7

Africa: a crucible for climate change and poverty

Hannah Reid[1]

"It is important to understand that Africa and climate change are intrinsically linked, as climate change will affect the welfare of Africans for years to come… The world's wealthiest countries have emitted more than their fair share of greenhouse gases. Resultant floods, droughts and other climate change impacts continue to fall disproportionately on the world's poorest people and countries, many of which are in Africa … [There is also a need to recognize] the strength and creativity of African people in times of stress. What is needed most now is that Africans are supported in their efforts to build on these strengths.
Archbishop Desmond Tutu[2]

I. AFRICA – A SPECIAL CASE FOR CLIMATE CHANGE

Global warming is already affecting Africa.[3] The Intergovernmental Panel on Climate Change (IPCC) predicts that "the effects of climate change are expected to be greatest in developing countries in terms of loss of life and relative effects on

1. This paper is drawn entirely from the publication, *Africa – Up in Smoke*, which was written and compiled by Andrew Simms and Hannah Reid based on material from the Working Group on Climate Change and Development (Simms, A and H Reid (2005), *Africa – Up in Smoke? The Second Report from the Working Group on Climate Change and Development*, New Economics Foundation, London; available online at http://www.iied.org/climate_change/pubs.html#auis). The Working Group on Climate Change and Development is a coalition of development and environment non-government organizations including ActionAid, BirdLife International, CAFOD, the Catholic Institute for International Relations, Christian Aid, Colomban Faith and Justice, Friends of the Earth, Greenpeace, Institute of Development Studies, International Institute for Environment and Development, Practical Action, Medact, New Economics Foundation, Oxfam, Operation Noah, People and Planet, the Royal Society for the Protection of Birds, Tearfund, Teri Europe, WaterAid and the World Wide Fund for Nature.
2. This text is taken from Archbishop Tutu's Foreword to *Africa – Up in Smoke*, op. cit.
3. Hulme, M, R M Doherty, T Ngara, M G New and D Lister (2001), "African climate change: 1900–2100", *Climate Research* Vol 17, pages 145–168.

investment and economy". Not only is Africa more exposed to the impacts of climate change than many other regions in the world[4] but the IPCC describes it as "the continent most vulnerable to the impacts of projected change because widespread poverty limits adaptation capabilities".[5]

Small-scale farming accounts for most of the food produced in Africa, and employs 70 per cent of working people.[6] Most farming is dependent on rainfall, which means that Africa is particularly vulnerable to the uncertainties and weather extremes of global warming. Africa's high sensitivity to climate is exacerbated by other factors such as widespread poverty, recurrent droughts and floods, a dependence on natural resources and biodiversity, a heavy disease burden and the many conflicts that have engulfed the continent. There are further complications introduced by an unjust international trade system and the burden of unpayable debt. Even where the links to climate change are under-appreciated, Africa is a continent only too aware of the threat of "natural" disasters and the obstacles they pose to poverty reduction. Floods in Mozambique, which hit world headlines at the beginning of the new millennium, exemplify this.

The Intergovernmental Panel on Climate Change describes Africa as "the continent most vulnerable to the impacts of projected change because widespread poverty limits adaptation capabilities"

All these factors call for a new model of development in which strategies to increase both human resilience in the face of climate change and the stability of ecosystems are central. It calls for a new test on every policy and project, asking whether each proposal would increase or decrease people's vulnerability to the climate. This challenge requires a new flexibility and not a one-size-fits-all, market-driven approach to development. Recently, the role of developing new technology has been strongly emphasized. In particular, governments have focused on how to improve weather forecasting in Africa. But, there is a consensus among development groups that a greater and more urgent challenge is strengthening communities from the bottom

4. IPCC (2001), *Climate Change 2001: Impacts, Adaptation and Vulnerability*, IPCC Working Group II, Third Assessment Report, J J McCarthy, O F Canziani, N A Leary, D J Dokken and K S White (editors), Cambridge University Press, Cambridge.
5. IPCC (2001), *Third Assessment Report, Summary for Policymakers*, IPCC, Geneva.
6. Maxwell, S (2001), "WDR 2001: is there a 'new poverty agenda'?", *Development Policy Review* Vol 19, No 1, pages 143–149.

Box 7.1: Climate predictions for Africa

- Africa's coastal area already experiences the environmental problems of coastal erosion, flooding and subsidence. Exploitation of coastal resources, development and population pressures are all drivers. Climate change is expected to intensify these problems. The IPCC predicts "climate change will exacerbate existing physical, ecological/biological, and socio-economic stresses on the African coastal zone".
- Some "14 countries in Africa are subject to water stress or water scarcity" and "a further 11 countries will join them in the next 25 years".[a]
- Land areas may warm by as much as 1.6°C over the Sahara and semi-arid regions of Southern Africa by 2050.
- In Southern Africa and parts of the Horn, rainfall is projected to decline by about 10 per cent by 2050.
- Sea level is projected to rise by around 25 cm by 2050.
- The west coast of Africa is currently affected by storm surges and is at risk from extreme storm events, erosion and inundation. With climate change, tidal waves and storm surges may increase, and inundation could become a major concern.
- East Africa's coastal zone will also be affected: climatic variation and sea-level rise may decrease coral and patch reefs along the continental shelf, reducing their buffer effects and increasing the likelihood of coastal erosion.

SOURCE: IPCC (1997), *The Regional Impacts of Climate Change: an Assessment of Vulnerability – Summary for Policymakers*, IPCC Special Report online at www.ipcc.ch
a. UNEP (1999), *Global Environmental Outlook 2000*, Earthscan, London.

up, and building on their own coping strategies to live with global warming.

II. FOOD, FARMING AND THE ENVIRONMENT[7]

Africa's social and economic development is now even more endangered because climate change threatens to undermine the integrity of the continent's rich but fragile ecosystems.[8] In Africa, these natural systems form the foundation of the economy of most countries, from which most people derive their livelihood.[9] Africa contains about 20 per cent of all known species of plants, mammals and birds, as well as one-sixth of amphibians and reptiles. Biodiversity in Africa, which is greatest outside formally conserved areas, is under threat from climate change and other stresses. Savannahs, tropical forests, coral-reef marine and freshwater habitats, wetlands and East Africa montane ecosystems are all at risk.

7. This section is written by Dr Anthony Nyong, Centre for Environmental Resources and Hazards Research, Department of Geography and Planning, Faculty of Environmental Sciences, University of Jos, Nigeria, and Nicola Saltman, Climate Change Policy Advisor, WWF-UK.
8. Huq, S, A Rahman, M Konate, Y Sokona and H Reid (2003), *Mainstreaming Adaptation to Climate Change in the Least Developed Countries (LDCs)*, IIED, London.
9. Desanker, P V (2003), *Impact of Climate Change on Life in Africa*, WWF, Godalming.

Poor people, especially those living in marginal environments and in areas with low agricultural productivity, depend directly on genetic, species and ecosystem diversity to support their way of life. As a result of this dependency, any impact that climate change has on natural systems will threaten the livelihoods, food intake and health of the population.

With the extinction of plant species used in traditional medicines in Africa, it is expected that the change in climate will affect people's ability to tackle illness. The World Health Organization (WHO) estimates that 80 per cent of the

Box 7.2: Farming associations in Mozambique – using the landscape to spread risk

Despite civil war and major floods and drought, Mozambique has emerged in the twenty-first century as a country of progress and possibilities. The ADAPTIVE Research Project[a] set out to investigate how rural people have adapted to these disturbances so that rural communities can be better supported in the face of future changes, especially climate change. Research focused on the community of Nwadjahane in Gaza Province in southern Mozambique, which in recent years has had to live with political and economic instability, drought and major flood and storm damage.

In Nwadjahane, villagers farm both the fertile lowlands through irrigation and the higher sandy dryland fields. Severe floods and droughts over the last two decades have increased household demand for plots of land in both areas. While the lowland can produce good crops of rice, vegetables and potatoes, these can be destroyed during floods. Highland areas can produce good crops of maize and cassava during flood years. However, during drought years the highlands are less productive, and families rely on lowland production.

Households with land in just one area have started to develop informal farming associations to lobby those responsible for land allocation. They have successfully managed to gain access to new areas to farm. The farming associations are especially important for very poor households as they enable them to share some of the production costs, and risks, and thus increase their overall resilience to both droughts and floods. The associations have also fostered innovative and experimental farming practices. When successful, farmers have been able to take learning back to their own individual farms. For example, 45 per cent of those interviewed had changed to more drought-resistant species of rice, maize, cassava and sweet potato at some point during the last six years as a direct result of the information exchange within and beyond the farming associations. The associations have also been particularly popular with groups of women, leading to a strengthening of their position within the farming community.

Within the Nwadjahane community, individuals, households and formal and informal groupings of people are all looking for ways in which they can reduce their vulnerability to disturbances and increase the resiliency of their livelihoods. Some adaptations are driven specifically by experience of extreme climatic events, but many come from a combination of climatic, environmental, economic, political and cultural issues. The study shows that we need to take climate change seriously but that it must be viewed within the everyday context of people's lives.

a. The ADAPTIVE project is based at the Universities of Oxford and Sheffield, UK, coordinated by Professor David Thomas and Dr Chasca Twyman. In Southern Africa it works with the Climate System Analysis Group at the University of Cape Town. See http://www.shef.ac.uk/adaptive

Box 7.3: Support for smallholder agriculture in Ethiopia

Many of the approaches that constitute "good development" also double as excellent techniques for adapting to the uncertainties of global warming. Smallholder farming in Ethiopia is a case in point. Ethiopia is crippled by unfavourable international trade rules, lack of rural roads and market access, unemployment, debt and environmental degradation. Three million people have become HIV positive. So, when the rains fail in Ethiopia there is nothing to fall back on.

The Ethiopian Orthodox Church, which works with the agency Christian Aid, is addressing these issues through its Rural Integrated Development Programme in Bugna, in the Amhara region of northern Ethiopia. Project coordinator Deacon Abate Desale says, "the land is so degraded in this region that erosion causes floods when the rains come and drought when it does not. Most Ethiopians are dependent on the land for their livelihoods so we must invest in it." Techniques such as terracing land on hillsides to stop erosion and collect water for irrigation, replanting trees, and protecting areas of land for regeneration are all effective long-term measures to prevent drought leading to famine in the future.

The programme shows the potential of Ethiopia. In the middle of the dry, unproductive landscape is an oasis of lush, green vegetation and birdsong. This "garden of Eden" is designed to teach neighbouring farmers how to grow vegetables and trees successfully with traditional organic methods, enabling them to earn an income and have a more balanced diet. Vegetables such as carrots, lettuces, tomatoes and onions, rarely seen in rural Ethiopia, are intercropped with a variety of seedlings such as coffee and fruit trees. Farmers learn about organic pest control, irrigation and water conservation, and are given seeds and tree seedlings.

SOURCE: information from Christian Aid, 2005;
see http://www.christian-aid.org.uk/world/where/eagl/partners/0307eoc.htm

world's population in low-income countries relies on these plants for primary health care. In Mali traditional medicines have declined because many medicinal plants have been wiped out by constant drought.[10]

Livelihoods built on particular patterns of farming may also become unviable. If left unaddressed, climate change is estimated to place an additional 80–120 million people at risk of hunger; 70–80 per cent of these will be in Africa.[11] With increasing temperatures and extreme weather events, climate change will further erode the quality of the natural resource base, thereby reinforcing conditions of poverty.

III. WATER, DROUGHT AND THE CHANGING RAINS

Africa is already persistently affected by drought. Local droughts occur every year and continental crises seem to occur once a decade, or, more recently, twice. Although the continent uses only around 4 per cent of its renewable

10. Information from Tearfund project partner, TNT, Mali.
11. IPCC (2001), *Climate Change 2001: Impacts, Adaptation and Vulnerability*, op. cit.

freshwater resources, "water is becoming one of the most critical natural resource issues".[12] Climate change is expected to intensify Africa's increasingly critical water situation, with Southern Africa being one of many water-stressed regions which could see a further decrease in the flow of streams and the ability of groundwater to recharge.[13] Reduced annual average rainfall and runoff will worsen desertification in Southern Africa.[14] With Africa's dependence on rainfed agriculture, its people are very sensitive to disruptions in the hydrological cycle,[15] and drought is a serious hazard because so many Africans have subsistence livelihoods.

In the Nile region, most scenarios estimate a decrease in river flow of over 75 per cent by the year 2100. This would have significant impacts on agriculture, as a reduction in the annual flow of the Nile above 20 per cent will interrupt

Box 7.4: Living with climate variability and uncertainty in South Africa

At every level, from individual and community to nation, people have had to cope with climate variability and climate change for centuries. So, in order to improve understanding of how societies may adapt to future climate change, it is necessary to understand human behaviour and decision-making, as well as climate science. The ADAPTIVE Research Project[a] investigated farmers' perceptions of, and responses to, changes in the summer rainfall area of South Africa.

For farmers in South Africa, the concepts of "drought" or "extreme" rainfall are not necessarily sufficient to capture the dynamics of climate variability. Factors such as the timing of the onset of first rains (which affects when crops are planted), the distribution of rainfall within the growing season, and the effectiveness of the rains, all affect the success of farming. Better drought forecasting alone may therefore not be enough to help people cope with climate uncertainty and change.

The ADAPTIVE work identified different types of response to climate variability and change. Some forms of response occurred in all project study areas. For example, commercializing small-scale agricultural production was important as it created a source of cash that could then be used flexibly to meet household needs. Far from being passive victims, people recognized even subtle changes in climate, and took steps to respond to them.

a. The ADAPTIVE project is based at the Universities of Oxford and Sheffield, UK. The project is funded by the Tyndall Centre for Climate Change and has received support from Oxfam, Save the Children and others. In Southern Africa it works with the Climate System Analysis Group at the University of Cape Town. See http://www.shef.ac.uk/adaptive

12. UNEP (1999), *Global Environmental Outlook 2000*, Earthscan, London.
13. Ibid.
14. Ibid.
15. Facts and figures on water from Tearfund/IPCC.

normal irrigation.[16] Such a situation could cause conflict because the current allocation of water, negotiated during periods of higher flow, would become untenable. The IPCC states: "it seems prudent to expect drought in Africa to continue to be a major climatic hazard", observing that even a small decrease in precipitation combined with higher evapotranspiration could result in "significantly greater drought risks".[17]

IV. IMPACTS ON HEALTH

Health is often neglected in the assessment of vulnerability and adaptation to climate change. However, methods have been developed for assessing the impacts of climate variability and change on a range of health outcomes.[18] Systematic health assessments are needed to inform the management of everything from water to food, housing and trade. The range of potential problems sensitive to climate change is considerable:

- heat stress (the direct effect of the thermal environment on health);
- air pollution (outdoor air quality);
- weather disasters (floods, windstorms);
- vector-borne diseases (such as malaria, dengue, schistosomiasis and tick-borne diseases);
- water-borne and food-borne diseases (such as diarrhoeal diseases);
- food security;
- demographic changes that shift the balance of vulnerable populations demanding different health services.

Despite its relative neglect as an issue, there has been a steady improvement in the understanding of the impacts of climate change on health since the first IPCC report in 1990.

Methods have been developed for assessing the impacts of climate variability and change on a range of health outcomes. Systematic health assessments are needed to inform the management of everything from water to food, housing and trade

16. Dixon, R K, J Smith and S Guill (2003), "Life on the edge: vulnerability and adaptation ofAfrican ecosystems to global climate change", *Mitigation and Adaptation Strategies for Global Change* Vol 8, No 2, pages 93–113.
17. IPCC (2001), *Third Assessment Report, Summary for Policymakers*, op. cit.

The WHO has estimated that, globally, for the year 2002, there were 150,000 deaths and the loss of 5.5 million "disability-adjusted life years" [19] (a standard WHO measure to quantify and compare disease burdens) caused by climate change.

The most recent IPCC report is unequivocal: climate change will have the biggest impact on the communities least able to respond to it. "The impacts of climate change will fall disproportionately upon developing countries and the poor persons within all countries, thereby exacerbating inequities in health status and access to adequate food, clean water and other resources."[20] These communities are also the least responsible for damage to the climate. Africa's high vulnerability to the impacts of climate change is compounded by widespread poverty. Ongoing drought and floods, and a dependence on natural resources for rural livelihoods in turn exacerbate vulnerability. Sub-Saharan Africa already supports a heavy disease burden including HIV/AIDS, malaria, diarrhoeal diseases, respiratory infections, cholera, dengue fever, yellow fever, encephalitis, schistosomiasis and haemorrhagic fever.[21]

"The impacts of climate change will fall disproportionately upon developing countries and the poor persons within all countries, thereby exacerbating inequities in health status and access to adequate food, clean water and other resources"

The WHO states that changes in the patterns for the spread of infectious diseases are a likely major consequence of climate change.[22] Malaria represents a particular and additional threat in Africa. There are between 300 and 500 million cases of malaria in the world each year, with a very high proportion of those occurring in Africa – largely among the poor. Malaria causes between 1.5 and 2.7 million deaths a year, of which more than 90 per cent are children under 5 years of age. In addition, malaria slows economic growth in Africa by up to 1.3 per cent each year.[23] Climate change is

18. Kovats, S., K. L. Ebi and B. Menne (2003), *Methods of Assessing Human Health Vulnerability and Public Health Adaptation to Climate Change*. World Health Organization, Health Canada, the United Nations Environment Programme, and the World Meteorological Organization.
19. McMichael, A J, D H Campbell-Lendrum, C F Corvalàn, K L Ebi, A K Githeko, J D Scheraga and A Woodward (eds) (2003), *Climate Change and Human Health – Risks and Responses*, WHO, Geneva.
20. IPCC (2001), *Climate Change 2001: Impacts, Adaptation and Vulnerability*, op. cit.
21. McMichael, A J, et al., op. cit.; Nyong, A (2005), 'Impacts of climate change in the tropics: the African experience', paper presented at Avoiding Dangerous Climate Change: a Scientific Symposium on Stabilization of Greenhouse Gases, Meteorological Office, Exeter, United Kingdom, 1–3 February.
22. WHO (2003), *Climate Change and Human Health – Risks and Responses. Summary*, WHO, Geneva.
23. UNEP (2005), *Africa Environment Outlook: Past, Present and Future Perspectives. Impacts of the State of the Environment*, UNEP, Nairobi.

almost certain to make an already bad situation worse, and may already be contributing to the problem. In one highland area of Rwanda, malaria incidence increased by 337 per cent in 1987. Some 80 per cent of the increase could be explained by changes in rainfall and temperature. Further small changes in temperature and precipitation could trigger malaria epidemics at current altitudinal and latitudinal disease limits. Global warming will increase the incidence of floods, warming and drought – all of which are factors in disease transmission. In South Africa, it is estimated that the area suitable for malaria will double and that 7.2 million people will be at risk – an increase of 5.2 million.[24] Greater climatic variability can introduce the disease to areas previously free of malaria. Populations within these areas lack immunity, which will increase the impact of the illness.[25]

In South Africa, it is estimated that the area suitable for malaria will double and that 7.2 million people will be at risk – an increase of 5.2 million. Greater climatic variability can introduce the disease to areas previously free of malaria. Populations within these areas lack immunity, which will increase the impact of the illness

V. DEVELOPING POTENTIAL RENEWABLE ENERGY SOURCES

Africa has great potential for renewable energy and energy-efficiency technologies, having abundant resources of biomass, and for geothermal and hydro power. There is also a large market and human demand for sustainable energy, especially in poor communities. However, these resources and technologies remain largely unexploited.

Almost half of Africa's countries could profitably produce hydro power, but only a fraction of that potential has been reached to date because of poor infrastructure and high costs of initial investments. The continent accounts for only 1.3 per cent of the world's solar energy facilities, and only 4 of its 53 countries have started exploring underground heat sources.[26] At the same time, much of the population is surviving without electric power. Over three-quarters of sub-Saharan Africans have no access to electricity, compared to

24. Information source: communication from WWF-UK, 2005.
25. Zhou, G, N Minakawa, A K Githeko and G Yan (2003), "Association between climate variability and malaria epidemics in the East African highlands", *Proceedings of the National Academy of Sciences of the United States of America* 101, pages 2375–2380 (see http://www.pnas.org/cgi/content/abstract/101/8/2375).
26. OECD (2004), *Exploiting Africa's Huge Energy Potential as Weapon Against Poverty* (see http://www.oecd.org/dataoecd/43/45/32285615.PDF).

fewer than 14 per cent of people living in Latin America and East Asia.[27] Most of sub-Saharan Africa depends on biomass fuels taken from wood and agricultural waste. Families in rural and semi-rural areas have little choice but to increase their exploitation of fragile ecosystems to meet their energy needs, ultimately undermining both the fuel source upon which they depend and the rich diversity of plants and animals that live there. Fossil-fuel industries in Africa are also typified by exploitation, pollution and bad development practice.

The challenge is to create access to clean, affordable energy sources, which allow Africa to avoid the "dirty" energy development path that others have taken. These energy options also offer employment and economic development

Box 7.5: Energy loss? The Commission for Africa's approach

Concerning energy, the approach of UK Prime Minister Tony Blair's Commission for Africa is concentrated on funding larger power projects, rather than providing local access to energy, or clean renewable energy. The Commission supports hydro- and gas-powered energy as potential drivers of growth. Hydro resources in some African countries, notably the Democratic Republic of Congo, are noted to be huge but largely unexploited. Mozambique, it comments, has become a major exporter of electricity. "Mega-projects" in the gas industry are planned in Southern and West Africa. Work is already underway on the development of the Grand Inga hydropower project, supported by the Commission, with a new development company. More than $4 billion is earmarked for the first phase, the building of Inga-3 and transmission lines to Southern Africa. To develop the full potential of Inga, 40,000 megawatts, would cost £50 billion.[a]

But mega hydro and gas power schemes, together with grid expansion, puts all the energy eggs in one basket, soaking up the little available aid and investment, and leaving very little to deliver access to energy services for the poorest. Large power projects also tend to rely on international technologies, consultants and contractors, meaning that the funds invested will leak out of Africa, with little capacity-building taking place where the projects are built. Even so, the report itself states that the Commission "should avoid funding prestige projects that have so often turned into white elephants in the past".

The Commission misses the potential of indigenous technology manufacture and development capable of meeting current local needs – for example, micro-hydro, biogas, small-scale wind power and solar thermal water heaters. Investment is needed in African technology for African people. All of the Commission's other priorities for Africa – such as agriculture, promoting local enterprise and access to water – require appropriate clean energy services delivered in a way that is accessible and appropriate. Implementation of the Commission's energy strategy, therefore, requires a bottom-up approach, built around people's needs, rather than the current top-down strategy.

SOURCE: information from ITDG, 2005; see http://www.commissionforafrica.org/
a. Guardian Newspapers Limited (2005), "US$50-billion plan to tame the Congo River", 25 February; http://www.businessinafrica.net/news_features/environment/417751.htm.

27. Ibid.

opportunities and could help liberate countries from their dependency on oil. Various initiatives have been established to support sustainable energy, including the Global Village Energy Partnership.[28] However, a coherent strategy needs to be developed by leading high-income countries to reorient global investment away from fossil-fuel-intensive energy infrastructure. As recently as 2003, fossil fuel projects represented 86 per cent of the World Bank's spending on energy, compared to funding for renewables of just 14 per cent.[29]

VI. DISASTER RISK REDUCTION

"Extreme climate events such as floods, strong winds, droughts and tidal waves" are the main threats to Africa from climate change, according to the IPCC. Many African communities are already suffering from the effects of drought and increasingly unpredictable weather patterns.[30] Reducing vulnerability to today's climate through reduction of disaster risk is an excellent method of building adaptive capacity for the future uncertainties of global warming. This point is not lost to African countries. Mozambique's Action Plan for the Reduction of Absolute Poverty 2001–2005[31] states, "natural disasters… constitute an obstacle to a definitive break with certain degrees and patterns of poverty. Therefore, measures aimed at managing these risks are of the utmost importance."

Mozambique's Action Plan for the Reduction of Absolute Poverty 2001–2005 states, "natural disasters… constitute an obstacle to a definitive break with certain degrees and patterns of poverty. Therefore, measures aimed at managing these risks are of the utmost importance"

In high-income countries, billions of pounds are invested in reducing the risks associated with floods, earthquakes and droughts. Yet very little international aid gets spent on helping poor communities to do the same. For example, six months before the Mozambique flood disaster, its government appealed to the international community for US$ 2.7 million to prepare for the floods. It received less than half this amount. After the floods came, Mozambique received US$ 100 million in emergency assistance, and a

28. See http://www.gvep.org/
29. Simms and Reid 2005, op. cit., page 14.
30. Information source: communication from Tearfund, 2005.
31. See http://www.govmoz.gov.mz/parpa/eindex.htm

further US$ 450 million was pledged for rehabilitation.[32]

The 2001 *World Disasters Report* identifies four themes key to helping countries recover from disasters:[33]

- Investing in sustainable livelihoods increases the speed of recovery and reduces vulnerability of the poor to disasters. People's livelihoods are as important as physical defences.
- Plugging the spending leaks by maximizing local procurement ensures that post-disaster resources re-circulate within the local economy, rather than leaking out of it, and helps boost longer-term recovery.
- Diversified local economies are best. They maximize employment and respect economic, social and environmental priorities. They are more disaster-resilient than agricultural or industrial monocultures.
- The impacts of globalization, in terms of trade and financial flows, as well as climate change, are draining the resources needed to deal with disasters from the poorest countries.

The loss of social and economic fabric hampers post-disaster recovery. A narrow economic base, over-exploitation of natural resources and loss of diversity provide the weakest foundations for recovery

Several factors help vulnerable communities recover from "natural" disasters. These include strong, extended family structures, strong local government, and building on traditional approaches to housing and farming. Economic diversity and financial mechanisms to spread losses are also vital (for example, insurance, disaster funds, community trust funds). A dynamic civil society is important, along with good transport, communications, sanitation, good education and health services coupled with disaster-preparedness and emergency services. Conversely, the loss of such social and economic fabric hampers post-disaster recovery. A narrow economic base, over-exploitation of natural resources and loss of diversity provide the weakest foundations for recovery.[34]

32. Ibid.
33. Simms, A (2001), "The ecology of disaster recovery", in *World Disasters Report 2001*, International Federation of Red Cross and Red Crescent Societies, Geneva, chapter 2.
34. This section is drawn from Walter, J (2001), *World Disasters Report 2001*, International Federation of Red Cross and Red Crescent Societies, Geneva.

Box 7.6: Lessons from the tsunami: coastal management to reduce the impact of hazardous climatic events

Damage to Africa from the waves from the tsunami of 26 December 2004 was minimal, compared to the effects in Asia. However, there was a serious local impact in Puntland State, Somalia, where the village of Hafun was devastated, many other villages damaged, over 1,000 homes destroyed and 2,400 fishing boats smashed. Many freshwater wells and reservoirs were made unusable.[a] The tsunami was the result of an earthquake, not global warming, but the lessons about managing disasters apply to a warming world. Analysis of the places worst hit in Asia show that in many cases they had been developed for fish farming and tourism.

Tropical mangroves provide a variety of goods and services to coastal communities, and protect inland areas from storms and tidal waves. They stabilize sediments, reduce erosion, regulate flooding and recycle nutrients. Mangroves also provide a nursery area for many commercial fish species. Despite these benefits, shrimp farming in Southeast Asia that displaces the mangroves has been encouraged, aided by World Bank loans.

Areas of Myanmar and the Maldives, where the tourism industry had not yet damaged the virgin mangroves and coral reefs surrounding the coastline, suffered less from the tsunami. Coral reefs surrounding the Maldives absorbed much of the tidal fury.[b] The mangroves surrounding Simeulue Island, in Indonesia (near the epicentre of the tsunami) meant that the death toll was significantly lower there. Traditional knowledge about tsunamis following an earthquake, and the need to flee to higher ground, also reduced loss of life.

Much can be learnt from coastal communities, many of which have long experience with coastline management and fisheries rehabilitation. Disaster relief efforts must work with fisherfolk, support their organizations and use their expertise to ensure the restoration of their livelihoods. In the long term this will rehabilitate the coastline and marine fisheries, and protect them from future storms and floods likely to occur as a result of climate change.

a. Information from Oxfam, 2005; see http://www.oxfam.org.uk/what_we_do/emergencies/country/asiaquake/updates/update200105.htm.
b. In addition, the mangroves absorb significant quantities of carbon dioxide, a critical factor in global warming.

In Africa, particular risk reduction measures include participatory vulnerability assessment, rainwater harvesting, grain banks, designing and improving evacuation routes and sites, famine and flood early warning systems, protecting community buildings in flood-prone areas, and community disaster-preparedness training. Such measures are effective in saving lives and livelihoods in vulnerable regions. Importantly, many risk reduction measures are cheap and relatively simple to implement. It has been estimated that for every $1 spent on preparing for disaster, a further $7 is saved in the cost of recovering from it. Mainstreaming disaster risk reduction into relief and development planning protects programmes from being undermined by future hazards, and ensures that projects do not inadvertently increase vulnerability. Yet donor

organizations tend to approach disaster risk reduction on an *ad hoc* basis, normally as a reaction to a major disaster.[35]

VII. MIGRATION CAUSED BY CLIMATE CHANGE[36]

Numbers of refugees could dramatically increase over the coming years. Global warming, more than war or political upheaval, stands to displace many millions of people, thus destabilizing the global community. Low-income nations, which already receive many refugees, stand to carry the

Box 7.7: Climate change and conflict in northwest Kenya

In northwest Kenya, the lives of the Turkana people – nomadic pastoralists who graze large herds of cattle and other animals on the dry savannah – have long been made more precarious by political pressures from outside. Their ability to roam was restricted by arbitrarily imposed colonial borders, and modern governments have done little to help them. Armed groups and automatic weapons have entered their land from conflicts in neighbouring South Sudan and Northern Uganda. Now that rainfall seems to be failing, this has triggered conflict between the Turkana and their neighbours.

The Turkana are used to dealing with drought and food shortages. But because the droughts are more frequent and more prolonged, they have less opportunity to recover from a poor rainy season before the next is upon them. Rain is also less predictable than it used to be.

There have always been tensions between the Turkana and other pastoralist groups for access to water and pasture. But these have increased as water sources have dried up and pastures have been lost. Because the water table is not being recharged, the wetland areas that the Turkana could traditionally fall back on in times of drought have dwindled. Lake Turkana has receded, resulting in more territorial disputes. Many such disputes are settled peacefully, but each time one party is perceived to have broken an agreement, the willingness to trust the next time, and to respect borders, is eroded.

Cattle-raiding is also linked to drought. Raiding has always been used as a strategy to restock herds during or after a drought. Not surprisingly, prolonged drought and more cattle deaths lead to more raids. In 2004, a particularly big raid saw a coalition of the Toposa from Sudan and the Dodoth from Uganda take away large numbers of Turkana cattle. And raids lead, in turn, to new cycles of retaliation.

As a result of the droughts and growing insecurity, the Turkana have moved from a state in which they were able to cope most of the time, to one in which destitution and vulnerability to famine is a constant danger. International aid agencies like Oxfam have been providing relief food, and continue to do so, because the rains at the end of 2004 were patchy and poor. Oxfam's approach is not just to give out food, but to link human and animal health, relief and development, and to support Turkana institutions that are tackling the problems of cross-border raiding using conflict-reduction and peace-building techniques.

SOURCE: information from Oxfam, 2005; see
http://www.oxfam.org.uk/what_we_do/issues/evaluation/downloads/eafrica_pastoral_full.pdf

35. Tearfund (2003), *Natural Disaster Risk Reduction: the Policy and Practice of Selected Institutional Donors*, Tearfund, London.
36. Information source: communication from the New Economics Foundation, 2005.

Box 7.8: Conflict and water: peace-building between tribes in northern Kenya

Climate change is affecting the rainfall pattern in northern Kenya, and reducing the amount of rain. Coupled with other pressures on the natural resources of their rangelands, pastoral farmers are experiencing increasing conflict with each other over access to scarce water. During the dry periods they get water for themselves and their livestock by scooping into the sand beds of the dry streams. Such water is usually clean for drinking but quickly gets depleted.

Sand dams are an artificial enhancement of this traditional practice, which puts extra water into the sand beds. They are made by building a concrete wall across a channel at specific sites to trap and hold back the sand during flooding. Well-sited sand dams can store over 6,000 cubic metres of water, and sand-dam technology has been used successfully in Kenya in Kitui, Machakos and Samburu districts. Building sand dams gave ITDG the opportunity to help build peace between tribes in times of conflict over scarce resources. Teams of Samburu and Turkana people, in equal numbers (and with equal numbers of men and women) working together built the dams, and this helped to improve tribal relations.

SOURCE: information from ITDG, 2005; see http://www.itdg.org/?id=region_east_africa_kit_jun_03_sand_dams.

largest share of additional costs associated with environmental refugees. Yet these countries are least responsible for creating the problems associated with climate change. Environmental refugees are already with us. They are people who have been forced to leave their homes and even to cross borders because of environmental factors such as extreme weather events, drought and desertification. They are probably more numerous than their "political" counterparts.

In Africa it is the impact on farming that could force people to leave their homes. Africa's farmers have proved skilled at adapting to changing rainfall patterns, but global warming threatens to stretch coping mechanisms too far. If the flow of the Nile reduces (and sea levels rise), the most densely populated part of Africa will be disrupted. This will affect about 66 million people (estimate for 2002), projected to rise to nearly 90 million by 2015, nearly all living along the banks of the Nile. Creating new legal obligations for states to accept environmental refugees would be one way to ensure that high-income countries accept the consequences of their fossil-fuel-intensive lifestyle choices. Environmental refugees need recognizing, and the problem needs managing before it manages us.

VIII. CONFLICT ASSOCIATED WITH CLIMATE CHANGE

Climate change is likely to increase conflict levels in many parts of Africa. The case studies in Boxes 7.7 and 7.8 describe two examples of increasing conflict in northern Kenya, where, very much in line with climate change models for sub-Saharan Africa, droughts appear to be becoming longer and more frequent.

IX. RECOMMENDATIONS FOR AFRICA

In the light of Africa's special circumstances, the Working Group on Climate Change and Development considers these proposals a minimum needed to manage the impact of global warming on the continent. Without implementation of these measures, achievements in development in Africa in the last few decades could be reversed by climate change.

Increase support for small-scale agriculture. Dramatically increased support for small-scale agriculture is required, with an approach to farming based on maximum appropriate diversification. Highly diverse systems, as opposed to commercial monocultures, are more resilient and more productive. Farming based on expensive and energy-intensive artificial inputs will be both vulnerable to fuel-price rises, and will add to the problem of climate change. Vitally, small-scale farmers need support from a favourable policy environment and research that addresses the problems they themselves have identified. Boosting production is crucial, especially because of the enormous burden of HIV/AIDS, and requires systems that combine new insights and technologies with the wisdom of tradition.

Rich countries need to exceed their targets for reducing greenhouse gas emissions, set under the Kyoto Protocol. They need to cut emissions to a level commensurate with halting global warming, so that temperatures rise no more than two degrees above pre-industrial levels

Cut rich-country emissions of greenhouse gases. Rich countries need to exceed their targets for reducing greenhouse gas emissions, set under the Kyoto Protocol. They need to cut emissions to a level commensurate with halting global warming, so that temperatures rise no more than two degrees above pre-industrial levels.

Focus on local needs first. Africa needs to be freed from

a one-size-fits-all development approach. Effective responses to climate change will differ everywhere, depending on local circumstances, so a new flexibility is needed. The greatest challenge is securing livelihoods at the local level.

Map likely health impacts. In terms of health, the challenge to the international community is to help map the complex impacts of global warming, and ensure that both the resources are available to tackle them, and that the development policy framework does not make things worse. For example, as climate change puts stress on scarce water resources, a dogmatic approach to water privatization could easily increase the vulnerability of millions of people in Africa.

Help Africa leapfrog "dirty development". The exploitation of fossil fuels in Africa does little for the development or security of its people. But the potential for sustainable and renewable energy on the continent is large, as is the market – especially in poor communities. To meet people's need for energy, improve health at the household level, and help Africa leapfrog "dirty development," international donors and financial institutions should switch investment from fossil fuels into promoting access to renewable and sustainable energy.

The exploitation of fossil fuels in Africa does little for the development or security of its people. But the potential for sustainable and renewable energy on the continent is large, as is the market – especially in poor communities

Support community coping strategies. Global warming presents a huge challenge to the coherence and coordination of aid. For example, donors are focusing strongly on the role of technology. But promoting disaster reduction at the local level by supporting community coping strategies is more effective and yields immediate benefits that stretch beyond just tackling climate-driven disasters. The integration of disaster risk reduction in relief, reconstruction, development programming and poverty reduction plans should be prioritized.

Release aid quickly and set targets for local procurement. More efficient systems are needed to ensure that aid is released quickly and that humanitarian aid is targeted well when disasters strike. To ensure the long-term

development benefits of money spent on disasters, there should be targets for local procurement set for governments and agencies. This would help prevent the leakage of relief money from affected communities.

Implement existing agreements on environment and development. Specifically, the international community should implement the agreement made at the World Summit on Sustainable Development (WSSD) to help Africa prepare for and mitigate disasters at both community and national levels. This should include, as agreed at the WSSD, promoting "community-based disaster management planning by local authorities, including through training activities and raising public awareness".

The international community should implement the agreement made at the World Summit on Sustainable Development to help Africa prepare for and mitigate disasters at both community and national levels

Test whether initiatives are climate-proof and climate-friendly. All policies and projects should face the test of whether they will leave people in Africa more or less vulnerable to the effects of global warming. Each proposal should be assessed in terms of being climate-friendly and climate-proof. At the very latest, in line with the recommendation of the Commission for Africa, climate change should be "mainstreamed" by 2008.

New and additional funding. All funding to help Africa adapt to global warming should be new and additional to existing funds, and seen not as aid but as an obligation of the rich countries which created the problem.