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CLIMATE CHANGE AND ECONOMIC DEVELOPMENT

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UNEP

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Children on one of southern Africa's mightiest rivers are playing the Limpopo board game, literally for their lives. Piloted in places like Zimbabwe's Matabeleland and Mozambique's Gaza Province, it uses the power of play to teach ways of reducing vulnerability to flooding.

If a counter lands on a space showing a well designed flood-proof village – or one advising children to move themselves and livestock to higher ground – it moves forward several spaces. But if it alights on one depicting a decimated forest, land degradation, or other factors increasing vulnerability, it must go back six.

The game – part of a larger project, funded by the Global Environment Facility (GEF), launched after the devastating Limpopo floods six years ago – underlines in a simple but poignant way the challenges developing countries face as they try to adapt to the extreme weather events linked to climate change.

Clean development

In industrialized countries, progress is starting to be made in reducing emissions of greenhouse gases as a result of the Kyoto Protocol and through its flexible mechanisms. The Protocol links to the developing world; for example through the Clean Development Mechanism (CDM) which allows developed countries to offset emissions (for example through forestry and renewable energy projects in developing countries) and has burst into life.

By 2012, certified emission reductions achieved through the CDM are expected to reach at least 1.2 billion tonnes, more than the combined emissions of Spain and the United Kingdom.

The industrialized countries as a group are still on track to meet their Kyoto commitments, provided they make a more extensive effort domestically, and make active use of the market mechanisms of the Kyoto Protocol. It is clear, however, that in the long run deeper emission cuts will be required.

But past pollution from industrialised countries has already guaranteed us some climate change: carbon dioxide, after all, can persist in the atmosphere for up to 200 years. So the global community must help developing countries adapt.

Climate proofing

Least Developed Countries have – or are preparing – National Adaptation Programmes of Action (NAPAs) under the United Nations Framework Convention on Climate Change. Take Malawi, where almost every facet of life will need some measure of 'climate proofing'. Droughts and floods have increased in intensity, frequency and magnitude over the past few decades.

Floods destroyed fish ponds six years ago, while a drought in the mid 1990s triggered a total loss of fish stocks in Lake Chilwa. Malawi's NAPA calls for restocking, assistance in fish breeding, and better understanding of how temperatures disrupt the reproduction of key species.

It also calls for reforestation of the catchment of the Shire River which produces most of the country's electricity. Deforestation and unsustainable agricultural practices has led to the siltation of dams.

Samoa's NAPA calls for assistance to move infrastructure and communities to higher ground, for measures to strengthen buildings against increased cyclones, and for restoring community springs. It says that boosting the health of habitats and ecosystems will provide vital buffers against climate change.

Funding for adaptation is starting to accumulate as a result of investments in the CDM and voluntary pledges to a special fund established to finance the implementation of NAPA activities. However, these resources must be augmented if they are to have measurable results in the poorest countries of the world.

Emission reductions

It is becoming clear that all investments in developing countries, both public and private, must factor in climate change if they are to be viable. But this cannot be an alibi for inaction on emission reductions.

Scientists estimate that a 60 to 80 per cent cut in greenhouse gases will be needed to stabilize the atmosphere. We must keep our sights set firmly on this target. Otherwise everyone, rich and poor alike, will have more and more pressure to adapt and fewer places to adapt to and from. They will end up playing their own versions of the Limpopo River game – and, like the children on its banks, playing for their very lives ■

Facing the **Challenge**

MWAI KIBAKI addresses climate change and the African development dilemma

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On behalf of the Government and the people of Kenya, I wish to extend a warm welcome to all the delegates and other visitors who have come to Nairobi to attend the twelfth Conference of the Parties Kenya is honoured to host the twelfth Conference of the Parties which is also the second meeting of the Parties to the Kyoto Protocol (COP/MOP2) in November this year at the United Nations Offices in Nairobi.

It is appropriate that the Conference be held at the premises of the only United Nations headquarters in the developing world and we look forward to a successful and memorable conference. climate change is a reality which affects all countries but its impact is and will be most acutely felt in the developing world, particularly in African countries. climate change is threatening to frustrate poverty eradication efforts and make the prospect of meeting the Millennium Development Goals far less certain.

The climate change Convention and its Kyoto Protocol provide a good basis for multilateral action. Although some progress has been made in the implementation of these instruments, the actions are far from adequate. This is primarily because of the limited scope of the commitments of developed country parties and inadequate implementation of these commitments. The extent to which developing countries can comply with their commitments and therefore contribute towards the ultimate objectives of the Convention, is dependent on their being facilitated by developed Country Parties. The climate change negotiation process and the outcome of these negotiations need to be fair to all countries.

Africa is the region most vulnerable to the impact of climate change despite the fact that it is the least responsible for contributing to greenhouse gas emissions. The implementation of practical adaptation activities with predictable and secure funding therefore is a top priority for Africa in this Conference. In terms of mitigation, equity is needed in the implementation of the Clean Development Mechanism (CDM).

While this is a largely private sector venture, there are certain actions governments can take to even out the ground. Specific targets need to be set to redress the imbalances in the geographical distribution of CDM projects. Africa supports the exploitation of other options for mitigation, including those which may not be covered by CDM, and particularly those that promote local sustainable development objectives.

Working within the principles of equity and common, but differentiated, principles, it is important that we view climate change as an opportunity to address the challenges of achieving sustainable development, rather than framing it as an environmental problem. There is need for countries to have a flexible global regime to cater for the changing circumstances. At the core of this regime must be elements relating to adaptation, technology development and transfer.

I wish to state that in the interest of sustainable development of our region, we are keen to be associated with global efforts to foster long- term cooperative action to address climate change by enhancing the implementation of the climate change Convention and its Kyoto Protocol.

We realize that for all these efforts to succeed, action must start at the national level. Kenya is prepared to face this challenge together with other nations of the World ■

Mwai Kibaki is President of the Republic of Kenya.

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Window

of Opportunity

MARK MALLOCH BROWN reports a growing momentum in governments and business to tackle climate change, and describes how the issue is being mainstreamed through the UN system

The carbon-based economy is in many respects an uncontrolled experiment on the global climate, with serious, but hard to measure risks for the economy, the environment and human health. For several decades now, the world's leading scientists have been warning that without major policy changes in the next few years, we face a future filled with danger.

While projections still combine uncertain effects with certain facts, even the minimum predicted shifts in climate for the 21st century are likely to be significant and disruptive. To take just one of many very worrying examples, sea levels have already risen by 10 to 20 cm over pre-industrial averages.

Without urgent and concerted action, five broad trends appear inescapable:

1. The world's coasts will face increasingly severe storms and floods, with the inundation of coastal areas displacing millions of people.
2. Salt-water intrusion from rising sea levels will impact the quality and availability of freshwater, worsening the world's growing water crisis.
3. As warmer conditions alter forests, wetlands and rangelands, the damage to the Earth's ecosystem will be far reaching and irreversible: some 25 per cent of mammals and 12 per cent of birds could become extinct over the next few decades.
4. Shifting agricultural lands and creeping desertification will leave many areas unfit for crops or grazing.
5. Warmer and wetter conditions may accelerate the spread of new varieties of infectious diseases such as malaria and yellow fever.

Dire consequences

Each of these scenarios has dire consequences for our world. Yet, while consensus on the science is gradually moving towards the more alarmed end of the scale, determined resistance by a powerful minority of doubters has made effective strategies difficult to agree and implement. Such delay should concern all countries, but is especially troubling for developing ones that remain particularly vulnerable to the effects of climate change.

Poor people already live on the front lines of poverty, pollution, disaster, and degradation. Their livelihoods and food security depend directly on agriculture, forestry and fisheries. Their economies will suffer most from the heightened frequency of drought, floods and storms associated with climate change. Indeed, there is a real risk that climate change could erect new obstacles in the way of achieving the Millennium Development Goals.

Climate change policies require strong economic resolve, ▶

particularly in light of two closely linked global concerns: energy security and worldwide economic stability in an era of rising oil prices. Creative responses driven by solid research, shared knowledge and the participation of governments and people at all levels are needed to meet this critical challenge.

At a very minimum, the world must pursue a double strategy: We need to reduce emissions of greenhouse gases, which means altering how we live and do business – including through more efficient use of energy and other resources, technological development, and greater public awareness. And we need to adapt to the climate change that is already inevitable because of the massive accumulation of past emissions.

Despite the minority of sceptics, momentum to address the climate crisis is growing. The communiqué issued by G-8 Members last year at Gleneagles – and their actions and pronouncements since – underscore the fact that major players no longer question whether climate change is taking place. They also understand the need for market and non-market approaches, and for striking a balance between public policy prescriptions and technology-based solutions. Of course, not all States share the same commitment to addressing the challenge, and they also differ on what actions to take. But the broad, common acceptance of the problem presents a new window of opportunity to tackle the challenge collectively.

Even before this political momentum was generated, real gains were being made. The UN Framework Convention on Climate Change, the centrepiece of global efforts to limit and stabilize atmospheric greenhouse gas concentrations, has come to enjoy nearly universal membership. And with the entry into force of the Convention's Kyoto Protocol, a new era of fighting climate change has begun. The 155 parties to this Protocol have agreed to reduce developed countries' greenhouse gas emissions to levels 5.2 per cent below their 1990 amounts. The Protocol created three innovative and cost-effective market-based mechanisms to assist developed countries to comply with its commitments: the Clean Development Mechanism (CDM), Joint Implementation, and International Emissions Trading.

CDM, the only market instrument currently available to facilitate greenhouse gas reductions by developing countries, has yet to realize its potential to help developed countries meet their targets, or to prompt meaningful changes in production and consumption patterns in developing ones. Nevertheless, the global carbon market, including CDM and emissions trading, stands at $11 billion, and is expected to grow significantly.

This market reflects a remarkable feature of the climate process: the growing involvement of the private sector and the interest of new business sectors. While some of the responses are due to mandatory regulations, companies – both from Kyoto parties and from non-parties – are increasingly realizing that carbon trade can be potentially quite lucrative. This trend received a further boost with the start of the European Union's Emissions Trading Scheme in 2005: its empirical data on actual prices of carbon emission reductions significantly improves upon prior academic or government estimations.

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We need to reduce emissions of greenhouse gases, which means altering how we live and do business — including through more efficient use of energy and other resources

Renewable energy

The development of such trading schemes underpins the reality that private investment and corporate behavioural change will prove at least as significant in winning the climate fight as direct government action. The magnitude of the task before us means that neither governments nor businesses can hope to address ▶

it alone. That is why strong political will has to be matched with sustained private effort to arrive at solutions to changing climate.

Already, the private sector is engaged as never before, and not just through Kyoto's market mechanisms. More and more, corporate leaders are grasping the potential of renewable energy, hybrid vehicles, breakthrough techniques and green technologies. The financial and insurance sectors have become increasingly concerned about climate change as a business risk, and have been pressing Governments to act with greater determination.

Economic growth

Particularly promising are recent moves to introduce environmental criteria into key measures of corporate performance. Earlier this year, institutional investors from around the world, representing $2 trillion in assets, signed on to the Principles for Responsible Investment, sponsored by the UN Secretary-General's Global Compact and UNEP's Finance Initiative. This represents a major step forward in efforts to 'put a price' on environmental stewardship – or the lack of it – by channelling finance and investment towards companies that display corporate citizenship, including through meaningful action against climate change.

Despite these welcome advances, climate change still tends to be perceived as a predominantly environmental concern, though it has profound implications for economic growth, social advancement, and almost all other aspects of human well-being. Progress in dealing with it demands that we break down these barriers, and fully engage relevant sectors of government and civil society in our efforts. Indeed, a more holistic understanding of the implications of climate change can help solidify the political will and public concern necessary to help find solutions. There must be an integrated approach, in keeping with the precepts of sustainable development, which positions it firmly within a broader agenda.

Such integration is already under way at the United Nations, where climate change is being mainstreamed throughout the UN system – from the normative, intergovernmental processes of the Climate Change Convention, to the operational work of the funds, programmes, agencies, and regional commissions.

Our disaster relief strategies are taking the impact of climate change into account. The Global Environment Facility – an initiative being implemented by the UN Development Programme, UNEP and the World Bank – has been steering more funding to projects aimed at both mitigation and adaptation. UNEP is also working more broadly with UNDP better to integrate environmental issues into development planning, and it is studying the feasibility of making the UN Organization itself carbon-neutral.

Global action

Last year's climate meetings in Montreal made significant strides forward. Two parallel tracks were agreed that have great potential to intensify future global action. The first involves discussions among the parties to the Protocol, and looks at binding targets for the industrialized countries beyond 2012. The second is a dialogue involving all parties to the Convention which looks at a broader range of long-term cooperative action. The Climate Change Conference in Nairobi is well placed to advance action on both tracks, and to drive progress in both policy and practical terms.

Most of the immediate progress that can be made to reduce greenhouse-gas emissions involves using fossil fuels more efficiently. Industry, which accounts for over 40 per cent of global carbon dioxide emissions, can benefit from getting more electricity, transport, and industrial output for less coal, oil, or gasoline. That is a no-lose situation: more profit, less pollution, less global warming. The savings thus realized will buy time for the global climate system while alternative-energy technologies – which at present only contribute less than 2 per cent to world supplies – can be developed and made cost-effective.

Some governments have already attempted to cut greenhouse gas emissions with a mixture of incentives subsidies, voluntary programmes, regulations, and fines. Several have attacked the problem directly by imposing 'taxes' on carbon use. Others have established 'carbon markets' where units of energy use may be bought and sold. These arrangements anticipate provisions that will apply beyond the Kyoto Protocol.

Growing urgency

The fight against climate change will require a sustained effort for this entire century. Unsustainable practices are woven deeply into the fabric of modern life. At last though, as Gleneagles and then Montreal showed, there is emerging agreement on the problem, as well as growing urgency in the search for solutions. The Nairobi Climate Change Conference is a significant opportunity to build on this understanding, and to take ever more aggressive measures to address the problem. We must all – individual citizens, private enterprise and policy makers alike – work to ensure that this strengthened resolve translates into real progress towards winning this battle ■

Mark Malloch Brown is Deputy Secretary-General of the United Nations.

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Setting *Priorities*

MARTHINUS VAN SCHALKWYK describes Africa's vulnerability to climate change and identifies key areas for action by both developed and developing countries

It has become abundantly clear over the past decade – based on evolving science, and work of the IPCC – that the potential impacts of climate change may hold a far greater risk than previously believed; that roughly 2°C is the lower range of predicted temperature increase, while 3°C seems increasingly likely from a doubling of pre-industrial carbon dioxide. Recent evidence also suggests that the biosphere may be approaching key physical tipping points – thresholds beyond which the external drivers of change are replaced by self-sustaining internal drivers – points beyond which policy options will become very limited indeed. It is clear that such changes could lead to irreversible damage across Africa, and the rest of the globe.

Adverse effects

In Africa, as in many parts of the world, impacts could include greater and more rapid sea level rise than previously projected, and more frequent coastal storms, threatening the lives and livelihoods of coastal communities; the increased incidence of extreme weather events; substantial reductions in surface water resources leading to accelerated desertification in sensitive arid zones; and greater threats to health (such as malaria), biodiversity (including bleaching of coral species on the east African tropical reef systems) and agricultural production (a predicted decline of 12 per cent in production in Africa by 2080).

African marine and fresh water fisheries already count among the world's most vulnerable. Western and central Africa show particularly high exposure and dependency and low adaptive capacity in the face of declining or migrating fish stocks resulting from climate change.

Forty per cent of Africa's international borders are demarcated by river channels and basin watersheds, and most major rivers traverse national boundaries. These are sensitive to even moderate reductions in rainfall, as are projected for much of western and southern Africa. Such reductions could lead to an increase in inter-communal and inter-state conflicts over scarce water resources and threaten the sustainability of hydro-electric power generation, if not managed in a proactive manner.

Projected significant reductions of perennial surface water in southern Africa by the end of the century could threaten key ecological and livelihood resources, such as the Okavango Delta in Botswana, and large urban centres, such as greater Cape Town. Aridification and greater extremes of climate, potential extinctions of endemic species and disruption of physical ecosystems – such as the remobilization of Kalahari dune systems – represent only a few of many significant projected impacts on local sustainable livelihoods and ecological resources.

Overall, the projected impacts of unmitigated climate change in Africa are likely to have significant impacts on human livelihoods, health, water resources, agricultural production and food security, as well as nature-based tourism. All would undermine economic prospects across much of the continent. Indeed, most African countries are among those least able effectively to respond to, and cope with, these adverse effects. The risks are many, the opportunities far less bountiful.

Priority areas

Against this background, we look forward to a productive and constructive two weeks when we meet in Nairobi for the twelfth Conference of the Parties (COP12) if the United Nations Framework Convention on Climate Change (UNFCCC) and the Conference of the Parties/Meeting of the Parties (COP/MOP2) of the Kyoto Protocol in November. There are five priority areas that I would like to highlight for this African COP:

1. Keeping the momentum and creative space to strengthen the regime.

Countries have different responsibilities, but we all – developed as well as developing – have a common one to act according to our capabilities and national circumstances. The ideal regime should work for both the developing and the developed world, recognizing that there is no 'one-size-fits-all' solution.

Joerg Boethling/Still Pictures

We believe that an innovative approach of providing positive incentives for actions that promote local sustainable development, and avoid greenhouse gas emissions, will go a long way to framing developing country action under the Convention.

For developed countries the process of agreeing on substantially stricter targets must be finalized expeditiously to ensure that there is no gap between the first and second commitment periods. The Article 9 review mandated in the Kyoto Protocol should also receive high priority in Nairobi.

Given the scale of the challenges ahead and the inter-linkages between the two tracks agreed in Montreal (the Kyoto track and the Convention track), it is very urgent to foster better understanding of the various scenarios for the future architecture of the regime. More specifically, we need to unpack – and in the process debunk the myths and reduce the uncertainties about – possible balanced 'packages' that could build a bridge between the two tracks. We will need to find ways both to broaden participation and to bring about deeper emission reductions under a Kyoto Plus regime. We therefore need to maintain the political momentum and space to innovate.

2. Sustainable development
For developing countries, a future regime should offer incentives for synergies between sustainable development and climate change mitigation, and more fully balance adaptation and mitigation. A register of sustainable development policies and measures (supported through technology and enabled by finance) would seem a preferable vehicle for recognizing and supporting through incentives current and future action by developing countries.

3. Adaptation
Adaptation remains at the forefront of any sustainable development policy agenda. Given the climate change impacts outlined above, we must now move into a new gear on three fronts: implementing concrete adaptation measures, identifying additional vulnerabilities, and ensuring adequate, predictable and sustainable funding of the key financial mechanisms. We trust Nairobi will be the turning point in activating the Adaptation Fund under the Kyoto Protocol, and in finalising the modalities of the five-year programme of work on impacts, vulnerability and adaptation.

4. Carbon markets
Nairobi must kick-start the process of redressing the inequitable and limited geographical distribution of the Clean Development Mechanism (CDM). At the time of writing, the 15 CDM projects in the pipeline in Sub-Saharan Africa accounted for only 1.7 per cent of the total of 850 projects world-wide: ten located in South Africa, two in Nigeria and one each in Côte d'Ivoire, Tanzania and Uganda.

To build faith in the carbon market and to ensure that everyone shares in its benefits, we must address the lack of information and other obstacles that African countries face in participating effectively in the international climate regime. There is a particular need for technical and institutional capacity building in Africa, and for working together to support the development of CDM projects in African countries.

5. Technology
To succeed in initiating real action on technology transfer, we should seize the opportunity provided by the upcoming review of the mandate of the Expert Group on Technology Transfer at COP12 to seek a broader mandate that would allow it to consolidate the numerous technology-related decisions under the Convention.

Looking beyond Nairobi, we all agree that investment in developing and deploying low-carbon technologies must be scaled up. Successfully deploying privately-owned, climate-friendly technologies in developing countries will also require us to resolve the vexing issue of intellectual property rights. In this context it may be constructive to develop focused programmes for the transfer of technologies in particular sectors – such as cleaner coal or solar thermal electricity – and to broaden the focus of the technology cooperation paradigm to include incentives for South-South cooperation.

The Nairobi meetings must put in place the building blocks to give content to these African priorities. Though success will require political will in both the developing and developed worlds, it is of utmost importance that all developed countries continue to take the lead in global efforts to combat climate change and to assist vulnerable countries to adapt to its devastating impacts. With strong support from our partners, developing countries can play their part in tackling our common responsibilities, albeit in a differentiated way ■

Marthinus van Schalkwyk is Minister of Environmental Affairs and Tourism, South Africa.

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Environmental

Contract

DAVID MILIBAND calls for urgent action to combat the reality of climate change and outlines priorities for progress

In the five months I have been in my present job, I have become increasingly aware that the facts surrounding climate change are more alarming – and the consequences more immediate – than most people realize. Many people see it as purely a long-term issue: the reality is, we are feeling the impacts now. Arctic sea ice has already thinned by about 40 per cent in the last 50 years. The ten warmest years on record have all occurred since 1990. We need to respond with urgent action both at the national and international level – including helping the most vulnerable to adapt to the impacts and making progress on reducing our emissions of greenhouse gases.

In the UK we recognize the threat and are taking action across the economy, in housing, transport, energy production, and with business. As a consequence of our policies, the UK is on course to reduce greenhouse gas emissions by 23-25 per cent by 2010 compared to the 1990 baseline. That is around double the size of our Kyoto commitment – and it has been achieved while maintaining strong economic growth. We will continue to pursue an ambitious programme to take us further, in line with our self-imposed domestic target of reducing CO2 emissions by 60 per cent by 2050.

But we have to place domestic action in an international context. The UK only represents around 2 per cent of global greenhouse gas emissions and that percentage is falling. If we are to meet the UN Framework Convention on Climate Change's objective of stabilising greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system, then we need a global response. Let us not lose sight of this objective. The longer we delay action, the greater the cost. We know from the International Energy Agency's figures that there will be around $17 trillion of investment in energy infrastructure over the next 25 years. Channelling this into clean technology is absolutely key: if it is instead directed into dirty technology, it will lock us into further substantial increases in greenhouse gas emissions for many years to come.

Environmental consequences

Our response needs to be urgent, and – crucially – informed by the most up-to-date science and economic and social analysis. The Stern Review on the Economics of Climate Change, commissioned by the UK's Prime Minister and the Chancellor of the Exchequer in July 2005, will provide significant insights on its economic, social and environmental consequences, and on the costs of action and inaction. These will be crucial for all parties to examine and take on board.

Climate change is increasingly being seen not just as an environmental issue but as one which cuts across our economic, development and foreign policy agendas. That is why the Prime Minister chose to place it on the agenda for heads of Governments at the G8 Summit last year. One outcome of the Summit was the Gleneagles Dialogue, which provides a more informal space to explore key challenges away from the negotiating room, complementing the work of the UNFCCC.

I believe that both the formal and informal processes need to focus on four priority areas:

Adaptation The need to adapt to unavoidable climate change is now a reality and adaptation issues are rightly a crucial area on which to make progress during the Nairobi meeting. In particular we need agreement on implementing the five year work programme on adaptation – to ensure the work to be carried out over the next four years on impacts, vulnerability and adaptation can proceed without delay – and on guidance on the operation of the Adaptation Fund.

Our primary goals must be to encourage the flow of funds into adaptation projects for the most vulnerable countries and ensuring that adaptation to climate change is mainstreamed into development policies. Assisting developing countries to adapt to the inevitable changes we are already experiencing is a fundamental responsibility of developed countries under the Convention.

Technological solutions

Future Technology Kenya's Minister Kivutha Kibwana has rightly emphasized for Nairobi the future of the technology-transfer framework under the Convention, a hugely important issue for developing countries.

The International Energy Agency has been looking at low-carbon technologies, analyzing what technological solutions are feasible, driven by the desire to introduce low-carbon energy and adaptation measures that will stabilize our climate at a safe level in a practical timescale.

It found that existing low-carbon technologies can halve the growth of oil demand at a cost of under $25 a tonne and return global carbon dioxide emissions to current levels by 2050. This shared understanding of the specific technology challenges and opportunities increases our ability to identify and agree priority areas for cooperation on practical activities.

Strengthening Carbon Trading One of the most effective ways of shifting investment towards low-carbon technologies is through creating meaningful carbon trading mechanisms, which will need the support of governments, society and individuals. We have made a good start in Europe with the EU Emissions Trading Scheme, but more needs to be done to strengthen the market – including incorporating aviation and surface transport, further cuts in carbon allowances and greater harmonization. Internationally, we are working closely with California, the Regional Greenhouse Gas Initiative in the US Northeast states, and with other countries, to design trading schemes that can be linked.

The Clean Development Mechanism is already a key pillar of the international carbon market, potentially covering some 148 non-Annex I parties, and is linked to the EU and Japanese private markets. It is expected to deliver 1.2 billion tonnes of emission reductions to 2012. There are UK participants in 26 per cent of currently registered projects.

Much still needs to be done to realize the CDM's potential, not least in Africa. By building on its early success and looking at its partnership potential with other market mechanisms, we can seek to create a truly global carbon market, fit to deliver on the challenge and scale of action needed post-2012.

Clean technology

But we still must do more. The World Bank and Regional Development Banks are developing a global Energy Investment Framework to accelerate public and private investment into energy for development (with a particular emphasis on access for the poor), low-carbon energy technologies and adaptation. Attracting this investment will require policy conditions that can mobilize international finance and domestic private sector investment.

Long Term Goal Finally, building consensus around a non-binding, aspirational long-term goal would provide greater clarity on overall direction as we move to a low-carbon global economy. It would enable all countries to take seriously the risks of getting locked into a high-carbon trajectory and, importantly, guide nations in setting their own national policies.

A long-term goal will also help drive innovation and investment in clean technology. Some investors are concerned about whether low-carbon solutions – which often take years to develop and bring to the market – will be rewarded.

I recognise that the developed world should take the lead internationally on climate change and that we have responsibilities to assist developing countries in their efforts to move to a path of low-carbon development while ensuring they become climate resilient. Inaction is simply unacceptable.

In the nineteenth and twentieth centuries, improved understanding of rights and responsibilities in the UK led to a social contract and improved social welfare for all. I believe that for the twenty-first century we need an environmental contract where citizens, business and nations work together towards a goal, with clear understanding of each others' rights and responsibilities. The UNFCCC is playing a crucial part in this discussion and Nairobi provides an opportunity for all countries to play their part and to meet the challenges we all face ■

David Miliband is Secretary of State for the Environment, Food and Rural Affairs of the United Kingdom.

No Reason

To Wait

JOSÉ GOLDEMBERG calls on both developed and leading developing countries to take immediate action

Global warming is not the only problem now facing mankind, but it is one of the most serious with which humanity has ever been confronted. Others such as overpopulation – as predicted by Malthus in the 19th century – did not occur as forecast. Water shortages, already plaguing many regions of the world, may also probably be tackled successfully.

There are however cases where civilizations – such as those of Easter Island and some large Mayan Yucatan settlements – have perished as a result of overexploiting natural resources. With global warming we are again testing the limits of the carrying capacity of the environment on which we depend, changing the composition of the atmosphere with unknown consequences. The jury is still out on whether civilisation will survive it.

The irony is that we know precisely what is causing global warming: the massive injection of gases from human activities into the atmosphere, mainly CO^2 (carbon dioxide) from the burning of fossil fuels. The solution is therefore clear: to reduce such emissions, we must 'decarbonize' the present energy system. This, of course, is more easily said than done, because the extraordinary progress witnessed in the 20th century was based essentially on the large-scale, widespread use of fossil fuels. Coal, oil and gas became essential for mobility, electricity generation, heat production and all kinds of chemical and industrial products.

Consumption patterns

Fossil fuels will not be abandoned easily, not only because they are relatively cheap and easy to get, but because our consumption patterns are intimately connected to them.

There are therefore three options:
1. to change consumption patterns radically, which is difficult and not a realistic option except under a very severe crisis;
2. to adapt to the effects caused by climate change, which is a very asymmetric option in social terms because the rich may manage to do this more easily than the poor, thus aggravating thus the serious problems of underdevelopment ;
3. to reduce drastically the emissions of greenhouse gases through using fossil fuels more efficiently and switching strongly to renewable energies.

Mark Edwards/Still Pictures

The third option is the only one really being implemented. Some other new technologies, such as carbon capture and storage or fuel cells might also contribute but are still under development.

In industrialized countries there is already a clear 'decarbonization' of the economy: carbon emissions are not growing as fast as the gross domestic product (GDP): in other words, economic growth has been 'decoupled' from carbon emissions, as the energy system becomes less dependent on fossil fuels. In developing countries, however, the growth of these emissions follows GDP growth more closely, a trend aggravated by the intensive use of coal in China and India.

The 1992 United Nations Framework Convention on Climate Change (UNFCCC) reflects that asymmetry and incorporates the political principle of "common but differentiated responsibilities", through which industrialized countries agree that they should take the lead in reducing emissions. However, such compromises have been often used in international negotiations as an excuse for inaction — except by the European Union (EU) which has taken the Kyoto Protocol seriously and has been using its 'flexibility mechanisms' to fulfill its commitments. However, the EU countries produce only 15 per cent of the world´s greenhouse gas emissions.

The EU has also adopted targets and timetables through directives, for increasing the share of renewable sources in the energy matrix, in consonance with the proposals put forward in the 2002 Johannesburg World Summit for Sustainable Development. This indicates that there is nothing sinister about targets and timetables: indeed, governments operate all the time under strict budgets and similar parameters. The absence of such tangible goals – as is the case in the United States which has not joined the Kyoto Protocol – leaves without guidance the private sector, which ultimately will have to conduct the activities required.

There is no novelty in establishing and pursuing targets and timetables, as has successfully demonstrated, for example, by both the Acid ▶

Rain Programs (which put caps on sulphur dioxide (SO2) and nitrogen dioxide (NO2) emissions from thermal plants) or the 1987 Montreal Protocol (which phased out several groups of halogenated hydrocarbons that deplete the ozone layer, such as CFCs).

Commitment period

We must urgently extend the present regime to its second commit-ment period beyond 2012, and achieve more reductions in greenhouse gas (GHG) emissions. Proposals to that end are being discussed by national governments. But it is essential that the US (which is responsible for 25 per cent of all global GHG emissions) joins and that the leading emitters in developing countries are attracted to adhere to emission mitigation policies, possibly through voluntary commitments under the UNFCCC rules: They would not have to encompass all sectors but basically those where real success can be achieved. For example, a commitment from Brazil to reduce deforestation in the Amazon would be a major step forward, as would ones from China and India to reduce their large emissions from coal combustion through, for example, improved efficiency standards and using last generation technologies for electricity generation. The widespread use of biofuels for transport (ethanol replacing gasoline, biodiesel substituting for diesel oil),

A commitment from Brazil to reduce deforestation in the Amazon would be a major step forward, as would ones from China and India to reduce their large emissions from coal combustion

and other types of modern biomass as an energy source, is another very important option to be considered by all countries, no matter whether they produce them domestically or replace unsustainable imports of fossil fuels.

Implementing such measures will ultimately depend on action taken by governments at different levels. International treaties will only succeed if they carry heavy sanctions for non-compliance (as does the Non Proliferation Treaty), otherwise even mandatory clauses are voluntary in reality. Yet many municipalities, states and even countries are taking action to reduce their GHG emissions, thanks to pressure from non-governmental organizations and the sheer enlightenment of some governmental actors.

In 2004 the California Air Resources Board, for example, adopted standards that aim to reduce GHG emissions from cars and light trucks by 18 per cent in 2020 and 27 per cent in 2030 – estimated to cut emissions by 30 million tons of carbon dioxide equivalent (tCO^2 eq) a year by 2020. Stricter motor vehicle emission standards are also expected to cut ozone-forming pollution by about 6 tons per day in 2020.

In São Paulo State, Brazil, the use of ethanol blended in gasoline (gasohol) avoided emissions of nearly 7 million tCO^2 eq in 2003. The use of ethanol, which is now less expensive than gasoline, has also reduced annual fuel costs to consumers by as much as $7.5 billion, as well as significantly reducing air pollution.

Nations must act more vigorously, and local governments can do a lot to avoid the dire consequences of global warming. There is no reason to wait ■

José Goldemberg is Secretary for the Environment, State of São Paulo, Brazil

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Climate Change

Won't Wait

YVO DE BOER describes recent accomplishments, and present and future challenges, in climate politics as the reality of climate change becomes ever more evident

Climate change is increasingly an everyday reality. The growing intensity and frequency of droughts, floods, extreme weather events, and other impacts speak loudly for the need to deal with this real and serious threat.

The international response to climate change has evolved around the United Nations Framework Convention on Climate Change and its Kyoto Protocol, which together provide the institutional basis for action on a global scale. The latest round of international talks – the United Nations Climate Change Conference in Nairobi – deals with important issues for advancing international action to mitigate the causes of climate change, and to adapt to its impacts.

Africa is particularly vulnerable to climate change. In Kenya, where millions of people must already cope with climate impacts, one can truly feel the urgent need for action. So taking concrete steps to strengthen support to developing counties in their efforts to tackle climate change is a major priority for the Nairobi conference.

Action on adaptation to adverse effects of climate change will be a key theme. In the past few years the international process has laid a solid basis for addressing adaptation. The 2002 New Delhi declaration on climate change and sustainable development, which recognized it as a high priority, was followed by the adoption of the Buenos Aires programme of work on adaptation and response measures in 2004. The next year, the United Nations Climate Change Conference in Montreal adopted a five-year work programme on impacts, vulnerability and adaptation to climate change, intended to help develop the technical basis for increasing resilience. Agreement is needed on the specific activities within the programme to be carried out up to 2008: countries are expected to take decisions in Nairobi that will enhance action on adaptation on the ground.

Critical elements

Developing countries will be hurt most by climate change. Yet they are often those with the least capacity to respond to its impacts. The Adaptation Fund was therefore established under the Kyoto Protocol to support adaptation activities in developing countries. The Fund is financed by a share of the proceeds generated by the Clean Development Mechanism (CDM) – one of the Protocol's market-based instruments – and by voluntary contributions. Countries adopted a decision at the Montreal conference giving initial guidance for the operation of the Fund, but a number of issues relating to its management remain to be agreed. Ministers have an opportunity in Nairobi to reach political agreement on critical elements of the governance and management of the Adaptation Fund. This is especially important as the CDM is already generating income, which must be channelled to finance adaptation projects that make a real difference for communities in the developing world.

Emission reductions

There has been progress in implementing the Protocol's market-based mechanisms. The CDM – combining support for sustainable development in developing countries with ▶

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enhanced cost-effectiveness of emission reduction in industrialized ones – is the first to become operational. It is now booming. The number of registered CDM projects grew from a few dozen at the end of 2005 to 270 by the end of August 2006. About a thousand more are in the pipeline, heading for formal evaluation prior to registration. In February 2006 it was estimated that the CDM pipeline would deliver more than 800 million tonnes worth of certified emission reductions by the end of 2012. By the end of August 2006, just six months later, this estimate is increased to more than 1.2 billion tonnes – equivalent to the combined emissions of Canada and France in 2003. By October 2005, 50,000 tonnes of certified emission reductions had been issued; now this stands at over 11 million tonnes. The current CDM pipeline is expected to generate some $12 billion in carbon credits by 2012, if the price of a tonne of carbon is around $10. If the post-2012 value of credits can be ensured, and the CDM continues to grow, the actual income is likely to be much higher.

Cleaner technology

The Montreal conference decided to strengthen the CDM by streamlining its procedures and increasing financial resources to support its governance structure, giving it more muscle. The conference in Nairobi is to consider steps to enhance capacity-building for CDM host countries, and other actions to promote more equitable geographical distribution of projects. It is important that the sustainable development benefits of the CDM, such as the transfer of cleaner technology and improved energy efficiency, are more accessible to communities around the world.

Global dialogue

Joint implementation, another of the Protocol's project-based market mechanisms, was only formally approved in 2005. It allows industrialized countries with emission reduction targets to earn credits by jointly implementing projects that reduce emissions or remove carbon from the atmosphere. This is particularly important to countries with economies in transition, many of which have enormous potential for low-cost measures to reduce greenhouse gas emissions but lack the investment capital to implement them. The Joint Implementation Supervisory Committee, which governs the mechanism, has done much since it was established at Montreal, and the mechanism is now close to operation. Countries are expected to take important decisions in Nairobi to strengthen and further operationalize joint implementation.

Dealing with climate change in the longer term is a central challenge. Countries made a major step towards addressing it in Montreal by launching two new processes on future policy. One track is a global dialogue on long-term cooperative action by enhancing implementation of the Convention. Structured around four thematic areas – sustainable development, adaptation, technology, and ▶

market-based opportunities – it is designed to allow countries to exchange experiences and analyse strategic approaches for longer term action.

Advance development

The other track is for negotiating new commitments beyond 2012 for industrialized countries under the Kyoto Protocol, focussing on quantified emission reduction commitments, and addressing such issues as the duration of the commitment period; differentiation of commitments and burden sharing; and sectors and sources of emissions and removals. A new subsidiary body to the Convention – the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol – has been established for this purpose

After a successful start in May 2006, discussions on future action continue in Nairobi. A workshop under the dialogue focuses on how to advance development in a sustainable way and how to realize the full potential of market-based opportunities. Discussions under the Protocol on further commitments for industrialized countries continue with an in-session workshop on the exchange of scientific, technical and socio-economic information – including a presentation by the Intergovernmental Panel on Climate Change and ones by countries on the scientific basis for determining their further commitments, on emission trends and on the mitigation potential of policies and technologies. The two processes are closely related and support the same objective.

Future policy

Significant longer-term emission reductions will largely depend on deploying new and more efficient technologies. So it is not surprising that making clean technology available to developing countries is one of the great challenges facing the process, one on which the success of climate policy might depend. Technology is a central common element in discussions on future policy, and negotiators are expected to agree in Nairobi on a set of actions to enhance its transfer to developing countries.

The Protocol calls for a review to take place at the second Conference of the Parties, serving as a Meeting of the Parties to the Kyoto Protocol (COP/MOP). Countries must decide in Nairobi on how to conduct it, building on the momentum of the two-track process on future action already under way.

Grave responsibility

Holding the twelfth Conference of the Parties and the second COP/MOP on a continent so vulnerable to climate change starkly demonstrates to negotiators their grave responsibility to make substantial, meaningful contributions to the fight against climate change, for communities both in Africa and around the globe. Climate change will not wait for them, but might be slowed down by the will of determined nations working together ■

Yvo de Boer is Executive Secretary of the United Nations Framework Convention on Climate Change.

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PEOPLE


UNEP

Monique Barbut, the Director of UNEP's Division of Technology, Industry and Economics, was unanimously elected Chief Executive Officer and Chairman of the Global Environment Facility for a three-year term by its Council in June. Her appointment appeared to have boosted deliberations among governments on what in August became agreement on a record $3.13 billion funding package.

Before joining UNEP in 2003, **Ms Barbut** had a distinguished career in France's economic development bank, la Caisse Centrale de Cooperation Economique, and at the Agence Française de Developpement (AFD), the country's principal executing agency for foreign aid, becoming its Executive Director for all Caribbean, Pacific and Indian Ocean activities. She was also a key player – as a member of the French delegation – in the financing negotiations at the 1992 Rio Earth Summit and played an active role in the creation of the GEF.

UNEP's Deputy Executive Director, **Shafqat Kakakhel**, said she would be "greatly missed" and **Paul Wolfowitz**, President of the World Bank Group added: "Her appointment brings valuable skills and experience to GEF, which are vital for strengthening the Facility's effectiveness". Ms Barbut said: "In partnership with GEF member countries, I look forward to building on GEF's core strengths and increasing its impact with respect to the implementation of international environmental agreements.

Rodrigo Hernan Vivas Rosas, from Colombia, has won one of the first redesigned UNEP Sasakawa Prizes, presented in New York on 30 October. The other was awarded to the **Tenadi Cooperative Group** of Mauritania.


Google

After two decades of recognizing important environmental initiatives, the $200,000 Prize has been shifted towards being an incentive for environmental ideas and initiatives that are innovative, replicable, and — most importantly — sustainable in the long term.

Each laureate's scope of activities is associated with a theme selected for the year. In 2006, the theme for which candidates were eligible was 'Deserts and Desertification'.

Mr Vivas Rosas, 36, has successfully established several environmental and community development initiatives that have won international acclaim and recognition. He is the leader of CIPALSA, an alliance between 16 organizations and nearly 65,000 people, including government and non-governmental organizations, a foundation established by ex-guerrillas and an association of indigenous people. Its work includes the 500 Mil Cisternas (500,000 tanks) project — a water supply alternative in arid and semi-arid rural areas of Colombia, which uses easily and quickly constructed tanks to capture and store rainwater for use in family agriculture, homes, schools, and colleges.

Trained in law and sustainable development, he also leads the way for REDLAYC, a food security and sustainable development regional entity, and is regional counselor for ECOFONDO, a consortium of regional environmental organizations. His activities span the Andean region, and his achievements have dented the poverty that helps perpetuate local guerrilla activity, the production of illicit crops, and the flow of migrants to Colombian cities. His integrated models and approaches are seen as a kind of laboratory for developing tools and applications in hillside environments plagued with lack of resources and threatened by desertification.

The Tenadi Cooperative Group was founded in May 1975 by more than 200 families living in the desert. Persistent drought in the Sahel — and Mauritania, in particular — since 1973 has killed 90 per cent of the livestock, annihilating the hopes of people who have followed a nomadic lifestyle there for centuries.


Tenadi

As a result, many nomads decided to come together and settle on their land. Confronting a hostile nature, the group have used innovative techniques to lay down a solid foundation not just for basic survival, but for sustainable development. Their activities include sinking two boreholes with immersed pumps to provide water; getting agriculture up and running; introducing new crops and regenerating flora which were becoming extinct; and spreading techniques to prevent sand encroachment among other nomadic encampments that want to become settled.

To combat desertification, the cooperative has improved and reforested 80 hectares around the boreholes to stop movement of the dunes, backed by a nursery of Prosopis trees for planting windbreaks — and created a date palm oasis, where market gardening produce and other crops can be grown productively under the trees.

Achim Steiner, UNEP's Executive Director, said: "This is an award for the literally hundreds of thousands of grassroots initiatives trying to conserve the health and fertility of the land in some of the harshest environments on the globe." ■

An Equal Chance

RAPHAEL HANMBOCK and **AUBREY MEYER** say that unequal patterns of consumption must be tackled alongside emissions, if dangerous climate change is to be avoided

Z. Jananovic/UNEP/Still Pictures

High and low per capita carbon emissions are a proxy for wealth and poverty both within and between nations. One third of the world's people enjoy 94 per cent of the global dollar income and account for 90 per cent of the greenhouse gases so far emitted throughout history; the other two thirds share just 6 per cent of this income and 10 per cent of the emissions.

We will not correct the over-consumption of fossil fuels that is leading to dangerous climate change without also correcting these unequal consumption patterns. And this has to be 'designed': it will not happen by accident.

'Contraction and Convergence' (C&C) is a simple model for sharing the reduction of future greenhouse gas emissions internationally. Guided by the science, it takes a safe and stable target for concentrations of the gases in the atmosphere, and then calculates the global 'contraction budget' of future emissions required to achieve it. Within this limit, it recognizes that all citizens of the Earth, regardless of income, have an equal right to emit greenhouse gas.

It pre-distributes future emissions entitlements so that they 'converge' by a given date on the global average per capita value, while total emissions 'contract' to meet the safe global target. The shares created in this way are tradable, and so can be a valuable resource to combat poverty and promote clean development.

Thus, based on current assessment of the danger, a 'ceiling' of the equivalent of 450 parts per million of carbon dioxide in the atmosphere could be set. A global emissions budget would then be calculated, and this would contract to near zero by around 2080, to keep concentrations within that 'safe' ceiling. Convergence to equal per capita emissions would be achieved by 2030.

Climate calamity

The model will, however, calculate any contraction budget chosen, and convergence at any rate to equal shares per person. Whatever the eventual figures, the principles remain true.

Such, therefore, is C&C in principle. We need it in practice as soon as possible since rising gross emissions indicate looming climate calamity, while increasingly inequitable consumption patterns are now equally an indicator of looming conflict. As the situation becomes more urgent, it is futile to continue basing climate negotiations on a mere 'aspiration' to succeed, while randomly picking targets out of a hat. It is similarly futile

to try to defend unequal rights, if agreement by consensus is what we seriously seek.

The C&C model is a rational calculus to account for how we can all do enough soon enough to avoid the worst. Negotiations for a 'post-Kyoto' settlement must be based upon it. However arbitrary, or even Utopian, it may seem to some, it is still less arbitrary than the random alternatives on offer. And, as the Archbishop of Canterbury observed last year, "anybody who thinks C&C is Utopian simply hasn't looked honestly at the alternatives."

The objective of the United Nations Framework Convention on Climate Change (UNFCCC), like that of C&C, is to stabilize the rapidly rising greenhouse gas concentrations in the atmosphere. Its principles are precaution and equity. Contraction provides 'precaution' and convergence ensures 'equity' : Parties should now negotiate the rate for both. In 2003, Joke Waller Hunter, the late UNFCCC Executive Secretary noted that the objective of the Convention "inevitably requires contraction and convergence."

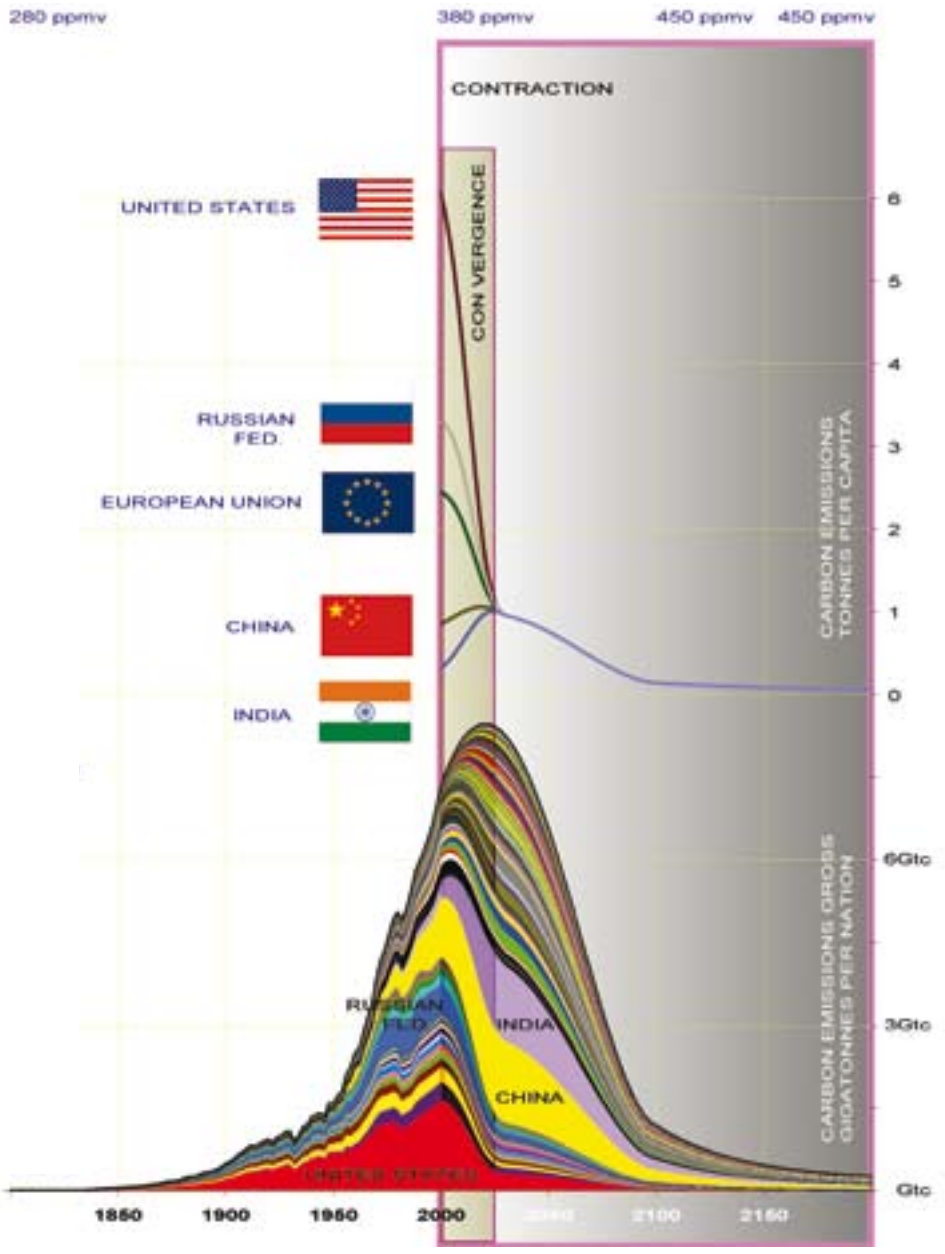
Take action

This is what the world's poorest peoples – those most vulnerable to the impacts of changing climate – have been asking for. The Africa Group first made their call for the C&C framework a decade ago in Kyoto. They won the point but lost the moment as the patchwork of measures in the Kyoto Protocol came into play. Since then, progress with the Protocol has been painfully slow, while the problem has grown much faster than predicted.

The twelfth Conference of the Parties in Nairobi is a moment of truth. The deal we all need, if we are to survive, is more than simply an agreement between some countries, after 15 years of deadlock, to take action 'if you will'. This would be welcome, but unless any agreement is governed by a C&C framework, it will be directionless. Without this vision, our best efforts will gradually perish ■

"Raphael Hanmbock is Co-ordinator of the African Network for a Climate Community (ANCC) West and Central Africa, and Chairman of ACAN Cameroon and Aubrey Meyer is Director of the Global Commons Institute.

CONTRACTION for CO^2 CONCENTRATIONS at 450 ppmv and Convergence by 2030



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Protect and Grow

OGUNLADE DAVIDSON describes Africa's particular vulnerability to a crisis it has done little to create, and suggests how it can grow both in wealth and in resilience

The world's poorest people have benefited least from the economic activities which have caused greenhouse gases to build up in the atmosphere. Yet they will suffer the most from the consequences, due to their weak resilience to global shocks. Nowhere is this more true than in Africa.

Scientific records indicate that Africa is warming at a rate of 0.5 degrees Celsius a century, and there has been significant decline in precipitation, especially since the mid 1970s. Climate models show, furthermore, that the northern part of the continent may become 5°C (and southern areas 7°C) warmer by the middle of this century and beyond, while its eastern and western regions may receive increased rainfall. More extreme and more intense droughts and floods are predicted to increase, along with a greater probability of persistent and intense El Niño — Southern Oscillation (ENSO) effects. The variable rainfall in the Sahel and the south of the continent will result in more persistent droughts than at present.

Global warming

Over 80 per cent of Africa's people now depend on agriculture for their livelihoods. But it is predicted that by the 2080s major losses in cereal production will affect over 40 per cent of its countries. There will also be a significant impact on livestock and marine resources, as their wellbeing is strongly linked to rainfall. Vector-borne diseases such as malaria and cholera, which are closely related to climatic changes, are forecast to worsen. Climate change can also have a disastrous effect on what is an already economically deficient continent, especially by affecting coastal areas which — as in the west and east of Africa — make a profound contribution to their countries' economies. However, Africa's greatest problem lies more in its weak capacity to respond adequately to climate variability and extremes than in responding to global warming per se. This is compounded by its equally weak response and poor resilience to other global shocks.

Africa is the most vulnerable continent to the problems caused by the build-up of greenhouse gases. But it has accounted for less than 3 per cent of it so far, and still contributes less than 4 per cent of the annual addition (3.6 per cent in 2002) Most countries – the Seychelles, South Africa and Libya are exceptions – contribute less than 0.5 tonnes per capita, as opposed to the EU's 12 tonnes and the USA's almost 20 tonnes. The continent has an enormous capacity to be a net carbon sink.

Economic gains

All countries need to take collective and individual action to tackle this problem, and Africa must contribute by reducing its greenhouse gas emissions per unit of economic output and developing to cope with the likely impacts. Unfortunately, most of Africa's vulnerability to climate change is due to its infrastructure deficiencies and high dependence on natural systems. This was clearly demonstrated, for example, in the 2000 Mozambique floods which affected 4.5 million people — causing 700 deaths and economic losses estimated at $500 million and cutting the GDP growth rate from 10 per cent to 2 per cent — and in the repeated Ethiopian droughts of 1968, 1994 and 2005.

The continent's food production increased 2.8 fold ▶

between 1961 and 2002, but with a minimal impact on hunger because population increased by similar amount. About 40 per cent of the harvest is lost either on and off the farm, and reducing this with known storage and delivery systems can lead to tremendous economic benefits and hunger reduction. Similarly improved water storage and delivery, with well-known technologies, can save up to 40 per cent of water resources: using saved water for irrigation and a more rational distribution system can lead to substantial economic gains and reduce vulnerability to climatic change. Improving public health systems — such as with more rationalized health delivery and distribution mechanisms — can similarly reduce vulnerability to vector-borne diseases. All this requires funds, and a greater role for governments in mapping future growth strategies. So a two-pronged approach is needed: intensifying the more common approaches towards climate change adaptation and mitigation while achieving an aggressive growth of wealth creating activities.

Regional effort

Existing activities to build up human and institutional capacities to tackle climate change constraints, though welcome, should be strengthened to maximize gains from such actions as national communication and training programmes. Countries and institutions should be encouraged to learn from each other, while instituting schemes to retain human resources. Climate change research and development continues, but mostly outside the continent: the relatively little in Africa is uncoordinated, reducing its impact. The international attention the Gleneagles agreement gave to this should be exploited, along with regional and national efforts in a co-ordinated framework. This could lead to promising environmentally-sound and climate-friendly technologies being developed and implemented, producing major economic gains. Using suitable research and development to integrate traditional knowledge with modern systems will be valuable; agriculture provides a rich base for this.

Wealth creation

African countries must be involved in major wealth creating activities, while coping with the demands from climate change mitigation and adaptation: growing poverty remains the greatest obstacle to Africa's development. The UN Department of Economic and Social Affairs estimates that the number of people living on less than $1 per day rose from 288 million in 1980 to 516 million in 2001. Some positive economic growth has been recorded since 2000, but it needs to be strengthened. An even greater problem is the rising inequalities (in income, human capabilities, access to infrastructure, and decision-making) in several countries, as these can lead to civil conflicts and strife. Sierra Leone provides an example: just before the 1989 war the richest 20 per cent of its people accounted for more than 63 per cent of all spending: the bottom 40 per cent for just 3.1 per cent. Poverty and inequality can only exacerbate stresses from climate anomalies as the continent's response will be severely weakened.

Developing energy, industrializing agriculture and mining sustainably are three promising areas for wealth creation. Africa will be unable to cope with climate mitigation and adaptation demands without substantially increasing its use of its indigenous modern energy resources. It is the smallest consumer of modern energy services, though the ratio of its production of all fossil fuels to its reserves is above the world's average, and it is richly endowed with renewable energy resources. Similarly its vulnerability to climate change will only worsen, unless there is a significant increase in the use of fertilisers, irrigation and agricultural mechanization. Africa contains over 40 per cent of the world's as yet unexploited mineral resources but, unfortunately, only first stage low-value mining activities are being carried out: the high-value processing stages remain outside the continent. Using more sustainable mining methods is crucial if it is adequately to respond to such global shocks as climate instability.

Scientific uncertainties and economic risks can no longer be used to justify inaction in preventing further major man-made interference with the global climate system. Countries should fully exploit the current growing international attention to climate change and development in Africa — as in the Gleneagles agreement — despite declining aid to the continent. Africa's capacity adequately to respond to the challenges of climate instability will be expanded by improving overall resilience, integrating climate change goals into sustainable development strategies, increasing the use of modern energy systems with reduced carbon intensity, and strengthening international initiatives.

Developmental aspirations

There are obstacles, however. Only five of the 210 Clean Development Mechanism projects registered as of June, 2006, were in Africa: most were India, China and Brazil. Special considerations are needed for African countries plagued with infrastructural deficiencies. Governments need to take a greater role in addressing this: the private sector involvement advocated by donor and international agencies can assist but only in an adequately regulated and competitive environment.

Africa's challenge is to develop a framework and policies that ensure that resources are used efficiently and equitably, to maintain economic and developmental aspirations, and to protect the weak in responding to changes in the climate ■

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Bram Van De Biezen/UNEP/Still Pictures

Freedom

Isn't Free

ATIQ RAHMAN calls for deeper cuts in emissions and greater effort on adaptation to be made urgently to free the world from the imminent threat of dangerous climate change

Runaway climate change is looking ever more threatening. There appears to be just a small window of opportunity in this decade for rapid action to avert catastrophic and irreversible changes.

The good news is that – despite all the misinformation campaigns – the process of climate change negotiation is continuing. Scientific effort, through the Intergovernmental Panel on Climate Change (IPCC), is narrowing uncertainty and demonstrating the anthropogenic footprint. The Kyoto Protocol has come into force and European countries are trying to implement it. But the bad news is that there are increasing extreme climatic events while global action to reduce greenhouse gases remains very weak, and emissions are increasing more rapidly than ever.

There should be an absolute 5.2 per cent reduction in the greenhouses gas emissions during the Protocol's first commitment period,: in fact we have seen a greater increase. And the Kyoto target itself was only designed to be the first, small and inadequate step. It is an absolute priority that the parties to the UN Framework Convention on Climate Change achieve deeper cuts, so as to meet its prime objective: saving the planet from the threat of runaway climate change. The 12th Conference of the Parties/2nd Meeting of the Parties in Nairobi must strive to achieve them.

Over the last five years there has been an unprecedented increase in extreme weather events in rich, developing and least developed countries alike, including cyclones, floods, heat stress, drought, and the rapid melting of polar ice and glaciers. All countries will need to adapt. Devastating hurricanes like Katrina and Rita have exposed the United States' vulnerability, demonstrating lack of preparedness and the need for adaptation even there; and the adaptation needs of the poorer countries are much greater.

Global climate

The Framework Convention and Protocol enshrine simultaneous actions on mitigation and adaptation. In the final analysis, mitigation is the best form of adaptation, which is certainly no substitute for it. Any delay in reducing emissions will only increase the need and cost of adaptation, and increase the risk of runaway global climate change. The primary responsibility of the Convention and Protocol – and all their member states, signatories and non-signatories – is to reduce emissions now. Industrialized countries must take the lead. Developing countries must also do their utmost, and seek a path of development with lower greenhouse gas emissions.

The delay in the Protocol coming to force has deprived the world of a major opportunity for reversing the course of rapid increase in greenhouse gases. Even its attempt to be a first, small beginning was thwarted by a small group of countries. By contrast, European countries are trying to implement it, but attempts are weak and inadequate. A limited number of Clean Development Mechanism (CDM) projects are emerging. But they are virtaully exclusively in the domain of such large developing countries and major ▶

emitters as China, India and Brazil. Most of the smaller and poorer nations — and particularly the Least Developed Countries — will largely remain outside its benefits, though they will be the most affected by the adverse impacts of climate change. A special mechanism to include them is essential to make the CDM a universal instrument.

All efforts must be made in include the USA into all future processes. In this rapidly globalizing world it is neither desirable nor helpful to keep the greatest economy out. The US is not only the greatest greenhouse gas emitter; it also can play a key role in solving the problem of climate change with its scientific and financial capabilities. If the US Administration is serious about freedom across the world, then freedom from the increasing threat of climate change – particularly for the poor and vulnerable countries and communities – must be part of the equation.

Climate sceptics

While mitigation efforts have stumbled, there has been some progress over adaptation, maybe as a result of their very failure. This also serves as a rebuff to climate skeptics, emphasizing not only that climate change is real and already here, but that communities and ecosystems need to be protected from its potential threats. Much of this is due to interest from developing countries who have identified that adaptation has direct and reinforcing relationship to sustainable development. Many have led and initiated important advances. The 48 nations of the Least Developed Countries, for example, have started National Adaptation Plans of Action: several industrialized countries, such as Finland and the United Kingdom, have initiated similar plans and activities. Adaptation has to be focused to development. It will be supported, and become cost-effective, if done with sensitivity and respect for local and national circumstances.

The Convention's objective is "stabilization of the greenhouse gas concentration in the atmosphere at a level that will prevent dangerous anthropogenic intervention with the climate system". But what is "dangerous" remains both controversial, and a scientific challenge, and must be resolved politically. Present concentrations of greenhouse gases are already leading to heat stress, extreme weather events, the melting of polar ice, and the shifting of glaciers and permafrost.

So have we reached dangerous levels? A global and urgent political consensus on this is essential, but so far there is none. The European Union is moving towards a 2ºCelsius increase as the limit of acceptability, yet that may still have intolerable impacts. In the absence of consensus, this must be seen as the absolute upper limit, with a view to reducing it.

In the final analysis, this is an issue of consumption, production and environmental justice. Agreeing the Convention was principally a process of governmental North-South negotiations. But civil society – environmental, research, scientific, and business groups – has influenced governments to decide in favour of the planet above narrow national or group interests. The principle of "common but differentiated responsibility" was accepted by all parties and actors.

The 2006 Conference of the Parties should be a fertile ground for discussing the second commitment period, bringing deeper cuts in the North and more decarbonized economic development in the South. Initiatives and discourses on a post-Kyoto architecture, with various positions on equity, fairness and allocation of responsibility and burden sharing have already been initiated by different groups in both the North and the South. The more progressive ones, such as the "South-North Dialogue on Equity in the Greenhouse, a proposal for an adequate global climate agreement", have combined researchers and institutes from both.

Development needs

The present structure of North-South negotiation may need to be revisited. But any future architecture must include all nations, and particularly the USA, the greatest emitter. It must take into consideration the need, and the right, of poor countries and communities to survive with their development needs met and minimum dignity ensured.

Freedom from the threat of climate change is one of the key freedoms for which every country will have to take responsibility. If it is not ensured, other freedoms – such as from hunger, injustice, terrorism, and dictatorship – could be equally threatened. There is no part of the planet so isolated and fortified that it is free from the danger. Climate security has to be for the entire planet, and all its citizens ■

Atiq Rahman is Executive Director of the Bangladesh Centre for Advanced Studies and Chairman of the Climate Action Network, South Asia.

S. Belon Lopez/UNEP/Still Pictures

Star Profile: Bianca Jagger

"We must all change"

Bianca Jagger talks to Geoffrey Lean


google

Bianca Jagger uses public transport, shunning the conventional celebrities' carbon cocooned existence. To prove it, she offers to show *Our Planet* her Oyster card – a rechargeable pass for use on London's buses and underground trains. And, she adds, "I do not own a car".

It is all part of her fight against global warming, one of the many causes she has taken up over the last quarter of a century – since her divorce from rock star Mick Jagger – which have won her worldwide recognition, and many awards. She has long been a campaigner for human rights, especially those of women and indigenous people, and against AIDS and the death penalty – causes she firmly believes are interlinked with the environment.

Sitting in her London flat, she speaks with characteristic passion about climate change. "If we have children and grandchildren, how can global warming not be important to us?" she asks. "Unless we are prepared to make changes that are almost unbelievable, we are not going to be able to save the planet."

Many of the changes will have to be made by Governments, she says, and "we need to make them accountable. We need to think about their environmental policies and global warming." But "unless we are all prepared to change" , she adds, there is reason to be "very pessimistic" about the future of the world.

"There are so many things we can do. Instead of driving everywhere, we should walk short distances or use public transport. Turning the thermostat down just one degree will make a big difference. Recycling waste and turning off electrical appliances are also important."

In campaigning on global warming, human rights and her other causes, Bianca Jagger is fulfilling a destiny she laid out for herself as a teenager, interrupted by her marriage. Born Bianca Perez-Mora Macias in Nicaragua in 1950, she left her country at 16 – largely because of discrimination against women there – to study political science on a French Government scholarship.

Her beauty drew her into Parisian and then international society, and she ended up marrying Jagger, becoming a worldwide celebrity, entering the rock world, and finding much the same discrimination there. After her divorce, she returned to her original course, but found she had to struggle to get herself accepted.

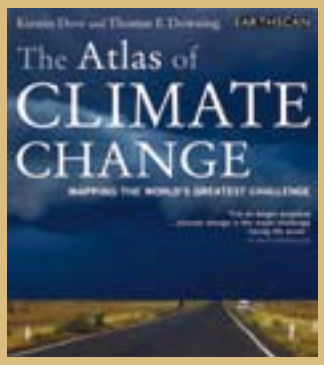
"This is what I set out to do with my life, and what I care about" she says. "But it was an arduous and difficult task to gain credibility. People were going to be sceptical, they had an image of someone who was glamorous and sophisticated and it was difficult to overcome it."

Her awards bear testament to her success. In 2004 she received the Right Livelihood Award, 'the Alternative Nobel Prize', for her "longstanding commitment and dedicated campaigning over a wide range of issues of human rights, social justice and environmental protection." Others include the Rainforest Alliance's Green Globe Award for "her extraordinary conservation efforts and achievements", the Amnesty International/USA Spotlight Award for leadership, and the National Coalition Against the Death Penalty's 'Abolitionist of the Year Award'.

She feels strongly that celebrities should "take the time and have the commitment and the interest to learn about issues, and have the humility to understand them." She adds: "I have had to learn a lot. I am not a photo-opportunity celebrity, who is pictured holding a child, but then comes home and forgets."

"I am very grateful to have access to leaders, to be able to talk to them about things I care about. But I do not take it for granted. It has all been a great leaning experience." GL.

BOOKS & PRODUCTS



The Atlas of Climate Change by Kirstin Dow and Thomas E. Downing presents the most up-to-date scientific data and arguments on the drivers and the impacts of climate change in an easy-to-read format, with over 50 full-colour maps and graphics. Part of a larger series of "State of the World" Atlases published by Earthscan, this publication covers a wide range of subjects, from vulnerable populations and health impacts, to future scenarios and responding to change. The final chapter – Committing to Solutions – provides concrete examples and suggestions for personal and public action.

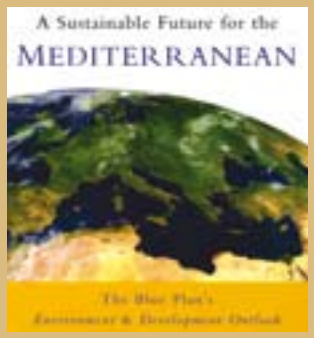
UNEP is collaborating with the University of Geneva and the UN Institute for Training and Research to develop the Geneva Programme in Environmental Diplomacy, in the tradition of its three decades of support to environmental diplomats in their efforts to strengthen their profession. The programme will be implemented with the financial support of the Government of Switzerland and the OSCE/UNEP/UNDP Environment and Security Initiative and in collaboration with the University of Peace and LEAD International. Students who successfully pass its course and complete their final thesis will receive ten European Credit Transfer and Accumulation System credits validated by the University of Geneva.

As global warming becomes ever hotter news, more books by distinguished journalists have been added to the extensive library on climate change. Andrew C. Revkin of the ***New York Times*** is the author of ***The North Pole Was Here***: P***uzzles and Perils and the Top of the World*** (published by the ***New York Times*** and Kingfisher), which explains how the fate of the pole will affect the whole world. ***New Scientist*** journalist Fred Pearce has written ***The Last Generation*** (Eden Project Books), which demonstrates how the present generation will be the last to enjoy the stable predictable climate of the last 13,000 years. And the London ***Guardian*** columnist, George Monbiot in his new book, Heat: ***How to Stop the Planet Burning***, outlines how a 90 per cent cut in emissions within 30 years is both necessary and practical.

UNEP was one of many organizations that provided material for Al Gore's book and film ***An Inconvenient Truth***. The 96 minute film, which is mobilizing influential opinion and catalysing action worldwide, has become the third most seen documentary in US film history, even overtaking Madonna's ***Truth or Dare***. The accompanying book was originally published in the United States by Rodale.

India's ***National Institute of Hydrology*** is organizing an International Conference on *Water, Environment, Energy and Society in New Delhi* from 18-21 December. The conference, a contribution to the seventh phase of UNESCO's International Hydrological Programme, will critically re-examine policies for water management in the light of the world's increasing demand for water and its uncertain supply. Its main themes will be water and environment, water for energy, water hazards, water for society, and water for other uses.

A Sustainable Future for the Mediterranean: ***The Blue Plan's Environment and Development Outlook*** analyses the past, present and possible future – up to 2025 – of the environment and development of the Mediterranean basin. Edited by Guillaume Benoit & Aline Comeau, with a . preface by Lucien Chabason, and published by Earthscan, it is the result of the work of many experts from the Mediterranean countries. It focuses on six major issues – water, energy, transport, urban areas, rural land use, and coastal areas. It sounds the alarm on the possible risks of a "business as usual" scenario, and it shows that alternative solutions may be developing to "contribute to the preservation of the unique quality of this region and ensure for it a future commensurate with its past". The Blue Plan is a Regional Activity Centre of the Mediterranean Action Programme, established under UNEP's aegis.



The new and unique ***Green Awards 2006*** will spotlight brands or organizations that have creatively demonstrated their commitment to sustainable development across different media and marketing disciplines. The CarbonNeutral event takes place in London's Guildhall on 29 November 2006, supported by UNEP, Media Guardian, the City of London, Marketing Week, and CSR Wire.

Visit UNEP's online bookshop at: www.earthprint.com

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Keeping the Window Open

JENNIFER MORGAN says that the last opportunity for avoiding dangerous climate change will not last much longer, and calls for urgent action.

Climate change is here and now. It is a fact. Its impacts are almost everywhere. The use of fossil fuels such as coal, oil and gas are warming our atmosphere to the point that, if we don't change our ways, the planet will be dramatically altered forever. It is, indeed, the key challenge to the world.

Retreating glaciers in the Himalayas and Alps, islands sinking under rising sea levels, and icebergs floating adrift in the Arctic and Antarctic are common images of global warming. Most are remote from most peoples' daily lives and concerns. But WWF has been documenting the impacts of climate change through 'Climate Witnesses', people who are already experiencing its impacts. Whether German foresters, Nepalese sherpas, Fijian fishermen, or indigenous communities in the Arctic, they are testifying about change occurring under their noses, not fifty year projections about what might happen some day – and their witness stories have all been scientifically verified.

So humanity now stands at the doorstep of an historic moment. For the first time it is in the process of fundamentally changing the planet. The consensus of thousands of scientists around the world is that most of the warming since the middle of the last century is due to human activities. Over the last 200 years, the amount of carbon dioxide in the atmosphere – the major gas that causes climate change – has increased by 30 per cent, mainly due to burning fossil fuels.

These are not small matters. The question now is how society reacts. How fast can we change the way the world uses energy so as to prevent the worst impacts?

Political will

We know from scientists that a global average increase of 2° Celsius above pre-industrial temperatures forms a threshold beyond which the impacts become irreversible for ecosystems and many communities around the world. It is a big, but not impossible, challenge to stay beneath it, but it offers new opportunities for innovation, efficiency and business. It means that global emissions must peak and drop dramatically in the next ten to fifteen years.

Delaying action for only 5 to 10 years would mean that much more effort would be needed later to reach the same environmental goal. Achieving a medium probability of staying below 2° Celsius, after implementation of the Kyoto Protocol, would require global emissions to decrease by 1 to 2 per cent per year over several decades. Delaying reductions until 2015 would increase this to 3 to 4 per cent per year. And putting off global action until 2020 would make it virtually impossible to hit this target. The challenge is to cut all greenhouse gas emissions, not just CO2, by about 60 to 80 per cent globally by the middle of the century to keep open the possibility of avoiding the worst damage from climate change.

This is clearly a big challenge – but it is achievable, given the political will.

The first step was the entry into force of the Kyoto Protocol. This has placed an economic value ▶

on CO2 by setting a binding target on industrialized countries' emissions. The target can be measured and monitored effectively, as can the individual quotas set for each country.

Countries must meet these Kyoto targets, but it was always understood that first commitment period of the Protocol was just that – the first of many. The first meeting of the parties to the Kyoto Protocol in Montreal 2005 launched the next round of negotiations to determine what will happen after this period runs out in 2012. Every country participating in that meeting, except my own – the United States – understood that more action is needed and that every nation will have to play its part in solving climate change. So there is a tremendous chance to shape the way the coming $16 trillion of investments in energy sector investments (estimated by the International Energy Agency) will be made. A signal has now been sent to the carbon markets that the Kyoto Protocol is, and will remain, the basis for negotiations. But much more certainty needs to be provided so that that this vast sum will be channelled into energy systems that emit zero, or very little, carbon.

Ambitious policies

Several formal processes are under way and each must play its part. However, the formal negotiations under the Kyoto Protocol and the UN Framework Convention on Climate Change provide the foundation, and are the vehicle through which agreement can be found. By 2008 countries should have finalized the negotiations on the Protocol's second commitment period, and the agreement must be ambitious enough to ensure that the 2°C threshold is not crossed,

Each of the major emitting countries must decide to do more and do it together. The industrialized countries must take on deeper national mandatory targets, and continue with the Kyoto cap and trade system. Some developing countries must also contribute more – adopting, step-by-step, more ambitious policies and measures that reduce emissions and scale up low carbon investments. They would then enter into the global carbon market in a much more substantial manner than in the past: This would both give them the chance to use it to meet their deeper targets and provide big opportunities for technical and financial transfer. The international treaty must help developing countries meet their national development goals, and the carbon market could be one way to do so.

We need to be creative, tapping into unused reserves and debates that have not so far been considered in the context of climate change. We must 'climatize' such issues as disaster relief

Countries need to take the plunge together in an equitable yet ambitious way. We need to be creative, tapping into unused reserves and debates that have not so far been considered in the context of climate change. We must 'climatize' such issues as disaster relief and the European budget debate, which could redirect billions of euros to fight today's challenge of climate change rather than still fighting yesterday's battle of achieving food security after the Second World War. Each will play a role in determining our future and each should be thinking about how to avoid the worst impacts of climate change.

The world will look to Germany in 2007 as it holds the G8 and EU presidencies Chancellor Merkel – who as environment minister helped to negotiate the Kyoto Protocol – has a tremendous opportunity to build international trust, use Germany's tradition of innovation to chart a zero to low carbon future, and ensure that the EU continues its leadership role.

Our window of opportunity for action to avoid the worst impacts of climate change is closing rapidly. It is time for leadership with a capital L ■

Jennifer Morgan is Director of the Climate Change Programme, WWF International.

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Mark Edwards/Still Pictures

Golden Opportunity for Black Gold

RAMI A. KAMAL outlines his personal suggestion for how the petroleum industry can benefit both itself and the world by taking the lead in combating global warming

Two opposing forces are at work on the petroleum industry, each powerful enough by itself to cause unprecedented change. On the one hand, the industry is in the fifth year of a crude oil price boom, considerably more powerful than its two predecessors of 1974 and 1980. This has already yielded additional worldwide earnings of up to $1.53 trillion – great news for an already profitable global industry.

On the other hand, it finds itself increasingly on the defensive as a major contributor to anthropogenic carbon dioxide (CO^2) in the atmosphere, which – backed by a growing body of scientific evidence – is widely believed to be the chief cause of global warming. Burning fossil fuels accounts for approximately 75 per cent of emissions, releasing 24 gigatonnes of CO^2 ($GtCO^2$) into the atmosphere every year. Crude oil alone is responsible for approximately 47 per cent of this.

Industrial revolution

About 45 per cent of man-made emissions stay aloft, imposing themselves upon the earth's natural budget which had been happy to regulate itself at an estimated net annual flux balance of 770 $GtCO^2$. Human interference inflates the world's natural CO^2 reservoir by as much as 3.2 per cent a year. Carbon dioxide has a long lifetime and over 150 years, since the start of the industrial revolution, cumulative human additions are thought finally to have exceeded natural tolerance limits, triggering an exponential spiral of rather rapid global warming. Dire predictions abound on where this will lead: including sea level rises that will drown world coastlines; more frequent and larger storms; the cessation of the Gulf Stream; the disappearance of the ice caps; the release of immense quantities of methane trapped in permafrost; even a return to the conditions of the Archean Age of 3.8 to 2.5 billion years ago, where the atmosphere was unsuitable for life as we know it; and so forth. For proponents of the position that fossil fuel burning is directly feeding into global warming, the prognosis is further haunted by projections that an energy-hungry world expects to burn more and more fuel. One reliable estimate predicts that global energy demand will rise 50 per cent by 2030, with oil remaining the dominant fuel source.

The effects of global warming are tangible and measurable. If burning fossil fuels is raising global ▶

temperatures at observed rates – and if these are set to increase with growth in world energy needs – the negative effects will be measured within the span of a lifetime. This resembles a Hollywood thriller about an asteroid accelerating towards collision with the earth, rather than an issue we can sweep under the carpet for our descendants to deal with 10,000 years hence.

Immense problem

A body of scientific detractors will always feverishly argue that we have it all wrong, that global warming is a natural phenomenon that has happened many times before in the Earth's distant history, and that this latest episode has little or nothing to do with man-made CO^2 emissions. That is the beauty of science. But hundreds of scientists worldwide from academia, government and private firms have produced enough reasons to believe that human meddling with nature is indeed creating an immense problem. The momentum is towards worldwide acceptance of an undesirable impact of anthropogenic CO^2 on global temperatures.

Rising sentiment

Even the US Government, though not a signatory of the Kyoto Protocol, outspends the rest of the world in research on mitigation and in incentives targeting CO^2 capture and storage. In March 2006, the e-weekly-edition of Worldwide Refining Business Digest reported: "The USA government, through the Department of Energy is accelerating its interest in CO^2 motivated enhanced oil recovery and seeks to work with the oil companies to develop capture projects from the utility industry".

The petroleum industry must also pay heed to rising sentiment among its product end users about global warming and its role in augmenting the danger. Consumers and customers increasingly seek confirmation that suppliers act socially and environmentally responsibly, and they make selections based on image and identity. This will be reflected in demand for fuel and energy products, and petroleum producers and suppliers must adequately address it if they are to protect oil markets as the transport fuel of choice.

Reduce emissions

The industry is rapidly arriving at a crossroads. The CO^2 challenge is unlikely to disappear. It must be fully addressed if the hydrocarbon economy is to be sustained. Industries which rely on petroleum fuel products are increasingly being challenged, through regulation and policy, to reduce emissions, and this is shaping their future acceptability. Indecision – perhaps through misinformation, ignorance, or a failure to read public sentiment – may signal the beginning of the end of an industry that has fueled the world for 150 years.

Sometime, probably soon, the petroleum-producing arms▶

Hartmut Scharzbach/Still Pictures

of the industry will be subject to the uncomfortable dictation of rules, regulations and taxation on all oil use, as international bodies make frenzied attempts to control the production of CO^2-emitting fossil fuels. The process has already started. In September 2004 California adopted the world's first law to require limits on greenhouse gas emissions from passenger vehicles, giving car manufacturers a decade to reduce CO^2 emissions by 30 per cent in all new vehicles sold in the state. The coal industry has already taken preemptive action by announcing ambitious and brave plans for zero emissions by 2020 The petroleum industry finds itself lagging uncomfortably behind.

Meanwhile human innovation and technology will rally to developing cleaner energy sources. Again, this process has long since started; one example is research on hydrogen fuel cells.

Global citizenship

The price boom gives the petroleum industry, petrochemical industries and petroleum product end user industries with their combined resources a golden opportunity to vie for leadership in the struggle to protect the Earth's fragile environment. They need not have their backs to the wall. There is a way out.

To maintain petroleum's ascendancy as the world's choice fossil fuel for decades to come, petroleum producers, refiners and related industries are called on to:

- Create a cooperative body to formulate policies and monitor direction on commitments to reduce petroleum-sourced CO^2 emissions to the atmosphere. This should have the vision and clout to create such challenging goals as a zero CO^2 emissions from petroleum by the 2020 target.
- Divert some of their recent windfall income to finance research and development technologies for CO^2 capture and storage and cleaner and more efficient combustion. Oil companies should also seriously support R&D into capturing CO^2 from vehicles, so as to maintain the petrol pump culture unscathed.
- Focus on widely deploying enhanced oil recovery with carbon dioxide (CO^2-EOR) with the intent of long term sequestration of the injected CO^2. The world now has over 30 years of experience of CO^2-EOR, and it can recover an additional 2 to 15 per cent of oil-in-place. At today's prices, this extra oil will add handsomely to the petroleum producers coffers and help finance research and development in CO^2 mitigation. Carbon trading could add even more revenue, if most of the CO^2 is skillfully kept underground in the depleted petroleum reservoirs. These two new sources of wealth would comfortably pay back the capital outlays in item 2 above.
- Demonstrate global citizenship by supporting regional applications of renewable energy such as solar energy; and such industrial uses for captured CO^2 as carbon fiber, carbon black, carbon for the petrochemical industries, and the widespread use of CO^2 to treat municipal and industrial waste water.

This is the time for such a four-pronged strategy. Developing, fabricating and implementing capture technologies can be costly, so the industry should capitalise on its current income windfall. As the price of a barrel of crude edges towards $100, oil producers must push hard gracefully to avoid their own demise. The petroleum industry can rebound from its current defensive position and bask in the glory of good global citizenship for generations to come. This would not just save the world but also create hundreds of thousands of additional jobs, businesses and exciting opportunities, while the industry generates more income. A no-brainer? ■

Rami A. Kamal is a consultant on Saudi Aramco's Carbon Management Team. He has also represented Saudi Arabia on the IPCC. These are his views and do not necessarily represent those of his employers.

Raczfitompo/UNEP/Still Pictures

Sean Prague/Still Pictures

Firm *Commitment*

ZIJUN LI describes how China is leading the world in investing in renewable energy

Nothing happens slowly in today's China. Energy consumption has soared as the economy registered spectacular growth rates, above 9 per cent annually, in the past decade. Power demand is projected to reach 2.7 trillion kilowatt-hours by the end of 2006–an 11.3 per cent increase over 2005. This has resulted in a ramping-upofpower-generation capacity and an enormous increase in oil and gas imports. Yet, while China is investing in new fossil fuel exploration both at home and abroad, it is also significantly expanding its interest in renewable energies through a host of new policies and initiatives.

Many analysts expect tremendous growth in China's renewable energy market over the next 15 years. Government policy is the major driver of the country's renewable energy industry, and a new Renewable Energy Law – which took effect in January this year – and a series of new government incentives both reflect China's firm and longstanding commitments. By 2010, renewable energy is to contribute 10 per cent of the country's gross energy consumption, increasing to 16 per cent by 2020. This is a huge jump from the current 1 per cent share.

China is investing in new fossil fuel exploration both at home and abroad, it is also significantly expanding its interest in renewable energies through a host of new policies and initiatives

Energy strategy

Already, the move towards expanded investment in renewable energy shows signs of gearing up. In 2005, China was the world's top investor in renewables, with investments topping $6 billion, according to the U.S.-based Worldwatch Institute. BP's Statistical Review of World Energy 2006 reports that China's cumulative installed wind turbine capacity alone reached 1,264 megawatts (MW) in 2005, adding nearly 500 MW year-on-year, due in large part to the $600 million in investment poured into the sector last year. Wind power is a key element of China's long-term renewable energy strategy, and capacity is expected to reach 30,000 MW by

2020 under the new Renewable Law.

China has also long been the world's leader in solar thermal production and use, generating nearly 59 per cent of the global heating capacity for non-pool systems in 2004. While domestic demand for solar cells still represents only a tiny share of the global market, the remarkable growth of Chinese solar companies yielded 42 per cent of the world's total photovoltaic output in 2005.

Domestic hydropower generation topped 401 terawatt-hours in 2005, making China the world's leading producer here, too. Seeing this potential, the new Renewable Energy Law has set a target for 300,000 MW of hydropower generation capacity by 2020. Most significantly, China is offering a growing role to other parts of the world in small hydropower (SHP). Figures from Renewable Energy World indicate that China had installed more than half the world's total of 31,200 MW of SHP capacity by 2005, and observers expect even faster development nation-wide under the new law coming into force.

Industrial wastes

Biofuels also account for a promising share in the country's long-term renewable energy strategy. Liquid fuel produced from plant biomass and/or treated municipal and industrial wastes is expected to substitute for 10 million tons of petroleum by 2020, accounting for 15 per cent of the total Chinese consumption of transport fuel. Last year China produced 643 thousand tons of oil equivalent of fuel ethanol, representing 4 per cent of global production.

At a time when global energy demand is skyrocketing, China's commitment to the renewables revolution has been widely noted. But whether the country's renewables market will reach the projected level depends very much on future regulations and policy implementation. The enactment of practical, effective measures under the new law still lags behind. In particular, the lack of compatible local administrative acts and regulations is hindering its enforcement . For instance, although China recently developed the world's first full-permanent magnetic levitation wind power generator – representing a breakthrough in the country's weak domestic wind technology sector – great uncertainty remains over commercialization side due to vague financial and administrative rules ■

Zijun Li is China Fellow at the Worldwatch Institute.

Mark Edwards/Still Pictures

Making

Ourselves Heard

The United Nations Framework Convention on Climate Change is bringing young people from the four corners of the Earth to Nairobi for its meetings in November. This gives us a wonderful opportunity to address our thoughts on climate change to our leaders.

The Earth's climate has gradually changed over the centuries. Warm and cold periods have alternated. But changes are occuring faster and more destructively over the last few years. Earth is getting hotter and humanity is primarily responsible.

In these last few decades human activity has disturbed the natural balance. Greenhouse gases from burning fossil fuels are largely responsible. Forests have also been cut down for wood and to make room for agriculture or cities, laving fewer trees to absorb carbon dioxide from the atmosphere.

Governments should offer financial or economic incentives to encourage people to take a more environmentally friendly stance. They should:

- subsidize products using 'green' technology in order to make them more accessible to people – making hybrid cars affordable would be one such example;
- introduce sanctions for the most polluting industries;
- impose limits on the energy consumption of factories.

Simple actions by individuals to save energy and use renewable sources can also make a difference, all the way down to village level in developing countries. For example, using a solar lamp rather than one that burns kerosene will prevent about a tonne of CO2 being released into the atmosphere over a period of 25 years.

Everyone needs to take action, because climate change is altering our future, our work, our local environments, our health, and our way of life ■

Abdoul Byukusenge, Rwanda, is a UNEP TUNZA Youth Advisor for Africa.

Mark Edwards/Still Pictures

Into the *Mainstream*

PREETY BHANDARI describes how India could play a crucial role in tackling climate change

Negotiations on climate change are delicately poised: the next two years appear to be crucial for making any progress on a global commitment to address this challenge. The role that India can assume could be crucial to advancing efforts to tackle it. There are, of course, a menu of imperatives that could drive this – economic aspirations as well as political ones, underlining India's current euphoria at having arrived on the international scene.

Its economic aspirations are evident. A well publicized and consistent effort to maintain GDP growth at and above 8 per cent a year is clear evidence of them. Yet this very economic growth is drawing attention to India's likely greenhouse gas footprint, and those of other major developing economies including China, Brazil, South Africa, and Mexico. India's incremental energy demand is projected to be among the highest in the world, driven by sustained economic growth, increasing income levels, and greater availability of goods and services – all factors which attest to increased greenhouse gas emissions. The worst fears, however, are somewhat unfounded. There are many reform processes and initiatives accompanying this economic growth which have the potential to decouple it from its environmental implications.

Some energy-economy-environment model runs have shown clearly that existing policies and programmes could lower the trend of emissions by about 20 per cent. Besides these measures – driven largely by narrow domestic considerations – India can clearly articulate the technological or financial support it requires from the international community to pursue a greener path of development. Its recent forays with the United States, either bilaterally or multilaterally through the Asia Pacific Pact on Clean Development and Climate, are manifestations of this. Though some argue that political imperatives, rather than a commitment to climate change mitigation, drive this developing partnership.

Development challenge

In the face of increasing pressure on India to make some form of commitment to reducing its emissions of greenhouse gases, it needs to make clear that the strides in development that the world perceives it to be making – shown by a burgeoning middle class with high spending power, urban islands of prosperity – do not completely represent its development paradigm. A large part of its population is still at the subsistence level, and thus a large part of its development challenge remains ▶

Joerg Boethling/Still Pictures

yet to be met. Not until these people are extricated from the poverty trap can all the talk of 'strides' in Indian development be fully warranted.

It is simply unfair to impose restrictions on India, considering its present, early, position on its development trajectory, and considering that its projected rise in per capita carbon emissions in 2030 will still represent less than half the 2000 world average of 3.8 tonnes. Furthermore, the adverse impacts of climate change will disproportionately affect the poor in developing countries, including India, exacerbating their already precarious conditions.

Climate change

Two-thirds of India's cropland are prone to drought, with the monsoon rains highly variable from year to year, season to season, and place to place. Besides, 40 million hectares of land are susceptible to floods: on average eight million hectares, and 30 million people, are affected each year. In the seasons before and after the monsoon, the coastline – particularly the east coast – is vulnerable to tropical cyclones. In 2001 alone, 20,753 people died in floods, droughts and earthquakes in India, with 36,649,077 people affected. These extreme events are likely to worsen with climate change, while underdevelopment – and lack of resources to hedge against them – will fundamentally constrain the capacity to adapt. The Indian government will have to consider anticipatory responses and programmes, and the associated expense, while negotiating its response to a future climate regime. For all these reasons, it would be unthinkable, at this stage, for India to decelerate its development juggernaut, for the sake of the climate.

The only way to ensure that some form of responsibility for India's future climate footprint is factored into its planning process is by 'mainstreaming' environmental considerations into it. Thus the country's policy makers will have to ensure that incremental energy demand will be met, as far as possible, through environmentally benign sources and technologies. At the same time, issues related to the security of the environment and such natural resources as water and food need to be raised high enough to produce a paradigm shift in harnessing them for growth, while ensuring adaptive policy responses to deal with predicted impacts of climatic variability and change. The climate change lexicon has to permeate to the policy making community. The handful of research institutions engaged in the area, and the few negotiators that represent the country, have a paramount role in informing and educating politicians. If India succeeds in instituting such considerations in its planning process, it would show the way as a proactive emergent power that is concerned about both local and global environmental issues.

Global issues

India's international political aspirations include the desire to be seen as a champion of the developing country brigade, as it has so successfully been in the past through the Non-Aligned Movement, the formulation of the Berlin Mandate during the climate change negotiations, and more recently at the WTO talks. Arguably, it needs a 'makeover', if it wishes to gain legitimacy as a global political power, and to be an articulate and forceful negotiator for developing country interests. Perhaps what is needed is a revival of economic, cultural, and – more importantly – ideological moorings and identities with other countries, both to insure against isolation on important regional and global issues, and to build and enhance on the image of a country willing to be a partner and help in the process of 'development for all'. It is trying to build bridges with Africa and Latin America – and ASEAN too – but these discussions will necessarily have to be more comprehensive, taking in all strategic considerations including the environment. The climate agenda offers India another avenue both to further its sustainable development, and to be seen as a political leader of some reckoning in tabling developing country concern ■

Preety M. Bhandari is Director of the Policy Analysis Division, TERI, India. These are her views and may not reflect those of the institution.

Plant a Billion Trees ...

... and a Canopy of Hope will reach into the Sky

The symbolism – and the substantive significance – of planting a tree has universal power in every culture and every society on Earth, and it is a way for individual men, women and children to participate in creating solutions for the environmental crisis.

Al Gore: Earth in the Balance (1992)

Down-to-Earth action against climate change is being launched by UNEP so that individuals, communities, organizations, private business, and governments can play their part in averting the biggest environmental and security threat to the planet. During 2007 UNEP wants your help to plant a billion trees—a symbol of climate solidarity and a highly practical way of reducing the pollution that is causing global warming.

Plant for the Planet: The Billion Tree Campaign, launched in Nairobi in November 2006, is backed by prominent international personalities including Nobel Peace Prize laureate and Green Belt activist, Wangari Maathai.

The campaign — in which UNEP will be working with all sectors of society in all regions of the world —will utilize the power of the Internet to realize the billion tree promise. Using a new and dedicated website www.unep.org/billiontreecampaign, individuals and entities will be encouraged to enter pledges to plant anything from a single tree to several million. The website will record the running tally of pledges and publish photos and accounts from registered members of the campaign depicting what they have achieved.

The campaign builds on the success of UNEP's *Plant for the Planet* campaign. It will encourage the planting of indigenous species, and ones appropriate to the local environment. Advice on tree-planting will be made available via the website, as will information about reforestation and other tree-related issues — including links to partner organizations equipped to give advice tailored to local conditions. As ideal planting conditions vary from region to region, the campaign will operate throughout the year.

Besides focusing on tree-planting and deforestation, the *Billion Tree Campaign* will fulfill a broader symbolic purpose, highlighting not only climate change but other pressing issues including biodiversity loss and the urgent need for integrated water resource management.

Responsibility for arranging the planting will rest with the person or organization making the pledge. They can physically carry it out themselves, or pay for others to do so.

UNEP will act as a catalyst, providing leadership and federating existing tree planting activities from all over the world. It will provide a small secretariat which will raise awareness worldwide about the campaign, and about how people and organizations can join it. Landmark events, such as the 2007 World Environment Day celebrations, which will focus on climate change under the slogan of *Melting Ice: A Hot Topic?* ■

When we are planting trees sometimes people will say to me, "I don't want to plant this tree, because it will not grow fast enough." I have to keep reminding them that the trees they are cutting today were not planted by them, but by those who came before. So they must plant the trees that will benefit communities in the future. I remind them that like a seedling, with sun, good soil, and abundant rain, the roots of our future will bury themselves in the ground and a canopy of hope will reach into the sky.

Wangari Maathai: Unbowed – One Woman's Story (2006)