

GLOBAL SECURITY CHALLENGES AND SUSTAINABLE DEVELOPMENT IN AFRICA: AN ANALYSIS OF CLIMATE-CHANGE-AS-A- NEW SECURITY-THREAT PARADIGM.

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Abstract

This paper looks specifically on the linkage between climate change and sustainable development vis-à-vis Africa's security in the 21st century. Drawing from the security rethinking studies, and environmental literature, we argue that the most important but often disregarded, and undertheorized analytics domain in the contour of Africa's security and geostrategic considerations is the nexus between weak sustainable economic development model and existential threat that do not lend themselves to military response. The central thesis is that the greatest threat to environmental security emanates not from poverty, but from the process of wealth creation, hence the impossibility of an environmentally sustainable capitalist economic development in a non-dematerializing global economy. The paper concludes by nothing that the extant international adaptation measures to climate change, not only reduces Africa's adaptive capacity but also predisposes it to the cascading cataclysmic consequences of the developed countries' ecological footprint. Finally, against the background that climate change is bound up with other social and economic issues facing developing nations that are fundamentally related to inequality and injustice, the paper recommends the principle of 'common but differentiated responsibilities' in the climate-change-as-a-security-threat global mitigative measures, if global environmental security must be concretized into action.

Keywords: *Africa, Sustainable development, nuclearisation, climate change, new threat paradigm; human insecurity, ecological footprint, Human security.*

Introduction/Problematique

In an increasingly interconnected system, there is neither invulnerability nor developmental irreversibility; rather, the weakness of the periphery increases the exposure of the centre, making the

entire configuration, including the centre, more unstable, the seemingly secure societies of the world started realizing that they too were vulnerable to events in the less secure and hence underdeveloped regions of the globe;,



interconnectedness means that dysfunctions in the weaker components of the global fabric result in reciprocating. Given the retro feeding nature of these trends, no region of the world can be immune to impending crises of potentially catastrophic proportions (Head, 1991:5).

In the aftermath of the Cold War, an intellectual firestorm was created around the emergent securitization framework between the “pronuclear” school and the “antinuclear” school in Africa. At the end of the securitization debate, ‘nuclearization’ was presented as the footnote of Africa’s security policy framework by the “nuclear theologians” (Mazrui, 1967; Weidenfeld and Nicolson, 1964; Subramanian, 1982; Adisa, 1981; Aluko, 1981; Subramanian, 1982; Ibikunle, 1976; Marwah and Schulz, 1975; Nweke, 1980; 1985, and 2000). By implication, national security was defined as the acquisition of nuclear capability, and political independence, considered meaningless if Africa cannot acquire it.

However, in the emergent shift in security construct which now stands in direct opposition to the earlier traditional realist state-centric conceptualization of security, one can at least in theory distinguish between ‘defense policy’, which focuses exclusively on the military dimension, and ‘security policy’, which takes a broader view and incorporate other security domains. In the new international peace and security agenda, the prospect of uncertainty and

the dynamic nature of change, and unanticipated disaster are now taken into consideration in security threat projection. And the systemic relationship between climate change and security in terms of both its functions and dysfunctions have become a subject of growing public debate and academic inquiry leading to the outpouring of scholarly literature (Garcia, 2008; Maybee, 2008; Kuwali, 2008; Podesta and Ogden, 2007; Barnett, 2003; Stripple, 2002). Such systemic or ecological interactions and security do not respect the boundaries and political jurisdiction of nation-states. This is what makes the environment-security nexus an aspect of states’ external sovereignty (as that concept refers to relations among states), and at the same time an aspect of internal sovereignty (as it refers to a regulatory function of public policy (Reinicke, 1998).

Put differently, the interdependence between states, environmental issues, and national security cut across the domestic-international public policies at any level from the local to the global. Upon this recognition, the impact of climate change on peace and security was top on the agenda of the United Nations Security Council debate held on April 17, 2007 (UN Department of Public Information, 2007). Given direct and indirect negative spillovers of environmental problems, a new threat that undermine human sustenance, human livelihood, safety, and survival has led to the climate-change-as-a-security-threat nexus analytics of

securitization. Thus, the international community has noted that climate change as environmental problem is a serious threat to national and international security, and that it would be counterproductive to treat climate security concerns solely or even primarily with the traditional tools of national defense; which may not be best suited for the purposes of reducing the vulnerability of countries to natural hazards made worse by climate change.

In other words, climate change is no longer about environment, it is increasingly about development. Evidently, the intersection between Africa's incorporation with the global capitalist economy, its "ecological footprint" and "ecological debt" (an neutral index of the ecological (un)sustainability of man's activities on the environment), implies that Africa is susceptible to the "hot spots" of the emerging non-military human security threats even under the Environmentally Sustainable Development (ESD) model as being practiced. This is because, economic growth relies upon exploitation of natural and social capital, on the one hand, and climate change results from human activity, rather than pure forces of nature.

Despite this hindsight, a critical reading of past efforts at addressing "ecological debt" such as the "Limits to Growth" debate of the 70's championed by the "Club of Rome", the Brandt Commission's, the Palme's Commission; the Brundtland's

Commission (chaired by Mrs. Cro Harlem Brundtland, the then Prime Minister of Norway), Rio Summit of 1992 (the United Nations Conference on the Environment and Development) Multilateral Environmental Agreements (MEAs), the Intergovernmental Panel on Climate Change (IPCC), and Koyoto are at best the merger of environment and economics in decision making masquerading as multilateral mitigation and adaptive measures. As a result, human actions have continued to influence the climate, human induced climate change (IPCC, 2005), because the global economy, and consumption are still based on the weak model of sustainability that allows the total depletion of exhaustible resources as long as the derivative (FOREX) revenue is invested in tangible and intangible assets. The implication of this according to Ohiaegbu is "the destruction of natural resources of today on tomorrow which leads to an "unsustainable situation" which developing nations have been subjected to, in satisfying international demands by depleting its share of nature's resources, its natural capital" (Ohiaegbu, 2006:106).

For many reasons, the security problems facing contemporary Africa deserve more rigorous and comprehensive attention. First, Africa has become a major flashpoint of livelihood and other aspects of human security which interact with geo-strategic (or "hard") security issues (Smith and Vivekanada, 2007; Ki- Moon cited in the Washington Post, Editorial, and 16 June 2007:15). For



instance, West Africa has accounted for 15 percent of cumulative disaster events in Africa between 1975 and 2002, which rose by 94 percent from the 1970s to the 1990s, or 154 disasters during the first five years of this decade, compared to 136 during the past two decades.

This paper takes its departure from the point that Africa's securitization framework is myopic because it has not 'captured the need to reach out in defence of people as well as the state' (Oberleitner, 2005: 190-191). Thus, what constitutes an 'existential threat' in a world of "every state for itself" (Cooper, 2002:16) has not been determined in the contour of Africa's security and geostrategic considerations. Whereas the emergent shift in security construct now stands in direct opposition to the earlier state-centric conceptualization security, Africa's "new security threat paradigm", however, has all the birth marks and finger prints of US Global War on Terrorism (GWOT), a timeless, borderless geopolitical strategy whose presumptions is that all conflicts, insurrections and civil wars is terrorist threats, regardless of the facts on the ground. This explains the presence of such security coalitions, and institutions like the Gulf of Guinea Guard,(GGG); the Trans-Sahara Counter Terrorism Initiative (TSCTI); the Gulf of Guinea Energy Security Strategy (GGESS); Combined Joint Task Force-Horn of Africa (CJTF-HOA), African Conflict Prevention Pool (ACPP), a unit created by the U.S. Central Command (CENTCOM); the Special Operations

Command Europe (SOCEUR) of the U.S. European Command (EUCOM);the Terrorist Interdiction Program (TIP) ,and the Pan-Sahel Initiative (PSI),among others (Combined Joint Task Force-Horn of Africa Fact Sheet 2006, <http://www.hoa.centcom.mil/>) in African continent.

As the national security community have begun to characterize climate change as "the 'coming anarchy', a shift in focus to human security would therefore require securitization that is quite different from those that focus almost exclusively on the security of the state, regime or military security (Willet ,2004: 114).There is no longer considerable ambiguity and confusion about what kind of security system" is most appropriate for Africa (Ajulu, 2004: 272-273), a more desirable type of security for Africa is the one that dwell more on human security. For Africa, human security means is the welfare of the individual, and by extension, the community, as against threats to regimes and the territoriality of nation states, earlier emphasized by the traditional realist state-centric conceptualization of security.

This article proceeds as follows. The first part presents the changing discourse on security showing how the concept has expanded, why it did, and the need for rethinking the traditional realist paradigm of national security. The second part discusses the debate between developing nations, and the

developed nation over who was responsible for ecological footprint and ecological debts and who should pay for the adaptation to the impacts of climate change. The third part highlighted Africa's susceptibility to the "hot spots" of the emerging non-military human security threats. Let us begin by appreciating the changing discourse on security.

Changing Discourse on Security: Transition from Nuclear Security to Human and Environmental Security

The issue of survival remains the base value of global politics, indeed, of all human agencies. One common feature of a traditional realist paradigm/approach to 'security' is that, the state is made the ontological referent object of security. Under the realist traditional security framework supported by *the doctrine of raison d'état*, and the 'leviathan', state's security in the final analysis is only definable in terms of sovereignty and territorial integrity. Thus, security being the primordial consideration of states often equated with their existence, state security was defined as 'national security' as opposed to the security of individuals, groups of one sort or another, civil society, world society or common humanity (see. Buzan, 1994, Lippman, 1991; Meinecke, 1984). Such a vision of security predisposed "states to priorities their own national security interests over and above the interests of individuals who live both within their own territories, and within other states (Klare, 2001). With such a 'corporate-

security state' framework, the government's imperative is to provide security for its corporate interests in order to fulfill its national interests.

However, such conception of security was never without its critics. The parsimoniousness of the traditional approach by paying disproportionate attention to the military dimension of security, not only made analysts to ignore other issues which were of equal importance and also blinded analysts to the inter-relationship between different threats to the different sectors: economic well-being, environment-related issues, social stability, etc (Buzan,1998).In the wake of the end of the Cold War, the narrowly militarised of a traditional realist paradigm understanding of 'security' started becoming anachronistic as a new framework of securitization known as 'human security' emerged that cover virtually all the measures that threaten human survival, and dignity (Government of Canada,1999); Hampson,2000).Thus, following the changing menus and priorities of world politics, the subject matter of security has undergone both a "broadening" and a "deepening" as well as a revisioning . As could be seen from the contours of the debate on security rethinking in security studies (see Figure 1), the subject and the object of human security is now socially or environmentally constituted (see Cell 2: and Cell 4: in Fig 1). Therefore, it is not only issues that pertain to military security (Cell 1: and Cell 3) that impinge upon individual's security.



The emergent shift in security construct now stands in direct opposition to the earlier traditional realist state-centric conceptualization. As a result, at least in theory one can talk of a transition from nuclear security to human security or, the security of person. For example, in

the case of Britain, one can now distinguish between ‘defence policy’, which focuses exclusively on the military dimension, and ‘security policy’, which takes a broader view incorporating economic and trade issues.

Fig. 1: A Matrix of Security Studies
What is the Source of Security Threat?

	Military,	Non-military,	or both?
Cell:1 National Security (Conventional Realist approach to Security Studies)			Cell2: Redefined Security e.g., Environment and economic security)
Cell 3 Intra-state security, e.g., civil war ethnic conflict, and democide)			Cell 4: Human security, e.g., environment and economic threats to the survival of societies, groups, and individuals)

As a result, the idea of human security is now seen in terms of fivefold interwoven interaction between subsystems linked by specific bridges: environment and economy linked by resources; economy and society by social forces; society and polity by brokers and alliances; and politics and culture by ideology (just as in the relationships between the Earth, a unified complex: interacting whole of air, water, land, and living organisms) (Nef, 1985).

The UN Development Programme 1994 Report and the creation of the Commission on Human Security which published its report on Human Security Now, in 2003, presents a more complex, varied, and nuanced visions of human security, as the security of the individual; safeguarding and expanding

people’s vital freedoms, shielding people from acute threats and empowering people to take charge of their own lives’ (Commission on Human Security, 2003:iv).Such an ontology of security is in contrast to the traditional realist approach to ‘security’ in which the security of the regime in power was made the ontological referent object of security.

Upon the realization that mankind was living in a world of mutual vulnerability (Head, 1991), and ecological interactions do not respect the boundaries and political jurisdiction of nation-states, the impact of climate change on peace and security was top on the agenda of the United Nations Security Council held debate on April 17, 2007 (UN Department of Public Information, 2007). Environmental

security is an aspect of states' external sovereignty (as that concept refers to relations among states), and at the same time an aspect of internal sovereignty (as it refers to a regulatory function of public policy (Reinicke, 1998). This is because the interdependence between states, environmental issues, and national security cut across the domestic-international public policies at any level from the local to the global. Yet, climate change does not affect people equally; the related disasters and impacts often intensify existing inequalities, vulnerabilities, economic poverty and unequal power relations (Brody *et al.*, 2008; IPCC, 2007).

Cost of Climate Change

The stalemate between the developing, and developed nations in the climate change negotiations bound up fundamentally with inequality and injustice, can be resolved by the application of the Rio principles when it states that a 'state has sovereign right to exploit its own resources in accordance with its own policies, without harming the environment elsewhere (principle 2); environmental protection is an integral part of development (principle 4); and the polluter pays principles, including the internalization of costs and the use of economic instruments (principle 16) (Haas, and Levy, 1992:12). Related to this, is the principle of 'common but differentiated responsibilities' which has become a key principle for the developing nations in the climate change negotiations.

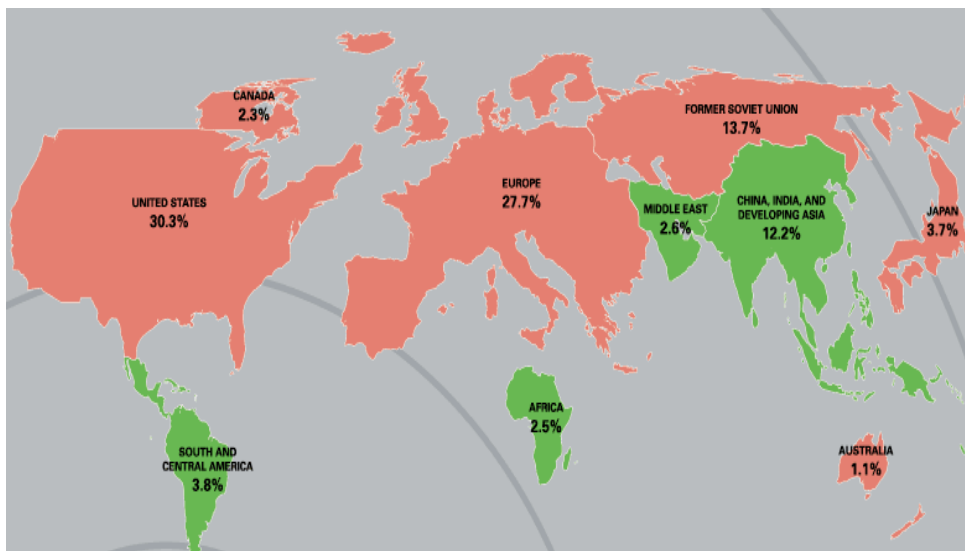
The position of most developing countries of differentiated (Baumert, et al., 1999) responsibilities which implies that they should not be required to take any substantial commitments of their own in combating climate change (Harris, 2003: 27), is underscored by the historical responsibility of developed countries for climate change. Thus, a 'common but differentiated responsibilities' as stressed by the developed countries lays the principle of fair burden-sharing according to responsibility in the light of international justice, and is only a restatement of the 'the polluter pays principles' and the use of economic instruments (principle 16) in retrospect. This is justified realizing that developing countries are more exposed to climate hazards and less resilient, would be hit hardest by the economic and social impacts of climate change. They are projected to bear some 75–80 percent of the costs of damages induced by climate change (UNFCCC, 2007a). Warming of 2°C could permanently reduce annual income per capita an estimated 4–5 percent in Africa and South Asia. The estimated losses for high-income countries are smaller, dropping the global annual average loss in income per capita to about 1 percent (World Bank 2010c).

Africa represents only a small fraction, 2.5%, out of the total carbon dioxide (CO₂) emissions per year, yet 14% of the population of the world lives here. The emissions per inhabitant in Libya, the Seychelles and South Africa are on the level of the lowest among OECD

countries with the other African countries trailing lower behind them.

Fig.2: Industrialized countries emit most anthropogenic CO₂

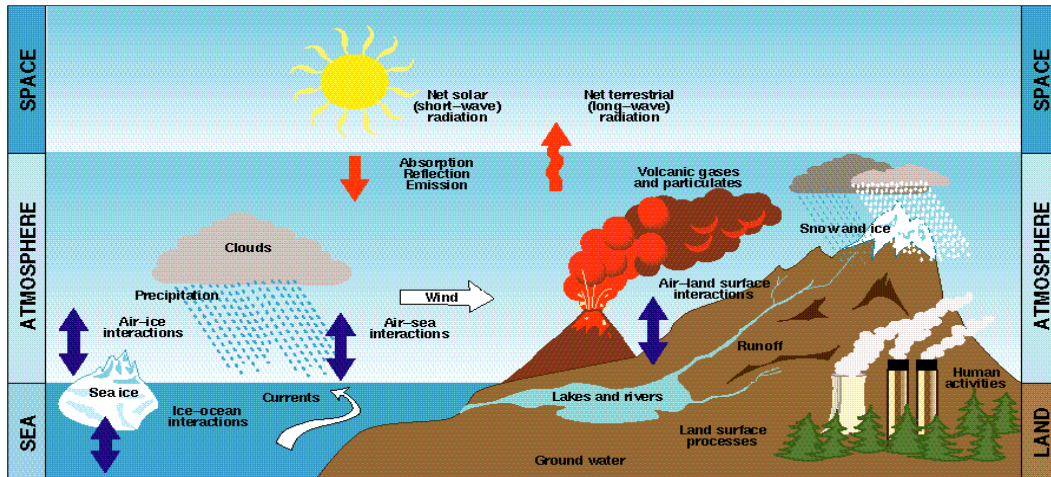
(Area proportional to historical CO₂ emissions from fossil fuel combustion, 1900-1999)



Regionally, emissions (both per capita and in total) are at their highest in United states (30.0%); Europe (27.7%); former Soviet Union (13.7%), and China, India, and developing Asia (12.2), or 83.6% taken together. In other words, most of the "greenhouse gases" (GHGs) of which the most important are carbon dioxide (CO₂), nitrous oxide (N₂O,) and methane (CH₄) working as a 'greenhouse' surrounding the earth were discharged by developed countries over the past few centuries. Developed countries remain the largest per capita

users of both total energy and industrial energy. A fact that must be remembered is that Western countries and industrialized Asian nations like Japan and the Republic of Korea have moved many of their factories to developing countries such as China and India, where cheap labour allows them to manufacture at lower costs than at home. This globalization of production has resulted in the scenario in fig 3, the discharge of much more waste in poor nations that otherwise would have been released in developed countries.

Fig.3: The Challenges of global warming and climate change



Over the years, industrial development has overexploited natural resources, polluted the air and water, altered the climate and resulted in enormous accumulations of waste from industrial facilities and from products discarded at the end of their life or displaced by newer models. The United National Industrial Development Organization’s Industrial Development Report (2011) noted that Industrial development has brought unprecedented improvements in standards of living– but at an environmental cost. It noted further that pollution, resource depletion and the waste of discarded products, each at an all-time high– are major causes of environmental degradation and climate change. Policy-makers must address them as they remap development paths (UNIDO, 2011)

One way of considering equity in terms of burden-sharing is by looking multilateral funding of adaptation efforts. Arguably,

not all funds pledged by developed countries have yet been made available, and some developing countries cite difficulties in accessing what funds are available. By one recent accounting, bilateral programmes have committed \$110 million to more than 50 adaptation projects in 29 countries (Frankel-Reed, 2006). The World Bank reported in 2006 that provided approximately \$170 million “on the order of approximately \$50 million over about five years,” mainly through the Gifted World Bank GEF (2006) for the preparation of national communications, which address both mitigation and adaptation its support for adaptation had been. Given the nature, and rate of funding, it becomes uncertain how the World Bank could generate from “a few tens of millions” to \$1 billion for adaptation purposes by 2012. This is in spite of the fact that there has been six more Intergovernmental Negotiating Committee (INC) meetings from Rio to Kyoto (1992-1997).

For the developing world, equity is about getting a fair share of the global common, and burden-sharing according to responsibility in the light of international justice, “cannot be avoided if the deep North-South divide that has characterized cooperation in the global economy were to be bridged. In fact, the US and Australia threaten to drop their insistence if developing countries were not to get involved in new commitments. Contrary to what was promised in the Berlin Mandate, some developed countries and the US in particular continued to push for commitments for developing countries. For instance, the third stage (1997-), the post-Kyoto agenda was a matter of how to make the agreement acceptable for certain developed countries and thereby secure their ratification (Najam et al.,2003:222). Thus, in the absence of commitment to mitigation, defined as any anthropogenic interventions that can either reduce the sources of greenhouse gas (GHG) emissions (abatment) or enhance their sinks (sequestration), and the promotion of a national-level analysis of the various technologies and practices that have the capacity to mitigate climate change (mitigation assessment) by the international community, Africa keeps

paying the Ecological Debts of the developed countries’ ecological footprint.

Are human security issues in Africa’s security and developmental equation, distinct from or similar to the existing ones on regime and/or territorial security?

Africa’s Ecocatastrophes: The Burden of Global Ecological Footprints of Weak Sustainability.

Possible climate change/security interactions over time

Since Africa is vulnerable the more to livelihood security and other aspects of human security which interact with geo-strategic (“hard”) security issues (DFID, December 8, 2005). There is a complex matrix of possible climate change/security which interacts with the environment, adding further stresses to Africa’s deteriorating situation. The International Centre for Trade and Sustainable Development (ICTSD) provides possible impacts on rural livelihoods and food security, which is further compounded by matrix of possible climate change/security interactions over time (Figure 4)

Fig 4: Number of undernourished, incorporating climate change effects (in millions

	<i>1990</i>	<i>2020</i>	<i>2050</i>	<i>2080</i>	<i>2080/1990 Ratio</i>	
<i>Developing countries</i>	885	772	579	554	0.6	
<i>Asia, Developing</i>	659	390	123	73	0.1	

<i>Sub-Saharan Developing</i>	138	273	359	410	3.0	
<i>Latin America</i>	54	53	40	23	0.4	
<i>Middle East & North Africa</i>	33	55	56	48	1.5	

Source, Joachim von Braun, IFPRI. Impact of Climate Change on Food Security in Times of High Energy Prices, Background Paper prepared for the International Centre for Trade and Sustainable Development (ICTSD)

Figure 5 below depicts the matrix of possible climate change/security interactions over time. In the short term (2007-2020); medium term (2021-2050) and long term (2051-2100) direct impact of global weather catastrophes will involve local conflict over water, and

some international conflict over water. Many countries on the African continent are prone to recurrent droughts; some drought episodes, particularly in south-east Africa, which are associated with El Ninos, or ENSO (El Nino -- Southern Oscillation) events in IPCC jargon.

Figure 5: Matrix of Possible Climate Change/Security Interactions over Time

	Direct impact	Indirect Consequences					Slow-onset
	Water	Food	Health	Mega-projects	Disasters	Bio-fuel	Sea level
Short term (2007 - 2020)	Local conflict over water	Failure to meet MDGs	Failure to meet MDGs	Long history of development-induced displacement from 1950s	Nation states begin to lose credibility due to inability to prevent large disasters	Isolated food - fuel competition & price spikes	Small number of displacements
Medium term (2021 - 2050)	Increased local & some international conflict over water	Significant displacement due to famine	Interacts with food production problems	Displacement of rural poor due to CDM & large scale dams & other state based mitigation & adaptation projects	Significant political unrest due to failure of DRR & inadequate recovery in many countries	Food-fuel competition increases & biodiversity erosion	Increasing displacement & national/international

							tension
Long term (2051 - 2100)	Major international conflict over water	Major displacement & political upheaval	Major displacement due to epidemics	Major urban upheaval and other political fall out from mega-project displacement	Major upheaval with international implications due to unattended weather catastrophes	Major discontent due to food-fuel competition	Major international tension s due to population displacement

In the short term (2007-2020), indirect consequences of global weather catastrophes were attributed to the failure to meet MDGs. Concerning the MDGs individually, UNDP (2007) states:

...Climate change may pose a threat to food security through erratic rainfall patterns and decreasing crop yields, contributing to increased hunger. Furthermore, adverse climate change impacts on natural systems and resources, infrastructure, and labor productivity may lead to reduced economic growth, exacerbating poverty. These effects threaten the achievement of MDG 1. Loss of livelihood assets, displacement and migration may lead to reduced access to education opportunities, thus hampering the realization of MDG 2. Depletion of natural resources and decreasing agricultural productivity may place additional burdens on women's health and reduce time for decision-making processes and income-generating activities, worsening gender equality and women's empowerment (MDG 3). Increased incidence of vector-borne

diseases, increases in heat-related mortality, and declining quantity and quality of drinking water will lead to adverse health effects threatening the achievement of MDGs 4, 5, 6 and 7. In general terms, the realization of MDG 7 may be jeopardized through climate change negatively impacting quality and productivity of natural resources and ecosystems, possibly irreversibly, threatening environmental sustainability. Climate change, a global phenomenon, calls for a collective response in the form of global partnerships.

Climate change has the potential to cause powerful systemic shocks to human development across a large number of countries and its threat potential in terms of human development impacts are likely to prove irreversible. The March 2008 European Council report provided a striking synopsis of the challenges that climate change poses to international peace and security:

The immediate and devastating effects of global warming will be felt far away

from Europe, with the poor suffering disproportionately in south Asia, the Middle East, central Asia, Africa and Latin America, ultimately bearing the consequences. The fact that the consequences of climate change is disproportionately felt by the poorest who are least responsible for it, makes the issue of climate change one of justice as much as economic development.

Similarly, the Intergovernmental Panel on Climate Change (IPCC) in its Fourth Assessment Report noted that the poor of this planet are most likely to suffer the worst effects of climate change. The IPCC 2007 Report maintains that Africa is very likely to suffer very damaging impacts and at present commands the least resources for coping and adapting to these stresses:

The regional increase in temperature will be higher in Africa than the global mean in some cases up to 50%. Desertification will advance significantly, especially along the Sahel zone, which stretches from Senegal in the West to Somalia in the East, as well as in southern Africa. These trends will lead to a decrease in the availability of water resources and agricultural land even as population increases and economic growth expands. This development will especially affect those states in which agriculture plays a significant role. 250-550 million people could be affected by hunger if there is a temperature increase of 3°C; it is likely that, by 2050, 75% of all undernourished people will be concentrated in Africa.

Some countries' agricultural yields could decline by more than 50% by 2020 and incomes by more than 90% by 2100. In West Africa, a roughly 500 km long metropolitan belt is developing between Accra and the Niger Delta, which will be highly vulnerable in the face of any rise in sea level (Ki-Moon, 16 June 2007).

Climate change, increasing levels of Water stress, and Water-Related Crises

A key challenge in responding to climate change is the increasing number of events of too much and too little water. From 1999 to 2008, floods affected almost 1 billion people in Asia. The corresponding figures were about 4 million in Europe, 28 million in the Americas and 22 million in Africa. For instance, the 2010 flood in Pakistan affected more individuals than the combined impacts of the Indian Ocean tsunami (2004), the Kashmir earthquake (2005) and the Haiti earthquake (2010). Flash floods in the Himalayas are estimated to cause the loss of at least 5,000 lives every year. Water is a critical resource for personal and national survival, and management of many of the world's 261 international rivers will face severe tests: many coastal freshwater aquifers will suffer Stalination as a result of sea level rise. In Africa alone, according to the IPCC 2007 report by 2020, between 75 and 250 million people are projected to be exposed to an increase of water stress due to climate change. If coupled with increased demand, this will adversely



affect livelihoods and exacerbate water-related problems.

Similarly, from various UNDP reports (2004) the threat of climate change and human development in countries in Africa is alarming as increased levels of water stress will have a significant impact on food security in some countries in Africa with yields from rain fed agriculture being reduced by up to 50% by 2020. It added that drought affected areas in sub-Saharan Africa could expand by 60-90 million hectares, with dry land zones suffering losses of US\$26 billion by 2060 (2003 prices), a figure in excess of bilateral aid to the region. It is estimated, in addition, that an additional 1.8 billion people could be living in a water-scarce environment by 2080. Climate change is expected to have significant impacts on water supplies creating or exacerbating chronic shortages and on water quality. There is already widespread acceleration of glacial retreat and in many areas stream flow is shifting from spring to winter peaks. If continued, these shifts could affect the availability of water for agriculture and other uses. Sea's level rise will result in saltwater intrusion into coastal fresh water aquifers, potentially reducing water resource availability. Changes in quantity and intensity of precipitation are likely to result in more floods and droughts and increased demand for irrigation water. Water management often requires costly investment in infrastructure. Given the long economic and physical life of reservoirs, water withdrawal, treatment,

delivery, and disposal systems, adaptive responses are generally slower in water management than in agriculture (Burton and May, 2004).

One of the expected consequences of climate change is a rise in the sea level, due to heat expansion of water and glacier thawing (Yao, 2002). According to the IPCC some of the expected consequences of a further increase in the mean temperature are sea-level rise, melting of glaciers, changed precipitation patterns and increased frequency of extreme weather events, all of which could have severe negative effects on human life and well-being as well as on the economy (IPCC 2001a). For instance, in China the annual average size of the area struck by flooding period between 1950 and 1989 was 8 million hectares, and from 1990 to 1998 this area has increased to 16.7 million hectares in average (NCCCC, 2001). Chinese research has estimated that a 1-meter rise in sea-level would inundate 92,000 square kilometers of China's coast, thereby displacing 67 million people that live in coastal areas (World Bank, 1997 in Harris 2003). The coastal areas are also expected to suffer from the increased frequency of severe storms, salt-water intrusion and land loss (IPCC, 2001a).

Major cities have been warned against sea level rise (Wagner, 28 March 2007). According to a team at Keele University and the UK's Centre for Ecology and Hydrology, a large number of countries will suffer moderate, high, or severe

stress and sea level rise in the long term and its collateral impacts on river flow as well as ocean discharge regimes will cause displacement of many millions of people currently living in coastal areas. For the small island nations of the world, especially the many cultural groups living on coral atolls, entire nations may face complete submersion. The study notes that, "of the more than 180 countries with populations in the low-elevation coastal zone, about 70 percent have urban areas of more than five million people that extend into it. The authors then list Tokyo, Japan; New York, U.S.; Mumbai, India; Shanghai, China; Jakarta, Indonesia; and Dhaka, Bangladesh. One could add other cities as well to the list, for example, Cartagena, Colombia; Lima, Peru; Buenos Aires, Argentina; and Recife and Rio de Janeiro, Brazil.

Considering the fact that Africa consists of four major basins which are bordered on the ocean side low-lying, Africa's is not exempted from the exposure to sea level-displacement-security (Ibe, and Awosika, 1991: 105-12). Nicholls (2004) expects 200 million environmental migrants by 2080, whereas the Friends of Earth (2007) expects the same number by 2050 already, including 1 million in small island states. On the regional level, UNEP expects in Africa alone 50 million environmental migrants by 2060 (Boano, et al., 2008). Christian Aid (2007) classifies the expected environmental migrants by breaking down its predicted number of approx.

0.9 billion people by 2050 to 250 million people affected by droughts, floods and hurricanes and 645 million by dams and other development projects. Vulnerable Africa's coastal cities include Dakar, Senegal; Accra, Ghana; Lagos, Nigeria; Luanda, Angola; Cape Town and Durban, South Africa; Maputo, Mozambique; Dar es Salaam, Tanzania; and Mombasa, Kenya; and Mogadishu, Somalia. In Nigeria for instance, coastal flooding plagues parts of the country, especially Lagos State and the adjoining state of Ogun. Although coastal flooding represents a threat to coastal communities worldwide, the threat is potentially acute for coastal cities, such as Lagos, which is already stressed to its limits by a population of 17 million. In the event of sudden rise of sea level of only 20 cm, it is estimated that over 740,000 people would be displaced in Nigeria. A rise of 1 m would lead to 3.7 million internally displaced persons (IDPs), and 2 m would render over 10 million homeless people in the country (Paehler, 2007).

Several African coastal zones, many of which already are under stress from population pressure and conflicting uses, would be adversely affected by sea-level rise associated with climate change. The coastal nations of west and central Africa (e.g., Senegal, Gambia, Sierra Leone, Nigeria, Cameroon, Gabon, and Angola) have low-lying lagoon coasts that are susceptible to erosion and hence are threatened by sea-level rise, particularly because most of the countries in this area have major and

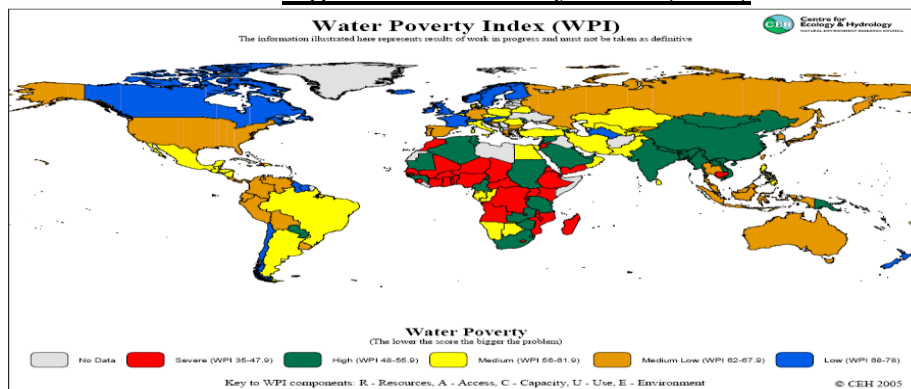


rapidly expanding cities on the coast. Flooding is a common environmental challenge in Lagos and its environs, and its impact would worsen in the years ahead as the sea-level rise interacts with other factors, like weak municipal waste disposal, poor drainage systems, demographic pressure, and collapse of social infrastructure. The west coast often is buffeted by storm surges and currently is at risk from erosion, inundation and extreme storm events.

The coastal zone of east Africa also will be affected, although this area experiences calm conditions through much of the year. However, sea-level rise and climatic variation may reduce the buffer effect of coral and patch reefs along the east coast, a result of which will lead losing a sizable proportion of the northern part of the Nile delta through a combination of inundation and erosion, with consequent loss of agricultural land and urban areas. The cost of dislocation which includes Salinization of coastal aquifers and other low-lying fresh water resources and loss of infrastructure will be difficult for poor countries to bear, especially in Africa. This observation is further reinforced by the Intergovernmental Panel on Climate Change report (2007): Towards the end of the 21st century, projected sea-level rise will affect low-lying coastal areas with large populations. The cost of adaptation could amount to at least 5-10% of GDP. Mangroves and coral reefs are projected to be further degraded, with additional consequences for fisheries

and tourism.

Related to sea level rise is the issue of shortage of fresh water resources. Of the 19 countries around the world currently classified as water-stressed, more are in Africa than in any other region, and this number is likely to increase, independent of climate change, as a result of increases in demand resulting from population growth, degradation of watersheds caused by land use change and siltation of river basins. A drop in water level in dams and rivers could adversely affect the quality of water by increasing the concentrations of sewage waste and industrial effluents, thereby increasing the potential for the outbreak of diseases and reducing the quality and quantity of fresh water available for domestic use. The relationships between South Africa and Lesotho and between Egypt and Ethiopia illustrates that conflict may erupt between Downstream and upstream riparians. This situation is particularly dangerous if the downstream country also believes it has the military power to rectify the situation.). What is important here is that such disputes occur not only among nation-states but also in areas of ethnic, regional, and subnational tensions, where competing loyalties and sovereignties make politics extremely volatile In fact, competition for pastoral land and water has been a driving force behind the majority of local confrontations for the last 70 years in some African societies (Okidi, 1992, Gleick, 1993:79-112).

Fig 6: Water Poverty Index (WPI)

Source: Water Poverty Index

<http://www.ceh.ac.uk/sections/ph/WaterPovertyIndex.html>

A June 2007 report by the United Nations Environmental Programme (UNEP) identified drought cycles, desertification, and land degradation as important contributing factors to the current crisis (United Nations Environment Programme, 2007; United Nations News April 17, 2007). A 2008 OXFAM report noted that seven droughts between 1991 and 2000 have increased food insecurity, and prompted animal losses, conflict, and cattle rustling. This is very critical to the production of food crops in most climate-dependent economic activity. As climate patterns shift, changes in the distribution of plant diseases and pests may also have adverse effects on agriculture (Gitay et al., 2001).

The distribution of fresh water worldwide is another source of insecurity. Water is an unevenly distributed resource, but distribution

alone is not the main question. The central problem for most of the world population is access to clean water. It relates directly to health, energy, and food security. This is where the quandary lies. Out of the proven 40 856 km³ of fresh water worldwide, sub-Saharan Africa possesses about 9%; East Asia and the Pacific, 19%; South Asia, 12%; the Middle East and North Africa, 0.67%; and Latin America and the Caribbean, about 26%. The OECD countries, in turn, contain within their territories more than 20% of the global fresh water (World Bank 1992), and the remaining 13% is in the Eastern European region, including the former Soviet Union. Control over water resources is a vital and strategic human-security issue.

Also, with the same level of water precipitation, a business as usual scenario models indicate that likely

surface temperature rises by 2100 will be in the range 1.40 to 5.80C, dependent on latitude and longitude. For Southern Africa; sub-continental warming is predicted to be greatest in the northern regions. Temperature increases in the range of between 10C and 30C can be expected by the mid-21st century, with the highest rises in the most arid parts of the country. Of greater consequence for South Africa, as a semi-arid country, is the prediction that a broad reduction of rainfall in the range 5% to 10% can be expected in the summer rainfall region. This will be accompanied by an increasing incidence of both droughts and floods; with prolonged dry spells being followed by intense storms. It is anticipated that climate variability and change in the Sahel will have overwhelming impacts on agriculture and land use, ecosystem and

biodiversity, human settlements, diseases and health, and hydrology and water resources. With respect to agriculture and land use, climate change will likely elicit a significant change in agricultural production both in terms of the quantum of products as well as the location or area of production (Fig.7). Such “extreme precipitation events” causes increased soil erosion (Adejuwon, 2004).The on an ecosystem leads to low yield of agricultural products for industries that depends on it. This is the case in Cocoa farming in Okitipupa, of Ondo state in Nigeria where changes in rainfall pattern leads to change in the yield of cash crops like cocoa and rubber, palm oil. This has affected cocoa grower scheme and contract farming for supply of cocoa beans (*Nigerian Tribune, Wednesday 23 April, 2008. Page 26*)

Fig 7: Production Trend of Major Export Crops in Nigeria (1960-1994)

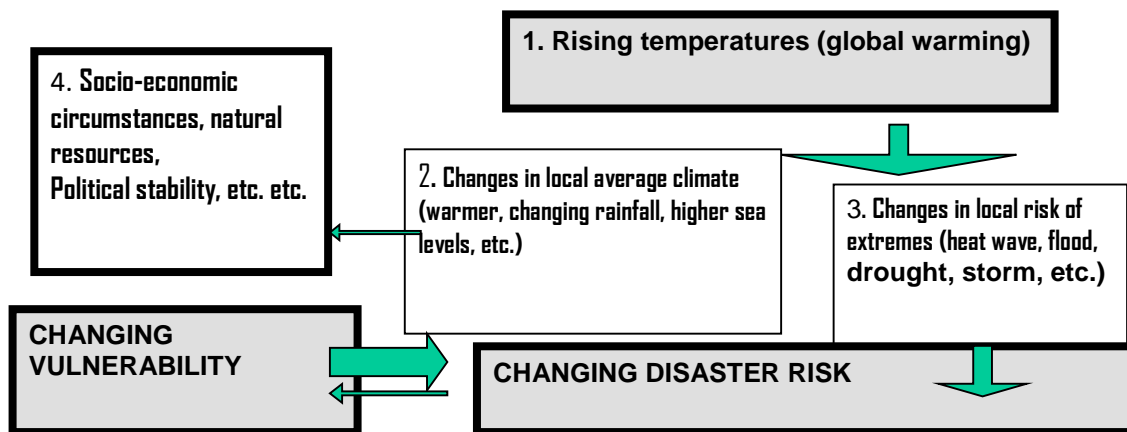
Crop	Metric Tons (000)			Export Earnings (in million)			Remarks as at 1994
	1960	1980	1994	1960	1980	1994	
Cocoa	180	143	100	35.0	15.0	10.0	56% consumed locally
Palm Produce	617	134	22	38.2	0.0	0.0	100% consumed locally
Rubber	58	98	99	14.2	8.0	10.0	Very Little for Export
Cotton	151	0.0	262	5.9	0.0	0.0	100% consumed locally

Source: Ministry of Agriculture, Fisheries & Forestry, Ondo State. Accessed from: http://www.ondostate.gov.ng/min_aff.php, on July 28, 2010

The implication of the above environmental trends is that it affects security in Nigeria by exacerbating the effects of other security stressors, like poverty and disease. For instance, agriculture is the main source of food, industrial raw materials, and employment (about 70%) in Nigeria. This is very critical for agriculture which is the economic mainstay in most African countries, except the oil-exporting countries, contributing 20-30 per cent of GDP in sub-Saharan Africa and 55 per cent of the total value of African exports.

Another way of seeing “Extinction Risk from Climate Change” (fig.8) to paraphrase Thomas, and 18 co-authors is to look at ecosystems and biodiversity. Changes in natural ecosystems are among the first observable impacts of climate change. Generally, apparent effects of these threats include loss of biodiversity, rapid deterioration in land cover and depletion of water availability through destruction of catchments and aquifers.

Fig 8: Climate change and its implication for Disaster Risk



Source: Proceedings of Red Cross /Red Crescent Climate Centre International conference 2007

Another IPCC (1997) report noted that, where extreme weather events become more intense and/or more frequent, the economic and social costs of those events will increase, and these increases will be substantial in the areas most directly affected. The report went further

to state that more and more mega-disasters such as those associated with hurricane Mitch (1998), the Orissa super-cyclone (1999), hurricanes Katrina and Rita, and tropical storm Stan (2005) often produce cascades of secondary physical hazards such as

landslides (as Nicaragua during Mitch or in Vargas, Venezuela in 1999) or downstream inundation when dams overflow or dam authorities release large volumes of water to safeguard large dams (as in Mozambique at present and in several recent years). They also trigger changes in social relations, including the exacerbation of unequal gender relations evident in literature on gender differentiated impacts of natural disasters (FAO, 2010a; FAO, 2010b). This suggests that the impacts of climate change will also be gender differentiated.

Climate Change and Gender

As with natural disasters, climate change is likely to exacerbate previously existing patterns of discrimination that, on average, render women more vulnerable to fatalities and reduce their life expectancy, especially for economically poor women, more than men. Disasters that lead to increased physical, social and economic insecurity, and affect women and children, are among some of the push factors that give rise to trafficking. Therefore, insecure disaster regions must be considered as potential areas for such harmful activities. Women and children are at greatest risk and most susceptible to trafficking and exploitation in times of disasters (Hodge and Lietz, 2007). Natural disasters, such as earthquakes and tsunamis, and climate-related disasters, such as floods or famine crises, may disrupt local security and safety nets and increase levels of stress, family conflict and

mental health issues. Therefore, they contribute to the neglect of children "Overcrowding, chaotic conditions, lack of privacy and the collapse of regular routines can contribute to anger, frustration and violence", with children (especially girls) and women being the most vulnerable individuals. Women or children face a greater risk of becoming targets for exploitation, gender-based violence and human trafficking when they are unaccompanied, separated or orphaned, due to the erosion of social controls and protections that normally regulate the behavior within households and communities (FAO, 2010a; FAO, 2010b).

Climate Change and National Health Problems

One of the most worrisome national security threats of climate change is the spread of disease, among both people and animals. The U.S. Global Change Research Programme, which Congress created in 1990 to coordinate the work of 13 government agencies on global warming, released a report that identified 11 key health areas at risk from climate change. Among the concerns were diseases spread by food, water and pests such as mosquitoes and ticks; respiratory allergies; asthma and other respiratory diseases; and heat-related deaths and illnesses. The impact of disease on Africa's stability has long been a concern for U.S. intelligence and military officials, and the National Intelligence Council recognized in a National Intelligence Estimate in 2000 that "climatic shifts" were likely to allow

diseases such as malaria and yellow fever to spread to new areas. As illustrated in fig Figure 9 below human health is being increasingly recognized as having strong environmental components. Obvious examples include the importance to human health of good air quality, clean drinking water, clean food, and minimal exposure to toxic chemicals and UV-B radiation. Recent changes in the epidemiology of Lyme disease, Hantavirus, malaria, trypanosomiasis, schistosomiasis, cholera, and yellow fever are attributable to changing land-use practices. Direct effects include increases in heat stress, decreases in cold-related mortality, and increases in air pollution-related pulmonary and allergic complications. Indirect effects, some mediated through interactions with land-use practices, include increases in the geographic distribution of a variety

of diseases including malaria; dengue fever, yellow fever, and Hantavirus.

The increased health risks are likely to be most acute in developing countries. This is because many climate-related infectious and vector-borne diseases are associated with warm or hot weather conditions and, most importantly, because public health systems, which can substantially reduce health risks, tend to be relatively weak in many developing countries (Campbell-Lindrum et. al., 2003). Africa is at risk primarily from increased incidences of vector-borne diseases and reduced nutritional status. Thus, there is increased morbidity and mortality in sub-regions where vector-borne diseases increase following climatic changes would have far-reaching economic consequences.

Fig 9: Tropical cyclones, prolonged droughts, extreme rainfall, sea level rise, Mosquito Bites



Source: *Proceedings of Red Cross /Red Crescent Climate Centre International conference, 2007*



Epidemics accounted for 40% of disasters in the sub-region during 1975 to 2003, compared to 20% by flood and drought, and cause most human fatalities and debilitation. There has been a reported increase in the prevalence or outbreak of diseases, such as malaria, cerebral-spinal meningitis, and heat strokes in Nigeria for instance. For example, the World Health Organization (WHO) reported there were about 17,500 cases of “serious” outbreaks of meningitis in the northern part of Nigeria in early 2009. No fewer than 960 people died of the disease, especially in Bauchi, Gombe, Taraba, Yobe, and Zamfara States. Obviously, in an environment of worsening poverty and falling health standards, citizen’s expectation from the government increases.

With reference to Nigeria, climate change-related flooding has already had immediate impacts on food production, livelihood assets, and human survival, in both rural and urban areas in Nigeria. There are about 61 active erosion sites in the 177 communities in Anambra State, estimated to cost over 17 billion (naira). One of such erosion sites in Umuchiana-Ekwulobia has submerged 75 buildings and displaced about 437 families. In 2008, for instance, erosion washed off the rail line linking Aba and Port Harcourt, leading to a decline in economic activities in Aba, Abia State. Soil erosion has destroyed many communities and rendered about 200,000 homeless as internally displaced persons in Abia, Enugu, and

Anambra states of southeastern Nigeria. Heavy rainfall and perennial flooding in some states, like Adamawa, Bauchi, Borno, Kebbi, Lagos, Nassarawa, Niger, Ogun, Plateau, Sokoto, and Yobe, in 2007 affected about 50,000 people, and killed about 63 persons. In Bauchi State, no fewer than 24 persons were reported dead, while 5,787 farmlands and 13,609 houses, worth over N 717.3 million (naira), were destroyed by the flood. In Gombe state, similar floods induced about a 50 percent hike in prices of grains. Consequently, 100 kg bags of maize, beans, millet, and sorghum increased to N 3,400, N6,000, N4,000, and N3,000 respectively, as against N 1,700, N 3,000, N2,000, and N 1,500 three weeks before the flood disasters. Dr Tunde Arosanyim, chairman of the All Farmers Association of Nigeria (AFAN), attributed the flood to global warming, describing it “as the worst in 20 years” (Onuoha, & Ezirim, 2010).

Defective Adaptation Measures as 'Environmental Terrorism'

While a key factor in reducing future risks in developing countries lies in strengthening the development of effective adaptation measures (Tol and Dowlatabadi, 2002; Ebi et. al. ,2005).By default, however, adaptative measures that emerged from international climate effort such as UNFCCC have their side effects, what literarily amounts to 'environmental terrorism', “incidents in which the environment itself is disrupted with ecological consequences of the act” (Schwartz, 1998: 484).This is already taking place in the form Mega-projects

conceived by nation -states as solutions to climate change such as the planting of large scale forestry under the Kyoto Protocol's Clean Development Mechanism (CDM). For instance ,such large-scale investments as in the case of bio-fuels which is seen in the medium and long term as a substitute for green house gas-producing petro-based energy sources have had the perverse effect of taking considerable land out of food production and diverting food grains, thus raising food prices and eroding biodiversity. On this count, Africa is experiencing corporate plunder of its land. According to the International Food Policy Research Institute:

150 million in the Democratic Republic of Congo, in Ghana, the Norwegian firm Biofuel Africa secured 38,000 hectares for 'the largest jatropha plantation in the world; European companies have grabbed over 600,000 hectares of land for the cultivation of agro fuels crops; in Mozambique Sun Biofuel has acquire more than one-seventh of the country's total area for growing energy plants estimated above 11 million hectares; in Swaziland the British multinational D1 Oils have acquired over 3,000 hectares in various parts of the country in addition to over 1,000 hectares at D1 Oils-operated farms, in Madagascar a South Korean firm Daewoo Logistics plans to buy a 99-year lease on over a million hectares for the production of 5m tones of corn a year by 2023, and to use another 120,000 hectares for the production of palm oil; in Sudan there are efforts by the state to attract investors

for almost 900,000 hectares of its land; in Ethiopia, the government set aside 24 million hectares for the production of fuel crops (Hailu,2008; Rosengrant, et al, 2006; Knaup,2008; Borger, 2008)

Cognizant of the extensive commercial interest in development of advanced Biofuel, in August 2011, President Barack Obama announced that the U.S. Navy, along with the Departments of Energy and Agriculture, would invest up to \$510 million to co-finance construction or retrofit plants and refineries capable of producing significant quantities of advanced biofuels over the next three years. The biofuels being pursued by military and commercial interests include hydro-treated renewable jet fuel (HRJ) and hydro-processed renewable diesel fuel (HR-D), both of which can be made from the same materials or feedstock. Production-level feed stocks include oil seeds such as camelina, jatropha, rapeseed, soybeans and babassu; animal fats; and plant and cellulosic materials such as crop residue, wood scraps and switch grass. In this regards, Seattle-based Altair Fuels, affiliated with Sustainable Oils, is building two biorefineries to supply drop-in substitutes for traditional jet fuels to the Air Force, with production beginning in Bakersfield, Calif., in late 2012 and in Tacoma, in 2014. Also, Sapphire's plant is projected to be producing 100 million gallons of renewable diesel 2013 and jet fuel by 2018 and 1 billion gallons by 2025. Additionally, an Australian coalition including Qantas, Virgin and



Boeing plans to ensure that five percent of Australia's aviation fuel will be Biofuel by 2015, and 40 percent by 2050.

To recapitulate, the implications of these private-sector investments in Biofuel besides causing corporate plunder of Africa's arable lands are bound. Ultimately, it leads to "the destruction of Africa's natural resources of today on tomorrow in satisfying international demands by depleting Africa's natural capital, its share of nature's resources," (Ochiaegbu, 2006:106) as the commercialization and internationalization of Biofuel production has become a self-fulfilling prophecy. Also, this alternative source of energy while reducing the dependence of the developed nations on fossil fuel from the developing nations will reduce the foreign exchange of oil exporting nations. These further reduce Africa's adaptive capacity, and help explain climate-change-as-a-security-threat nexus and its implication for Africa's insecurity and sustainable development in a changing global security architecture in the 21st century.

Conclusion

In the foregoing analysis, we have highlighted some of the current environmental trends posed by climate change that serve as the transmission belts of the security threats to Africa. The following observations emerged from the analysis: (1) following the aftermath of the Cold War and changing menus and priorities of world politics

, the subject matter and foci on security discourse, security undergone both a "broadening" and a "deepening" as well as a revisioning which significantly led to socially and environmentally reconstitution of human security; (2) the main challenge to security narrative for managing current climate variability still remains how to link economic security with environmental sustainability in a non-dematerializing global economy, (3) the underlying assumptions of mainstream "eco-efficiency" approach to development under the Kyoto Protocol's Clean Development Mechanism (CDM) is neo-liberalism, at best the merger of environment and economics in decision making masquerading as multilateral mitigation and adaptive measures (MMAMs), and therefore, cannot serve the cause of sustainable human security; finally (4) the search for new paradigms for security must take cognizance of the cascading consequences of existential threat from climate change that do not lend themselves to military response and are capable of producing "deadly pandemics and other natural disasters" with WMD-like effects.

Contingent upon the above observations, the following recommendations are proffered as policy options for Africa's needed new securitization and security threat projection:

- I. The importance of climate policy to national security demands that it receives much greater prioritization, and therefore, national security

- consequences of climate change should be fully integrated into national security and national defense strategies;
- II. The African political leadership should *securitize* the issue of climate change by prioritizing a revisioning of security which sees individual, and human security as the ultimate referent object in any securitization framework, and projection of security;
- III. With multiple, complex connections among, environmental quality, human migrations, war, disease, social disruption, and ecoterrorism, security consequences of climate change should be fully integrated in national development plans of African nation-states Since [t]he environment has a profound impact on African national interest in the sense that environmental forces transcend borders and oceans to threaten directly the health, prosperity and jobs of African citizens national security should be increasingly seen as an environmental issue, hence providing for proactive measures for responding to climate shocks that may come from within or outside Africa's territorial borders;
- IV. As climate change response actions can potentially act as a significant factor in boosting sustainable economic and social development, a national strategy specifically designed to bring this about must include the major objectives of poverty alleviation and the creation of jobs;
- V. Two simultaneous and parallel courses of action is need: the transformation of African energy systems, our lifestyles, our economies, in order to minimize, and preferably prevent, climate change; and preparing for the disastrous consequences of the global warming which is already on the horizon, with a view to engage in a comprehensive and profound dialogue on the new security challenges facing us;
- VI. Having seen that the developed countries' ecological footprint is being paid by Africa's 'ecological debts', an euphemism for the historical responsibility of developed countries for climate change, Africa's approach to reducing or coping with climate risks should be a complementary elements of a comprehensive international effort, and a national self-help reactive-proactive approach which a balance of the mitigation and adaptation side of the climate change response equation.
- The policy proposals presented here are illustrative rather than exhaustive, but they have the potential to strengthen national security by reducing Africa's vulnerabilities to climate change.



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