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Links between climate change, conflict and governance in Africa

INTRODUCTION

Climate change is increasingly becoming a permanent agenda item at many policy-making forums. Such prominence is evidence of the perceived impact of climate change on the shaping and influencing of the development trajectory and balance of power in the global political economy.[2] Climate change is distinct from natural climate variability since it results from human activities that alter the composition of the earth's atmosphere. Climate change is associated with natural changes, such as the spread of the Sahara because of desertification, reduced precipitation, devastating droughts, a rise in temperature, more intense storms and frequent flash floods, the melting of the snowcaps of Mount Kenya and Kilimanjaro, a rising sea level and significant changes to the pattern of daily lives. In the Sahel region, desertification is causing clashes between herders and farmers because the availability of cultivated land is being reduced. Climate-related effects of this nature are already resulting in violent conflicts in northern Nigeria, Sudan and Kenya. Africa, with its history of ethnic, natural resource and interstate conflicts, is seen as being particularly vulnerable to this new climate-induced security threat.[3] Despite being the continent least responsible for the emission of global greenhouse gases, one of the principal contributors to climate change, it will suffer the consequences of a changing climate most severely.

Climate change is today being recast as a security threat, rather than being just an environmental issue. Increasing energy consumption contributes to global warming. At the same time, energy is a key development resource and developing countries are likely to increase their energy requirements. Energy demand thus has implications for a policy aimed at mitigating the effects of climate change. A policy aimed at reducing energy use and cutting down on carbon emissions in Africa would reduce economic growth, making poverty reduction harder to achieve and generating risks of political instability and conflict. Furthermore, making the transition from fossil fuels to renewable (low-carbon) energy sources will be costly for poor economies as this process needs a relatively large share of limited economic resources. Thus, efforts to mitigate climate change, including measures to reduce energy use in developing countries, are likely to reduce human security, increase poverty and threaten food security.

The Third Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) has recognised climate change as a political issue on the international agenda. The economy of sub-Saharan Africa is heavily dependent on agricultural production and this has generated immense interest in the impact of climate change on agriculture. The region also has the highest percentage of malnourished inhabitants in the world, with nearly 70 per cent of people living in a state of chronic hunger. This situation is expected to worsen under climate change, which could push crops, livestock and farmers out of their livelihood niches, and increase the frequency and severity of floods and droughts.

In the Horn of Africa, rainfall has become less predictable and the rainfall margin between a good year and a total failure is narrow. Cyclical droughts are increasing in frequency, with the drought cycle on average increasing from one in eight years to one in every two or three years. The impact of such changes on agricultural production, livestock rearing, water supply and hydro-power generation is substantial. In combination with

current insecurities stemming from economic, social and political factors, climate change will increase the risks of conflict and instability, especially under conditions of poor governance. Yet current efforts to prioritise adaptation to climate change and address climate-sensitive conflict and security problems in a comprehensive manner are only at a conceptual stage.

There are many ways in which African countries can respond to and mitigate the consequences of adverse climate change. The debate until now has focused on the urgency of creating a security 'hook' on which to hang climate change negotiations, but little has been achieved so far. Democratic governance and political commitment on climate change have progressed painstakingly slow, even though the United Nations Security Council (UNSC) has established it as a security issue. The truth of the matter is that while Africa generates the least amount of greenhouse gases and will be hardest hit by global warming, it has little or no voice in negotiations on possible solutions.

This paper reviews the linkages between climate change, governance and security threats in Africa, and analyses the response of the international community in formulating climate change policies to ensure future security and prevent conflict. It also identifies available policy options and recommends mitigating measures to counter the perceived and real effects of climate change in Africa. Also briefly reviewed are the roles of African states, regional and national organisations, and the international (donor) community, which will all be instrumental in achieving success.

CLIMATE CHANGE AS A SECURITY THREAT IN AFRICA

Human security and environmental protection are mutually dependent. On the one hand, the depletion of natural resources undermines livelihoods, increases vulnerability to disaster and puts human security at risk. On the other, issues of democratic governance, namely violent conflict, inappropriate or inadequate policy frameworks, and political instability lead to the mismanagement of natural resources and the maladministration of justice. An attempt will be made to provide an understanding of the forces that lead to environmental and political insecurity, with special focus on Africa under the effects of climate change.

Africa has seven distinct climatic zones and ecosystems ranging from that of the Sahara to the rainforests of central Africa.[4] The impact of climate change will vary between and within countries. However, determining the regional impacts of climate change with any level of confidence is difficult. Available climate change evidence for Africa suggests increasingly scarce water resources in central Africa, declining and failing agricultural yields in the Horn of Africa, encroaching, desert-like environments in Algeria, Chad and Mali, the destruction of marine and coastal resources, and damage to property and infrastructure.[5] These changes are already undermining the carrying capacity of large parts of the dry pastoral regions in Africa, causing destabilising population movements and raising tensions over dwindling key resources. Under these circumstances climate change potentially becomes a significant factor that can tip fragile states such as the Democratic Republic of the Congo (DRC) and Somalia into socio-economic and political collapse.

Climate change has repeatedly been called a major threat to Africa. Indeed, Africa has time and again been considered the continent that will be affected most negatively by climate change owing to the combination of severe climate-related impacts, economies that are highly climate-dependent, and countries that have the least capacity to adapt.[6] For example, Cameroon, Chad, the DRC and Nigeria all have high export levels consisting mainly of natural resources. These resources (or natural capital) are estimated to contribute about 26 per cent and 13 per cent to the total wealth of low-income and middle-income countries respectively, which, in the main, are located in Africa. The comparative percentage for industrialised nations is just two per cent.

To explore the direct role of climate change to explain the historical risk of conflict in Africa, Burke et al used 1981 to 2002 panel data on climate variation and conflict events.[7] The results reveal that temperature can affect agricultural yields through increases in both crop and surface water evapo-transpiration, resulting in heightened water stress in the absence of irrigation. The combined effect of these mechanisms could be expected to reduce African staple crop yields by 10 to 30 per cent for every degree Celsius (°C) of warming. This is an important finding in the light of the heavy dependence of African countries on agriculture and the production of primary commodities. Adverse consequences of climate change for food security in Africa seems inevitable, as demonstrated in 2010–2012 by the food situation in the Horn of Africa.

Recent predictions suggest an increase of 54 per cent in armed conflict in sub-Saharan Africa by 2030 compared to the 1980–2000 period.[8] Concurrently, the risk of violent conflict and climate-induced armed conflict is considered high for Africa. The climate change-linked spatial and temporal changes in rainfall patterns and frequent droughts make the survivability of African pastoralists in arid environments particularly difficult.[9] The fighting between pastoralists and farmers in the Oromia and Ogaden regions of Ethiopia, inter-clan fighting in Somalia and increased fighting during drought periods in northern Nigeria all indicate the link that exists between the human impact of

climate change and the threat of violent conflict.[10] Conflicts between pastoral communities in the arid and semi-arid borderlands of northern Kenya, southern Sudan and southern Ethiopia are linked to competition over access to pasture and water, livestock raiding and the heavy presence of small arms.[11]

In such regions, inter-annual and inter-seasonal variability in rainfall patterns determines pastoral mobility and the use of fallback grazing areas, inter-community relations, altered land tenure arrangements and conflict, all of which lead to overgrazing of excessively used rangeland. The availability of communal rangeland resources across national borders and sporadic pastoralist conflicts over key natural resources are common features in dry lands. Although the availability of resources may seem the natural cause, pastoral conflict may be triggered by the absence of good institutions and external interference. It is not drought but the coming of the rains that is associated with greater concern about conflict,[12] and a strong pointer to the role institutional governance can play in the use of natural resources and access to pastoral lands. While this remark indicates that pastoralists do not fight during a time of scarcity, but during periods of plenty, loss of life because of the widespread use of sophisticated firearms and the disruption of livelihoods remains a major concern for security policies.

Aside from the political fragility of many countries, violent conflict is still prevalent throughout the continent, although currently not at inter-state level. The region that stretches from central Africa to the Horn of Africa is particularly worrisome in terms of localised conflict.[13] In a number of African countries the increase in violent conflict is the most striking feature of the cumulative effects of climate change.[14] Conflict per se is not a problem as such, but violent conflict as a consequence of climate change certainly is. It is how the aftermath of conflict is handled that matters most as far as policy is concerned.

Algeria is an illustrative case. Only three per cent of its total area is arable. Coming out of decades of civil war, with a death toll of 150 000, it is expected that the country will be impacted seriously by climate change. Pressure on limited arable land and a serious risk of desertification, increased water scarcity and severe food shortages, especially in the northern region, are likely to be made worse by rising temperatures and decreasing rainfall. The never-ending conflict in the Darfur region of Sudan and the resulting human tragedy are in part the result of climate change and its interaction with triggers of violent conflict. Chad and Mali, which lie partly in the semi-arid Sahel, have also already experienced higher temperatures and less rainfall during shorter rainy seasons, resulting in poor harvests and drought. Pressures on the agricultural sectors of these countries have therefore increased significantly, further exacerbating existing tensions between herders and farmers competing for dwindling resources. Rainfall patterns can and do affect inter-community relations, and pastoralist conflict over the key natural resources may occur.

Africa is often termed the troubled continent, or the world's nightmare, a continent with climate-dependent economic sectors at risk of violent ethnic conflict. The conflicts in Africa are attributable to demand for the fair distribution of resources, historical grievances, disputes over access to increasingly scarce resources and weak state institutions. The Albertine Rift in the DRC, which is in a constant struggle to end an ongoing civil war, is one of the most biodiversity rich and ecologically unique regions of Africa. This wealth coincides with an abundance of mineral resources, but sadly the region has been the centre of some of the world's most devastating conflicts in recent history.[15] This turbulent context poses a range of risks and opportunities to conservation agencies, who are managing environmental resources that can be both the seed of conflict and the foundation for peace-building and ensuing development.

Rainfall patterns can and do affect inter-community relations, and pastoralist conflict over the key natural resources may occur

The population of Africa is growing rapidly and urbanising. This means not only that the demand for resources will continue to grow, but also that the impact of climate change will be exacerbated. Africa is lagging behind Asian countries such as India, Singapore and China as regards economic development, and is also significantly behind schedule in achieving its Millennium Development Goals (MDGs). Many of the approximately 30 per cent of developing countries that lag behind in achieving their MDG targets are in Africa. Most African states currently have difficulty in delivering or fail to deliver basic services such as education, health care, etc., while development funds are hardly a substitute for economic development.

The *World Development Report 2010: development and climate change*[16] was released ahead of the December 2009 meeting on climate change in Copenhagen. In the resulting Copenhagen Accord it was agreed that global emissions must be reduced 'so as to hold the increase in global temperature below 2 °C', but it failed to clarify the means to achieve this objective.[17] It was a non-binding

political declaration and failed to provide a successor to the Kyoto Protocol, which expires in 2012. The accord cites that global warming of 2 °C above pre-industrial temperatures could result in a permanent reduction in annual per capita consumption of four to five per cent in Africa.

On this note, the possible security threat posed by climate change generally follows three paths. Firstly, insufficient rainfall and rising temperatures may threaten people's livelihoods, especially in the poor regions of Africa. The climatic variables may, by virtue of frequent droughts and heightened resource scarcity, result in environmental stress and land-use related conflicts as witnessed in Kenya, with both the Mau forest issue and the 2008 post-election violence being examples. Considering the limited capacities of developing economies, this could then trigger conflict and general instability, particularly in instances where institutions and governance structures are weak.

Secondly, the rise in the sea level, the melting of glaciers and extreme weather events induced by climate change would provide new environmental conditions and create situations of conflict. Thirdly, and more challenging, the threats of non-linear events brought about by climate change could have irreversible consequences for life on earth. With this in mind, there is need for immediate action to ensure that Africa's development prospects and human livelihoods are not compromised by heightened climate variability and the effects of climate change.

LINK BETWEEN CLIMATE CHANGE, CONFLICT AND DEMOCRATIC GOVERNANCE IN AFRICA

Burke et al. state that there are strong historical linkages between civil war and temperature (a proxy for climate change) in Africa, with warmer years leading to a significant increase in the likelihood of war.[18] Using climate model projections, the authors estimate an additional 393 000 battle deaths by 2030, 'if future wars are as deadly as recent wars'. The study, using 1981 to 2002 data, also indicates that a 1 °C increase in temperature is likely to result in a remarkable 49 per cent increase in the incidence of civil war in sub-Saharan Africa.

Over 95 per cent of Africa's agriculture is rain-fed, rural populations depend on agriculture and other natural resources for their livelihoods, and their crops are sensitive to small changes in temperature and rainfall regimes. So when temperatures rise, as is currently predicted, the livelihoods of many in Africa will suffer. The disadvantaged may become more likely to take up arms against others when there is a sense of exclusion from a key resource and political grievances are not addressed. In a post-Copenhagen world, where global leaders failed to reach a binding agreement to curb climate change, more wars and related deaths could ravage Africa. The case of Darfur, where conflict has been ongoing for almost a decade, may just be the tip of the iceberg. The herder-farmer conflicts in parts of Sudan and Kenya, Algeria and northern Nigeria speak to instances when the impacts of climate change increase the risk of violence.

To date, this impact has been mixed to uncertain for agricultural crops.[19] Maize and wheat in southern Africa show negative effects, and cowpeas in eastern Africa show strong negative effects. The area suitable for agriculture, the length of the growing seasons and the yield potential are expected to decrease along the margins of semi-arid and arid areas. Southern Africa is most likely to be affected by decreasing crop yields and could thus experience food insecurity that will exacerbate malnutrition. Areas such as Burkina Faso and Mali show evidence of increased agricultural production (especially millet) of 55 per cent and 35 per cent respectively because of an increase in rainfall, and could experience improved human welfare. In the already food-insecure Chad, rain-fed agricultural yields are projected to decrease by up to 50 per cent by 2020.[20]

The climate has been changing significantly in West Africa for some years now and almost every country in that region, with the exception of Burkina Faso and Mali, has experienced a year-on-year reduction in rainfall. In the northern part of the Sahel, rainfall in the 1970s and 1980s was half of that received in the 1950s and 1960s. The whole water cycle has been affected, with serious consequences for agriculture and food security. The pattern of rainy seasons has changed and the number of natural disasters has been on the rise. In 2008, for example, torrential rains led to the flooding of vast cultivated areas and loss of life, especially in Togo and Ghana. The dry, cold, north-easterly trade wind that blows along the coast of West Africa has weakened, with Benin and Côte d'Ivoire affected in particular. The increasing disruption of agricultural calendars and crop seasons by variations in the onset of the wet season militates against the proper planning of agricultural activities, resulting in crop failures. Government assistance amounts to vague and incoherent statements, and farmers are left to cope on their own.

Access to clean water is a major problem in many African countries.[21] One-third of people live in drought-prone regions and one-quarter, or about 200 million people, currently experience significant water stress. Drought accounted for 31 per cent of all natural disasters in Africa between 1975 and 2002, while floods accounted for 26 per cent.[22] The Horn of Africa countries of Ethiopia, Eritrea and Somalia have suffered more drought-related deaths (estimated at 600 000) over the last century than any other part of Africa. These countries have also

experienced persistent conflict on an internal and regional basis. Drought and famine remain major threats to the region's security.

Kenya is also challenged by how to mitigate and adapt to climate change. The Mau forest complex has recently been a topic of heated public debate following serious forest destruction through illegal logging, conversion of forests to agricultural land and heavy human settlement leading to a reduction in river flow and a severe water shortage in the lower catchments. Upriver rains have caused frequent flooding downriver in Budalangi in Western Province. The issue has been highly politicised with some legislators arguing it would be inhumane to vacate the settlers without adequate compensation and alternative livelihoods.[23] According to the Kenya Forest Service, the authority that is mandated to protect and promote the sustainable use of forests, about 100 000 ha of forest cover has already been destroyed through encroachment and illegal allocation.

African farmers have developed many different ways to cope with climate variability, such as contour bunds, i.e. ridges and ditches dug across the slope along the contour, and Zäi agriculture, i.e. micro-catchment water harvesting systems as practiced in the northern part of Burkina Faso. However, such agricultural innovations may not be sufficient to cushion farmers against future climate risks, given the uncertainty of crop responses to climate change. According to one study, climate change will result in an increase in dry lands and areas under water stress by 2080.[24] As a result, arid and semi-arid areas could expand by five to eight per cent, equalling a loss of production on a further 50 million to 90 million ha of arable land.

The IPCC notes that the effect of climate change on food insecurity in Africa is still not fully understood, particularly when other multiple stresses and triggers that may enhance the impact of possible climate changes are taken into account.[25] The report suggests that unabated climate change could displace people from their homes. In Sudan alone, about 24 per cent of the population are internally displaced, meaning that these people are without homes, have no secure means of income and live in precarious and insecure situations. According to the UN High Commission for Refugees (UNHCR), around 67 million people worldwide had been forcibly displaced as a result of conflict, persecution and natural disasters by the end of 2007.[26] Sixteen million of these people fell under UNHCR and UN Relief and Works Agency (UNRWA) mandates as political refugees. The number of internally displaced persons (IDPs) was estimated at 51 million worldwide, with 26 million people displaced as a result of armed conflict and 25 million people by natural disasters. In the same year Africa hosted close on half of the internally displaced persons globally (12,7 million people), while Sudan alone hosted the highest number of persons forcibly displaced internally (5,8 million people). These displacements were mostly caused by factors related to poor governance, conflict between government security forces, rebels and other armed groups, and community violence, with climate change as an underlying causal factor.

Despite some sporadic improvements in the last 40 years, Africa's economy as a whole is not growing fast enough to keep up with the rate of population growth, nor with economic growth in the rest of the world. Seventeen countries in sub-Saharan Africa are included in the list of the world's most fragile states.[27] The states affected by conflict include Angola, Chad, Equatorial Guinea, Nigeria, Somalia and Sudan, even though all of them have significant natural resources. There are many complex reasons for this, including inadequate governance, rampant corruption, disease and inadequate healthcare, heavy dependence on natural resources and ongoing cycles of violent conflict, such as in the eastern DRC, with the Kivu and Ituri areas being particularly problematic, Angola (rebel wars), the Darfur region of Sudan, Chad, Somalia, northern Nigeria (civil wars), and Guinea with its recent coups. On average, life expectancy remains low at 49,6 years, whereas no other part of the world had a life expectancy of less than 60 years in 2005.[28] Together, these factors inhibit the ability of many African countries to adapt to changes in climate. Poorer countries by definition have fewer resources and less resilience to deal with adverse climatic conditions, even in an early modest manifestation.[29]

Seventeen countries in sub-Saharan Africa are included in the list of the world's most fragile states

Governance includes all the rules and enforcement mechanisms that guide and coordinate people's behaviour with regard to a converted (both intended and unintended) outcome. Many countries in Africa without systems of good governance in place show an association between conflicts and poor law enforcement in protecting the natural resource base and in observing human rights.[30] The issue of democratic governance has moved to the forefront of Africa-European Union (EU) relations. The initial scope of governance under the Cotonou Partnership Agreement, with a focus on the efficient and transparent management of public finances, has been extended geographically and thematically into an ambitious agenda. The scope of

governance now covers the observance of human rights, the deepening of democracy and the strengthening of the rule of law, public-sector reform and the management of public finances, decentralisation and local governance. More effective state-civil society dynamics are central to the agenda, as are economic, political and governance development agendas. In this regard, Botswana uses revenue from diamond mining to finance investment in public sectors such as education, healthcare and infrastructure, thereby reducing poverty.

Africa has scored low on a composite measure of the development index over the years. Almost half the population of sub-Saharan Africa live on less than one dollar per person a day, face the challenges of a declining income per capita (1980 to 2000) and have the worst health conditions on the planet with the highest child mortality rate. Forty per cent of the population in the region are undernourished, over 60 per cent of the adult population are illiterate, and deforestation is high at 0,78 per cent annually. The relatively limited economic, human, infrastructural and information resources and poor governance lower the continent's adaptive capacity to climate change at local, national and regional levels. Against this background, armed conflict threatens lives and livelihoods, and exacerbates people's vulnerability to climate change. However, Africa is endowed with rich natural resources that are reflected neither in gross domestic product (GDP) statistics nor in systems of national accounts. Prioritising investments in the resources sectors for improving the well-being of populations as a whole is a much needed development option.

MANIFESTATIONS AND DYNAMICS OF CLIMATE CHANGE

Climate variability is not new in Africa's history, but the incidence and severity of floods and droughts have increased sharply in recent years.[31] Climate projections indicate this trend will intensify and increase the continent's vulnerability in coming years, especially as far as it concerns rain-fed agriculture, which employs about 70 per cent of Africa's population.[32] Without strong improvements in agricultural productivity, the region's food security will be at risk and livelihoods in jeopardy. The good news, however, is that many countries grow a large number of crop varieties for different uses and production needs, some of which have the ability to withstand drought and have a higher heat tolerance.[33]

The impact of climate change on human livelihoods in Africa will be generally severe, but the extent to which this will lead to violent conflict in the long term is uncertain and will at best remain controversial.[34] Several climate projections indicate rainfall increases in eastern Africa and some studies report increases in rainfall and vegetation cover in the Sahel. Others have reported uncertainties over specific crop responses in different regions of Africa under a climate change scenario. Some scholars have argued that climate change will not change the current security situation in Africa much since the existing socio-political structures are already prone to violent conflict.[35] These projections notwithstanding, there is ample evidence that climate change is already having a severe impact in many countries and regions of Africa, although the impacts differ even within countries. From the north-eastern to south-western regions, Kenya is experiencing a drying up of lakes and rivers, dwindling water supplies, serious food shortages and electricity shortfalls that are draining budgetary resources and dampening the prospects for economic recovery from the global financial crisis. Chad is losing a large percentage of its livestock population to droughts. Lake Chad is disappearing because of insufficient rainfall in the region, coupled with variations in climatic patterns, and its situation of extreme food insecurity is worsening.

Generally, the following conflicting patterns can already be distinguished. In recent decades the Saharan and Mediterranean regions and southern Africa have become more arid.[36] In the latter region there has been an increase in inter-annual rainfall variability over the past 40 years, with more intense and widespread droughts being experienced. This trend has occurred along with changes in seasonality and weather extremes.[37] Heavy rainfall events have increased in Angola, Namibia, Mozambique, Malawi and Zambia. Within East Africa, some regions have also experienced an increase in annual rainfall, with some regional variations within the same country as well. In West Africa, rainfall has increased in the last 10 years in comparison to the extended drought years from the 1960s to the 1990s, which saw the annual mean rainfall drop by as much as 30 per cent.[38] Average annual temperatures in Africa have risen by about 0,5 °C over the course of the 20th century. Some areas are warming faster than others. The countries of the Nile Basin, for example, saw an increase in temperature of between 0,2 °C and 0,3 °C per decade in the second half of the century, while Rwanda experienced temperature increases of 0,7 °C to 0,9 °C over the same period.[39] This gradual warming meant more hot spells and fewer cold days across the continent.[40] Climate change-induced variability will make the remaining productive land more precious. Natural resources in well-endowed African countries are likely to continue drawing external attention. Increasing demand for resources globally manifest themselves in a scramble for fertile land and mineral-rich locations as international powers and companies spread ever wider to secure supplies. The scramble for fertile land is already occurring in Ethiopia and Madagascar, where concerns over

resource rights and exploitation have been raised as investment firms or countries set business agendas. Countries in the Arabian Gulf, South Korea and China have invested in land in Africa to grow food crops, biofuels, etc. to meet their own domestic demands.[41] In the case of Madagascar, such engagements have raised the political temperature. This recent trend in 'land-grabbing' indicates that a global food price hike could provide strong incentives for foreign-owned concerns to control productive lands and make a profit, while access to food could be used as a political instrument by African governments. Rent-seeking behaviour and other forms of incentives to control resource access may increase and become a reason for remaining in power.[42] Such developments would be a clear manifestation of climate change impacts elsewhere in the world resulting in a decreased food supply.[43]

Changing disease patterns, diminishing access to food, water shortages and a rise in the sea level could lead to increased population movements within and across countries, and increasing competition over resources and incomes in migrant-receiving areas. A sea-level rise would threaten the densely populated coastal areas, lagoons and mangrove forests of both eastern and western Africa, possibly forcing major population displacements and movements. More than a quarter of Africa's population live within 100 km of the coast.[44] The number of people projected as being at risk from coastal flooding could increase from one million in 1990 to 70 million in 2080. Local food supplies are projected to be negatively affected by decreasing fish resources in large lakes owing to rising water temperatures, a situation that could be worsened by over-fishing and increased eutrophication levels. As many countries are ethnically fragmented and polarised, a potential risk exists that these conditions may result in violence.[45]

For many African countries, natural disasters oscillate between either too much or too little rain. A series of devastating drought years between the 1960s and 1990s in the Sahel,[46] and the more recent unpredictable heavy rains and associated severe floods experienced in Mauritania (2006 and 2010), Gorom-Gorom in northern Burkina Faso (2006), northern Niger (2006 and 2010) and Senegal (2006) are a few illustrative examples. Seventy-five per cent of African countries occupy zones where small reductions in rainfall could cause proportionately larger declines in river flow. Water partitions Africa and about half of sub-Saharan Africa's population lack access to a safe water supply.[47] By 2025, 1,45 billion people in Africa are projected to experience an increase in water stress or scarcity due to climate change. Water scarcity is even more acute in North Africa in view of the very high population growth rates and an already high rate of water resource use.

Diseases will likely spread as Africa is already vulnerable to a number of climate-sensitive diseases such as Rift Valley fever, which afflicts humans and livestock; cholera, which is associated with both floods and droughts; and malaria, where the warming climate has resulted in the extension of the malaria zone to the high-altitude areas of Kenya, Rwanda and Tanzania. These factors, superimposed on existing weak health systems, will have direct implications for humanitarian emergency responses. The interaction of the impacts brought about or compounded by climate change with other vulnerability factors are likely to cause large-scale migration and urbanisation within countries and across borders by people in search of better livelihoods.[48] Such developments will have severe humanitarian impacts and are bound to undermine peace and stability, add to urban poverty and increase crime. While water shortages are expected to increase the risk of conflict, actual conflict trends in Africa remain a controversial topic.

Changing disease patterns, diminishing access to food, water shortages and a rise in the sea level could lead to increased population movements

In summary, Africa is facing an economic loss of one to two per cent of GDP annually because of climate variability.[49] Global temperature increases are expected to lead to reduced rainfall and shortened crop-growing periods in western and southern Africa, and increased rainfall, heavier flooding, and fiercer and more frequent cyclones in north-east Africa. Overall, the effect of climate change on Africa may not be entirely negative as the continent could also reap considerable opportunities from this development. The World Bank's new climate strategy for the region, *Making Development Climate Resilient*,[50] focuses on knowledge and capacity development, the scaling-up of financing and mitigation opportunities.[51] One example is a pilot carbon sequestration project for agricultural carbon in Kenya, funded through the World Bank's BioCarbon Fund, which is purchasing carbon credits based on a mutually agreed price per tonne. In Madagascar, a BioCarbon Fund project is aimed at reducing carbon emissions by addressing deforestation through promoting sustainable livelihood activities in protected areas, while a project of almost US$80 million

will expand access to electricity in Mali. A number of World Bank-funded agricultural production risk projects in, for example, Ethiopia and Malawi, target rural farmers with the aim of reducing risks associated with natural adversity and climatic factors.

INTERNATIONAL RESPONSE TO CLIMATE CHANGE

The first major international meeting on climate change held in Geneva in 1979 discussed climate variability and how changes might affect natural resource-based and related human activities. In 1985, the Villach Symposium in Austria concluded that the increase in greenhouse gases could induce global warming and produce a serious rise in the sea level. This led to the presentation of the UN *Framework Convention on Climate Change* (UNFCCC) at the Earth Summit in Rio de Janeiro in 1992. It was here that climate change was noted as being a global phenomenon that required all countries to seek mitigation measures at all levels.[52] It was recognised that mitigation of the effects of climate change would require a compromise in the economic and social lives of nations as far as it concerned the exploitation of natural resources, energy production and utilisation, the disposal of waste, international trade, technological transfer, and information acquisition and dissemination. Sustainable policies could only have a chance of being implemented if national, regional and local authorities were to commit to defend, understand and agree on the strategies to be used, and make the stated international objectives their own.

Within the UN framework and that of other organisations such as the World Bank and the International Monetary Fund (IMF), the potential security implications of environmental change are not new. The issues were tabled, among others, during the UNFCCC Conference of Parties (COP) in Bonn in 2002. Most prominently, the UN Development Programme (UNDP) in its Human Development Report (HDR) 2007/2008 emphasised the consequences of climate change for human security.[53] The UNHCR was one of the first organisations to explicitly mention climate change as a threat to international security, giving the likely effects as being 'increased social tension and political conflict, both within and between states'.[54]

In 2000, the UNFCC parties (COP 6) met in The Hague, the Netherlands, to negotiate the rules and operational details governing the implementation and measurement of emission reductions in greenhouse gases (GHGs) by Kyoto Protocol member countries.[55] Until around this time, discussions on climate had focused mainly on mitigation options. Prevention of the long-term impacts on the planet's climate systems was sought through reductions in emissions of GHGs. The first IPCC report that alerted the world to the problem of the rapidly increasing greenhouse effect led to governments agreeing to take measures to stabilise their emissions at the UNFCCC levels at the Rio Earth Summit in 1992. In 1995, the second IPCC assessment report led to negotiation on the Kyoto Protocol (COP 3) in December 1997 in Kyoto, Japan. It was here that members of developed countries and countries in transition agreed to reduce their overall emissions of the common GHGs by an average of five per cent below 1990 levels between 2008 and 2012.

The world's richest countries, namely the G8 countries, began to discuss the impact of climate change on Africa at Evian in France in 2003 and agreed to strengthen international cooperation on global earth observation with a view to developing fully operational regional climate centres in Africa through the Global Climate Observing System (GCOS). At the Gleneagles Summit in Scotland in 2005, the G8 action plan shifted to a broader approach of energy efficiency, clean technology and support for adaptation. The proposed package included improvements to energy efficiency, the harnessing of funding for clean technology and an increase in the availability of such packages to developing countries, and assistance to vulnerable communities to adapt to the impact of climate change. At the summit of the Africa Progress Panel,[56] a body established in the wake of the Gleneagles Summit, the accord reached at the Copenhagen Summit in 2009 was merely 'noted', rather than being 'adopted', during the last minutes of an imperfect process. As a result, the summit constituted a lost opportunity in reaching a binding consensus on the threats of climate change. The Copenhagen Accord is clear on additional financing to be provided by developed countries to developing countries to deal with impacts of climate change, but uncertainties on the sourcing, management and disbursement of the proposed funding remain. This happened at a time when the impact of insufficient rainfall and rising temperatures in Africa became more obvious on a daily basis, and the efforts to achieve the MDGs became ever harder.

The UN Special Session on Africa in 1986, which created the UN Programme for Africa's Economic Recovery and Development (UNPAERD), demonstrated the international community's commitment to helping African countries in their efforts to fight poverty and achieve development. Because of this, the AU has raised adaptation to climate change to a priority and is seeking more support. In 2007, the AU called for the better integration of climate-change adaptation strategies into African national and regional development policies, programmes and activities. With regard to financing, the organisation has called for the urgent reform of the Global Environment Facility (GEF) funding mechanism to ease African countries' access to the facility's financial

resources, and the exploration of alternative sources of finance and mechanisms to support climate adaptation programmes in Africa.

In December 2007, Africa and Europe adopted a new strategy for their political cooperation and partnership. Their first action plan (2008–2010) set out eight close partnerships in areas of common interest,[57] inter alia on security, democratic governance, climate change and energy security, trade and migration. The international response to the potential security implications of climate change has been strongly driven by the EU. Indeed, the EU considers climate change as a major threat to its interests, as well as to international security and stability.[58] The UK, Germany, Sweden, Denmark, Greece, Finland and Spain, in particular, have been active within the EU, the UN and the Organisation for Security and Cooperation in Europe (OSCE). The likely security implications of climate change were also put on the agenda of the joint Nordic-African Foreign Ministers Meeting in March 2009.[59] African countries have been mostly absent from the international debate on this matter so far, which is unfortunate. Only the Seychelles provided a statement to the draft comprehensive report of the UN Secretary-General on the security implications of climate change in 2009.

While Africa contributes less than four per cent to global CO_2 emissions, most of its mitigation opportunities are linked to improvements, such as sustainable land and forest management, that bring solid development benefits. True to this, over 60 World Bank-supported projects in Africa already take the importance of combating climate change into account.[60] Through a US$250 million Forest Carbon Partnership Facility (FCPF), the World Bank continues to encourage more investment from public and private sector bodies and developing country governments to stop deforestation in return for access to carbon credits. In the fiscal year 2009, the bank prepared a strategy to integrate climate change in its activities in Africa more effectively and started mainstreaming this strategy into its investments and analytical work, initially in Ethiopia and Mozambique.

POLICY OPTIONS AND RECOMMENDATIONS

Policy options

Climate change is one of many security concerns facing Africa. Its impact may be magnified or moderated by underlying conditions of governance, poverty and resource management, as well as the nature of the impact at local and regional levels. If implemented in time and on the scale required, climate adaptation policies and programmes could help avert climate change effects and other environmental stresses before they trigger conflict. Adaptation options must recognise existing social, political and economic tensions, and avoid exacerbating them.

Natural resources may be concentrated in a relatively small part of a country, so that one region is better endowed and thus more favoured than other regions. In such instances, natural resource endowment does not always, unfortunately, turn out to be a blessing, but paradoxically becomes a resource curse. Examples are the eastern region of the DRC, where artisanal mining accounts for 80 per cent of all mineral exploitation, and the northern regions of Nigeria, Angola, Sierra Leone and Algeria. Favoured regions will often disagree with the redistribution of the proceeds from such resources to countries as a whole. Scholars have long considered the implications of polarity and the skewed distribution of natural resource proceeds on system stability and, by extension, on the occurrence of civil strife or war. The problem often arises from a common tendency in natural resource-dependent countries for resource revenue to be appropriated by a few individuals to the neglect of populations as a whole. Rent-seeking tendencies by leaders or individuals in elevated political positions, and high levels of poverty, rampant corruptions and conflict are common characteristics in resource-rich African economies.[61] Such situations have the potential to increase violent conflict, displace people internally and result in forced emigration, as has been the case in Darfur.

Natural resource endowment does not always turn out to be a blessing, but paradoxically becomes a resource curse

The seizing and control of resources by the elite, which results in a growing gap in wealth distribution and the availability of opportunities, and the abuse of electoral processes have often characterised economic and political governance in Africa. These issues stand in the way of sound development and nullify investment incentives. A concerted effort at resource redistribution to redress grievances is likely to be a far more effective means of conflict prevention than responding to conflicts as they occur, i.e. crisis management. The way in which countries or authorities deal with conflict situations is dependent on whether good governance or poor governance policies prevail in the country in question. Chad, for example, is employing traditional mediation

mechanisms to deal with potential resource conflicts related to climate change. Responding to any conflict in an effective and timely manner holds greater potential for its resolution.

The possibility of increased incidences of civil war as a result of climate change has a number of public policy implications.[62] Firstly, if conflicts are primarily the result of shocks to agricultural productivity and livelihoods because of a rise in temperature, then governments and aid donors can help to reduce the risk of conflict by improving the ability of the agricultural sector to deal with higher temperatures. Such efforts could include the development of better-adapted crop varieties and providing farmers with the knowledge and incentives to use them. Other options for safeguarding agricultural productivity in sub-Saharan Africa include improving the irrigation infrastructure and expanding rainwater-harvesting technologies where feasible. Secondly, the risk of latent civil wars in Africa can be reduced by the establishment of insurance schemes to protect poor households and communities from climate shocks. One option would be the extension of the recently initiated weather-indexed crop and livestock insurance schemes in Ethiopia, Malawi and Morocco. A variant of this would be to make the provision of donor assistance contingent on climate-risk indicators, such as 'rapid conflict prevention support' to augment local economic conditions when the risk of violence is high. The need for such mechanisms in Africa will become increasingly urgent if global temperatures continue to rise, rainfall continues to decline and climate-related shocks become more real.

Long-term planning for climate-sensitive resources should take into account the benefits provided by such resources. Changes in population and income will affect resource use, and so will climate change. By including climate-change consequences in long-term strategic plans, the result could be shaped to enhance the ability to cope with future unexpected changes and to minimise potential risks. For example, the government of Malawi has identified possible modifications to projects planned for implementation under the National Environmental Action Plan and the National Disaster Action Plan (NEAPNDAP).[63]

Farmers have a wealth of indigenous knowledge and coping strategies, for example using different crop varieties in specific ecological areas. A compilation of such information may be a cost-effective way of identifying feasible options. An inventory of existing practices and decisions should focus on actual social and economic decisions in the light of variable climatic regimes over time or region. For example, agricultural practices in the dry lands of the Sahel could be used in areas that may become drier. In particular, adaptation options that require long-term decisions should be identified and analysed for implementation.[64] The data collected on the most consistent basis regarding projects that seek improvements in human wellbeing and the environment are found in the records of the World Bank. For instance, of the 11 155 economic development projects carried out by the bank since 1947, about 18 per cent had 'environment and natural resources management', specifically biodiversity protection, as a major theme.[65] Beyond a missed scientific opportunity, conservation groups are risking damage to their reputations as they largely fail to deliver data that provides evidence of a link between their actions and improvements in the status of biodiversity or ecosystem services.

Evert Lindquist,[66] basing his work on a review of International Development Research Centre (IDRC) projects, suggests that climate change projects and networks tend to function on three levels, namely expanding policy capacities, broadening policy horizons and policy advocacy.[67] The intention of networks should be to build a critical mass of researchers and expertise that is often not available within individual countries, and to encourage mutual learning among them. In addition, they should aim to foster more coordinated, collaborative research efforts by which research of a quantity and quality greater than would otherwise be possible can be produced. This policy advice is based on the understanding that great conflicts in the world have been resolved by means of the work of scientific networks. Furthermore, scientific networks provide a neutral base from which to influence policy, such as, for example, the controversy over Nile River water.[68] Networks also provide unique opportunities for the inclusion of a range of stakeholders in their activities, with each one taking on those roles in which they are most capable and best positioned.

Lindquist's views emphasise the usefulness of including civil society stakeholders in research networks both to enhance the research process (drawing in new stakeholder perspectives, experience and ideas) and to take advantage of the strengths of local and civil society groups that are often better positioned to know the lie of the land. For example, the Eastern and Central Africa Programme on Agriculture Policy Analysis (ECAPAPA), which operates under the Uganda-based Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA), has been involving different stakeholders in the process of designing a network. This has enhanced participation by stakeholders in the network's activities and created a sense of ownership in the outputs. This places local-level organisations in a better position to take research results to the grassroots level and use them to influence policy-making from the bottom up.

Recommendations

A World Bank report of 2009 states that poverty and the high dependence on agriculture for economic growth are the main reasons for the fact that many developing countries will be hardest hit by climate change.[69] Yet, these economies are least able to afford the cost of managing or mitigating the effects of climate change. Planting and protecting forests will be a crucial part of the global response to climate change, in terms of both mitigation and adaptation. However, to get this policy prescription right the people living in and around the land to be reforested should be taken into consideration and be involved in the land-use change proposals. Payment for ecosystem services has been considered an efficient way of rewarding communities living adjacent to forest ecosystems and achieving conservation outcomes. Compensating end users, e.g. timber concessionaries and local farmers, for avoided deforestation is one way to limit GHG emissions and to mitigate climate change impacts. This begs an answer to the question as to who actually owns the trees in different parts of Africa.

Since the relatively poor countries and regions in Africa are likely to be the most affected by climate-induced changes and related negative effects, a fair response to climate change would be to include a comprehensive funding mechanism and compensation package from the most heavily polluting countries to the countries whose historical emissions are low. At the global level, the *World Development Report* urges the rich countries responsible for most greenhouse gas emissions in the past to act now in order to prevent the world from a catastrophic future climate.[70] The report also pleads with the rich countries to provide adaptation funds to developing countries so as to lay the foundation for low-carbon growth. If policy and financial incentives for climate adaptation and mitigation are to be successful and equitable, there is an urgent need for a solid scientific understanding of how services flow from one region to another. The focus should, on the one hand, be on what segments of populations benefit from ecosystem services and, on the other, what groups would need to be compensated for protecting those services.

The current unbalanced global trade relationships between the North and the South are seen to contribute to the negative ecological effects of climate change. The principle and application of carbon trading to abate environmental pollution is based on the invention of perverse property rights to pollution and to air. As the Copenhagen Accord reveals, African countries have difficulty in getting their voices heard at global decision-making forums and, as a result, have no voice in attempts to find solutions to climate change, even though they are affected directly.[71] Strategies on climate change should be developed at global, regional and national levels, along with effective partnerships for democratic governance. Doing so will, to a large extent, involve the formation of a people-centred partnership and an increase in the involvement of civil society in the design and implementation processes.

Participation by civil society in the various stages of the joint strategy is critical. It constitutes a good recipe for every mutual relationship and enables each actor's specific role in the partnership to be identified. Africa-based non-governmental organisations (NGOs) should take an active role in harnessing the continent's natural resources for more sustainable development through environment-friendly initiatives. They should also be involved in informing, mobilising and organising civil society into a politically influential body with the means and the will to shape the direction of state policies and guide local development processes.

The unbalanced global trade relationships between the North and the South are seen to contribute to the negative ecological effects of climate change

The great uncertainty regarding global greenhouse emissions and local weather events results in many policy-makers taking chances with scarce financial and human resources. Yet, the precautionary principle calls for action even when the probability of impact by a changing climate is low. Such measures, e.g. the improvement of resource efficiency in the areas of water and energy to counter flash floods and recurrent droughts, are defined by having benefits that outweigh costs, regardless of the level of climate change impact. However, the different international frameworks on climate change mitigation and adaptation, emission trading, food, water, energy, etc. need to be linked and integrated to allow for a comprehensive approach. This should include developing global early-warning systems and information-sharing networks on climate change, security and conflict in Africa.

Many international agreements and treaties have been ratified, particularly on the sharing of trans-boundary water resources. Such binding commitments will need to be reviewed in the light of climate change and apparent regional imbalances. This will require improved regional negotiation, cooperation and coordination to manage and allocate shared resources equitably. Reference here can be

made in particular to sharing the water of rivers, such as the Nile, in a sustainable manner. In this respect it needs to be kept in mind that neither societies nor resource users are monolithic, and that climate change cuts across all segments of societies and transcends borders. For these reasons, negotiation, communication and coordination within and between countries and communities will be vital. Integrated risk reduction policies and the mainstreaming of climate change need to be key priorities to decrease vulnerabilities and improve resilience in the face of climatic changes.

Deforestation is responsible for 20 per cent of annual global CO_2 emissions and constitutes the main source of GHGs from many developing countries. Although Brazil and Indonesia are the worst affected countries, six of the ten largest forest losses are in sub-Saharan Africa. Currently, decisions not to clear forests are not eligible for carbon funding under the Clean Development Mechanism (CDM), the multi-billion-euro European carbon markets or the World Bank BioCarbon Fund. The past decade has also witnessed a sharp reduction in Official Development Assistance (ODA) financing directed at the forestry sector. This reached an all-time low in 2004 of only 0,3 per cent of total ODA flows.

Increased forest-related funding would lessen the problem, but financial incentive schemes that offer adjacent populations livelihood support and welfare would be required to reduce deforestation. A better understanding of the drivers of deforestation and the economic incentives for the clearing of forested areas by landholders could provide solutions that would encourage them to conserve forests. Much deforestation takes place to convert forest areas to relatively low-return, short-term uses, which suggests that financial incentives may not have to be very high to reduce deforestation significantly. Financial incentives would need to be designed carefully and be accompanied by a package of incentive schemes, from payment for environmental services to addressing poverty and protecting the vulnerable. In the long run, such schemes would not only increase forest cover, but also improve potentially tradable carbon stocks and the welfare of populations living adjacent to forests.

With support from its development partners, Africa took a pro-active approach in the preparation of the leading proposals, from global emissions control to equitable access to carbon finance, for the UNFCCC Conference of Parties in Bali in December 2007. The continent needs to work with the international community and other stakeholders to facilitate progress in reducing deforestation and to meet the livelihood needs of its peoples. Development partners should ensure that the necessary new or additional funding is available to enhance the full implementation of the Clean Energy and Development Investment Framework (CEDIF) that is being developed jointly by the African Development Bank (AfDB) and the World Bank.

The promotion of clean cooking and the use of biofuels are other approaches to reducing GHG emissions. Acute respiratory diseases are among the largest causes of death in developing countries. Switching from relatively inefficient traditional biomass fuels to kerosene, liquefied petroleum gas (LPG) or biogas would, in addition to helping the environment, produce significant positive health effects for the users. Botswana already offers useful lessons on the large-scale substitution of firewood by LPG. Biofuels have a role in a small number of countries such as Mauritius and Zimbabwe that have successfully developed potentially important biofuels based on their large sugarcane industries. Overall, however, the prospects of biofuels becoming an alternative energy source in Africa to mitigate the effects of climate change are rather limited, considering current technological development.[72]

For Africa, addressing the challenges of climate change and climate variability would be a major step towards addressing existing security threats and their concomitant challenges. This does not in any way imply that climate change is only a minor nuisance. On the contrary, the opposite is true. But it should be borne in mind that engaging contemporary climate-related problems is less important than building up resilience to face up to the impacts of climate change. The continent is the most vulnerable to climate change because of its heavy dependence on the natural environment and its climate-sensitive economic sectors, e.g. crop and livestock farming. The region also has high levels of poverty and a low capacity to adapt. Climate variability and extreme weather events are already affecting the economic performance of African economies severely. The uncertainty about the final effects of climate change poses a challenge for the introduction of adaptive measures and raises the stakes for risk-reduction efforts. This calls for a search for innovative solutions to reduce climate risks.

One such option in the pilot stage is the implementation of a rainfall-linked insurance scheme for small farmers in Morocco, Malawi and Ethiopia.[73] Traditional insurance against crop failure has tended to create perverse incentives that permit less productive farmers to let their crops fail so as to collect compensation. The resultant higher payouts have inflated premiums, making it unaffordable for deserving poor farmers. The new type of insurance contract is written against a rainfall insurance index and provides security and production incentives. As long as rainfall is below an established threshold, farmers receive payouts. Neither the crop or livestock farmer nor the insurer needs to verify damages, while at the same

time farmers have an incentive to make the best production choices.

CONCLUSION

This paper has attempted to link climate change, security (conflict) and governance, with particular reference to Africa. In the first instance, climate change may pose different types of security threats. These include insufficient rainfall and rising temperatures, which affect human livelihoods as a result of environmental stresses, ranging from severe droughts to resource scarcity and conflict because of intensified land use. In instances of limited capacities and weak institutional and governance structures, these factors can trigger conflict and create instability. Secondly, conflict may also arise from new environmental conditions arising from climate change-related events, such as a rise in the sea level and extreme weather events. Thirdly, the uncertainty regarding the intensity of climate change may have irreversible global consequences. The solution is the application of the precautionary principle of taking action even when the probability of the impact of climate change is low.

In mineral-rich countries, a link exists between the exploitation of natural resources, the flow of arms and the persistence of conflict. Control of the flow of arms may assist in reducing both the illegal exploitation of resources and conflicts partly financed by resource revenue. For countries endowed with rich mineral deposits or other natural resources, for example Sierra Leone and the DRC, disclosure of revenues earned from such resources would be important for transparency and good governance. On the other hand, resource scarcity in countries such as Algeria and the impact of drought in the Sahel region have intensified grievances, reaching a critical threshold in Sudan, where pre-existing tensions that led to violent conflict were exacerbated. In such instances, putting into place good governance structures could be instrumental in breaking the cycle of climate-change effects. To break the link between the impact of climate change and conflict in Africa would require comprehensive policy responses from governments and international communities. In addition, Africa urgently needs to put into place a common policy on specific key sectors, such as pastoralism and trans-boundary resources.

It is clear that Africa suffers greatly from the unpredictable consequences and injustice of climate change. Addressing the interaction between climate change and agricultural activities is likely to require a complex set of policy strategies. This is an important requirement, given Africa's significant dependence on agriculture. Climate change impacts agricultural production directly through high temperatures, greater water requirements for crops, more variable rainfall and extreme climatic events, which will result in substantial decreases in crop yields. Without the adaptation of agricultural crops, Africa will suffer severe drops in yields by 2030. Livestock production in dry lands will suffer too because of a deterioration in rangeland conditions, and the notably adverse changes in plant composition from palatable to non-edible species.

Africa is the continent that can least afford the cost of managing and mitigating the adverse impacts of a changing climate. For this reason, climate adaptation and mitigation policies in agriculture should involve financial and technological inputs, including the better understanding and application of indigenous knowledge and coping strategies. Adaptation to climate change should also target a faster increase in productivity and involve a range of social and economic factors, such as promoting education and literacy. All in all, Africa urgently needs to tackle the consequences of increasing climate variability and temperature increases in order to maintain its performance and preserve recent dynamic growth patterns and economic gains.

Putting into place good governance structures could be instrumental in breaking the cycle of climate-change effects

Furthermore, the continent needs a strategy to enable individual countries to participate in the decision-making processes and the implementation of development agendas. This assumes the introduction of democratic rules and the establishment of peace and security. Good democratic governance, the application of the rule of law and adherence to justice are preconditions for achieving success in economic development and environmental conservation. This observation is significant given the fact that a disproportionately large percentage of Africa's population is directly dependent on the land for its livelihood.

Given the many weak states and the poor enforcement of national laws in Africa, NGOs should actively take on governments as far as environmental and human rights abuses are concerned, and consolidate their efforts to build democratic governance and foster economic recovery. In this process, transparency in the allocation and distribution of public and external assistance funds is crucial and should be guaranteed. Authorities and external donors should track the money that is employed in the

mitigation of climate change and those who benefit directly. They should also evaluate whether specific projects provide the desired results to reduce the effects of climate change on natural ecosystems and sectors such as agriculture, water, energy and human security.

External interventions have a tendency to increase the duration of civil wars, but, interestingly, mediation has in most cases resulted in an end to hostilities. Interventions in civil conflicts reveal the significant policy implications of the identity of an external mediator, such as within the context of a UN peacekeeping model, increasing the chances of post-war stability. This seems in part to explain the frequency of diplomatic interventions in civil wars since the 1980s in the form of, for example, economic or military interventions that aim to shape future conflict policy.

Mainstreaming adaptation policies for climate change to integrate systematically new projects focusing on biological diversity into local, national and regional agricultural policies is essential. African farmers, scientists and policy-makers should work in concert to develop a sustainable use of biological resources, since these underpin the basis of human survival and are a safety net for the majority of rural communities in Africa. Research networks can influence policy if relevant information reaches potential recipients more effectively. However, the influence of research on policy is not straightforward and the benefits of research for society cannot be assumed from the start. This underlines the need to constantly seek strong leadership and vision in research, and to build research capacity. On this note, strong leadership is an absolute requirement for good governance in Africa. In many countries with poor governance there is a close association between conflict and poor law enforcement in protecting the natural resource base and human rights, and it is clear that without good governance there is little likelihood of finding peace. Indecision by African countries and failure by them to act in addressing the consequences of climate change will be catastrophic for progress. In the light of the accumulated evidence on climate change, current policy decisions will have a greater impact on future challenges than the decisions by any previous generation. The correct policy decisions on climate change need to be put in place sooner rather than later.

Nearly 50 per cent of the population of sub-Saharan Africa live below the poverty line. Measuring poverty in monetary terms is the common practice for assessing human welfare. However, rural communities and households in Africa are highly vulnerable to a changing climate and extreme weather events. In light of this, there is a strong justification for mainstreaming climate change into future government policies and development strategies. Failure to integrate the costs of climate change and climate vulnerability in welfare assessments is bound to seriously undermine adaptation to climate change and the efforts being made to reduce poverty and attain the MDGs. Ultimately, the challenges of climate change, governance and security in Africa can be resolved through cooperation and commitment to enforcing relevant treaties and agreements.

NOTES

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ABOUT THE PAPER

Adaptation and climate risk management is becoming an increasingly important policy discourse in almost all African countries. There is consensus that a response to climate change demands a concerted approach grounded in the principle of collective but differentiated responsibility. However, divergences in the perceived causes of climate change have revealed a deep divide between the developed and developing worlds.

The aim of this paper is to review and assess the existing evidence on the security threat of climate change, with particular reference to Africa. The paper addresses the question to what extent climate change poses a threat to security and conflict in Africa. It further seeks to identify manifestations of climate change, the sectors and regions most likely to suffer from the adverse impacts of climate change, and the associated incidence of conflict.

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