



Climate change, population pressure and conflict in Africa

INTRODUCTION

Climate change presents humanity with its largest challenge in recorded history. Its predicted effects over the coming decades include extreme weather events, droughts, flooding, rising sea levels that could affect countries such as Nigeria and Mozambique, retreating glaciers (although not in Africa, but with global impact), changes in habitats and increased spread of life-threatening diseases such as malaria. Little concrete analysis has been published on the relationship between climate change and conflict, however, and even less on the potential role that population growth plays in intensifying that pressure. Today Africa is home to the most rapid levels of population growth and of urbanisation in the world and will shortly have more people than China. Already it is inhabited by 14 per cent of the world's human population – a proportion that will rise to 25 per cent by 2050. Africa will inevitably face greater challenges owing to climate change than any other region.¹

Some, such as UN Secretary General Ban Ki Moon, have sought to make a direct link between climate change and violence in Darfur owing to resource competition – a trend that will accelerate as Africa's population expands to over a billion people in the next few years. Writing in the *Washington Post* in June 2007, he stated that: 'Amid the diverse social and political causes, the Darfur conflict began as an ecological crisis, arising at least in part from climate change.' Moon based his argument on changing rainfall patterns since the early 1980s and the resource competition, primarily over grazing and water that followed between Arab nomadic herders and black farmers. 'By 2003,' he writes, 'it evolved into the full-fledged tragedy we witness today.'²

The potential linkages between climate change, population pressure and conflict appear overwhelming, informed by much recent writing on resource wars, and, until recently, the thesis advanced by Paul Collier that African conflicts were largely driven by resource competition masquerading as issue-based politics – and

therefore by greed and not by grievance. Much of Colliers' arguments have been reformulated in subsequent years, but what remains missing is recognition of the global impact that climate change will have across the world owing to its effects in Africa.

Africa is characterised by widespread and deeply entrenched poverty, slow economic development until recently, and agricultural systems proven to failure during frequent and persistent drought. With its tremendous natural resources and remarkable social and ecological diversity, the continent reflects a close dependency of people on natural resources. It is this dependency that will present Africa with potentially severe adaptive problems in dealing with the twin effects of climate change and population growth in future years, as this paper illustrates. At the same time the last decade has seen steady improvements in economic growth, reduction in levels of conflict, improvements in the quality of governance and the number and quality of democracies.

CLIMATE CHANGE: THE EVIDENCE

It is now widely accepted that human-induced (anthropogenic) greenhouse gases (GHGs) are largely responsible for climate change. According to the most recent synthesis report from the Intergovernmental Panel on Climate Change (IPCC), GHG emissions increased by 70 per cent between 1970 and 2004, and anthropogenic warming and sea-level rise will continue for centuries, even if GHG concentrations were to be stabilised at current levels – itself an impossible challenge, given the demand for energy by current and future populations. One of six types of gases that form part of GHGs, carbon dioxide (CO₂) is far and away the most important anthropogenic GHG. Annual emissions of CO₂ grew from 21 to 38 gigatonnes (that is, by roughly 80 per cent) between 1970 and 2004. In 2004 CO₂ represented 77 per cent of total anthropogenic GHG emissions, of which the majority (56.6 per cent of total) came from fossil-fuel usage. Land-use change is another significant but smaller

contribution. Energy-related CO₂ emissions are therefore the single most significant contributor to GHGs and hence to anthropogenic climate change, more important than deforestation/decay of biomass and the release of methane.³ According to the IPCC, 'The largest growth in GHG emissions between 1970 and 2004 has come from the energy supply, transport and industry, while residential and commercial building, forestry (including deforestation) and agricultural sectors have been growing at a lower rate.'⁴

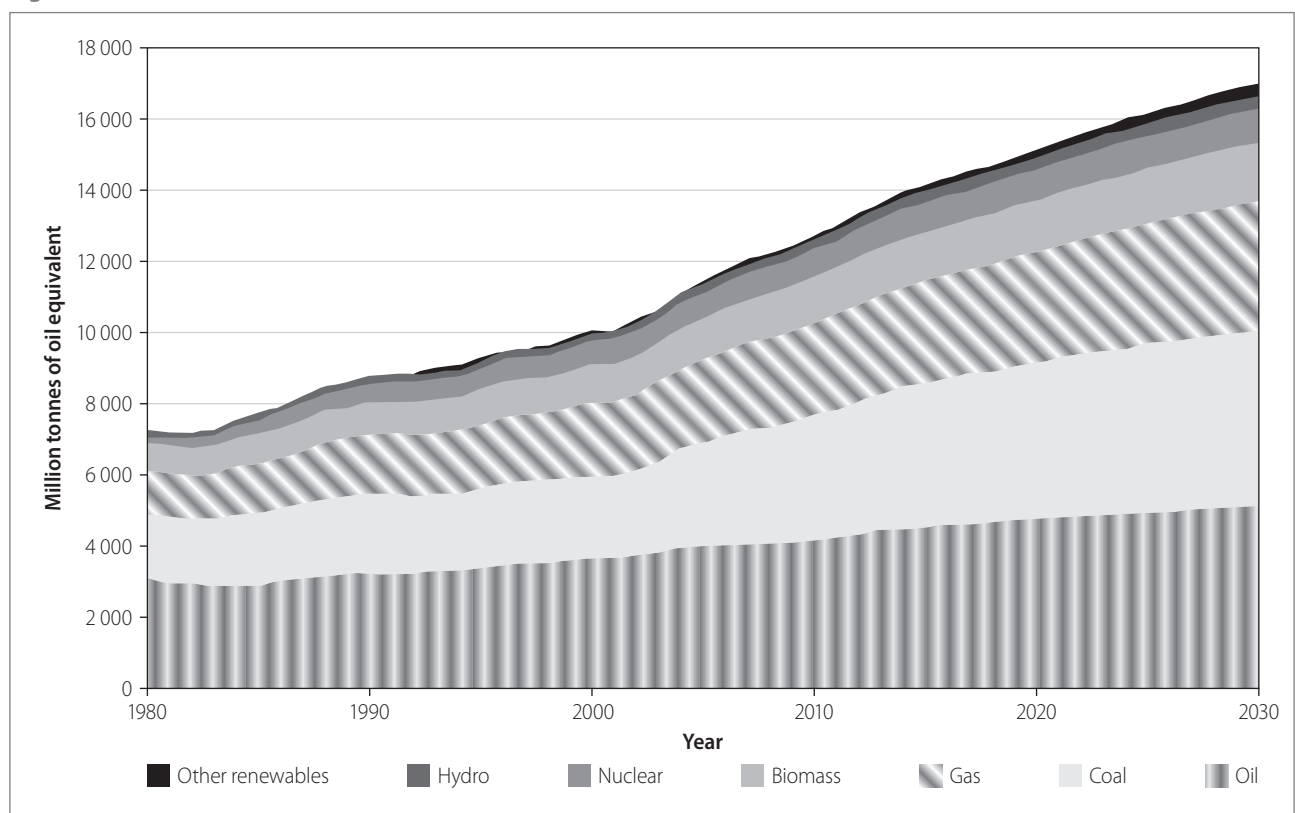
Shortly before the onset of the current economic crisis, world energy demand was projected to expand by 45 per cent between now and 2030 – an average rate of increase of 1,6 per cent per year – with coal accounting for more than a third of the overall rise (see figure 1). Much of the demand for oil in the period until 2030 will come from China (43 per cent) with India (20 per cent), the Middle East (20 per cent) and other emerging Asian economies responsible for the rest.⁵ Hence three quarters of the projected increase in energy-related CO₂ emissions will come from China, India and the Middle East.⁶ These expectations will be adjusted downwards in the months to come, in line with much lower economic growth rates that can now be expected as the rich world goes into recession, but the trend will resume in a year or two once the global economy has stabilised from its current crisis. If the intervening period provides a moment of respite in the headlong rush towards global climate change catastrophe, some countries appear tempted to renege

on earlier commitments towards mitigation as budgets shrink and growth projections (and associated GHG emission levels) are revised downwards.

Growth in wealth and in population numbers are key drivers of global emissions, although CO₂ emissions per unit of energy supplied have fluctuated over time, and differences in per capita income, per capita emissions and energy intensity among countries are significant. For example, in 2004 Africa, then with almost 920 million people, contributed 7,8 per cent of GHG emissions, while the USA and Canada, with 326 million people, contributed 19,4 per cent of emissions.⁸ Or put differently, Africans contribute less than one ton of CO₂ per person per year, compared with the 19,9 tons CO₂ per person per year contributed by Americans (with literally one vehicle for every one of its citizens) and the 8,2 tons by Europeans.⁹ The reasons for these vast discrepancies are obvious for Africa produces only 3 per cent of global electricity and the vast majority of people in sub-Saharan Africa still depend on traditional biomass for cooking. Under current projections, the number of electricity-deprived people is projected to increase in the coming decades as the population grows.¹⁰ In Mali for example wood and charcoal represent 80 per cent of the country's national energy consumption.¹¹

Population growth and economic development are driving unsustainable levels of greenhouse emissions. Recently the International Energy Agency (IEA) released the World Energy Outlook 2008 in which it warns that:

Figure 1 IEA reference scenario 5⁷



‘Current global trends in energy supply and consumption are patently unsustainable – environmentally, economically and socially ... It is not an exaggeration to claim that the future of human prosperity depends on how successfully we tackle the two central energy challenges facing us today: securing the supply of reliable and affordable energy; and effecting a rapid transformation to a low-carbon, efficient and environmentally benign system of energy supply.’¹² This, the IEA, noted, set the backdrop for a required energy revolution – the need to move to alternative sources of fuel and to avoid a potential oil-supply crunch.

Africa’s carbon absorption capacity will play a critical role in our common global future. What is left of Africa’s tropical rainforests is in Central Africa, since that in West Africa has largely gone – in a country such as Nigeria through population pressure, and in Côte d’Ivoire as a result of commercial logging and agriculture. The band of West African tropical forests that once extended from Guinea to Cameroon has been extensively depleted through logging and farming, as these lowland formations were relatively easily accessible from the coast. As a result, only 22,8 per cent of the original 500 000 km² of tropical forests remains in West Africa, much of which is degraded. According to Mongabay:

The effects from forest loss are yet to be fully understood, though erosion has greatly increased, as has the incidence of drought in the interior countries of Mali and Niger... The rainforests of Central Africa still cover a substantial area ... More than 70 percent of Africa’s remaining rainforests are located in Central Africa,

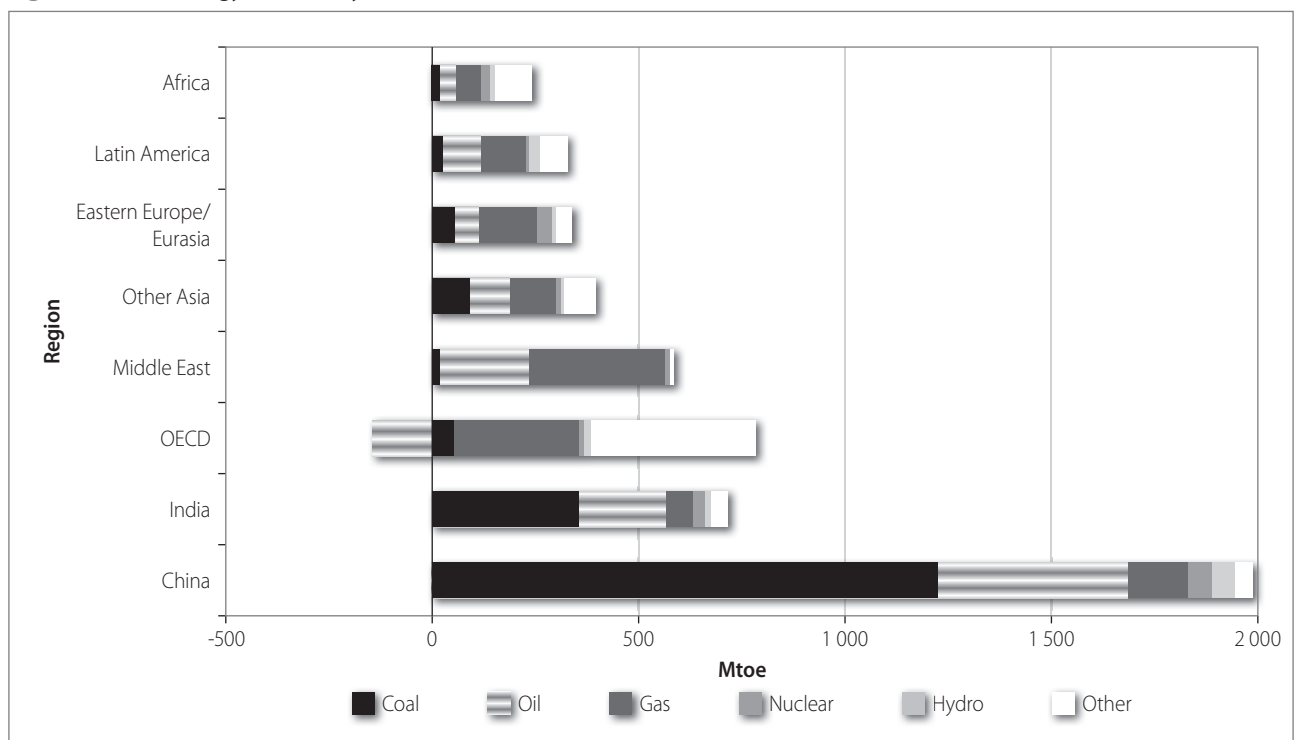
covering about 1,875 million square km ... in the Congo Basin in the Democratic Republic of Congo (formerly Zaire), Congo, and Gabon.¹⁴

Without urgent changes to the widespread illegal logging in countries such as Gabon and Cameroon, much of what is left of the world’s green lungs will disappear as commercial logging spreads from the accessible coastal forests to remote interior forests.

The most recent Synthesis Report of the IPCC (re-released in 2008) looks at the entire state of climate change, irrespective of the source of such change, natural or the result of human interaction. It notes that there is unequivocal evidence of the warming of the climate system – eleven of the last twelve years (1995–2006) rank among the twelve warmest years since the accurate recording of global surface temperatures in 1850. In addition, it is widespread across the globe and highest at higher northern latitudes. Increases in sea levels, the report notes, are consistent with warming, recently rising at an average rate of 3,1 mm per year. The extent of snow and ice decreases is most evident in the Arctic. Precipitation has increased significantly in eastern parts of North and South America, northern Europe and northern and central Asia, whereas rainfall has declined in the Sahel, the Mediterranean, southern Africa and parts of southern Asia. Extreme weather events have changed with fewer cold days and nights, and intense tropical cyclone activity in the North Atlantic and probably elsewhere.¹⁵

Although less widely reported than many other areas, Africa suffers quite severely owing to the impact

Figure 2 Global energy demand by 2030¹³



of dramatic swings between drought and floods (rainfall and river flows in Africa display high levels of variability), evident in the 2000 cyclone in Mozambique (which displaced 500 000 people and caused 950 000 people to require some form of humanitarian assistance) and the alternating droughts and floods in Somalia and Ethiopia (in late 2006, early 2007) and other parts of East Africa.¹⁶ Most recently, in January 2009, the South African coastal city of Durban was hit by a number of cyclones that left extensive devastation in their wake, including several thousand homeless.

An area such as the densely populated Niger and Nile river deltas could see damages because of storm surges increasing, saline water contaminating groundwater, river deltas being inundated, and even the croplands being destroyed. The Niger Delta accounts for about 7,5 per cent of Nigeria's land area and has a population of 20 million people.¹⁷

Natural systems are being affected by these regional climate changes, particularly those related to snow, ice and frozen ground, but generally also through changes such as early timing of spring events, leading to longer growing seasons. Shifts are occurring in algal, plankton and fish abundance in high-latitude oceans, as well as changes to coral reefs, among others.¹⁸ 'Sea level rise and human development are together contributing to losses of coastal wetlands and mangroves and increasing damage from coastal flooding in many areas. However, based on the published literature, the impacts have not yet become established trends.'¹⁹ Other changes include decreases in snow cover and the extent of northern hemisphere sea ice, as well as increases in soil temperature.²⁰

The IPCC has published and updated four groups of scenarios that explore alternative development pathways, covering a wide range of demographic, economic and technological driving forces – and resulting GHG emissions. The current global recession will impact severely on GHG emissions and on the affordability of policy responses. This is probably closer to what the IPCC has termed the A2 scenario – reflecting lower levels of economic growth – than to any of the others. Noting that climate data coverage is scarce, uneven and limited in developing countries,²¹ the IPCC summarises the impact of climate change on Africa as follows:²²

By 2020, between 75 and 250 million people are projected to be exposed to increased water stress due to climate change.

By 2020, in some countries, yields from rain-fed agriculture could be reduced by up to 50%. Agricultural production, including access to food, in many African countries is projected to be severely compromised. This would further adversely affect food security and exacerbate malnutrition.

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 to 10% of GDP.

By 2080, an increase of 5 to 8% of arid and semi-arid land in Africa is projected under a range of climate scenarios.

Since almost all of Africa's fifty river basins are trans-boundary, changing rainfall and run-off could impact on border delimitation, providing further impetus for the recent process launched by the African Union (AU) to gather all available information on the continent's colonially determined borders to help forestall future disputes. Less than one quarter of Africa's 45 000 km of international borders has currently been demarcated. Agricultural production, which relies mainly on rainfall for irrigation in many African countries, is already a risky business owing to the historically high levels of variability of rainfall and river flows on the continent, and will decrease with further seasonal variability (a trend already evident since 1970) with higher rainfall anomalies and more intense and widespread droughts. Harvests could shrink, possibly severely in the Sahel, West Africa and southern Africa. Agricultural yields from some rain-fed crops would most seriously affect small-scale farmers and subsistence farmers as a result of desertification, soil salinisation and water scarcity. This would affect sorghum in Sudan, Ethiopia, Eritrea and Zambia; maize in Ghana; millet in Sudan; and groundnuts in Gambia. In the absence of substantial increases in food production elsewhere on the continent, Africa would require much higher levels of food aid than currently – developments that could tax the humanitarian response capacity of African governments and providers of humanitarian assistance.²³

Reviewing those systems and sectors that would be particularly affected, the IPCC notes, among others:²⁴

... coastal: mangroves and salt marshes, due to multiple stresses; ... water resources in some dry regions at mid-latitudes and in the dry tropics, due to changes in rainfall and evapotranspiration, and in areas dependent on snow and ice melt; agriculture in low latitudes, due to reduced water availability; low-lying coastal systems, due to threat of sea level rise and increased risk from extreme weather events; human health in populations with low adaptive capacity.

Despite the comparative lower levels of data available from the continent, the IPCC singles out the impact of climate change on Africa as a 'double whammy' because of low adaptive capacity – weak governments with limited capacity owing to the extent of poverty, unequal

Table 1 The summary impact of climate change on Africa will, according to the IPCC

Phenomenon and direction of trend	Likelihood	Example of impact on agriculture, forestry and ecosystem	Example of impact on water resources	Example of impact on human health	Example of impact on industry, settlement and society
Over most land areas, warmer and fewer cold days and nights, warmer and more frequent hot days and nights	>99%	Decreased yields in warmer environments; increased insect outbreaks	Effects on some water supplies		Increased demand for cooling; declining air quality in cities
Warms spells/heat waves. Frequency increases over most areas	>90%	Reduced yields in warmer regions owing to heat stress; increased danger of wildfires	Increased water demand; water quality problems, eg algal blooms	Increased risk of heat-related mortality, especially for the elderly, chronically sick, very young and socially isolated	Reduction of quality of life for people in warm areas without appropriate housing; impacts on the elderly, very young and poor
Areas affected by drought increases	>66%	Land degradation; lower yields/crop damage and failure; increased livestock deaths; increased risk of wildfire	More widespread water stress	Increased risk of food and water shortage; increased risk of malnutrition; increased risk of water-and food-borne diseases	Water shortage for settlements, industry and societies; reduced hydropower generation potentials; potential for population migration

access to resources, conflict and incidence of diseases such as HIV/AIDS and malaria – that will compound the projected climate change impacts discussed above.²⁵

Africa is a large, warm continent where average annual temperatures have risen approximately 0,5°C over the course of the 20th century. This warming was not uniform, of course. According to Eriksen and others, the countries of the Nile Basin 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 saw temperature increase between 0,7°C to 0,9°C over the same 50-year period.²⁶ The summary impact of climate change on Africa according to the IPCC, is shown in Table 1.²⁷

But it is not only Africa's large landmass that will be affected. One billion people rely on fish for their main source of protein, including a substantial number of Africans – a figure that is rising as global consumption of fish and fish products is increasing. In China, for example, per capita fish consumption has risen from 5 kg in the 1970s to 26 kg in 2008. Rising demand for fish is occurring as fish stocks globally are declining owing to over-fishing.²⁸ Global marine catches have stagnated at around 85 million tonnes for a decade owing to excessive exploitation of decreasing stocks²⁹ and while national jurisdiction now extends some 200 miles (320 km) from the coast or edge of the continental shelf, 95 per cent of fishing occurs within their exclusive economic zone (EEZ).³⁰ It is in this context that Africa's marine resources are gaining in strategic and financial value. According to André Standing, 'As fish resources elsewhere are decreasing and the demand and value for fish is steadily rising, there is a growing dependence by foreign fishing

fleets, particularly from the European Union (EU) and Asia, on gaining access to historically underexploited waters of developing countries.'³¹ He adds that the growth in commercial fishing has been particularly high in West Africa, where total landings of fish have grown from 600 000 tonnes in 1960 to 4,5 million by 2000. Tragically, these increases in catches are not available to Africans because over-fishing and the prominence given to exporting fish means that Africa is the only continent where fish supply per capita is on the decline from its relatively low levels of 6,5 kg per capita. To maintain this relatively low level of consumption, given the growth in population growth discussed elsewhere in this paper, would require domestic fish production to increase by over 25 per cent over the next decade.³²

Oceans are also important for many other reasons, apart from the obvious one that they represent around 95 per cent of world's living space. Two examples suffice for the purposes of this paper. The first is that 25 per cent of world oil is estimated to lie beneath the Antarctic. The second is that shipping produces around 700 million tonnes of CO₂ per annum (substantially more than aircraft and a sector not mentioned in the Kyoto Accord) – a figure that could double by 2050.³³

Much more important from the perspective of climate change is that the oceans absorb about a third of the CO₂ released into the atmosphere by human activity. As global CO₂ levels rise, the earth's oceans necessarily become more acid since, when CO₂ is dissolved into water, it forms carbonic acid. The subsequent impact runs throughout the marine ecosystem as the organisms most affected are at the bottom of the food chain. These changes are

necessarily minute and incremental, given the immense size of the oceans, and will inevitably have an impact well beyond current humanity – but a recent paper by the Tyndall Centre for Climate Change Research in England argues that the world’s oceans are becoming acidic more quickly than climate change models predict.³⁴

POPULATION GROWTH

Global population numbers are set to rise from 6,671 billion in 2007 to 7,295 billion in 2015 and 8 billion in 2025, reaching more than 9,2 billion people by 2050. A massive 1,3 billion people will have been added to global totals in the period 2007 to 2025 alone, and slightly less in the following 25 years.

An increased number of these will be Africans. While Africa now has 954 million people – 14 per cent of global population – it will host 17 per cent by 2025. By 2050 a quarter of the world’s population will live in Africa – the largest portion of all continents. Africa therefore has substantial momentum in its population growth in the midst of a veritable explosion of its population and the move of its people from rural to urban areas. While these developments set the scene for future economic growth, African environmental stress will be sharply accentuated by its population growth and associated demand for food and energy.

It is well documented that the African state faces many challenges. Of Africa’s very youthful population,

some 133 million (half of the continent’s youth) are illiterate. Many young people have few or no skills, and little training and vocational assistance is provided. Over 20 per cent of young people in sub-Saharan Africa are unemployed at a time that labour immobility has reduced the bargaining power of organised labour.³⁶ If Africa is able to convert its youth bulge into a worker bulge, the continent is set on a high growth trajectory.

Although Africa is currently roughly halfway through a demographic transition from high to low death and birth rates, the extent of the transition differs from region to region, with southern Africa being the most advanced and West and Central Africa still in a period of rapid population growth. In general, mortality rates in Africa started to decline from 1945 and fertility from 1985 – but it will take some time before fertility rates reduce sufficiently to impact upon population growth rates, reflected in figures 4 and 5.³⁷

Nigeria, DR Congo and Ethiopia will remain on a rapid growth trajectory, although Egypt’s population will also steadily increase. Rapid population growth in Uganda will propel that country into the fifth most populous country in Africa by 2050, ahead of others with relatively large populations such as Tanzania, Kenya and South Africa – a country that will see relatively modest population growth in the decades ahead.

The impact of population growth is self-evident. In sub-Saharan Africa recent economic growth has helped reduce the share of people in extreme poverty

Figure 3 Key global population trends: 2007, 2015, 2025 and 2050³⁵

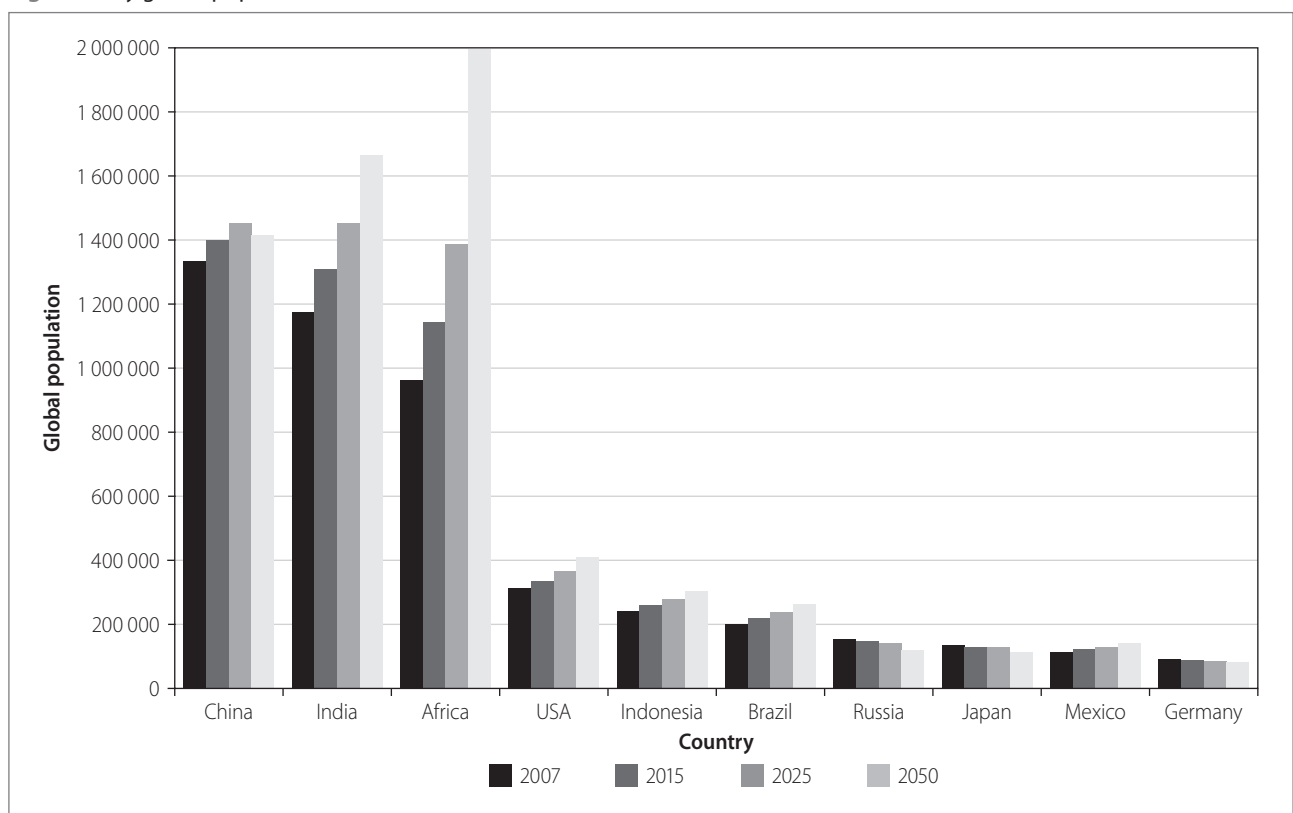
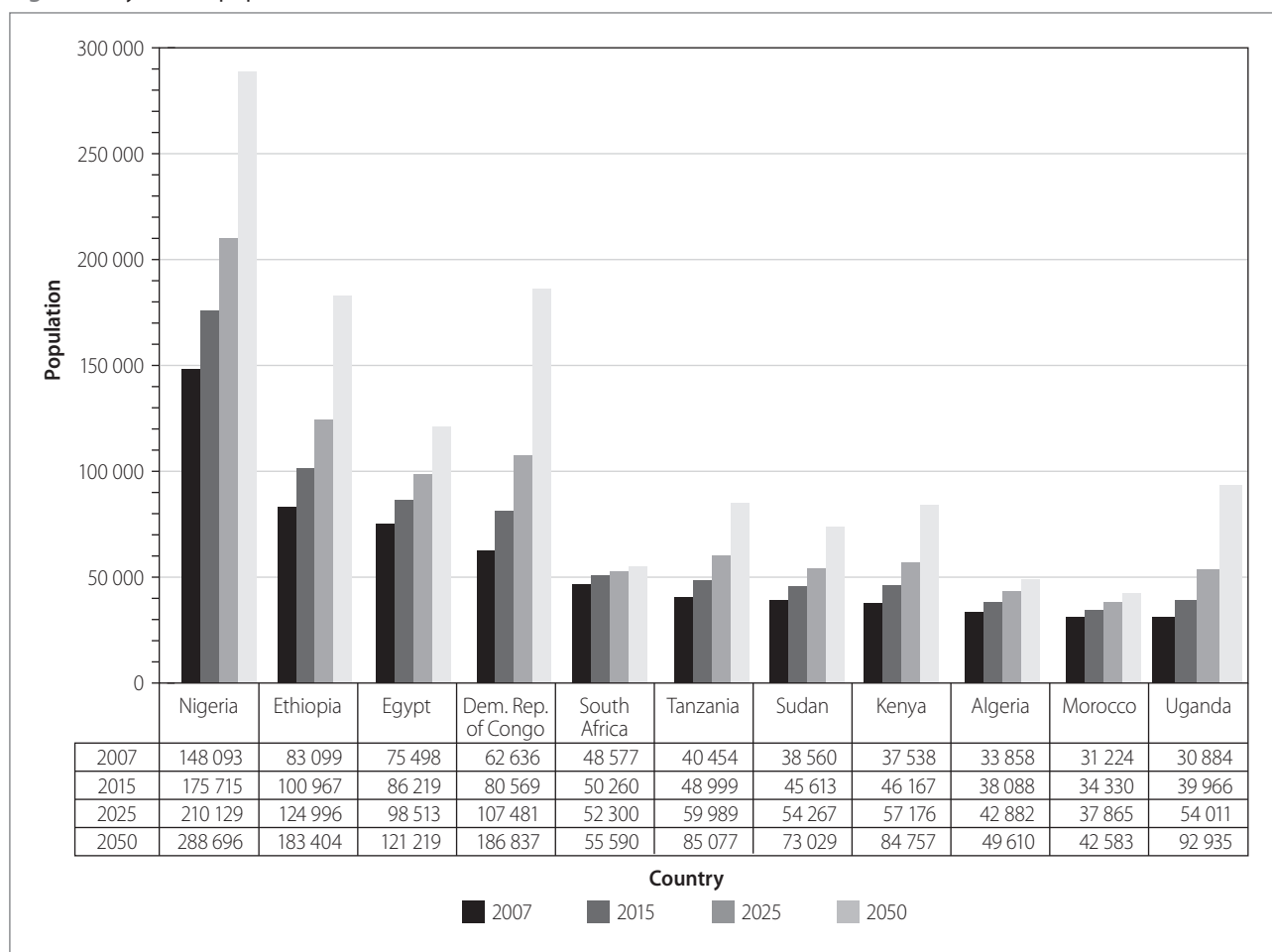


Figure 4 Key African population trends: 2007, 2015, 2025 and 2050



by 4 per cent from 1999 to 2004. Nonetheless, population growth has suppressed these gains and kept the number of people suffering \$1 per day poverty at nearly 300 million—more than 40 per cent of the region’s population.³⁸

URBANISATION AND URBAN POVERTY

An increased number of Africans are moving to urban areas – at a rate of 3 per cent per annum. Although they are currently still dominantly rural, 50 per cent Africans will live in urban areas before 2030. In effect, Africa’s urban population will double by 2030 – from a current 373,4 million to 759,4 million. This is more than all the current city dwellers in the West. By 2050 there will be more than 1,2 billion African city dwellers.³⁹

These figures necessarily conceal huge regional differences. East Africa is the least urbanised region in the world, but it is urbanising rapidly, to the extent that it has the world’s shortest urban population doubling time, less than nine years – from 50,6 million in 2007 to a projected 106,7 million by 2017. With much higher current urbanisation figures, the rates of urbanisation in North and southern Africa are lower.⁴⁰

While urbanisation is set to become a major coping mechanism for the impact of environmental stress, urban poverty in Africa is severe, with 66 per cent of those in urban areas living in informal settlements and slums. Yet it is not the largest cities that are absorbing new arrivals from rural areas, but the intermediate cities and towns with fewer than 500 000 inhabitants. By 2015 there will be 53 African cities with an average population size of 3,1 million people, and the three African giants, Cairo, Kinshasa and Lagos, will also grow rapidly.⁴¹

That major cities in the USA, such as Atlanta, New Orleans and even Washington DC, have similar levels of inequality (as measured with the Gini coefficient) to key African cities such as Abidjan and Nairobi is scant comfort because the absolute levels of poverty in African cities is immense. According to the new State of the World’s Cities Report, released by UN-Habitat in October 2008, cities in sub-Saharan Africa have the highest levels of urban poverty in the world.⁴² Although rural poverty is pervasive in the region, more than 50 per cent of the urban population in the poorest countries lives below the poverty line. Though Freetown in Sierra Leone, Dire Dawa in Ethiopia and Dar es Salaam in Tanzania are among the most equal cities in sub-Saharan Africa, with Gini coefficients of 0,32, 0,39 and 0,36,

respectively, the Gini coefficient in urban Kenya rose from 0,47 in the 1980s to 0,575 in the 1990s. (A Gini coefficient below 0,4 is generally considered the acceptability threshold where 1 indicates perfect inequality and 0 perfect equality.)

Inequality in South African and Namibian cities is most pronounced and extraordinarily high, despite the dismantling of apartheid in the early 1990s. In fact, urban inequalities in these two countries are even higher than those of Latin America. The average Gini coefficient for South African cities is 0,73, while that of Namibian cities is 0,62, compared with the average of 0,5 urban Latin America. Maputo, the capital of Mozambique, also stands out as a city with high levels of consumption inequality, with a Gini coefficient of 0,52.⁴³

The inequality in these cities is deepened by gender inequality – a form of inequality that cuts across others, so that it is a feature of rich as well as poor groups, racially dominant as well as racially subordinate groups, and privileged as well as untouchable castes. It is part of the process that causes poverty in a society and must therefore constitute part of the measures to eradicate poverty and solve inequality in the growing population and urbanisation trends.⁴⁴ If women are marginalised, the situation with Africa's children is worse.

MIGRATION

Since the 1960s, an increased number of Africans have sought to migrate to Europe, legally and illegally, in search of jobs and better living conditions. Population and ecological pressures in Africa will intensify this trend as will the extent of migration within the continent owing to water and other scarcities. In one of the few authoritative papers on the issue, renowned environmentalist Norman Myers warns:

Box 1 The Nile as a source of conflict

Egypt is entirely dependent upon the Nile and its policies towards Ethiopia, the Sudan and others, shaped and informed by this reality. Numerous attempts at redefining the colonial agreements that still form the basis for the use of Nile waters have been fruitless and the potential for substantial interstate conflict severe. Historically there have been frequent clashes between Egypt, Sudan and Ethiopia over sharing the Nile water and the 1959 bilateral agreement between Sudan and Egypt on the 'full utilisation of the Nile' is not accepted by others. Some argue that Egypt and Ethiopia are already engaged in proxy wars and the former has repeatedly argued that it would be prepared to go to war to protect its Nile water supply. The tributaries to the Blue Nile system in Ethiopia contribute more than 86% of the Nile waters while its population suffers from severe drought and recurrent starvation. The White Nile contributes the remainder, losing a considerable amount of water to swamp areas near its source and then to evaporation in its course through arid Sudan.

Source Debay Tadesse, The Nile: Is it a curse or blessing?, ISS Paper 174, 1–3, November 2008, Institute for Security Studies, Pretoria.

There is a new phenomenon in the global arena: environmental refugees. These are people who can no longer gain a secure livelihood in their homelands because of drought, soil erosion, desertification, deforestation and other environmental problems, together with associated problems of population pressures and profound poverty. In their desperation, these people feel they have no alternative but to seek sanctuary elsewhere, however hazardous the attempt. Not all of them have fled their countries, many being internally displaced. But all have abandoned their homelands on a semi-permanent if not permanent basis, with little hope of a foreseeable return.⁴⁵

WATER SCARCITY

Adequate supplies of fresh water for drinking, sanitation and irrigation are one of the most basic prerequisites for human habitation. Most countries in the Middle East and northern Africa are already considered water scarce, and by 2025 Pakistan, South Africa and large parts of India and China will also be water scarce.⁴⁶ Lack of a reliable supply of clean water presents immense challenges in Africa with its high rural population and dependence on rain-fed agriculture. Without water, economic and social development is not possible. There are about 50 internationally shared river and lake basins in Africa, the major ones being the Niger, Nile, Zambezi and Orange river basins and Lake Chad. Most of the surface water resources are concentrated in the Congo, Niger, Ogooué, Zambezi and Nile. An essential part of freshwater systems, less than 10 per cent of Africa's river and lake basins, is covered by wetlands.

At one level, Africa has enough freshwater resources – roughly in global proportion to its current population – but these are extremely variable in time and space, evident in an uneven distribution of surface and groundwater resources. North Africa is the driest region, followed by eastern and southern Africa. Central Africa boasts the largest share of Africa's renewable water resources.⁴⁷ A total of 65 per cent of Africa consists of drylands, the most prominent being the massive Sahara desert in the north (which is spreading) and the Kalahari desert in the south, in severe contrast to the tropical belt of mid Africa and its abundant freshwater resources. Already much of sub-Saharan Africa is experiencing hotter climates and reduced rainfall owing to climate change. Estimates are that up to 34 per cent of the surface area of Africa could be under threat of desertification.⁴⁸

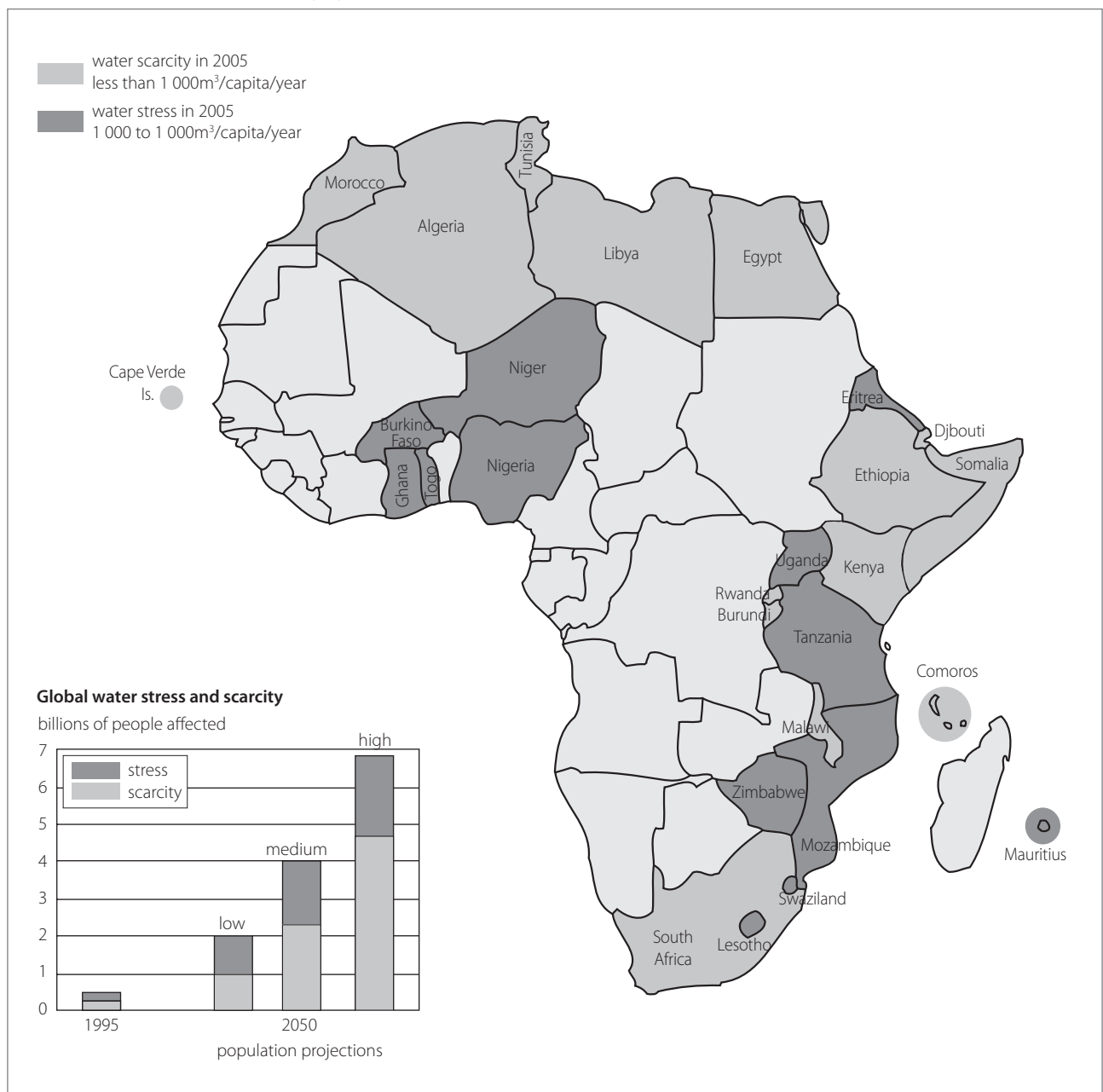
Although disputes over access to water have often flared into conflict at local level, they have seldom been the cause of major conflagrations, although poor management of water resources can undercut the stability of a region. The challenges are probably most severe in the absence of social control systems such as weak governments and

social fragmentation – evident in a region such as Darfur that has traditionally existed at the margins of Sudanese politics, but also as a result of the severe and irregular droughts experienced in the Sudano-Sahelian region. The competition between herders and farmers in Darfur saw nomads moving southwards in search of water and grazing, and placing them in competition with the farming tribes in those areas. While events in Darfur are well known, food shortages affected 25 African countries and up to 200 million Africans in the last decade.⁴⁹ Changes in rainfall in much of northern, eastern and southern Africa – already parched – could therefore have a dramatic impact on livelihoods in these poor regions as reductions in soil moisture reduce arable land and hence the potential for food production. Since Africa will experience the highest population growth in the world, it will face the

greatest demand for food production or imports in a region experiencing a declining ability to meet these demands.

In reviewing the spatial distribution patterns of rainfall in southern Africa, the three most economically developed countries in the region – South Africa (497 mm/year), Botswana (400 mm/year) and Namibia (254 mm/year) – all receive less than the regional average. According to Anthony Turton, ‘water scarcity is a fundamental developmental constraint, not only to South Africa, but also to the entire SADC region’.⁵⁰ South Africa, the largest economy in Africa, has already allocated some 98 per cent of its national water resource, hence ‘South Africa simply has no more surplus water and all future economic development (and thus social wellbeing) will be constrained by this one fundamental fact’.⁵¹ An important implication, he continues, is that

Map 1 Freshwater stress and scarcity by 2025⁵²



Box 2 The Congo River as a source of cooperation

Second only to the Nile in length in Africa, the Congo flows through the second largest rain forest area in the world and has the largest drainage basin and water flow in Africa. The proposed Grand Inga Project, near the river's mouth into the Atlantic, would cost \$50 bn and could generate some 40,000 MW, twice the amount of power of China's Three Gorges Dam and enough to provide energy for all of Africa's people. The scheme is supported by the power utilities of Botswana, Namibia, Angola, Congo and South Africa and will be a cornerstone of a pan-African power grid.

Source: Jeevan Vasagar, Could a \$50 bn plan to tame this mighty river bring electricity to all of Africa?, Guardian.co.uk, 25 February 2005, <http://www.guardian.co.uk/world/2005/feb/25/congo,jeevanvasagar> (accessed 19 January 2009).

'South Africa has lost its dilution capacity, so all pollutants and effluent streams will increasingly need to be treated to ever higher standards before being discharged into communal waters or deposited in landfills.' For Turton, the implications are grave. Taking possibly an extreme view, he argues that with a continuation of South Africa's current development trajectory 'then we can say, with a reasonable degree of certainty, that social instability will grow and South Africa will slowly slide into anarchy and chaos'.⁵³

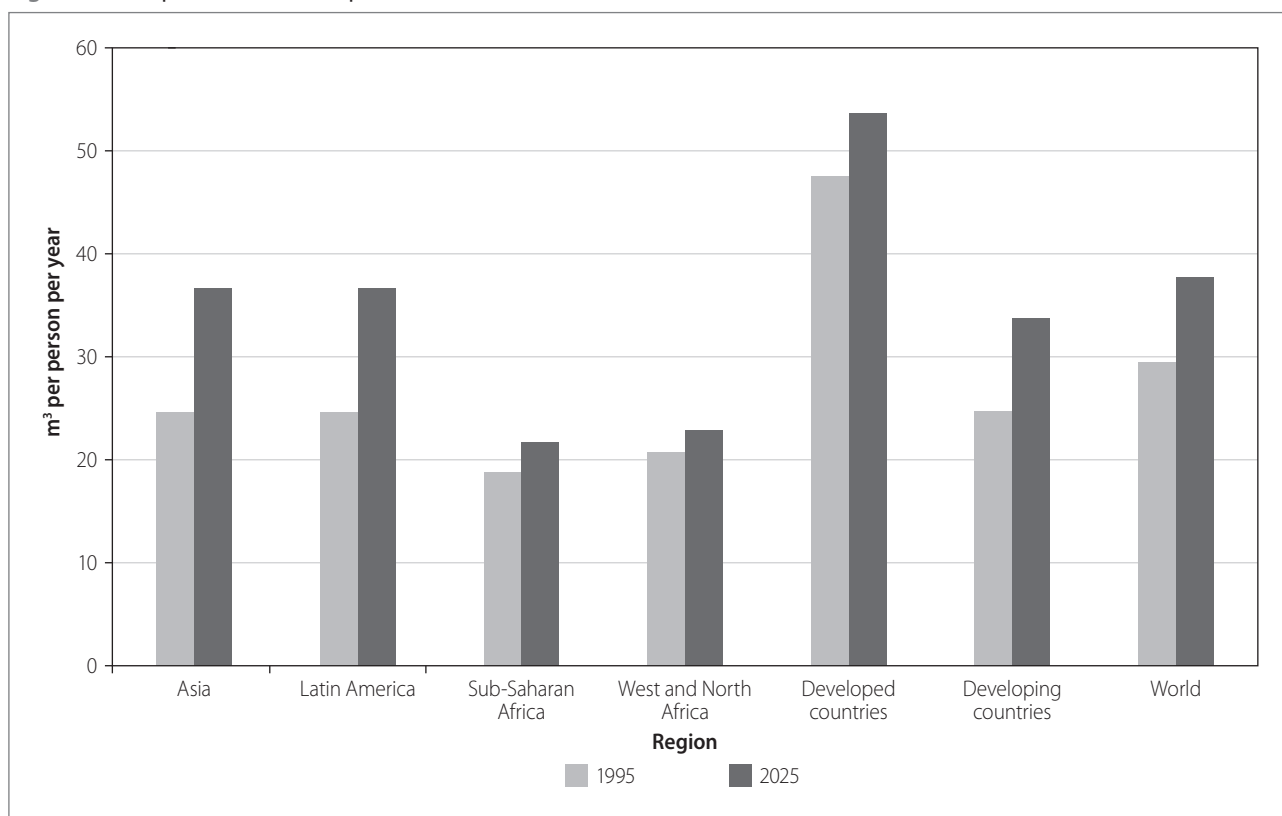
Unlike other regions, all the major centres of development in southern Africa are located on watershed divides. Instead of being located on rivers, lakes or the seashore, Johannesburg/Pretoria, Gaborone and Francistown, Windhoek, Bulawayo and Harare are all located on or

very close to watershed divides, implying that water supply cannot be based on gravitational flow. The supply of water to sustain urban development is therefore expensive and pollution is highly concentrated. Already the Gauteng region has to import water at great expense from the Lesotho Highlands Water Project and the Vaal river system. A 2008 WWF report warned that at current usage rates, water demand would exceed supply by 2013 – with substantial capital investment this could be stretched to 2025.

As this paper has shown, the demands of Africa's massive urban growth in the next decades will increase the pressure on the quality and quantity of local water resources. Current scarcities of fresh water will have increased markedly, and global demand for food will rise by 50 per cent by 2030, leading to steep price increases. Hardest hit will be rain-fed agriculture – which covers 96 per cent of all cultivated land in sub-Saharan Africa, a figure substantially larger than that in South America and Asia. It is a cruel irony that Africa's rapid urbanisation will partly offset some of the worst impacts of climate change, as rural subsistence farming is most likely to be the hardest hit.

Historically, farmers and pastoralists, fishers and forest dwellers have adapted to many changes in the climate by modifying crops and farming practices to suit new conditions. However, the severity and pace of climate change in the 21st century will present unprecedented challenges that will affect the poor most adversely as they depend upon climate sensitive activities and have

Figure 5 Per capita water consumption, 1995 and 2025⁵⁴



a low capacity to adapt. While worldwide, agriculture represents about 70 per cent of water withdrawal – in sub-Saharan Africa the figure is 87 per cent.⁵⁵

EXPLAINING CONFLICT

The March 2005 Report of the Commission for Africa found that 'Africa has experienced more violent conflict than any other continent in the last four decades'.⁵⁶ Most of the world's armed conflicts now take place in sub-Saharan Africa and at the turn of the 21st century more people were being killed in wars in this region than in the rest of the world combined. Most of the 24 major armed conflicts recorded worldwide in 2001 were on the African continent, with 11 of those conflicts lasting eight years or more.⁵⁷ Estimates show that wars stripped about US\$18 billion a year from African economies between 1990 and 2005⁵⁸ and there is serious concern that the impact of climate change will accentuate the propensity for conflict in Africa. Previously, until 2006, conflict in Africa had declined substantially from the extraordinary high levels that followed immediately upon the end of the Cold War in the early 1990s.

The political behaviour of people in the majority of African countries is distinctly derived from the continent's material poverty. Poor countries do not have the means (armed forces, law enforcement agencies and the like) to enforce state authority and, receiving little benefit from membership of regional organisations, while local groupings have few constraints to asserting their relative autonomy. It has been well established that the higher the per capita income a country enjoys, the lower its risk of armed conflict. This is why most wars take place in very poor countries and why Africa is the most violent continent. This violence has resulted in a stream of refugees on the continent, the vast majority of whom are women and children.

The evidence for this war-poverty association is reflected most starkly in the basic coincidence of instability and war that coexist with poverty and underdevelopment globally. Also, the lower a country's per capita income and the lower its growth rate, the greater the risk of a coup d'état. Africa's low economic growth rates (at least until the mid 1990s) and extreme poverty made it particularly coup prone, and in a sort of self-fulfilling prophecy, a history of past coups increases the risk of future coups – just as a past history of armed conflict increases the risk of future conflicts, and conflict in a neighbouring country increases regional instability.⁵⁹

Beyond poverty and lack of development most analysts agree about the centrality of the nature of the African state in explaining instability – and the reasons are evident. Modern African states were created by outsiders and held in place first by colonialism and then,

during the Cold War, by superpower rivalry before the external scaffolding was removed shortly after the collapse of the Berlin Wall. Already the continent was at the mercy of the neo-liberal prescriptions of the international financial institutions and together with the mismanagement by the continent's own leaders, the 1980s and 1990s were a difficult time for Africa. To compound matters, in the aftermath of the Cold War large sections of the state-run networks that were engaged in transport, training, provision of arms and equipment, money laundering and the like were ostensibly disbanded, but often effectively privatised – not only in the hope of a more peaceful globe, but as part of the downsizing of the defence and security sectors by the two opposing power blocks that followed the collapse of the Berlin Wall. In search of sustenance, these networks served to lubricate resource competition in Africa. While there are only a few collapsed or failed states in Africa, most African states are still weak, because governance in many has contracted rather than expanded for several decades in parallel with the acute economic crises experienced by the continent till recently.⁶⁰

From the mid 1980s the lack of development and the weakness of states had been accentuated through rising external debt, structural adjustment programmes, the disengagement of cold war patrons, and the advance of democratisation. These factors combined to challenge the prevailing political order. In many cases, these changes disrupted the stability of African state formations, increasing resource competition, and accentuated the unsustainable character of the post-colonial social system.⁶¹ That appeared to start to change in recent years. While freedom of the press, the rule of law and government transparency remain weak, and corruption is widespread at many levels of politics and the economy, literally all indices show strong improvements over the last decade. The large majority of African countries enjoy rising levels of prosperity, stability, and the normalisation of fragile state situations. More than 19 presidential and parliamentary elections were held in 18 African countries in 2007, although often marred by low turn-outs, particularly in Nigeria and Egypt, and abstention (in Algeria). Most elections are peaceful. Incumbent heads of state are often re-elected by wide margins, as are new presidents. Even in Zimbabwe, amid substantial intimidation and manipulation, the governing party maintained a charade of electoral process – a façade that fellow dictators of a decade earlier would have dispensed with at an early stage.⁶²

Violent conflicts in Africa are of a regional and unregulated character that reflects the absence of effective governance across national territories. Many governments do not have the capacity to regulate the number of weapons in society (to name one item), and with poorly

trained and armed police and military forces, sub-state actors are able to challenge and threaten the authority of the state. Hence the government in Kinshasa has virtually no ability to control events in Kivu province of the DR Congo (four hours flying time distant to the east), where a local warlord, Laurence Nkunda, set up an alternative administration in 2008. Practically, these arrangements translate into little capacity for disaster preparedness and almost no ability to cope with extreme weather events.

African conflicts often spill across state boundaries from a sub-region in one country to another next door. These clashes generally occur in areas outside formal state control. In the eastern DR Congo, for example, the conflict over access to the lucrative coltan and tantalite mining is between local militias, backed by business interests and foreign governments. In extreme cases (such as between Central African Republic, Chad and Western Sudan), insecurity and instability is a single, complex and interrelated problem that is an intrinsic part of the lack of state capacity and the absence of development.

Recent years of stellar economic growth have not been accompanied by prosperity for most ordinary Africans, income has not trickled down

Without administration and the application of rule of law – the nexus between the legitimate and illegitimate activities of business – government, criminals and conflict triggers are often difficult to distinguish from one another. Thus arms flow across national borders and involve numerous national and international actors – evident in reports in December 2008 that detail how the Mugabe regime obtained arms through Kinshasa in the face of global outrage about suppression in that country.

Internationally the most vivid example of the challenges presented by a collapsed state is the extent of piracy off the shores of Somalia, a country that has not had a central government since 1991. Last year (2008) saw 124 incidents of piracy off Somalia and about 60 successful hijackings. As a result, nearly 400 people and 19 ships were held along the Somali coast at the end of 2008.⁶³ Generally human-induced action often serves to accentuate nature. Hence heavy rains in Zimbabwe over the 2008/9 Christmas season extended the cholera crisis created largely by the collapsing administration system of the Mugabe regime.

FUTURE FLASHPOINTS

The interplay between resource competition, poverty and the mobilisation of ethnic and religious identities in Africa is complex, but characteristic of politics in numerous countries. Examples include the 1994 genocide in Rwanda that was furthered by violence over agricultural resources and the repeated cycles of religious-political violence in the regional capital city of Jos in Plateau State in Nigeria in 2001, 2004 and 2008. In the Darfur area of western Sudan, the United Nations estimates that the conflict has left as many as 500,000 dead from violence and disease. The combination of decades of drought, desertification, and overpopulation is among the causes of the Darfur conflict, because Baggara nomads searching for water have to take their livestock further south to land occupied mainly by Black African farming communities. In Côte d'Ivoire, crop-funded violence between so-called locals and foreigners (and northerners and southerners) has been manipulated by political leaders to the extent that the country has now been split into two for several years. In Kenya land has long been used to reward ethnic political support in the Rift Valley, largely between the Luo of western Kenya from the shores of Lake Victoria and the Kikuyu from central Kenya surrounding Mt Kenya. In Zimbabwe racial mismanagement of the economy has turned a country that was self-sufficient into a net food importer. Little support was provided to new farmers, no training and provision of capital to tide them over and the result was the decline of the Zimbabwean agricultural sector. In many of these politically induced conflicts, leaders aim to compensate for poor delivery by resorting to extreme policies and exhortation to violence. The result is an increase in violent competition for resources.

It has also been evident from data on poverty and human development that recent years of stellar economic growth have not been accompanied by prosperity for most ordinary Africans. Income has not trickled down, but has been captured by a small elite, while the majority of citizens have often seen an increase rather than a decrease in the effort required to obtain basic subsistence. Clearly the 2008/9 global recession will impact on African growth, as the scramble for African commodities will cool from the red-hot competition evident previously. As US consumption declines, China is cutting back on manufacturing and African commodity prices are falling, as less is needed to fill a smaller order book.

In an energy-hungry world, the competition for petroleum is set to intensify. Africa has only about 10 per cent of proven global oil reserves, but its location outside the Middle East and the fact that much of its oil is offshore and 'light and sweet' have made it an attractive international destination for exploration and exploitation.

In the absence of appropriate systems of governance, the discovery of oil is often fatal for democracy and sustainable development in poor countries. It undermines good governance and the streams of petrodollars invariably lead to corruption wherever oil is found. A third of the world's civil wars take place in oil-producing states and an oil-producing developing country is twice as likely to suffer internal unrest as a non-oil producer.⁶⁴ Libya and Nigeria have the largest proven oil reserves in Africa and while Libya consistently ranks as one of the top African countries on the Human Development Index, oil has reduced the Niger Delta in Nigeria to an ecological disaster zone rife with local unrest. Recently Angola became Africa's largest oil producer, overtaking a position long held by Nigeria. While Angola has seen annual GDP growth rates in excess of 15 per cent for eight consecutive years,⁶⁵ this massive wealth is available only to a handful of families in Luanda, with little or nothing for its populace. This is also true of Gabon and Equatorial Guinea, which have already squandered their oil blessings with little apparent result. Recent modest discoveries will see a number of African countries set to join the oil-producers of the future, including Ghana, Mauritania, Mozambique, Madagascar, Uganda, Kenya and Ethiopia. Included in this list are a number of Africa's better performers – countries with a track record (of recent democracy, such as Ghana) and solid economic growth (such as Mozambique). Others have a less impressive recent pedigree and could well succumb to the deadly embrace of the resource curse.

The existence of resources such as oil along internationally ill-defined borders has already proved to present problems. There have been clashes between troops from Uganda and DR Congo on Lake Albert in September 2007 and more recently between Nigeria and Cameroon over the decision by Nigeria to abide by a court ruling to give the Bakassi peninsula to Cameroon. In Sudan the oil rich town of Abyei has become a repeated flashpoint between troops from the government in Khartoum and the southern rebel group Sudan People's Liberation Army (SPLA). A peace deal ended the conflict in 2005, but could not resolve the boundary for the oil-rich area that both sides claim. In 2011, autonomous Southern Sudan is scheduled to vote on whether to break away as an independent state or remain united and share power with the north. Abyei is to hold a separate vote on whether to retain its special administrative status in the north or become part of the south. Besides its oil, Abyei is the focus of a dispute over grazing rights between migratory Arab herders from the Messeria tribe, who are aligned largely with the north, and the Ngok Dinka, who are affiliated with the south. Similarly a long-standing dispute between Equatorial Guinea and Cameroon has yet to be resolved to create a precise maritime boundary in the hydrocarbon-rich Corisco Bay.

With Africa set to provide between 25 and 40 per cent of US oil by 2015 and the expectation that China will shortly import the bulk of its oil supplies from the continent, foreign competition is sure to remain a factor – particularly between private US companies and state-owned Chinese ones. Apart from its modest oil blessings, the continent is a source of key strategic minerals such as bauxite, chromium, platinum, diamonds, gold, cobalt and manganese – all of which are crucial to the growth of manufacturing in China, India as well as the west.

CONCLUSION

While current emissions of GHGs aggravate the challenge, the fundamental source of climate change is the stock of emissions that has been accumulated since the Industrial Revolution. Since 1850 for example China has contributed around 8 per cent of the world's total emissions of CO₂, although it is the top emitter of carbon dioxide today. The United States has been responsible for 29 per cent and Western Europe for 27 per cent of historic emissions.⁶⁶ While China and India need to contribute their part to a global solution, it is clearly the industrialised and rich countries of Europe and North America – those responsible for the bulk of greenhouse gases and that have built tremendous wealth for themselves in the process – that need to bear the brunt of the alleviatory burden. Different from any previous era in recorded history, the strain that humans place on the planet set clear limits on current development paths for countries that aspire to the wealth and affluence evident in the United States and Europe. Among many factors, richer and more people are eating better, as well as more and different foods (more meat in particular, but also more fish), with the result that global meat consumption has doubled in the last 25 years and fish stocks are rapidly being depleted. The area of land needed to produce animal feeds has expanded accordingly, while the farming of fish has become a major source of environmental degradation elsewhere. Vehicle ownership is exploding, the demand for water expanding and, of course, that for energy. Put differently, the world as we know it would long since have ceased to exist if the consumption patterns of the West were to be achieved by Indians and Chinese, let alone by Brazilians, Russians, Mexicans, and people from Indonesia and Turkey. Projections of change in which people in China and India will eventually be as affluent as those in the West should therefore be treated with a healthy amount of scepticism as the world is nearing the end of fossil-fuelled industrial development.

In this cruel irony, the development options pursued by the West are being shut off for the rest.

Yet the argument of who is responsible is important only insofar as who should make greater contributions

towards meeting the costs of mitigation and adaptation. More important than apportioning blame is the assumption of responsibility for amelioration by all of humankind – governments, business and civil society, rich and poor, Africans, Americans, Indians and Chinese. Seen against this backdrop the current global economic downturn is an important and welcome check on unsustainable consumption patterns.

Africa, the continent that produces the least amount of GHGs, is almost universally seen as most at risk of its deleterious impact – not only because of possible changes in its climate, but because it has the least ability to cope and because large sections of its population are still heavily dependent on the changing vagrancies of nature such as rain-fed agriculture.

To some, such as the US military, the challenges presented by climate change are necessarily apocalyptic:

[C]limate change has the potential to result in multiple chronic conditions, occurring globally within the same time frame. Economic and environmental conditions in already fragile areas will further erode as food production declines, diseases increase, clean water becomes increasingly scarce, and large populations move in search of resources. Weakened and failing governments, with an already thin margin for survival, foster the conditions for internal conflicts, extremism, and movement towards increased authoritarianism and racial ideologies.⁶⁷

Resource competition need not be a source of conflict, but can equally serve as a basis for cooperation and the development of shared management systems

In later sections the report degenerates into hyperbole as the authors contend that:

The challenges Africa will face as a result of climate change may be massive, and could present serious threats to even the most stable of governments. Many African nations can best be described as failed states and many African regions are largely ungoverned by civil institutions. When the conditions for failed states increase – as they most likely will over the coming

decades – the chaos that results can be an incubator of civil strife, genocide and the growth of terrorism.⁶⁸

Such crass misinformation and lack of rigour does not stand up to analysis. Resource competition need not be a source of conflict, but can equally serve as a basis for cooperation and the development of shared management systems. This is most evident when reviewing the cooperative arrangements that govern Africa's rivers such as the Nile and Zambezi Basins and others. The management of resource competition is, in many senses, the basis of social coexistence and to suggest that scarcity and competition will necessarily lead to war is simplistic.

Nor is the linkage between climate change and conflict as linear as the US military might have one believe. Many factors impact on the probability of armed conflict. The role of income, natural resource endowment, population characteristics, ethnic and religious fractionalisation, education levels, geography, as well as previous conflicts, are all factors that constrain or could facilitate conflict. An exhaustive review of the ecological sources of conflict found that '... there is no generic ecological conflict-factor in sub-Saharan Africa. Instead, there is a tremendous variety of ecological issues that are relevant to conflict analysis. These include scarcity or abundance of natural resources, environmental change, production and marketing of natural resources, and the sharing of benefits from natural resource-exploitation.'⁶⁹

While climate wars may not be upon us, many challenges present themselves that will be intensified and exacerbated by our changing global climate, and that of Africa in particular. To be able to meet the minimum GHG targets recommended by the scientific community (2 tonnes per person per year by 2050) implies a tenfold reduction in per capita GHG usage by the USA, for example. The extent of political effort, resources and global mobilization required for such an achievement may not be self-evident. At national level it is comparable with the Manhattan project that produced the first nuclear bomb. Internationally the willingness to work together should be demonstrated by what followed immediately upon the terrorist attacks on 9/11 – an opportunity subsequent squandered. It certainly requires concerted action through the UN General Assembly, the Security Council and of course at COP15 – the United Nations Climate Change meeting in Copenhagen in December 2009. Countries need to invest in a substantial manner in alternative sources of energy – an effort that cannot be left to the market alone. For its part, Africa needs a green revolution – not only to feed itself, but also to soak up GHGs and stem the advance of deserts in the north and south.⁷⁰ Much is already in motion, for example the 'Great Green Wall' will involve several

stretches of trees 7 000 km long and 15 km wide from Mauritania in the west to Djibouti in the east, to protect the semi-arid savannah region of the Sahel, and its agricultural land, from desertification. But Africa also needs to invest in population control for ultimately it is increasing populations that are driving unsustainable development and African population growth will be the largest in the years that lie ahead. Many of these projects are of global climate change significance and international partners can play a key role. Already efforts such as the Alliance for a Green Revolution in Africa and those of Norway to lease and protect large swathes of forests in Central Africa hold great promise.

Africa also has considerable potential to increase its agricultural production, through both private and state-led initiatives. Recently the South Korean firm Daewoo leased a piece of land half the size of Belgium (1,3 million hectares), for 99 years in western Madagascar where it hopes to produce 5 million tonnes of maize per annum by 2023 as well as palm oil to reduce its dependence upon US maize. Other countries short of arable land, such as Saudi Arabia and Kuwait, have also been seeking agricultural investments in Africa.⁷¹ In Sudan, the New York-controlled company Jarch Management Group recently gained leasehold rights to 400 000 hectares of land that could serve as a source of biofuels and food crops. Saudi Arabia's Hadco has already leased 25 000 hectares of cropland for \$25 million in Sudan and Abu Dhabi has launched a project to develop over 28 000 hectares in north Sudan.⁷²

Clearly much needs to be done to improve the amount and quality of climate change information available from Africa

Yet a review of the scientific literature makes it clear that the science upon which climate change patterns are predicted for Africa, such as that regarding changes in rainfall and run-off, is not comparable to that available in much of the rest of the world. As a result, the projected implications of climate change for Africa may yet change.⁷³ In fact, comparatively little is known about Africa's role in the global carbon cycle. According to researchers at South Africa's Centre for Scientific and Industrial Research (CSIR), writing early in 2007: 'We currently do not know whether Africa is a net sink or source of atmospheric carbon, and have only vague indications of the continent's temporal and spatial patterns of carbon exchange.'⁷⁴

Mentioned earlier, Africa contributes only 3 per cent of the global fossil fuel carbon emissions that are responsible for rising atmospheric carbon dioxide concentrations despite being home to 14 per cent of the world's population. In contrast, Africa plays a globally important role in fire and land-use carbon emissions. Yet much of the continental assessments of Africa's carbon dynamics are primarily model-based with large uncertainties.⁷⁵ Clearly much needs to be done to improve the amount and quality of climate change information available from Africa, implying a substantial investment in meteorological weather stations, satellite observation and the like as some estimates are that the continent has an eightfold deficit in these capabilities.⁷⁶ If Africa is to deal with the problem, it needs to understand and measure it more accurately than is currently the case.

Recent years have seen a dramatic about turn in Africa's economic prospects, partly due to a five-year surge in commodity prices. Similar to the situation elsewhere, key African countries are set to generate massive income from oil exports, for example. According to the IEA, conventional oil production in the ten largest hydrocarbon-producing countries in sub-Saharan Africa reached 5,6 million barrels per day in 2007, of which all but 500 000 barrels was exported. The cumulative government revenues from oil and gas output (from royalties and taxes) in these ten countries is estimated to total \$4 trillion over 2007–2030 – roughly the current GDP of China or Germany. Nigeria and Angola is expected to remain the largest exporters, standing to gain combined cumulative government revenues of about \$3,5 trillion.⁷⁷ On the back of growing populations and the inevitable development imperative of urbanisation, both of which have been outlined elsewhere in this paper, such incomes present the opportunity for substantial development opportunities and poverty alleviation.

At the same time, high levels of armed violence remain endemic to many countries and regions such as Chad, Sudan, northern Uganda, the eastern Democratic Republic of Congo, Somalia, Mali and Niger – a reflection of high levels of poverty and underdevelopment. Recent years have also seen angry and violent demonstrations turn deadly in Senegal, Zambia, Burkina Faso, Cameroon and South Africa. Neither Angola nor Nigeria has been able to escape these trends. Although the civil war in Angola has effectively ended, the tragic situation of deprivation and ecological abuse in the oil-producing Niger Delta region in Nigeria appears to be deteriorating. Neither development detracts from the potential presented for development by the massive amounts of resource income that will be gained by both countries in the years to come. The key challenge here, as elsewhere, is the emergence of appropriate systems of governance and transparency on the allocation and use of such resources in the public as opposed to private interest.

While the extent of ‘bad news’ reporting on and from the continent does not present a balanced picture of trends or events, Africa will apparently suffer from the effects of climate change more seriously than any other region (Canada and Russia will probably benefit the most) given the continent’s limited coping ability and the large component of its people whose livelihoods depend upon agricultural and related activities.⁷⁸ None of this necessarily translates into war or conflict, although it does increase the challenges faced by weak governments.

The challenge of reducing GHGs and managing the impact of climate change present in the starkest manner possible our global interdependence. More than ever, Africa and its partners need to work together to turn deforestation around, to save its green lungs, to manage its cities and to grow food for its hungry billions.

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ABOUT THIS PAPER

Africa is characterised by widespread and deeply entrenched poverty, armed conflict, slow economic development until recently, and agricultural systems proven to failure during frequent and persistent drought. With its tremendous natural resources and remarkable social and ecological diversity, the continent reflects a close dependency of people on natural resources. This paper illustrates that it is this dependency that will present Africa with potentially severe adaptive problems in dealing with the twin effects of climate change and population growth in future years. More than ever, Africa and its partners need to work together to turn deforestation around, to save its green lungs, to manage its cities and to grow food for its hungry millions.

ABOUT THE AUTHOR

Dr Jakkie Cilliers is the Executive Director of the Institute for Security Studies. He holds a DLitt et Phil degree from the University of South Africa (Unisa) and co-founded the ISS in 1990. At present most of Dr Cilliers' interests relate to the emerging security architecture in Africa as reflected in the developments under the banner of the Peace and Security Council of the African Union. Awards and decorations include the Bronze Medal from the South African Society for the Advancement of Science and the H Bradlow Research Bursary. Dr Cilliers has presented numerous papers at conferences and seminars and published a number of books on various matters relating to peace and security in Africa. He is a regular commentator on local and international radio and television and has published widely. He is an Extraordinary Professor in the Department of Political Sciences, Faculty Humanities, at the University of Pretoria and serves on the International Advisory Board of the Geneva Centre for Security Policy (GCSP) and as independent non-executive director of the South African Banking Risk Information Centre (SABRIC).

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