



# our planet

The magazine of the United Nations Environment Programme — December 2011

DURBAN

RIO+20

XIE ZHENHUA  
GROWING CONSENSUS,  
JOINT ACTIONS

OLIVER LETWIN  
LET'S LOCK IN  
GREEN GROWTH

LISA JACKSON  
SUPPORTING SOLUTIONS

CANCUN

POWERING  
CLIMATE  
SOLUTIONS



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International Year of  
**CHEMISTRY**  
**2011**

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**XIE ZHENHUA : Growing consensus, joint actions** **PAGE 6**

China has been, is, and always will be active in taking practical actions to address climate change.



**OLIVER LETWIN : Let's lock in green growth** **PAGE 8**

The Durban and Rio+20 conferences must give a concerted push to more sustainable, low carbon, resource efficient and climate resilient development.



**LISA P. JACKSON : Supporting solutions** **PAGE 10**

Tackling climate change can enhance prosperity and help build the Green Economy.

**ALSO**

books **PAGE 4**

reflections **PAGE 5**

verbatim and innovation **PAGE 17**

UNEP at work **PAGE 18**

people **PAGE 26**

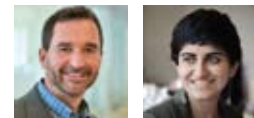
www **PAGE 33**

star **PAGE 34**



**QI YE : Getting off the roller coaster.** **PAGE 12**

After a great success, China now faces growing challenges in controlling emissions.



**HAL HARVEY and SONIA AGGARWAL : The Costs of delay** **PAGE 14**

The longer the world waits to tackle climate change, the more dangerous and expensive it will prove to be.



**A.R.RAVISHANKARA, MARIO MOLINA and DURWOOD ZAELEKE : At the crossroads** **PAGE 20**

Simply protecting and managing naturally regenerating trees has increased food production and reduced conflict.



**ROMINA PICOLOTTI : An equitable arrangement** **PAGE 23**

The Montreal Protocol should regulate production and use of HFCs



**VEERABHADRAN RAMANATHAN AND NITHYA RAMANATHAN : An unprecedented opportunity** **PAGE 28**

There are practical, affordable and transformative solutions for rapid mitigation of climate change.



**RADHA MUTHIAH : Arresting a silent killer** **PAGE 30**

Breaking a cycle that increases climate change, costs lives, and harms economic development.

# books

[www.unep.org/publications](http://www.unep.org/publications)



## Global Trends in Renewable Energy Investment 2011

By Bloomberg New Energy Finance, Frankfurt School and the UNEP Collaborating Centre for Climate and Sustainable Energy Finance.

Global investment in renewable energy jumped 32 per cent in 2010, to a record US\$211 billion. In addition to this eye-catching record, the investment activity in developing countries increased strongly and it is the first time the developing world has overtaken the richer countries in terms of financial new investment. The Global Trends Report 2011 offers an elaborate analysis of Trends and Issues in the financing of renewable energy.

## YouthXChange Climate Change and Lifestyles Guidebook

Published by UNEP and the UN Educational, Scientific and Cultural Organization (UNESCO), this booklet aims to promote sustainable lifestyles among young people aged from 15-24 by providing information and tips on topics such as water usage, waste reduction, energy and resource efficiency, travel and transport and responsible shopping and entertainment. By channeling the relevant information related to climate change in a less abstract manner, it seeks to help young people become the advocates and agents of change for sustainable lifestyles around the world.

## Keeping Track of Our Changing Environment

This publication by the UN Environment Programme (UNEP) was conceived with the idea of showing how the planet has changed in the twenty years since the first Earth Summit in 1992. The report was produced as part of UNEP's Global Environmental Outlook-5 (GEO-5) series, the UN's most authoritative assessment of the state, trends and outlook of the global environment. The full GEO-5 report will be launched in May 2011.

## IEA Training Manual Volume Two: Climate Change Vulnerability and Impact Assessment in Cities

This UNEP report analyzes the results of recent research on climate change, its impact on cities and options for responding. Its primary aim is to foster debate and present methodologies for evaluating the level of vulnerability and the adaptation capacity of urban centres. It also aims to strengthen awareness on possible impacts of climate change, while providing decision makers with a range of instruments to evaluate those impacts. In addition it provides examples of adaptation policies that could be applied by government institutions and other sectors of society.

## Sustainability and Equity: A Better Future for All

This is the 2011 Human Development Report Development by the United Nations Development Programme (UNDP), which argues that environmental sustainability can be most fairly and effectively achieved by addressing health, education, income, and gender disparities together with the need for global action on energy production and ecosystem protection. According to the Report, as the world community prepares for the landmark UN Conference on Sustainable Development in June 2012 in Brazil, sustainability must be approached as a matter of basic social justice, for current and future generations alike.



## Carbon Coalitions by Jonas Meckling

Over the past decade, carbon trading has emerged as the industrialized world's primary policy response to global climate change despite considerable controversy. With carbon markets worth US\$144 billion in 2009, carbon trading represents the largest manifestation of the trend toward market-based environmental governance. In Carbon Coalitions, Jonas Meckling, Postdoctoral Fellow at the Belfer Center for Science and International Affairs, Harvard University, presents the first comprehensive study on the rise of carbon trading and the role business played in making this policy a central pillar of global climate governance.

## Encyclopedia Of Climate And Weather (2nd Edition)

Stephen H. Schneider, Mastrandrea, Schneider, Michael Mastrandrea, Terry L. Root and Terry L. Root (2011)

For most of history, humans have made every possible effort to accurately foretell the weather, evolving from the use of guesswork, rule of thumb, and signs in the sky to the development of contemporary forecasting techniques drawn from two scientific disciplines, climatology and meteorology. The Encyclopedia of Climate and Weather provides a comprehensive history of this development.



Achim Steiner

UN Under-Secretary-General and  
Executive Director, UNEP

The gap between scientific reality and political ambition seems to remain firmly in place — and may be widening — as negotiations on how over 190 countries can move forward on climate change in Durban, South Africa. While there are a multitude of encouraging developments — in 2010 for example over US\$210 billion was invested in renewable energies in countries from Germany to China and the United States to Mexico, Kenya and South Africa — these remain too far behind the curve in terms of the size, scale and pace of what is needed to keep the rise in global temperatures beneath 2 degrees Celsius this century.

Durban may not yield a definitive and decisive new climate agreement, but it cannot suffer stalemate if social progress, economic growth and environmental sustainability are simultaneously to be realized. Among the many achievements of the UN climate convention meeting in Cancun, Mexico, last year was the confirmation that the negotiations remain at the centre of the international community's response, rather than drifting into the segmentation and segregation after the 2009 Copenhagen summit. This is the foundation upon which Durban needs to build — and from which to move forward on several achievable fronts.

In Durban everything remains on the table, including forwarding Reduced Emissions from Deforestation and Forest Degradation, and the conservation and sustainable management of forests, known as REDD+.

Over a dozen countries, such as the Democratic Republic of the Congo, Indonesia and Panama, are at advanced stages for participation in REDD+. Deforestation currently accounts for around 17 per cent of greenhouse gas emissions. Paying developing countries to conserve rather than clear forests can thus play a central role in combating climate change and delivering multiple Green Economy benefits, including improving water supplies, conserving biodiversity such as the iconic orangutan, stabilising soils and creating green jobs in natural resource management.

Norway — which supports the UN REDD programme, of which UNEP is a member — is providing US\$1 billion to Indonesia and a similar sum to Brazil. In Indonesia it has already triggered a moratorium on clearing new tropical forests for palm oil plantations.

There are opportunities for South Africa here too. Clearly the host of COP17 is not a vast tropically forested country. But there is real potential for planting and replanting trees and shrubs on degraded land in areas such as Kwai Zulu Natal and the Eastern Cape, providing financial incentives to landowners and state-owned areas in terms of improved management and livelihood opportunities for local people.

By some estimates there is some 1.2 million hectares of degraded land in the Eastern Cape alone. What might that be worth if just 10 per cent of that area was reforested and restored with carbon prices at US\$10 a tonne of carbon dioxide? The amount of carbon sequestered or taken up by these growing trees and shrubs — estimated at 350 ton per hectare, or perhaps even higher under wetter conditions, could be worth seven million Rand a year. Over 30 years this might grow to around 200 million Rand, though it would be somewhat diminished by such transaction costs as the cost of the trees and monitoring, reporting and verification of the projects.

Durban also needs to move forward on launching the Green Climate Fund to assist developing nations to combat climate change and provide options on how to generate the agreed climate finance of US\$100 billion per year by 2020. In addition, Governments must deliver tangible progress towards operationalizing in 2012 the new technology and adaptation mechanisms agreed in Cancun. And last but not least Durban needs to put on place a process for anchoring the emission-reduction pledges made in Copenhagen and Cancun and for moving steadily to close the gap between current ambitions and what is needed to keep temperature increases below two degrees. These moves would send strong signals to Rio+20 in June next year — 20 years after the Earth Summit of 1992 that set the course of contemporary sustainable development, including combating climate change.

Action to combat climate change and the transition to a Green Economy are happening literally everywhere. The challenge for Durban and for Rio+20 is to find ways of scaling-up and accelerating what is already underway — and of decoupling economic growth from resource use — while learning to recognise that addressing global warming and general environmental change is as much an opportunity as a challenge and can refocus and realize social progress for the many, not just the few.



# Growing consensus, joint actions



XIE ZHENHUA  
.....  
Vice Chairman,  
National Development  
and Reform Commission,  
PRC

People representing governments, NGOs, media and other relevant stakeholders are gathering in the beautiful city of Durban for the COP17/CMP7 United Nations negotiations on climate change. After years of endless efforts — and in adherence to the UN framework and the principle of consensus — governments agreed on establishing the UN Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol, forming the basis for the international legal form and institutions of global cooperation in addressing climate change. The Bali Roadmap set up a process to enable full, effective and sustained implementation of the Convention and the Protocol. Last year, the Cancun Conference took a successful step in implementing the Roadmap and the international community now has expectations of achieving positive outcomes in Durban.

The Durban Conference should continue to follow the two-track approach to make progress in the implementation of the UNFCCC and its Kyoto Protocol, which should be governed by the principles of equity and common but differentiated responsibilities and be conducted in an open, transparent, inclusive and party-driven process. Pursuant to the mandate of the Bali Roadmap, the conference should, on the one hand, implement the consensus reached in the Cancun Conference and define the detailed arrangements for such issues as finance, technology transfer and adaptation — and, on the other hand, continue the negotiation on unsolved issues left from Cancun and further develop a comprehensive and balanced outcome.

*“Firstly, the conference should determine the emission reduction arrangement for the developed countries that are Parties to the Kyoto Protocol under its second period: such a decision is the most crucial task, absolutely critical for the conference’s success.”*

With genuine concern, we hope that outcomes in three aspects can be achieved in Durban. Firstly, the conference should determine the emission reduction arrangement for the developed countries that are Parties to the Kyoto Protocol under its second commitment period. Such a decision is the most crucial task, absolutely critical for the success of the conference. Secondly, it should decide on the arrangements for developed countries that are not Parties to the Kyoto Protocol to undertake comparable emission reduction commitments under the Convention in terms of nature, magnitude and compliance procedures. And thirdly, the conference should further discuss and operationalise relevant mechanisms for adaptation, finance, technology transfer and measurement reporting and verification capacity-building — as well as arrangements on MRV and transparency which differentiate developed and developing countries. Under such circumstances, developing countries should, under the framework of sustainable development, carry out appropriate mitigation actions with financial and technological assistance from developed ones.

China has always given great attention to climate change and prioritised combating it as one of the grand and consistent strategies for its economic and social development. As a developing country, China faces arduous tasks of developing the economy, eradicating poverty, realizing industrialization and urbanization, and improving people’s livelihoods. Despite these

demanding tasks, however, China has been, is and always will be active in taking practical actions to address climate change.

China reduced its energy consumption per unit of GDP by 19.1 per cent during the 11th Five-Year Plan period. It has also pledged to fulfill a goal of reducing its economy’s carbon intensity by 40 to 45 per cent by 2020 compared to 2005 level. To realize this goal, China has set a series of binding domestic targets in its 12th Five-Year Plan, including reducing energy consumption and CO<sub>2</sub> emissions per unit of GDP by 16 per cent and 17 per cent, respectively, from 2010 levels by 2015, and raising the non-fossil fuel share of primary energy up to 11.4 per cent.

China has also introduced measures to fulfill these targets, such as: intensifying accountability; optimizing industrial and energy structures; implementing pilot projects; enhancing energy saving and low carbon management; promoting the circular economy; encouraging research, development, dissemination and application of low carbon

technologies; perfecting relevant economic policy; expanding low carbon pilot projects; and improving relevant institutions and mechanisms. These policies and actions demonstrate the Chinese government’s devotion to combating climate change and its dedication to accelerating its green low-carbon development.

Climate change is indeed one of the most crucial humanitarian challenges of our time, given its wide array of impacts on, and interactions with the well-being of all people and with development in all nation states. What we have achieved so far was hard-earned, and to reach an effective solution to combat climate challenge in future remains a difficult task. While calling for joint efforts of all countries, there is a need to take into consideration the different historical responsibilities, capabilities and national development process of each of them.

For the best interests of human beings, we gather side-by-side to strengthen the current outcomes, realise our promises, establish mutual political trust and reach a new consensus with the aim of enhancing cooperation to advance the comprehensive, effective and sustained implementation of the UNFCCC and its Kyoto Protocol, implement the Bali Roadmap and the Cancun Agreement, and boost a comprehensive, balanced and positive outcome in Durban. China is willing to work together with the international community to protect our planet and create a better future.



OLIVER LETWIN  
Minister for  
Government Policy, UK.

The 1992 Rio Earth summit marked a momentous step forward in international cooperation on social and environmental issues. Twenty years on, we are faced with increasing pressures on the global economy, the global environment and the world's poorest people. There could not be a better time for the world to lock in its commitment to sustainable development — and the Durban climate negotiations this winter and the Rio+20 conference, twenty years after the summit, next summer, provide the opportunity to do so.

At a time of short-term economic instability — when developed economies are struggling to return to growth, when the emerging economies are still growing rapidly, and when developing economies are desperately seeking to eradicate poverty — the global economy also faces a continuing long-term threat from the twin effects of climate change and the unsustainable use of natural resources. Unless substantial action is taken to remedy these twin long-term threats, we may emerge from the present economic instability only to find ourselves confronted by another and ultimately even more serious set of problems. So Durban and Rio+20 must give a concerted push to more sustainable, low carbon, resource-efficient and climate-resilient development.



Let's lock in  
green growth



The natural environment can and should play an important role in this push to green growth. As the OECD has said: ‘green growth is about fostering economic growth and development while ensuring that natural assets continue to provide ecosystem services on which our well-being relies’. Natural capital contributes both directly and indirectly to economic activity — through the use of timber, water and metals, and in regulating the climate and filtering pollution. But 60 per cent of global ecosystems are either at their limit or are being used unsustainably. In the long run, this will crimp growth and impose higher costs on consumers. The loss of natural capital from deforestation and degradation is estimated to amount to between US\$2 trillion and US\$4.5 trillion each year; and global fish catch is US\$50 billion lower each year than if stocks were better managed.

It is the world’s poorest people who are bound to be hardest hit by this loss of natural capital. They are the people most directly dependent on ecosystem resources. And they are the people who are most affected by and least able to respond to the changing climate. It is vitally important that, in any global discussions, it is not just the loudest voices that are heard.

So, we need to push for growth that meets the triple demands of rallying the global economy, not depleting the natural capital on which the economy ultimately depends, and helping the poorest to gain access to global prosperity.

*“...we need to push for growth that meets the triple demands of rallying the global economy, not depleting the natural capital on which the economy ultimately depends, and helping the poorest to gain access to global prosperity.”*

Some people think these three aims are in conflict with one another, and that the focus on green growth requires huge short-term sacrifice. But this simply isn’t true. Part of the point of achieving international consensus is that this gives all countries the comfort they need to make the investments necessary to move to a green growth path — in the knowledge that everyone else is committed to doing the same, and to incurring the same short-term costs so that we avoid a ‘race to the bottom’. But the sceptics about Durban and Rio+20 also miss the huge short-term advantages that a focus on green growth can bring us. We should look at this less as a short-term threat and more as a short-term opportunity.

At a time when the world is gripped in financial crisis, we need to look at the contribution green growth can make to the recovery. Investment in energy efficiency, in renewables and

in carbon capture and storage all contribute to employment growth, to export possibilities and to economic competitiveness — and all are sectors which are expanding faster, on average, than the world economy. The global low carbon goods and services sector is forecast to grow from £3.2 trillion in 2009/2010 by 3.8 per cent per year over the next five years.

The UK’s Green Deal alone — which allows households and businesses to become more energy efficient without upfront costs — has the potential to support over 50,000 green industry jobs within five years. At a time when the need for growth and jobs is on all our minds, these are huge advances — advances which are often underplayed.

In just the same way, by pressing forward — both internationally and domestically — with the rebuilding of natural capital, we can foster new technologies, new investment and new growth, not just in the long term but also over the next few years. Investment to reduce forest loss, to grow more food on less land, and to find new, sustainable uses of timber can deliver more vibrant economic growth than mindless deforestation. Exciting new forms of international financing can be mobilised to rebuild damaged ecosystems. And, as we repair those ecosystems, we can redeploy resources that are currently eaten up in efforts to save the poorest people in the world from the starvation and disease that otherwise result when natural capital has collapsed.

# Supporting solutions



LISA P. JACKSON

.....  
Administrator,  
US Environmental Protection Agency

For more than 40 years, the American economy and the global economy have prospered while environmental protections have expanded. The US Environmental Protection Agency's (EPA) work has saved lives and prevented illnesses, and contributed directly to innovation, job creation and economic growth. Today, as our nations face severe economic, social and environmental challenges, we need to continue to innovate to tackle threats like climate change while ensuring that our economies thrive and our communities prosper.

With overwhelming amounts of scientific study showing that the threat is real, climate change is now a household issue. Parents across the United States and around the world are concerned for their children and grandchildren. Governments are investing significant resources in adaptation strategies, while businesses invest billions in efforts to reduce carbon emissions and make their operations sustainable. Military planners are considering climate change as a threat multiplier in areas of conflict and instability. They know that if we do not act to reduce greenhouse gases, the planet we leave to the next generation will be a very different place than the one we know today.

Fortunately, we have learned that we can address our global environmental challenges and still grow



*“There is no silver bullet;  
sweeping government action  
doesn’t happen overnight,  
nor is it  
the only answer  
to the challenges we face as  
a global community.”*

and prosper in ways that expand economic opportunity around the world. There is no silver bullet; sweeping government action doesn’t happen overnight, nor is it the only answer to the challenges we face as a global community. EPA is committed to working with communities to take tangible, common sense steps to address climate change. We know that everyone needs to be part of the solution. By taking a portfolio approach, in collaboration with partners in the US and around the world, we can make major strides forward even in the face of mounting obstacles.

We are focused on promoting win-win solutions that expand opportunities for green job development, increase efficiency and reduce costs. This work is nothing new; we have been promoting energy efficient technologies through our Energy Star program for nearly 20 years. Some of our recent efforts, including partnering with UNEP and a number of automobile companies through the Partnership for Clean Fuels and Vehicles and the expanded Renewable Fuels Standard, are geared specifically at targeting government resources to spur investment in energy efficiency.

We’re also working to address urgent threats that we know have an immediate and negative impact on our climate — like black carbon. By collaborating with scientists from around the world, EPA is working to identify the greatest sources of black carbon in our atmosphere and developing solutions to reduce emissions and limit harmful impacts to our environment, economy and security.

Our efforts are also focused on supporting innovative new solutions like green infrastructure. Not only does investment in natural and green infrastructure lead to improved air quality, water quality and reduced energy demands; it can also result in cost savings and increased property values. The City of Philadelphia has invested in simple, solar powered trash compactors that have reduced the need for constant waste pick-up. That has had the dual benefit of easing traffic for city residents while reducing greenhouse gas emissions from idling vehicles. The City of Chicago has invested in permeable paving that allows rainwater to soak into the ground — reducing the “urban heat island” effect and taking pressure off of their water infrastructure. These are the kinds of cross-cutting solutions that can help solve our climate challenges while improving our lives.

In a world where major environmental changes can disrupt commerce, displace indigenous communities, and impact energy security, these efforts reflect important social and economic priorities. Environmental protections can address even the most complex challenges, like climate change, while enhancing our prosperity. A global green economy will thrive on collaboration, innovation, and a commitment to common sense steps. By expanding interaction between governments, international institutions, business leaders and civil society, we can continue our history of increasing environmental and health protections while expanding prosperity around the globe.



# Getting off the roller-coaster

China's 11th Five Year Plan (11th FYP), spanning 2006 to 2010, was historic for its action on climate change, effectively reversing a rapidly increasing trend of energy intensity, as measured by energy use per unit of GDP. Within five years, this energy intensity was cut by more than 19 per cent, helping to avoid 1.55 billion tons of carbon dioxide emissions — five times the emission reduction committed by the EU under the Kyoto Protocol. However, this historic success is shadowed by two other simultaneous changes: China, for the first time in recent history, surpassed the United States as the world's largest carbon emitter and, soon afterward, as its largest energy consumer. The country's



QI YE

Professor of Environmental Policy  
and Director of Climate Policy  
Initiative at Tsinghua University,  
Beijing

energy related carbon emission grew by a third in five years. Growing and daunting challenges lie ahead

During the 11th FYP period energy intensive industries continued the rapid growth experienced during the period of the previous Five

Year Plan, posing stern prospects for China's energy saving targets. Intensive regulations — coupled with an unprecedented scale of both investment and stringent enforcement — achieved a cumulative 12.5 per cent reduction in energy intensity between 2007 and 2009. However, the stimulus package implemented in response to the global economic crisis promoted investment in infrastructure and triggered a quick rebound of energy intensive industries. Action to save energy saving slowed down in the first half of 2010 and energy intensity began to grow again.

The legacy of the economic stimulus carried over into the 12th Five Year

plan (12th FYP) period. The motivation for local government to achieve economic development remains high. As a result, the GDP growth rate reached 9.6 per cent in the first half of 2011, and, not surprisingly, the reduction in energy intensity was unsatisfactory. This poses an enormous challenge if China is to meet its low-carbon targets for the next four years. The reappearance of a roller-coaster pattern of energy intensity implies that the foundation of China's low-carbon development is less than solid.

Nevertheless, the achievement of low-carbon development in the 11th FYP period deserves significant recognition for effectively curbing, and dramatically reversing, the rapidly rising trend of energy intensity. There was also tangible improvement in technological progress and in reducing energy intensive industries' and products' contribution to the economy, eliminating inefficient production capacity. A system of policies and institutions for low carbon development has been established, and is improving.

Rapid development of the alternative energy industry also demonstrated China's accomplishment in low carbon development during the period. With a surge of installed capacity, the manufacturing of wind and solar equipment has greatly improved in terms of technology, production capacity, and export. Investment in alternative energy technologies, their growth, and their construction onsite have been impressive. It should be noted that the manufacturing process itself sometimes consumes fossil fuels, but deployment of alternative energy equipment has immense potential to reduce carbon emissions.

*“The challenges  
that China faces  
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of its government  
and people to act.”*

Export and urbanization are two key drivers behind China's energy consumption and carbon emissions. The growth of exports has slowed in recent years, but they remain high for the 12th FYP period. China's urban population will surpass its rural one this year for the first time in history. As it formally enters an urban society its citizens' consumption behaviour will change dramatically. The economic system has to provide additional necessities for the newly urbanized population, now living urban standards. Since a urban resident in general consumes three times more energy than a rural one, urbanization will drive up energy consumption and carbon emissions tremendously, with impacts that will last for decades.

The 11th FYP period is an important window through which to observe China's challenges in low carbon development. Despite the country's relatively low per capita emissions, and even lower cumulative ones, the fact that it has become the world's largest carbon emitter puts it into the forefront of world attention — and this brings huge pressure. China experienced unprecedented inter-

national pressure during the 11th FYP period, and this has now grown greater than ever. It will soar again over the next five years when China will further widen the gap with the United States, now the second largest energy consumer and carbon emitter in the world. The sin is in the size!

What will happen next? China's success in the 11th FYP demonstrated its commitment and resolution in addressing climate change challenges — and the effectiveness of its policies, despite a lack of efficiency on some occasions. Tackling climate change is not just an international obligation, but a national imperative and domestic mandate, because of concerns about energy security, environmental quality and economic sustainability. The challenges that China faces are only matched by the willingness of its government and people to act.

Despite the size of the economy, China is limited by its technological and human resource capacity, like most developing countries. But the 11th FYP's achievement showed the world that governments can and ought to act to provide public goods of strategic significance. Policy-makers of nations must be willing and courageous to lead with vision, a sense of mission and high moral standards — all of which, unfortunately, tend to be obscured by localized and short-sighted interests in international talks.

China's challenges are those of the world, just as are the financial challenges in the West. Now that we are living in one globalized world, let us face them, show our helping hands and hide our pointing fingers.



# The Costs of Delay



HAL HARVEY

Chief executive officer,  
ClimateWorks Foundation

Physics harbour a frightening punch line for the story of climate change: even though the consequences of global warming persist for the very long term, the time available in which to avoid them is very short. Thus a delay — of even a decade — in reducing CO<sub>2</sub> emissions will lock in large-scale, irreversible change. It also increases the risk that the whole climate system will spin out of control.

This message may be alarming, but this is not alarmism. It's physics. And the earth's climate physics have serious implications for political action and technological innovation in the coming decade.

The story has five parts:

## I.

### Stabilizing CO<sub>2</sub> at any concentration requires very low emissions

For hundreds of thousands of years prior to the industrial era, such natural processes as plant growth, animal respiration, and soil erosion kept atmospheric concentrations of CO<sub>2</sub> in balance. But burning fossil fuels has introduced as much carbon in the past 50 years as had been sequestered over millions of years, thus upsetting the natural balance. Atmospheric CO<sub>2</sub> concentrations are now nearly double their pre-industrial level.

Once emitted, CO<sub>2</sub> remains in the atmosphere for centuries, or even millennia. Every ton introduced is therefore cumulative, and the resulting increases in concentration will persist in the atmosphere for thousands of years — even if emissions are reduced tomorrow. So stabilizing CO<sub>2</sub> concentrations at any level ultimately requires very low emissions.

## 2.

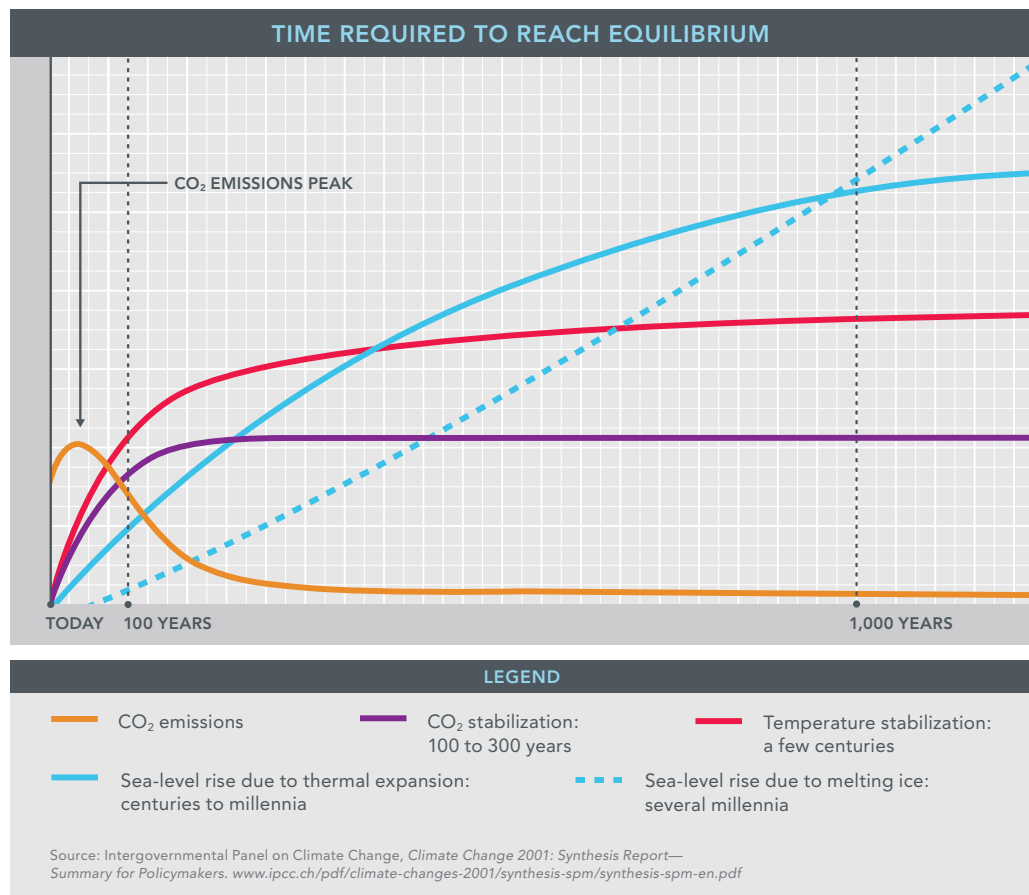
### Carbon “sinks” are disappearing

Until recently, natural “sinks,” primarily oceans and plants, absorbed much of the carbon dioxide dumped in the atmosphere. About a quarter of the CO<sub>2</sub> released each year is absorbed by the oceans (making them more acidic) and roughly another quarter by plants. These natural safety valves have masked almost half the impact of our emissions. But as the world emits more CO<sub>2</sub>, these sinks are becoming saturated. Although oceans continue to absorb a greater volume of CO<sub>2</sub>, they are becoming less efficient sinks, able to take in a shrinking percentage of emissions. This means that even if emissions remain constant, the growth rate of CO<sub>2</sub> concentrations in the atmosphere will soon jump, as this physical forgiveness gives out. Then we will be in deep trouble.



SONIA AGGARWAL

former manager of global research  
and special projects,  
ClimateWorks Foundation



### 3. Many impacts of climate change are irreversible

Due to time lags inherent in Earth’s physical systems, climate changes caused by CO<sub>2</sub> emissions will persist — and even grow — for centuries, even after emissions are halted. We are already seeing some effects of increased greenhouse gas levels, but have yet to witness the full impact of the current atmospheric accumulation. This is because the earth’s surface temperature does not react instantaneously to rising carbon dioxide levels, largely due to the oceans’ tremendous capacity to absorb heat.

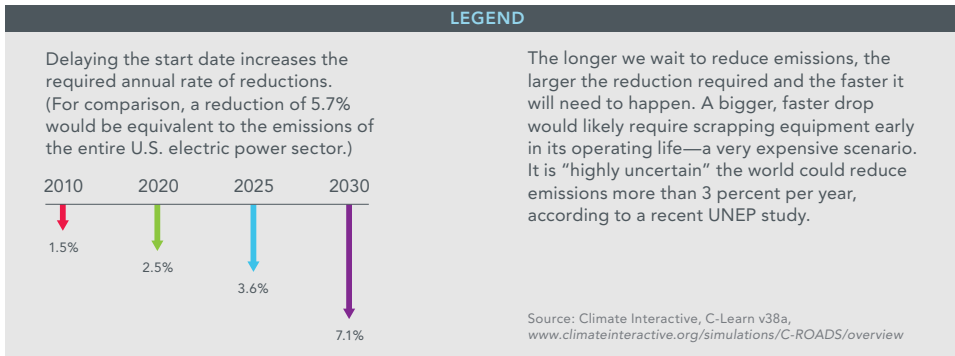
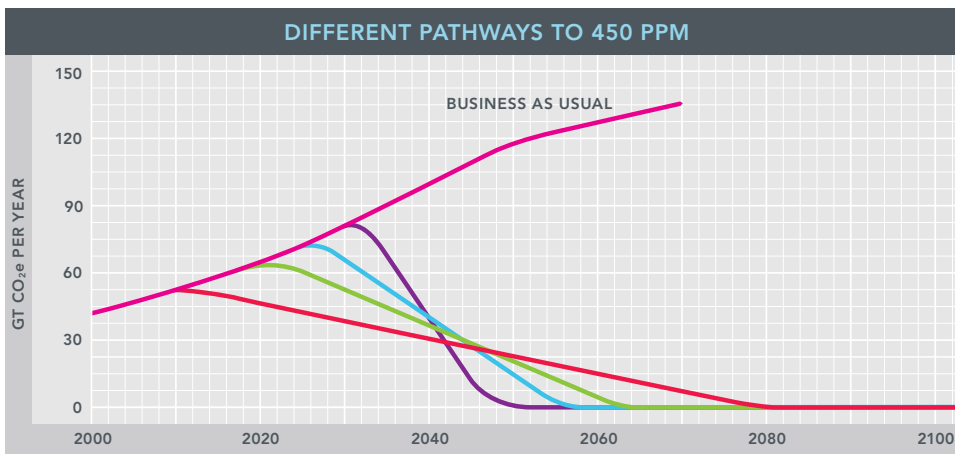
The changes can have serious consequences: permanently altered ecosystems, extinctions, and significantly reduced crop yields. Projections suggest we will lose 18 to 35 per cent of all species due to climate-forced extinctions. Other system changes — from ocean circulation to ice melt — are irreversible for thousands of years, at least.

### 4. The system can spin out of control

The earth’s reactions to changing CO<sub>2</sub> concentrations — altered global weather patterns, ocean temperature and acidity, and ecosystems, to name a few — are not linear. They can snowball, eliminating our ability to influence the outcome.

As warmer temperatures melt sea ice and reduce snow cover in the Arctic, for example, the darker surfaces of the newly exposed ocean and land absorb more heat from the sun than the light-colored ice and snow that previously covered them. This accelerates warming, further reducing snow cover. And the thawing permafrost in the Arctic Ocean is starting to leak large amounts of methane, a powerful greenhouse gas, into the atmosphere. Release of even a fraction of the methane stored in the seafloor could trigger abrupt climate warming — and there is no practical way to contain it. If we are to reduce

*“Addressing climate change is like turning an ocean liner: Changing course takes time, and no amount of rudder, applied too late, will hit the mark. If the world does not start to reduce emissions now, it will not reach any meaningful CO<sub>2</sub> concentration target.”*



the risk of such runaway feedback loops, we must rapidly cut greenhouse gas emissions.

## 5.

### Acting now saves money

Most energy-consuming assets — such as buildings, vehicles, factories, and power plants — have long lives that lock in their patterns of energy use for decades. The cheapest way to reduce CO<sub>2</sub> emissions is to ensure that new capital equipment is very efficient and powered by low-carbon sources. It will be enormously costly if the world misses this opportunity, builds inefficient

infrastructure, and then has to renovate it. Transforming infrastructure at the same pace as natural capital stock turnover is cheap; forcing such a turnover is very expensive.

Nations must put energy efficiency policies — such as fuel efficiency standards and building codes — in place now, not later. And governments must invest substantially now in research and development to drive down the cost of clean technologies and convert our energy supplies to near-zero sources. If we delay, the cost of reducing emissions sufficiently will shock the global economy.

Given carbon dioxide’s persistence in the atmosphere, it is useful to think of emissions in terms of a CO<sub>2</sub> budget, or a maximum volume of cumulative emissions that will allow atmospheric concentrations to stabilize.

If the world is to limit average global warming to 2° C — a threshold most climate scientists describe as a dangerous tipping point — it will need to stabilize atmospheric CO<sub>2</sub> at about 450 ppm. This corresponds to a total CO<sub>2</sub> budget of about 1,000 gigatonnes, or a trillion metric tons, of emissions for 2000–2050. Yet in just the first five years of this century, the world used up nearly 20 per cent of this 50-year carbon dioxide budget; at current rates, the full budget will be depleted in less than two decades.

Addressing climate change is like turning an ocean liner: Changing course takes time, and no amount of rudder, applied too late, will hit the mark. If the world does not start to reduce emissions now, it will not reach any meaningful CO<sub>2</sub> concentration target.

The longer we wait, the more drastic the cuts — and associated costs — will be. If we delay action for even a decade, CO<sub>2</sub> concentrations are likely to soar right past 450 ppm and unleash dangerous, uncontrollable ecological and geophysical responses. If we instead step up to the challenge, pass strong energy policies and invest aggressively in clean energy R&D, we have a fighting chance of containing CO<sub>2</sub> concentrations at 450 ppm — and averting a climate catastrophe.

*For more information, including references to peer-reviewed source documents, see “The Costs of Delay” at [www.climateworks.org/CostsOfDelay](http://www.climateworks.org/CostsOfDelay).*



# innovation



## Beehive Fence

British biologist, Dr. Lucy E. King, won the international prize of the Convention on the Conservation of Migratory Species of Wild Animals of the United Nations Environment Programme (UNEP/CMS) for developing an innovative beehive fence as a

natural deterrent from crop-raiding elephants. Based on the fact that elephants are scared about being stung by bees, Dr. King created a fence that is assisting to reduce conflicts between the world's largest terrestrial mammal and local people in Kenya and could become a blueprint for curbing similar problems in other countries with large elephant populations and expanding agricultural land.



## Suntrica SolarStrap

is a solar powered device that provides charging power mobile phones, MP3 players and digital cameras. The high efficiency solar panel stores energy into a light-weight battery that can be easily attached to a strap or belt for optimal energy gathering. It will certainly have

its use while the use of mobile phones is skyrocketing globally, some 20 per cent of the world still suffers from 'energy poverty' or not having access to a reliable supply of electricity.



## Xenith

Students at Stanford University have built a remarkable solar car — the Xenith — an entrant in the 11th World Solar Challenge in Australia. The car, whose giant, flat, reflective surface makes it resemble part of a satellite has 26 solar panels. The students have so carefully

designed car, trying to make it lean and aerodynamic, that they concern themselves with minutiae such as whether the driver's head might cast a slight shadow on the panels. The whole car weighs only 375 pounds and its chassis of carbon fiber, titanium, and aluminum measures just four inches thick.



## Oyster 800

is the newest wave energy device developed by the UK-based Aquamarine Power, with an output of 800 kilowatts, it produces 250 per cent more energy than its predecessor. Most of the improvements have come from a hinged flap that sticks out of the water

and is pushed shut with each passing wave. When the flap moves, it drives hydraulic pistons that deliver high-pressure water via a pipeline to an onshore turbine.

# numbers

## 7 Billion

The global population has reached 7 billion people which poses challenges such as ensuring adequate food and clean water to guaranteeing equal access to security and justice — **UNFPA**

## 1.4 billion

In 2010, 1.4 billion people, or 20 per cent of the world population, did not have access to reliable electricity or the power grid and depended on biomass for cooking and lighting — **Keeping Track of our Changing Environment: From Rio to Rio+20, UNEP**

## 1.2 million

Premature deaths avoided per year (of which 125,000 are children) thanks to policy to rid the world of leaded petrol — **The Global Benefits of Phasing Out Leaded Fuel**

## 540%

Increased recognition of the need to move towards low carbon, resource efficient energy solutions can be seen in the 540 per cent increase in investment in sustainable energy between 2004 and 2010.

## 110%

The number of megacities with at least 10 million people has grown from 10 in 1992 to 21 in 2010 — a 110 per cent increase.

## 80%

Of total global CO<sub>2</sub> emissions, 80 per cent is emitted by only 19 countries — mainly those with high levels of economic development and/or large populations.

## 60%

Over 60 per cent of Greenhouse Gases are emitted by three economic sectors: energy, industry and forestry.

## 50%

Global emissions have to be reduced by at least 50 per cent from their 1990 level by 2050, if temperature stabilisation is to be achieved at less than 2° Celsius average warming above pre-industrial levels — **IPCC Fourth Assessment Report: Climate Change, 2007**

— Keeping Track of our Changing Environment: From Rio to Rio+20, UNEP

# UNEP at work

UNEP undertakes a wide range of activities in promoting and facilitating the development and uptake of clean technology. Here are a couple of recent examples.



## A View from Mozambique

### THE PROBLEM

The Nova-Mambone Administrative Post is on the coast of the Govuro district in Mozambique and is especially prone to extreme climate events, such as cyclones and shifting rainfall patterns. As a consequence, the district is vulnerable to floods and droughts. To ensure sustainable livelihoods for the residents, viable and socially acceptable climate change adaptation measures are needed.

### THE SOLUTION

Three years ago, the people of the district proposed a project that would identify the climate change risks and impacts they faced, as well as the natural resources used by the community in earning their living, and existing strategies for coping with climate change. Through the Climate Change and Development – Adapting by Reducing Vulnerability programme (CC DARE), UNEP, in partnership with Centre for Sustainable Development of Coastal Zones, a governmental institution under the Mozambican Ministry for the Coordination of Environmental Affairs, helped the project team acquire the skills it needed on climate change adaptation and natural resources management.

The team has now also worked with other villages to help them develop new skills that can address

pressing local issues such as new measures for public health and sanitation, rehabilitation and construction of water catchments, improved farming practices and livestock management, and community-based natural resource management.

### IMPACTS

Sixteen thematic maps and one zoning map of the coastal area around Nova-Mambone showing suitable areas for agriculture, conservation, tourism, fishing and habitation have been developed. With help from UNEP, district technicians were trained in using the maps throughout all stages of the planning processes for new infrastructure works, such as boreholes, schools and medical centres. Using the maps, adaptation measures such as the resettlement of people, improved livestock management, the introduction of drought-resistant crops, the opening of boreholes for cattle in the dry season, and the use of gutters for water collection were adopted. Overall, through CC DARE, six per cent of the local population has been trained in adaptation and natural resource management.

### SUPPORT

Danish International Development Agency (DANIDA).

WEBSITE <http://ccdare.org/>



# Boosting Carbon Markets in Africa

## THE PROBLEM

In Africa, about 600 million people rely on forests and woodlands for their livelihoods. Yet, despite a rapid growth in carbon finance transactions, forest carbon projects in sub-Saharan Africa are often ignored. One of the main obstacles is the lack of local expertise to develop these kinds of projects.

## THE SOLUTION

Since 2007, CASCADE, has been helping Benin, Cameroon, the Democratic Republic of Congo, Gabon, Madagascar, Mali and Senegal to develop carbon projects from forests and farmlands by building the capacities of project developers, communities and national climate change institutions. By enhancing local expertise in setting up replicable projects in forestry, agriculture and bio-energy, CASCADE is helping to open up opportunities for African participation in Clean Development Mechanism and voluntary carbon markets, while linking buyers and sellers and bringing national experts together.

CASCADE helped the Congolese company Novacel generate carbon finance for its afforestation project. The project, called Ibi Batéké, aims to restore lands by means of agroforestry and forestry plantations. Besides supplying the 8 – 10 million inhabitants of Kinshasa's catchment area with cassava crops, charcoal, service wood and construction timber, the project helps reduce deforestation and forest degradation in the area. Locally, it employs more than 400 people in plantation work and in processing and marketing agricultural produce. More than 1,600 hectares are already under cultivation. On 18 February 2011, the project was successfully registered with the Clean Development Mechanism of the UNFCCC. As a result of these successes, Novacel has

sold 500,000 temporary carbon credits generated by the project until 2017 to the BioCarbon Fund of the World Bank, and another 500,000 carbon credits to the private sector company Orbeo. In addition, the project has recently signed a contract with the Livelihoods Fund established by a group of European corporations for the sale of another 300,000 tonnes of future carbon dioxide emission reductions. The significant stream of carbon finance resulting from these agreements will help the project develop further.

## IMPACTS

By stimulating local project developers' ability to set up carbon projects in rural Africa, CASCADE is showing that solutions to climate change and deforestation are possible. CASCADE has helped 13 project developers finalize their Project Design Document that enables them to attract the attention of carbon financiers. The 12 most advanced projects supported by CASCADE will reduce or sequester 297,500 tonnes of carbon dioxide equivalent a year, leading to significant climate and ecosystem benefits.

Overall, CASCADE has provided technical assistance to more than 20 projects in community reforestation, commercial forestry, bioenergy, and efficient cooking stoves and fish smokehouses, and has helped to avoid deforestation in seven African countries. The experience gathered from these activities has contributed to national and international policy debates on a more inclusive climate regime.

## SUPPORT

Core funding from the Fonds Français pour l'Environnement Mondial (FFEM).

WEBSITE <http://cascade-africa>



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# At the crossroads

The Montreal Protocol is considered by many to be the world's most successful environmental treaty. It has phased out 97 environmentally damaging chemicals by nearly 100 per cent over its 24-year history, putting the ozone layer on the path to recovering to its pre-1980 level by the middle of the century. It has also mitigated climate change, by preventing the emission of greenhouse gases equivalent to approximately 10 billion tonnes of carbon dioxide per year between 1990 and 2010 - many times what was expected from the Kyoto Protocol during the commitment period ending 2012.

Hydrofluorocarbons (HFCs) were introduced into commercial use as substitutes for other chemicals that damage the ozone layer, including both the original CFCs and the HCFCs used as transitional substitutes for them. But it has long been recognized that many are potent greenhouse gases. They are increasing rapidly and are projected to go on doing so. While radiative forcing from them is now quite small,

*“Many of the currently used HFCs — even though considered to be Short-Lived Climate Forcing agents (SLCF) compared to carbon dioxide — have lifetimes sufficiently long to make them significant greenhouse gases.”*

they will contribute significantly to climate change a few decades from now, perhaps up to 20 per cent as much as carbon dioxide in 2050, if the future emissions are the same as the current mix. Such a large HFC increase would require even steeper cuts in carbon dioxide to stabilize climate change. Limiting the production and consumption of HFCs with high Global Warming Potential (GWP) would minimize their contribution to climate forcing and preserve the climate benefits previously achieved by the Montreal Protocol.

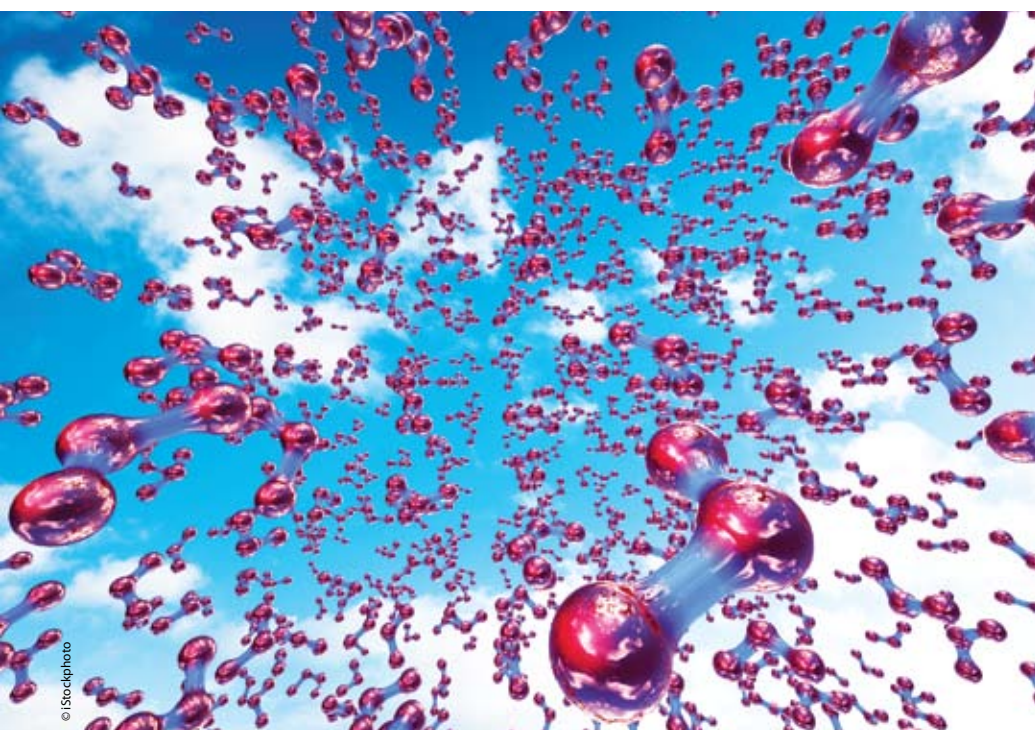
**It is worth laying out a few important facts and issues:**

**I.** HFCs are exclusively anthropogenic in origin. They were introduced to take the place of CFCs and HCFCs that were or are currently being phased out — and are used in various applications of refrigeration and air-conditioning, foam production, fire suppression, and solvents

**2.** As they contain only Hydrogen, Fluorine, and Carbon atoms (thus HFCs for short) and do not contain chlorine or bromine, they do not deplete the ozone layer. Thus, using them has helped avoid further damage to the ozone layer while allowing a smooth, almost unnoticed, transition from CFCs and HCFCs.

**3.** Since they contain carbon-fluorine chemical bonds, HFCs absorb infrared radiation in the atmosphere that would otherwise escape to space. Their ability to absorb it is comparable to those of CFCs and HCFCs — on a molecule-per-molecule basis — and much greater than other greenhouse gases such as CO<sub>2</sub>, methane, and nitrous oxide.

**4.** Not all HFCs are the same: there are significant dissimilarities in their impact on the climate. These arise mostly from the differences in their atmospheric lifetimes, which determine how much of each accumulates in the atmosphere. Many of the currently used HFCs — even though considered to be Short-Lived Climate Forcing agents (SLCF) compared to carbon dioxide — have lifetimes sufficiently long to make them significant greenhouse gases. For example, the very commonly used HFC-134a has a lifetime of roughly 13 years and a 100-year GWP of roughly 1,400 (i.e. 1,400 times more effective than carbon dioxide on a weight basis). However, some HFCs (olefins, or molecules with carbon-carbon double bonds) are very short-lived, i.e., “living” only days to weeks, rather than years in the atmosphere, and so have negligibly small GWPs. Using Very Short-Lived Climate Forcing HFCs with their low GWPs (or other non-HFC options) in place of the currently used high GWP ones would provide significant climate mitigation.





*“Reducing SLCFs  
appears to be  
a great opportunity  
to minimize  
climate change  
in the near future.”*

Thus choices can be made to use specific HFCs to benefit climate. What are the potential opportunities for this? Clearly the first and foremost is that a significant detrimental climate effect can be avoided by replacing the high GWP HFCs with very low GWP ones or with other environmentally safer alternatives, including not-in-kind technologies. If such replacement were implemented, the legacy of the Montreal Protocol in protecting the ozone layer would be augmented by its continued collateral benefit of ameliorating climate change. The Federated States of Micronesia has made a formal proposal to amend the Montreal Protocol to phase out HFCs with high GWP and the United States, Canada, and Mexico have contributed a similar one. At last year’s Montreal Protocol meeting of parties, 91 countries expressed support for limiting high GWP HFCs.

What are the challenges to passing such an amendment? Clearly, it requires recommitting to the “start and strengthen” approach of the Montreal Protocol, and building on the analysis of the treaty’s Technology and Economic Assessment Panel to understand the range of available alternatives, as well as their costs. It also seems prudent to explore limiting high-GWP HFCs in the context of efforts to limit the broader group of non-CO<sub>2</sub> related climate forcing agents, for example the recently expressed interest in such SLCF agents as black carbon, ground-level ozone and its precursor methane, and HFCs. Reducing SLCFs appears to be a great opportunity to minimize climate change in the near future.

Some countries and regions have implemented — or are considering implementing — constraints on HFCs. Examples include an ongoing review by the European Union of its regulations on HFCs and other fluorinated gases, a recent European Parliament resolution urging cuts in HFCs and other SLCFs, and the call by September’s Ministerial meeting on SLCF in Mexico City for a global initiative to support future action on SLCFs. A coalition of 400 businesses also has pledged to eliminate high GWP HFCs starting in 2015, adding further momentum to the effort to limit the climate damage these chemicals cause.

How HFCs impact climate ultimately depends on the choices made today to constrain their current negligible contribution to climate change so they do not continue the dangerous growth projected under business-as-usual.



ROMINA PICOLOTTI

.....  
President,  
Center for Human Rights and  
Environment, and  
former Secretary of Environment,  
Argentina

# An equitable arrangement

Equity — as nearly twenty years of hard-won experience demonstrates — is, without doubt, the golden key for climate negotiations. It is epitomized through the principle of “common but differentiated responsibility” between developed and developing nations. This principle is now a point of enormous contention in the climate negotiations. We risk derailing urgently needed solutions to reverse climate change tendencies because we have not yet found a way to guarantee equity under the UNFCCC process.



*“HFCs are  
in the  
same family of gases,  
have similar  
chemical properties,  
and  
are used  
in the same sectors  
as chemicals already  
regulated by the  
Montreal Protocol –  
so the structures  
are already in place  
in quickly to implement  
a phase-out.”*

Finding equity in the distribution of the atmosphere, equity in responsibility to mitigate, and equity in responsibility to the victims of climate impacts has thus far proven elusive to the negotiators. However, the international community has shown that it can provide equity in solving the global environmental challenge, as the story of the Montreal Protocol shows.

Considered the world’s most effective environmental treaty, the Protocol is a standard bearer for both global equity and climate mitigation. It applies the principle of common but differentiated responsibilities by requiring that industrialized nations step up to the plate first, while developing nations are given a grace period. And nations have agreed that industrialised countries should pay the incremental costs of compliance for developing ones.

Though the Protocol was originally designed primarily to protect the ozone layer, universal compliance with it has had a whopping positive effect on the climate by reducing climate emissions by the equivalent of 135 billion tons of CO<sub>2</sub> between 1990 and 2010. Considering the difficulties over negotiation of the Kyoto Protocol, the numbers are staggeringly impressive. The Montreal Protocol cut climate emissions to the tune of 11 billion tons per year — four to five times the reductions targeted in the first commitment period of the Kyoto Protocol!

And that’s not all. The accelerated phase-out of HCFCs (Hydrochlorofluorocarbons), negotiated and approved in 2007 under the Montreal Protocol, has the potential to eliminate another 15 billion tons of CO<sub>2</sub> equivalent. But there’s an important and fundamental catch: the phase-out’s climate benefits will only be realized if the transition out of HCFCs leads to substitutes that have zero or low Global Warming Potentials (GWPs). It could be greatly undermined if HFCs (hydrofluorocarbons) are selected as replacements.

HFCs are super greenhouse gases, 2,000 times more potent than carbon dioxide in terms of warming the climate. Although there are numerous low-GWP alternatives, they have become the fastest growing greenhouse gas in many countries through replacing HCFCs. If not controlled, they could be responsible for more than a third of climate forcing by mid-century.

HFCs are one of the six gases in the Kyoto Protocol basket being painstakingly negotiated under the UNFCCC process. A key issue in the talks concerns equity and differentiated responsibilities, and that is where our troubles lie. We face a crit-

ical dilemma, advancing by phasing out production and use of HCFCs under one regime (the Montreal Protocol), while being unable to limit the emissions of HFCs under another (the UNFCCC process).

How do we solve this? How do we take advantage of phasing out HCFCs but avoid the growth of HFCs — and, in so doing, guarantee the principle of common and differentiate responsibilities? Thinking of equity in the context of climate change negotiations in practice implies:

- a. Effective North-South transfer of technologies;
- b. Creating an equitable financial architecture guaranteeing equitable representation and decision-making power from Annex I (industrialised) & Non-Annex I countries;
- c. Annex I countries properly fulfilling their mitigation obligations;
- d. Annex I countries properly fulfilling their financial obligations on mitigation and adaptation.

All of these already occur and are present in the Montreal Protocol.

So why not then use what has already proven to be a fair, equitable, successful treaty that currently and successfully regulates HCFCs also to control HFCs?

Given the great success of the Montreal Protocol to date, it is a reasonable assumption that it would indeed serve as a constructive forum to address HFC phase-outs. The framework, institutions, and technical experts and negotiators who know each other well, are already in place. But a few more questions may arise:



- a. What do we gain in terms of mitigation?
- b. At what cost?
- c. What would this imply for the UNFCCC negotiations process?
- d. Are there other benefits?
- e. And — if the answers to all the above are positive, how do we do it?

A workable proposal already exists, first put forward by the Federated States of Micronesia in 2009. It would reduce 85-90 per cent of HFC production and use, achieving a climate mitigation of the equivalent of 100 billion tons of CO<sub>2</sub> by 2050. The United States, Canada, and Mexico followed with a similar proposal in 2010. So the politics are moving in the right direction.

HFCs are in the same family of gases, have similar chemical properties, and are used in the same sectors as chemicals already regulated by the Montreal Protocol — so the structures are already in place to implement a phase-out. The Protocol has already successfully eliminated nearly 100 per cent of 96 other damaging chemicals: an additional HFC phase-out could easily be put in motion.

If we do not address this potential and dangerous shift, the accelerated HCFC phase-out will lead to developing nations transitioning into HFCs in the next five years; in turn guaranteeing an enduring HFC market and a significant increase in emissions. So it is fundamental that we compliment an HCFC phase-out with a parallel phase-down of HFCs.

Developing countries would be comfortable using the Montreal Protocol to regulate production and use of HFCs and accounting to the UNFCCC for the mitigation gained. This would also provide good precedents for its synergy between different environment and agreements and for establishing equity in climate mitigation, since the Protocol has proven to guarantee equity through ensuring the transfer of technology and necessary financing, as well as enshrining the Principle of Equal but Differentiated Responsibilities.

Using the Montreal Protocol for this combined phase-out, will help us to leapfrog high-GWP HFCs entirely — saving billions of dollars to economies around the world.

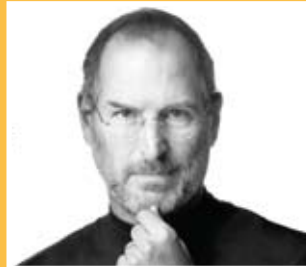
We cannot but seize this amazing opportunity.



# people

## AMINA MOHAMED

has taken up office as the UN Assistant Secretary-General and Deputy Executive Director of the United Nations Environment Programme (UNEP). She succeeds Angela Cropper of Trinidad and Tobago. Ms. Mohamed, whose appointment was announced in May by UN Secretary General Ban Ki-moon, brings a wealth of experience to the position as a distinguished diplomat, lawyer, manager and policymaker working across the sustainable development and environment policy agendas. From 2000 to 2006, she was the Ambassador and Permanent Representative of Kenya to the UN in Geneva. Since 2008, and as Permanent Secretary and Chief Executive Officer of the Ministry of Justice, National Cohesion and Constitutional Affairs of the Republic of Kenya, Ms. Mohamed played a key leadership role in the political, legal and constitutional reform process.



## STEVE JOBS

in the twenty years since the first Earth Summit in 1992, the internet, mobile phones and other communication technologies have made the world a much smaller place — and more of a ‘globalized village’. Today, there are some two billion Internet users worldwide and five billion people who have subscribed to mobile phone services. No one was perhaps more of a visionary to this trend than Steve Jobs of Apple Inc who passed away in October. Among other things, he made a promise in 2007 to be the first computer company to phase out the worst hazardous substances from all Apple products. In 2008 Apple lead the industry with the first computers virtually free of toxic PVC and BFRs. Today, all Apple products are free of these hazardous substances and where Apple lead, HP, Acer and others have followed.

## MAITE NKOANA-MASHABANE

President of the 17th Conference of the Parties (COP17) to the UN Framework Convention on Climate Change in Durban and Minister of International Relations and Co-operation of the Republic of South Africa. She will have a very busy agenda as the content of this year’s negotiations, which begin on November 28, would be the unresolved political issues surrounding the continuation of the Kyoto Protocol, as well as how to operationalise outcomes from the Cancun and Bali negotiations.

## JULIA GILLARD

Australia's Prime Minister has pushed through the new Clean Energy Act, under which the country's 500 worst-polluting companies will be forced to pay a tax on their carbon emissions starting from 1 July next year. Australia is one of the biggest per-capita emitters of carbon globally and has an economy that is more reliant than most on energy-intensive industries such as mining, including coal. It is also set to feel the impacts of climate change earlier than most, and arguably is seeing them already in the recent severe droughts. Domestic fuel bills are expected to rise as companies pass on the costs to consumers. But the government hopes that the legislation will force innovation in renewable energy supplies and free Australia from its reliance on fossil fuels.

## PATRICIA OKOED BUKUMUNHE

the Ugandan radio journalist won the prestigious 2011 winner of the UNEP Young Environmental Journalist Award and as part of her prize took part in a professional exchange visit to the United States, in which she travelled across the country, interacting with environmental experts, leading environmental journalists, scientists and public figures. The Award, which was launched in 2010 and is open to print, broadcast and online journalists, seeks to recognise the very best in original, accurate and inspiring reporting on the environment by young journalists in Africa.

To read the Patricia on the Road blog see: [http://www.unep.org/yeja/blogs/patricia\\_day1.asp](http://www.unep.org/yeja/blogs/patricia_day1.asp)



## YOUNG ENVIRONMENTAL LEADERS

from 18 developing countries gathered in Leverkusen, Germany in October to showcase their innovative solutions for sustainable development. They were part of the UNEP-Bayer Young Environmental Envoy Programme in which each Envoy is involved in a sustainable development project in his or her home country. Four students won this year's Young Environmental Leader Award for projects which had the most potential impact. They are: Sara Rudianto from Indonesia for a small bioreactor that can be used for cooking in households; María Rose Reyes Acosta from Ecuador for developing a process to treat contaminated water; Michael Muli from Kenya for a green energy project that produces clean fuel briquettes made from dried foliage and waste paper; and Mary Jade Gabanes from the Philippines for establishing an environmental education programme for children with special needs. As part of the Award, the four winners received project support worth a total of EUR 3,000 and further support in their home countries to make their projects environmentally and economically sustainable.



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# An unprecedented opportunity

Rapid and meaningful progress on slowing global warming is achievable if world leaders and policy makers are willing to rethink and broaden their strategy, in view of recent findings. It turns out that global warming is caused by two different types of pollutants. The first is the long-lived gases, which we have known about for decades, and which, stay in the atmosphere for a century or longer — most notoriously carbon dioxide (CO<sub>2</sub>) released by fossil fuel combustion. Most climate policies have focused on CO<sub>2</sub>, but it will take decades and trillions of dollars to reduce emissions significantly. The world cannot afford to lose such decades. The planet has already warmed by more

than 0.8°C and the resulting symptoms are being perceived in rising sea levels, melting mountain glaciers, including in the Himalayas and the Alps, large scale retreat of the Arctic sea ice and warming of the ocean waters penetrating to a depth of 1000 meters or more, and such extreme weather as droughts, floods and heat waves. Worse, humans have already dumped enough greenhouse gases (almost 1000 billion tons of CO<sub>2</sub> alone) in the atmosphere to warm the planet by more than 20°C. So, even if we were to replace half of all fossil fuel use with renewables, the warming will continue to increase for decades, because CO<sub>2</sub> molecules live for a century or more once released.

Fortunately, the world can get out of this seemingly hopeless predicament by broadening its focus to the second type of pollutants. Roughly half of total global warming is due to the release of four of these: dark soot particles called black carbon; and the gases methane, lower atmospheric ozone, and the halocarbons (CFCs, HCFCs and HFCs). These pollutants (except CFCs, which are already banned and a few other halocarbons) stay in the atmosphere for only weeks to a few decades and hence are referred to as Short Lived Climate Forcers. Cutting these short-lived climate warming pollutants levels in half, which is feasible with current technologies — as UN Environment Programme (UNEP) report on Black Carbon and Ozone has recently demonstrated — would quickly reduce their warming effect and give the world two to four decades for the effects of CO<sub>2</sub> reductions to take hold. If we were to eliminate black carbon emissions by diesel vehicles today, for example, their warming effect would disappear within weeks to a month. And the cost of such reductions, while not negligible, would not cripple economies; between 1989 and 2007, for example, California reduced its black carbon emissions by as much as 50 per cent.

Black carbon and ozone, two potent short-lived climate forcers, are also great targets for developing nations because they have other known consequences apart from their warming potential. Inhaling indoor smoke (containing black carbon and ozone precursors) from open fires used for cooking and heating around the world — the World Health Organization reports — leads to over 1.5 million deaths each year. Exposure of plants to high levels of ozone leads to damage to millions of tons of crops annually. And black carbon and ozone in the atmosphere have regional climate effects, including melting the Himalayan glaciers and decreasing monsoon rainfall, as recognized in a recent report by the Pontifical Academy of Sciences.

*“Roughly half of total global warming is due to the release of four of these: dark soot particles called black carbon; and the gases methane, lower atmospheric ozone, and the halocarbons (CFCs, HCFCs and HFCs).”*

The world has an unprecedented opportunity to mitigate some of the disastrous effects of black carbon and ozone on climate, agriculture, water and health with a simple act: replacing traditional cook stoves with energy efficient and pollution-free cooking technologies. This work has already begun with international initiatives like the Global Alliance for Cook Stoves, but challenges remain. The numerous cook stove initiatives that have taken place all over the world have demonstrated time and again that catalyzing widespread adoption of such clean cooking technologies will require innovative and affordable solutions.

This is where Project Surya, an internationally recognized cook stove project sponsored by UNEP, comes in. Its goal is to demonstrate scientifically the environmental and health benefits of introducing clean cooking technologies — and, ultimately, to provide a rigorous evidence base for large-scale action. It aims to deploy improved cooking technologies in a contiguous region with a population of approximately 50,000, thus creating a “black carbon hole” in the otherwise omnipresent pollution cloud which will be measured across space and time to quantify the multi-sector impacts of better cooking technologies. Project Surya will use cell phones, instrument towers, and satellites, and will empower village youth to work with

world-class experts in documenting the impacts.

A pilot phase was successfully completed in 2010 in a village in one of the poorest and most polluted regions in the Indo-Gangetic plains. It has already achieved some ambitious and measurable outcomes including: documenting the connection between indoor air pollution from cooking and ambient outdoor pollution levels; identifying improved cooking technologies that reduce pollution significantly; deploying improved cook stoves in all the 500 or so households in the pilot village; and verifying that we will be able to measure the impacts of a larger-scale intervention. Another, parallel pilot test has been started in Nairobi, Kenya.

Our recent data has also shown that the measured black carbon concentrations are three to five times higher than the concentrations simulated by climate models, making it all the more urgent to take action now to target it and other short lived climate forcers. Fortunately, there is a great success story to draw upon. The enormous greenhouse effect of CFC-11 and CFC-12 was discovered only in 1975. CFCs were regulated by the 1987 Montreal Protocol, because of their negative effects on stratospheric ozone, but if this had not happened they would have added enough heat energy to warm the planet by about 1°C or more.

China and India have a common interest in cutting the black carbon and ozone that is melting their shared glaciers, killing millions and destroying millions of tons of crops — and the United States and Europe share common interest in the Arctic where black carbon along and other short-lived pollutants are responsible for almost half of the melting ice. Modest steps that attack these short lived climate forcers, with fast and measurable responses, are the best way to jump-start the stalled climate mitigation actions.



# Arresting a silent killer



RADHA MUTHIAH

Executive Director,  
Global Alliance for Clean Cookstoves

Nearly three billion people — almost one in every two people on the planet — are exposed every day to smoke emitted from traditional cooking stoves and open fires. Two million die every year as a result, just from cooking for themselves and their families. The victims are predominantly women and children.

The toxic smoke produced from burning such fuels as coal, wood, dung or charcoal in inefficient stoves in homes with little or no ventilation

causes disease, injury and pollution. It can lead to such life-threatening illnesses as cancer, diseases of the heart and lungs, pneumonia and tuberculosis: it increases, for example, the risk of contracting the acute lower respiratory infections, including pneumonia, that account for a fifth of all child mortality around the globe. World Health Organisation (WHO) research has concluded that such household air pollution is the fifth greatest health risk in developing countries, and the

*“Black carbon and methane,  
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time spent gathering fuel could be better spent on income generation, educational opportunities and other productive activities.

Thus cooking with toxic and polluting fuels over open fires and inefficient stoves is part of a vicious and complex cycle that impacts the environment, human health and economic development significantly. But the cycle can be broken. The benefits of affordable, accessible and culturally-appropriate clean cooking stoves are clear enough: cleaner air, increased environmental sustainability, improved safety, enhanced livelihoods, and better health.

The Global Alliance for Clean Cookstoves — with over 175 partners and growing — was formed last year to save lives, improve livelihoods, empower women and combat climate change by creating a thriving global market for clean and efficient stoves and fuels. It has prioritised its work in Africa, where exposure to household air pollution is particularly severe: WHO discovered, analysing 2009 data, that 95 per cent or more of the population in over 20 nations throughout the continent rely on solid fuels. So far almost a third of the Alliance’s national partners are in Africa

The Global Alliance is co-funding an evaluation by WHO and the US Centers for Disease Control and Prevention of the acceptability, health impact and sustainability of clean cooking stove and fuel options in the Nyanza Province of Kenya, where mortality for infants and children under the age of five is twice the national average. It has also commissioned market analyses around the world — including assessments in Ethiopia and Nigeria — to identify opportunities for interventions that

leading risk factor for non-communicable diseases among non-smoking women. It also increases the chance of giving birth to babies with low birth weights who — if they survive — are themselves more likely later to develop non-communicable diseases.

Black carbon and methane emitted from such inefficient cooking, have long lasting consequences for the climate. Over a quarter of emissions of black carbon worldwide come from homes. Dr. Veerabhadran Ramanathan estimated in a 2009 UN Environment Programme

(UNEP) bulletin that it contributes the equivalent of a quarter of the global warming provided by carbon dioxide worldwide, reaching as high as 60 per cent in some regions. Meanwhile, the 730 million tonnes of biomass burned each year in developing countries emits more than a billion tonnes of carbon dioxide. Furthermore, women and children typically travel long distances each day, sometimes taking hours and jeopardising their safety, to collect fuel for cooking. The deforestation that results from removing wood can cause landslides that devastate towns and ruin arable soil. And the



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can help build commercially-sustainable clean stove businesses. This should, over time, assist a move away from donor-dependent initiatives towards thriving local, regional and global businesses.

The World Bank has launched the Africa Clean Cooking Initiative to stimulate the development and commercialisation of a new generation of clean cooking stoves in sub-Saharan Africa. It will be designed to leverage new technology and market developments, partnerships and financing mechanisms that could lead to consistent improvements in stoves' design, performance, and affordability, focussing on adaptability and local needs.

*“The benefits of affordable, accessible and culturally-appropriate clean cooking stoves are clear enough: cleaner air, increased environmental sustainability, improved safety, enhanced livelihoods, and better health.”*

In Uganda, Impact Carbon is working to shift the country towards widely adopting efficient, healthy cooking stoves that reduce charcoal and wood use by 35 to 65 per cent and save families more than US\$75 per year. Carbon finance has provided hundreds of thousands of dollars in subsidies to poor consumers, so far facilitating the distribution of more than 95,000 efficient stoves, while supporting the development of local, sustainable manufacturing enterprises and spurring the growth of small and medium retail ones.

The Maasai Stoves and Solar Project — created by the nonprofit International Collaborative for Science, Education, and the Environment (ICSEE) — emphasises incorporating women into its efforts to deploy clean cooking stoves in northern Tanzania. Involving local residents in making, distributing and installing stoves has brought together women, craftspeople, small businesses and merchants. US\$40 of the about US\$55 cost of a stove goes to brick makers, steel merchants, materials suppliers and transport costs, while the team of women who build and install them — and train others on how to use them properly — gets the other US\$15, in a scheme designed to create jobs and significantly stimulate the local economy. Monitoring for particulates and carbon monoxide show that the new stoves cut indoor smoke by 90 per cent. They also need 60 per cent less wood and so save the women and children of each household 12 to 15 hours a week that would otherwise be spent gathering it.

Led by the United Nations Foundation, the Alliance — which celebrated its first anniversary in the autumn — has set a ‘100 by 20’ goal, for 100 million homes to adopt clean and efficient stoves and fuels by 2020 as a step towards universal adoption. It facilitated the Lima Consensus, a groundbreaking agreement on developing a tiered, interim health and efficiency cookstove standard; enhanced the technical capacity of regional stove testing centres in Ethiopia and China; supported the formation of regional alliances in Africa, Asia and Latin America; and worked to develop a monitoring and evaluation framework. It is uniquely positioned to address and arrest this silent killer in Africa and throughout the world.



## Climate change: useful links

This page contains links to websites from governments, international organizations, non-governmental organizations, businesses, media, and other groups from around the world to help you research issues related to climate change. We have compiled these links from our own review of the vast amount of information available on the Internet to help you to find the most relevant sources for your research. Our *Planet* magazine does not, however, endorse the viewpoints of any of the groups to which we link, and we cannot guarantee the accuracy of the information posted on these sites. Rather, we hope to provide you with a broad range of opinions and perspectives.

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### www.unep.org

#### Climate change website

[www.unep.org/climatechange/](http://www.unep.org/climatechange/)

This is UNEP's homepage for climate change, one of our six priority areas. It has a depth of information on UNEP's Climate Change Programme, and relevant science, policy, publications, campaigns, news and events.

#### Unite to Combat Climate Change

[www.unep.org/unite/](http://www.unep.org/unite/)

This is the website of the United Nations campaign to encourage civil society and communities around the world to unite and act now to combat climate change.

#### UN-REDD

[www.un-redd.org/](http://www.un-redd.org/)

REDD – reducing emissions from deforestation and forest degradation in developing countries – investigates creating financial value for the carbon stored in forests, offering incentives for developing countries to reduce emissions from forested lands.

#### UNEP-Risoe Centre on Energy, Climate and Sustainable Development

<http://uneprisoe.org/>

UNEP-Risoe supports UNEP in its aims to incorporate environmental and development aspects into energy planning and policy worldwide.

#### Energy website

[www.unep.org/themes/energy/?page=home](http://www.unep.org/themes/energy/?page=home)

Information on UNEP's key activities to address environmental consequences of energy production and use at the global and regional levels.

## Action

### Unite for Climate

<http://uniteforclimate.org/>

Unite for Climate is an entry point into the world of youth action on climate change. Find out how young people are responding to climate change, learn about their experiences, and join campaigns from around the world.

### Time for Climate Justice

[www.tckctck.org](http://www.tckctck.org)

This website was launched by a formidable coalition of non-governmental organizations calling themselves the Global Campaign for Climate Action.

### You Control Climate Change

[www.climatechange.eu.com](http://www.climatechange.eu.com)

The European Commission's website provides information about climate change in 21 languages, including tips on how individuals can help bring it under control.

[www.climateworks.org/CostsOfDelay](http://www.climateworks.org/CostsOfDelay).

[www.cleancookstoves.org](http://www.cleancookstoves.org)

[www.projectsurya.org](http://www.projectsurya.org)

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## Climate change websites across the UN

### Gateway to the UN system's Work on Climate Change

[www.un.org/wcm/content/site/climatechange/gateway](http://www.un.org/wcm/content/site/climatechange/gateway)

This website links to extensive information about the UN and climate change. It also links to the many UN partners on climate change.

### The World Tourism Organization

[www.unwto.org/climate/index.php](http://www.unwto.org/climate/index.php)

A climate change and tourism site of this specialized UN agency.

### UNFCCC – The United Nations Framework Convention on Climate Change

[www.unfccc.int](http://www.unfccc.int)

The UNFCCC is an international treaty about potential action to reduce global warming and to cope with temperature increases. The Kyoto Protocol is an addition to this treaty. The website contains numerous resources – for beginners or experts – relating to climate change and the UNFCCC.

### IPCC – Intergovernmental Panel on Climate Change

[www.ipcc.ch/](http://www.ipcc.ch/)

The IPCC is the leading body for the assessment of climate change. It provides the world with a clear scientific view on the current state of climate change and its potential environmental and socio-economic consequences.

### WMO – The World Meteorological Organization

[www.wmo.int/pages/about/index\\_en.html](http://www.wmo.int/pages/about/index_en.html)

The WMO is the UN system's authoritative voice on the state and behaviour of the Earth's atmosphere.

# WANGARI



Wangari Maathai — who died in September, aged 71 — was an exceptional woman, sister, environmentalist and an a great African. If ever a life can be described as groundbreaking, it was hers. She was the first woman in East and Central Africa to gain a doctorate degree, she pioneered tree planting to improve the prospects of the poor, and became the first environmentalist and the first African woman to receive the Nobel Peace Prize. Yet her heart always stayed with the land and the rural people from which she sprang, and she remained a great listener, an excellent teacher, a wise counsellor and a faithful friend.

Born on 1<sup>st</sup> April, 1940, in Nyeri, central Kenya, to a farming family she grew up, as she once put it, “close to my mother, in the field, where I could observe nature”. Her parents taught her to “respect the

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soil and its bounty" in a land so green that there was no word in the local language for desert. She recalled drawing water from a spring, "fascinated by the way the clean, cool water pushed its way through the soft red clay so gently that even the individual grains of the soil were left undisturbed".

But the trees were cut for tea plantations, and the spring dried up. "I feel the tragedy under my feet. Gulleys stare at me, telling the story of soil erosion, unknown before. Hunger is on the faces of the people", she recalled. It was an experience that was to drive a lifetime of working to restore land and livelihoods throughout the world.

Thanks to her older brother's persuasion, her parents sent her to school, where she excelled, eventually winning a scholarship to the University of Pittsburgh and gaining her doctorate at the University of Nairobi where, by 1977, she was Chair of its Department of Veterinary Anatomy.

In that same year, Wangari founded the Green Belt Movement, which encouraged women in rural Kenya to plant trees, paying them a small sum for each one that survived." It occurred to me", she explained, "that some of the problems women talked about were connected to the land. If you plant trees, you give them firewood. If you plant trees, you give them food."

She left teaching to do this work full time. Over the intervening decades her movement caused over 30 million trees to be planted in Africa, helping nearly 900,000 women establish nurseries and do the work. In 2006 she was the inspiration behind — and became the co-patron of UNEP's Billion Tree Campaign, which has so far seen the planting of 12 billion trees worldwide.

Yet that was only one aspect of her activism, for she was also a champion of the rights of the downtrodden, especially women, of the well-being of the girl-child, and of expanding democratic space. "I started out planting trees and found myself in the forefront of fighting for the restoration of democracy in my country", she once said, a contribution praised in a tribute by Kenyan President Mwai Kibaki. During the years of struggle, she was able to turn to UNEP for safety and sanctuary when needed.

She served briefly as a junior environment minister from 2003 and the next year was awarded the Nobel Peace Prize for being "at the front of the fight to promote ecologically viable social, economic and cultural development in Kenya and in Africa".

She continued this fight to the end of her life. What drove her? "I don't really know why I care so much", was her answer. "I just have something inside me that tells me there is a problem and I have to do something about it."

*"I started out planting trees  
and found myself in the  
forefront of fighting  
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**WANGARI MAATHAI**  
**1940-2011**

By AMINA MOHAMED  
Deputy Executive Director, UNEP



**Global Conference on Land-Ocean Connections  
23-24 January, 2012**

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**Third Intergovernmental Review on the  
Implementation of the Global Programme of Action  
for the Protection of the Marine Environment  
from Land-based Activities (GPA)  
25-27 January, 2012**

**Manila, The Philippines**

**<http://www.gpa.unep.org>**



[www.unep.org/ourplanet](http://www.unep.org/ourplanet)