) Review of International & African Climate Change Legislation and Policies AWEPA Parliamentary Support Program in South Africa,

IDLO (October 2012) National Action climate change plan: Enabling Legislative and Institutional Framework for Climate Change Response in Kenya, IDLO, and Rome, Italy

Heinrich B. (2013) Towards a Coherent and Cost Effective Policy Response to Climate Change in Kenya: Country Report, Nairobi, Kenya.

EAC Secretariat (2011) EAC Climate Change Policy, Arusha Tanzania.

Secretariat of the Convention on Biological Diversity (2014) Global Biodiversity Outlook 4. Montréal, 155 pages.

World Bank. 2014. Turn Down the Heat: Confronting the New Climate Normal. Washington, DC: World Bank. License: Creative Commons Attribution—NonCommercial—NoDerivatives 3.0 IGO (CC BY-NC-ND 3.0 IGO).

World Bank , 2013. Building Resilience: Integrating climate and disaster risk into development. Lessons from World Bank Group experience. The World Bank, Washington DC.

UNDP (2004) Adaptation Policy Frameworks for Climate Change: Developing Strategies, Policies and Measures, CAMBRIDGE UNIVERSITY PRESS, UK.

GAO (2008) Food Insecurity Persists in Sub-Saharan Africa despite Efforts to Halve Hunger by 2015.

Revision of the AU/NEPAD AFRICAN ACTION PLAN 2010-2015: Advancing regional and continental integration together through shared values abridged report 2010-2012

UN-REDD PROGRAMME (n.d) REDD+ beyond carbon: supporting decisions on safeguards and multiple benefits.UN-REDD programme Policy Brief

UNECA (2011) agricultural water management in the context of climate change in Africa, working paper 9, <http://www.uneca.org/acpc/publications>

UNECA (2011) Assessment of Africa's Climatic Records and Recording Networks Including Strategic for Rescuing of Climatic Data, working paper 3, <http://www.uneca.org/acpc/publications>

UNECA (2011) Management of Ground Water in Africa Including Transboundary Aquifers: Implications for Food Security, Livelihood and Climate Change Adaptation, working paper 6, <http://www.uneca.org/acpc/publications>

World Metrological Organization (2015) The climate in Africa: 2013, WMO-No. 1147, Geneva Switzerland.

The Centre for International Governance Innovation-GIGI (2009) Climate change in Africa: Adaptation, mitigation and governance challenges, Copyright © 2009 The Centre for International Governance Innovation (CIGI). This work was carried out with the support of The Centre for International Governance Innovation (CIGI), Waterloo, Ontario, Canada (www.cigionline.org).

AMCEN, 2011: Addressing Climate Change Challenges in Africa; A Practical Guide Towards Sustainable Development.

Cheng, C., Pouffary, S., Svenningsen, N., Callaway, M., The Kyoto Protocol, The Clean Development Mechanism and the Building and Construction Sector – A Report for the UNEP Sustainable Buildings and Construction Initiative, United Nations Environment Programme, Paris, France , 2008.

Africa Partnership Forum (2009) special session on climate change: Carbon Finance in Africa.

Roger C. (2013) The evolution of the African group of negotiators in the UNFCCC, Backgrounder No. 64.

World Bank. (2014) Turn Down the Heat: Confronting the New Climate Normal. Washington, DC: World Bank. License: Creative Commons Attribution—NonCommercial—NoDerivatives 3.0 IGO (CC BY-NC-ND 3.0 IGO).

Liane S. & Heinrich B.S. (2012) The green climate fund.

ODI (2012) The practical challenges of monitoring climate finance: insights from climate funds update, Climate finance policy brief.

ODI (2011) Design challenges for the green climate fund; policy brief No. 4

Devisscher T. (2010) Ecosystem based adaptation: sectoral report for the adaptcost study

Africa Development Forum (2012) Acting on climate change for sustainable development in Africa, 7th African Development Forum, issue paper #9

Millennium Ecosystem Assessment, 2005. *Ecosystems and Human Well-being: Synthesis*. Island Press, Washington, DC.

UNEP (2007) Mangroves of Western and Central Africa. UNEP-Regional Seas Programme/UNEP-WCMC.

Mwambaza R. & Kotze J.L (2009) Environmental governance and climate change in Africa Legal perspectives, Monograph 167

UNEP (2010) Guidelines for the Development of National Legislation on Access to Information, Public Participation and Access to Justice in Environmental Matters, *Adopted by the Governing Council of the United Nations Environment Programme in decision SS.XI/5, part A of 26 February 2010.*

UNEP (2010) the Role of Legal Instruments to Support Green Low-Emission and Climate-Resilient Development: A Guidebook on Assessing, Selecting and Implementing Legal Instruments.

UNEP (2012) Global environmental Outlook 5: Under strict Embargo- Summary for Africa

UNEP (2012) Environment for the future we want: Global environmental Outlook 5, Progress Press; ltd, Valletta, Malta.

UNECA (2011) Climate change and Health across Africa: Issues and Options, working paper 20, <http://www.uneca.org/acpc/publications>

Bali Action Plan; Decision-/CP.13

Government of Kenya (2010) National Climate Change Response Strategy, Nairobi, Kenya.

UNDP (2007) Human development report 2007/2008 Fighting climate change: Human Solidarity in a divided world, NY, USA.

United Nations Industrial Development Organization (2003) Clean development mechanism: investor guide, South Africa. Vienna.

Higgins, P.A.T., 2014. Climate Change Risk Management. An AMS Policy Program Study. The American Meteorological Society, Washington, DC.

Ricardo et al (2005) A new role of UNFCCC, the match maker of global climate governance, Washington, DC.

ILO (2011) International environmental conventions; ILO encyclopaedia of occupational health and safety, <http://www.ilo.org/iloenc/part-vii/environmental-policy/item/744-international-environmental-conventions>