UNEP

Our Planet

Volume 16 No 2

The magazine of the United Nations Environment Programme

NATURE'S CAPITAL AND THE MILLENNIUM DEVELOPMENT GOALS

Martin Bond/Still Pictures

Schneider/UNEP/Still Pictures

Also available on the Internet at www.ourplanet.com

Kampoon Midsen/UNEP/ Still Pictures

Our **Planet**, the magazine of the
United Nations Environment Programme
(UNEP)
PO Box 30552, Nairobi, Kenya
Tel: (254 20) 621 234
Fax: (254 20) 623 927
e-mail: cpiinfo@unep.org
www.unep.org

ISSN 1013-7394

Director of Publication: Eric Falt
Editor: Geoffrey Lean
Coordinators: Naomi Poulton, Elisabeth Waechter
Special Contributor: Nick Nuttall
Circulation Manager: Manyahleshal Kebede
Design: Sharon Chemai
Production: UNEP/DCPI
Printed by Progress Press, Malta
Front cover photograph: Richard Devels /StillPictures

UNEP

From the desk of

KLAUS TOEPFER

United Nations Under-Secretary-General and Executive Director, UNEP

The 2005 World Summit in New York is one of the most important meetings of the early 21st century. It aims to deliver a new and strengthened United Nations in areas from security to human rights. It will also take stock of how we are faring on meeting the 2015 Millennium Development Goals, which range from halving dire poverty and increasing the access to safe and sufficient supplies of drinking water to empowering women and reversing the spread of infectious disease.

Natural disasters

Over recent months the environment has emerged as a crucial pillar, if not a cornerstone, upon which the Goals may well stand or fall. *A more secure world: Our shared responsibility,* the report of the Secretary-General's High Level Panel on Threats, Challenges and Change, says: " Environmental degradation has enhanced the destructive potential of natural disasters and in some cases hastened their occurrence. More than two billion people were affected in the last decade."

So the environment is not a luxury, affordable only when all other issues have been resolved, but the oxygen breathing life into all the Goals. It is the ribbon running round our common aspirations for a healthier, more stable, secure and just world.

It is also critical to economies. When New York's City Council set out to supply safer drinking water for its nine million customers, it faced a bill for water filtration of up to $6 billion. Instead of paying for equipment, it plumped for better management of river banks, forests, agriculture and other ecosystems to reduce pollution into the Catskill/Delaware river system. Working with nature in this way cost the city only $1 billion to provide safe drinking water, saving up to $5 billion.

Invasive species

Such hard economic arguments are underscored in the recently published Millennium Ecosystem Assessment and its spin off reports. The work of 1,300 scientists and experts from 95 countries, the Assessment has begun to put numbers on the value of ecosystems and the services they provide. It shows that an intact wetland in Canada is worth $6,000 a hectare, compared to $2,000 if it is drained for intensive agriculture. Similarly, it calculates losses from damage by alien invasive species in the Cape Floral region of South Africa at around $2,000 a hectare.

Recreational value

Intact tropical mangroves - nurseries for fish, natural pollution filters and coastal defenses - are worth around $1,000 a hectare. Cleared for shrimp farms, their value falls fivefold. The Assessment estimates that the Muthurajawela Marsh, over 3,000 hectares of coastal bog in Sri Lanka, is worth an estimated $5 million a year though such services as local flood control. And the annual recreational value of coral reefs in the six Marine Management Areas of the Hawaiian islands ranges from $300,000 to tens of millions of dollars a year.

Studies from Algeria, Italy, Portugal, Syria and Tunisia estimate that the value of timber and fuelwood from a forest is worth less than a third of that of the services it provides, ranging from protecting watersheds and providing recreation to absorbing pollutants like greenhouse gases. The burning of 10 million hectares of Indonesia's forests in the late 1990s cost an estimated $9 billion, including from increased health care costs and losses in tourism.

Sustainable development

There are also new findings on the link between the spread of disease and environmetal degradation. Studies in the Amazon by researchers at Johns Hopkins University in the United States have concluded that for every one per cent increase in deforestation, there is an eight per cent increase in the number of malaria-carrying mosquitoes.

So it is our sincere hope that the heads of state meeting in New York put "natural or nature's capital" right up there with human and financial capital and recognize that significant, targeted investments in the environment – including restoring and rehabilitating damaged and degraded wetlands, forests, mangroves, coral and the like – provide a high rate of return and will go a long way towards meeting the eight Goals. Anything less will undermine our attempts to defeat poverty and deliver sustainable development, short-changing current and future generations ■

YOUR VIEWS

We would like to receive your feedback on the issues raised in this edition of ***Our Planet****. Please either e-mail: cpiinfo@unep.org or write to:*
Feedback, Our Planet
Division of Communications and Public Information, UNEP
P O Box 30552, Nairobi
KENYA

Kevin Schafer/ Still Pictures

Relative Importance

ELLIOT MORLEY describes the urgency of conserving the great apes as part of achieving the Millennium Development Goals

The Great Apes – chimpanzees, bonobos, orang-utans and gorillas – are considered to be humankind's closest relatives. It is hard not to be touched by them – with their prehensile hands, human-like features, their ability to use tools and make plans, and their social interaction – as intrinsically bound with humans. This is borne out by molecular studies that have shown that chimpanzees share more genetic material with humans, about 99%, than with gorillas.

Ironically, these charismatic species have come to the forefront of the world's attention, and we have increased our knowledge about them, just as their numbers have declined. It is thought their populations may have fallen by as much as 90% since the start of the last century, and they face the real threat of extinction within our lifetimes. This has already occurred at some local levels, taking us a step closer towards total extinction in the wild. If we allow this to happen, it will be a tremendous loss not just to the local communities, but to the planet.

Symbiotic relationship

Great apes are effective indicator species, helping to inform us about the state of regional and environmental health. As the largest tree-climbing animals, they play a unique role in the ecology of the forest, from their feeding, nest-building and branch-breaking behaviour – thus pruning the trees and opening up light gaps in the forest canopy – to the dispersal of seeds. The symbiotic relationship between the great apes and the forest is vitally important.

When the last of a species dies out, its gene pool is lost forever. If one species becomes extinct, those that rely on it in one way or another (such as for protection or for food) will also be affected. In light of this, we aim through various government measures to preserve the diversity of species now alive.

All great apes face the significant threat of habitat destruction. In Africa apes are threatened by such diseases as ebola, as well as by pressure from over-exploitation by hunting to feed both the local community and the huge numbers of people engaged in logging. We cannot underestimate the damage that will be done to the ecosystem if great apes are allowed to vanish, or further decline significantly.

Global conservation

The UK Government has been at the forefront of trying to help range states implement programmes that will preserve and enhance great apes' native biodiversity. The UK was one of the first Governments to signal support for the Great Ape Survival Project (GRASP), jointly managed by UNEP and UNESCO. The project – agreed following the 2002 World Summit on Sustainable Development – aims to bring world-wide attention to the crisis, raise funds for conservation, and develop a global conservation strategy for all great ape populations. GRASP's work is key to promoting collaborative working across range states and amongst partners in the developed world to draw up cohesive plans ▶

dealing with the complex issues of maintaining great ape populations and helping to reverse their decline.

The UK Government has so far committed £563,000 to GRASP's work. As the largest single country donor, it has demonstrated its commitment to helping GRASP reach its target of raising sufficient money to fund 100 field projects by 2010. It is up to other donors to match this support.

UNEP and UNESCO are organising an Intergovernmental Meeting in Kinshasa in September to take the project further and embed it in the minds of governments and other partners. This is an excellent opportunity for donor countries and the range states of great apes to come together to discuss an effective work plan to take forward our commitment under the Millennium Development Goals (MDGs) to reverse the loss of environmental resources by 2015, and our commitment under the Convention on Biological Diversity to achieve a significant reduction in the rate of loss of biodiversity by 2010. These are challenging targets, but we must continue committing ourselves to ensure the health of the world's most important forests, and protecting great apes is an achievable step that takes us nearer to our overall aim.

Cultural tradition

The unsustainable trade in bushmeat is one specific issue being addressed by GRASP. Consuming bushmeat is both a livelihood opportunity and a cultural tradition for forest peoples. But the growth in markets and demand in urban areas – coupled with the ease of accessibility into once inaccessible areas, through such industries as logging – has put increasing, unsustainable pressures upon certain species, including great apes. Bushmeat is a good example of an issue that we cannot address simply from only one angle: to do so would be to oversimplify and essentially ignore either the rights of indigenous peoples or the aim to maintain and improve the world's biodiversity. Action across range and donor states is essential.

The increase in illegal logging has placed unsustainable pressures on once plentiful species. The UK was one of 40 countries to sign a ministerial declaration on illegal logging at the African Forest Law Enforcement and Governance conference in October 2003, so as to continue the process of working closely with range states and address matters at their root cause. Only through promoting sound forest management and governance can we start effectively to protect vulnerable species, whilst ensuring that indigenous people are preserved and their livelihoods, where possible, improved.

The UK Government also works with other countries to promote the conservation of the world's wildlife, and help stop the decline in populations of monkeys and great apes, through our membership of agreements such as the Convention on International Trade in Endangered Species (CITES). The Convention monitors, regulates and restricts trade in around 5,000 species of animals, including all the great apes: more than 167 nations have signed up to implementing it. International trade in animals listed on CITES, including bushmeat derived from those species, is either banned completely or controlled by means of a system of permits.

Pilot project

In October 2004, the UK was instrumental in drafting and proposing an important European Union (EU) resolution on great apes to the 13th Conference of the Parties to CITES. The proposal – which included calls to work closely with GRASP – was adopted, as was an EU proposal inviting the UN's Food and Agriculture Organisation to convene an international workshop to examine the bushmeat issue. The UK pledged £20,000 to set up a pilot project to help combat the smuggling of great apes in central Africa, to be jointly managed by GRASP and CITES.

The plain fact is that many of the issues faced by the Africa are intrinsically linked to poverty. Sub-Saharan Africa is the only region of the world to have become poorer in the last 25 years. The continent's share of world trade halved from 1980 to 2002, and it is home to 28% of the world's poorest people.

Good work has been done on meeting the UN Millennium Development Goals, but there is still a lot to do. This is why the UK Government has noted Africa as a main theme of its Presidency of the G8. Only by working together can we hope to achieve the eight Millennium Development Goals and I welcome the significant agreement on aid and debt that was reached at Gleneagles in July.

Great energy

My colleague, the Biodiversity Minister Jim Knight, now has these issues within his portfolio. Indeed this is the first time that biodiversity has appeared within the Ministerial portfolio title. This is no accident, but an acknowledgment of the significance of biodiversity across UK Government policy, both nationally and internationally. I know Jim will take forward these issues with great energy and commitment, reinforced by the support we will give him to sustain and grow the work of UNEP and GRASP.

Biodiversity is the yardstick by which we judge the success of our Department –and our success as a planet. As a developed country, we recognise that we have a responsibility to work with UNEP and others to address the very real threat to biodiversity generally, and to the great apes in particular ■

Elliot Morley is Minister of the Environment of the United Kingdom

Martin Harvey/ Still Pictures

Progress, Contradictions and Dilemmas

HENRI DJOMBO describes an important initiative to conserve biodiversity and calls for better partnership to realise it

The importance of biodiversity for our planet is undisputed, as demonstrated by the sheer number of international treaties on it. Between 1958 and 1992 (the dates of the signatures of the Geneva Convention on the High Seas and the Biodiversity Convention) there have been no fewer than 13 conventions or international accords on this all-important subject. Natural resources are the trump card to be played by countries that have so far been able to protect their biodiversity in ecologically and economically difficult circumstances (including deforestation, poaching, the heavy burden of debt, and climate fluctuations) so as to put into place the Millenium Development Goals (MDGs). Conserving biodiversity is an essential factor in fighting poverty and managing the environment sustainably.

Fiona Teede/UNEP/Still Pictures

Unique experience

The Congo Basin Forest Project, for example, is a unique experience that has been welcomed and embraced by the international community – a success story in conserving biodiversity.

The Congo Basin forests cover an immense area – 228 million hectares, incorporating more than 11 countries. Comprising 18 % of the world's tropical forest, it is the second largest such forest in the world, after the Amazon, and thus one of the planet's vital "green lungs". Preserving the "common human heritage" concerns us all. The United Nations General Assembly resolution 54/214 on the conservation and sustainable development of Central African forest ecosystems reflects the global consensus on the need to protect them.

Stuart G.R. Warner/UNEP/Still Pictures

These forests play a vital role for the entire planet in regulating climate and protecting biodiversity. They boast an exceptional range of biodiversity: more than 11,000 plant species, 409 species of mammals, 1,086 bird species, 152 species of snakes and 1,069 of fish.

Preserving biodiversity

The Central African Heads of States are aware of how high the stakes are and of their responsibility towards humanity. In a spirit of solidarity and of safeguarding common interests – and in view of protecting the future of coming generations – they solemnly declared at Yaoundé in 1999 and again in 2005 at Brazzaville their "adherence to the principle of preserving biodiversity and of sustainable development of forest ecosystems". Their ambitious Convergence Plan combines the demands of sustainable development and the management of natural resources. Adopted in February ▶

Steve Poe/UNEP/Still Pictures

2005, it is a long-term subregional strategic plan to ensure the conservation and sustainable development of forest ecosystems in Central Africa.

Its principal objective is "to manage the forest resources of the subregion in a sustainable and concentrated way and to establish protected areas that are representative of biological diversity and different ecosystems, for the good of the people and the balance of the planet." It amounts to a common vision of Central African states for realising the Millenium Development Goals and better preserving biodiversity.

Its principal objective is "to manage the forest resources of the subregion in a sustainable and concentrated way and to establish protected areas that are representative of biological diversity and different ecosystems, for the good of the people and the balance of the planet"

Convergence Plan

This important initiative was conceived along several strategic vectors which slot perfectly into the Goals, specifically the fight against poverty and hunger. It also reflects the eighth Goal – to develop a global partnership for development – in that 11 countries of the Central African region have joined together to form the Congo Basin Forest Partnership. This was launched in Johannesburg at the 2002 World Summit on Sustainable Development to promote the sustainable development of the Central African forest ecosystems.

Several recent reports, such as the Millennium Ecosystem Assessment published in April 2005, are very clear on the state of global biodiversity and also put forth the very plausible theory that the MDGs in this area – and on environmental protection more generally – are unlikely to be met. The Assessment unambiguously states that we must brace ourselves for a major deterioration in biodiversity, and it underlines the economic implications of this, especially for the fight against poverty. It is clear that if we do not succeed in reversing current trends, our efforts to halve poverty by the year 2015 will be in vain. It is thus imperative that a functional partnership be established.

Despite certain encouraging efforts by the North in this direction – such as the recent British initiative in the framework of the G8 – the general tone is dominated by a lack of solidarity and a blatant disregard for previously made commitments. Goal 8 should be the driving force behind all the other MDGs. Northern countries must face up to their obligations, to enable us all to reach our aim of achieving sustainable development together.

The future of this common human heritage of the forests of the Congo Basin is being decided right now. Why is it, then, that the countries of Central Africa have undertaken to provide 40% of the 2 billion US dollars needed to put in place the Convergence Plan, while Northern countries display extreme reluctance in coming up with the remaining 60% to save this world heritage.

Illegal logging

How do 2 billion US dollars over 10 years compare to the 300 billion US dollars annually doled out by OECD countries in agricultural subsidies? This modest 2 billion dollar sum, desparately needed to save the planet's biodiversity, is equal to the cost of purchasing eight F16 fighter jets. We consider the financing of the Convergence Plan not just a moral obligation, but the responsibility of the Northern countries, for is it not they who are the greatest polluters, the predators and destroyers of the tropical forest? Where does the capital that is used to exploit the forests of the South come from? Or the companies? Which are the countries who refuse to put into place a system of eco-certification of tropical woods, to counteract illegal logging and the pillaging of tropical forests? Who organises the poaching, and who purchases and uses the products of this illegal activity, such as elephant tusks and rhinoceros horns? Are they not extremely valuable and sought after in the West and in Asia?

Who conducts biological experiments and exploits local populations, while at the same time using their local knowledge for free? Do the results of this research benefit the South – or improve the knowledge base of laboratories in the North? It is the biodiversity of our forests that makes these experiments possible – yet we do not benefit from them at all. Only the Northern laboratories benefit, ▶

In an attempt to protect our biodiversity, we have created national parks and protected areas

not just in terms of knowledge, but financially.

In an attempt to protect our biodiversity, we have created national parks and protected areas. But, as it turns out – in line with structural adjustments imposed by the Bretton Woods institutions – most of our states stopped recruiting as long as 15 years ago. How, then, are we meant to protect our national parks, those sanctuaries and immense reserves of biodiversity, against the commercial agression of the wealthy?

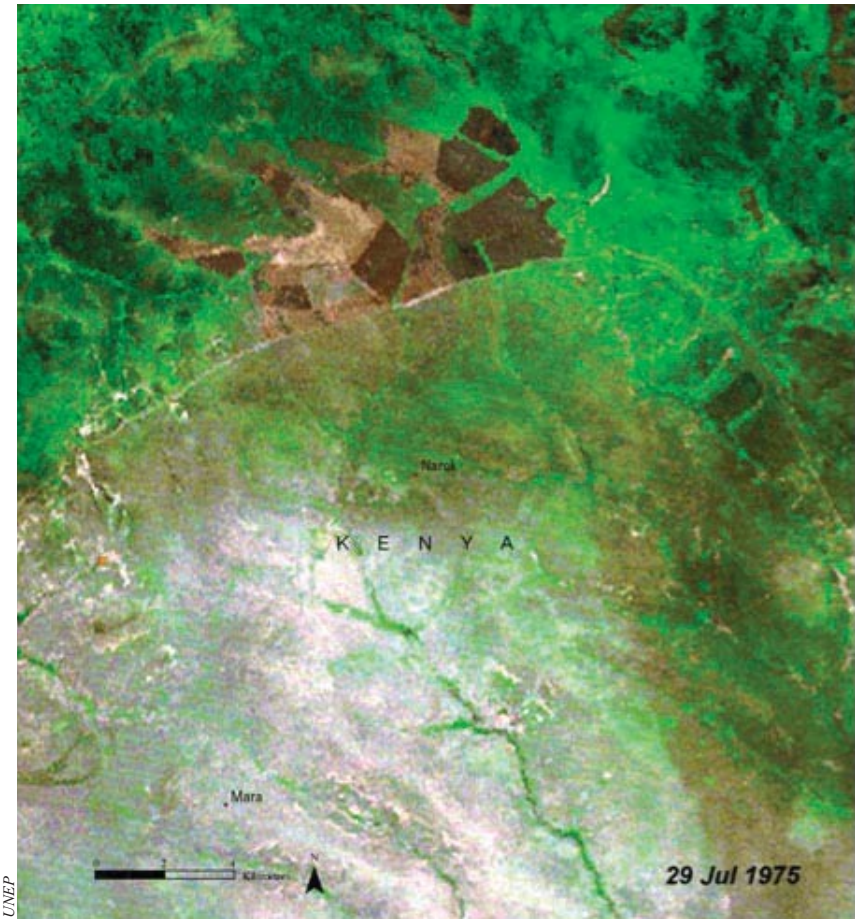
It is even more ironic when these "predators" – through their NGOs and other government structures – try to teach us how to protect our biodiversity and our ecosystems. What we expect from them is more solidarity, and an adherence to their commitments. Some of our partners, such as Italy, have shown the way by cancelling the debts of the countries in the region, against the financing of the Convergence Plan.

Financial transparency

We look forward to the establishment of innovative financing mechanisms for environmental projects to replace traditional forms of aid – which seem to be aimed primarily at employing Northern experts and financing projects chosen by the North, without first consulting with the local authorities. Furthermore, the system is characterised by a staggering lack of financial transparency, which facilitates corruption.

Taking into account these injustices, and this hesitation, it is clear that we desperately need a real partnership. This is what it will take to put into practice the dream that world leaders had, one day in September 2000 at the Millennium Summit ■

Henri Djombo is Minister of Forestry Economy and Environment of the Republic of Congo



UNEP

UNEP

These images, taken from *One Planet, Many People: Atlas of Our Changing Environment* (UNEP, 2005), show the dramatic changes that have occured over the past three decades in forest regions all over Africa.

PEOPLE

2005 Goldman Environmental Prize Winners

Corneille Ewango

Isidro Baldenegro López

Father José Andrés Tamayo Cortes

Chavannes Jean-Baptiste

Kaisha Atakhanova

Stephanie Roth

Credit: Goldman Environmental Awards

Corneille Ewango stayed in the vital Okapi Reserve in the Democratic Republic of the Congo to protect it during the recent civil war, when most of its senior staff fled. He hid the Reserve's herbarium collection, computers, research and data in the forest - and sometimes had to hide himself to save his life – but he also directly confronted military commanders to stop their soldiers poaching its wildlife. With the support of some 1,500 local people, he managed to preserve the Reserve, a crucial part of the Ituri Forest, which is home to many rare species and the Mbuti people, commonly known as pygmies. His brave persistence won him the 2005 Goldman Environmental Prize for Africa.

The prizes – founded by **Richard N. Goldman** and his late wife **Rhoda H. Goldman** in 1990 – are the world's foremost honours for grassroots environmental activists, six of whom annually receive $125,000, the largest awards of their kind. Others of this year's prizes were also awarded for protecting biodiversity. **Isidro Baldenegro López**, of Chihuahua Mexico – a subsistence farmer and community leader of the indigenous Tarahumara people – has spent much of his life defending its priceless forests from logging despite, as a boy, witnessing the assassination of his own father for taking a similar stand. In 2003 he was arrested on trumped-up charges and spent 15 months in jail, but his work has led to logging bans throughout the Sierra Madre region of the country.

Father José Andrés Tamayo Cortes, a charismatic priest, directs a coalition that has fought uncontrolled commercial logging in Honduras and exerted pressure on its government to reform its national forest policy. And **Chavannes Jean-Baptiste** has reached more than 200,000 people across Haiti, teaching the principles of sustainable agriculture and techniques to combat erosion in the heavily deforested country.

The two other prizes were won by **Kaisha Atakhanova**, who led a successful campaign to prevent nuclear waste being imported into the Republic of Kazakhstan, and **Stephanie Roth**, who has been the driving force behind an international campaign to stop the construction of Europe's largest open-cast gold mine in Romania. **Nancy Pelosi**, Democratic Leader in the US House of Representatives, said: "the leadership and commitment of the winners will protect our environment for future generations."

Ahmed Djoghlaf of Algeria has been appointed Executive Secretary of the Convention On Biological Diversity (CBD). He succeeds Hamdallah Zedan of Egypt as head of the Convention's secretariat, based in Montreal. Mr Djoghlaf has been Director of the United Nations Environment Programme/ Global Environment Facility in Nairobi since 1996. Klaus Toepfer, UNEP's Executive Director, said: "He has truly transformed our role within the Global Environment Facility and will be sorely missed. But our loss is the CBD's gain. Mr Djoghlaf has the skills, the intellect and experience to take this important convention forward into the 21st century."

UNEP

Svein Tveitdal has been appointed Special Advisor to the Executive Director of UNEP on Polar/Nordic issues in response to the increased importance of the polar ecosystems in a global environmental context. Director of UNEP's Divisions for Policy Implementation and Environmental Conventions from June 2003 to June 2005, he will be co-located at its Polar Centre GRID-Arendal in Norway, where he was Managing Director between 1992 and 2003. He has had longstanding personal and professional interests in the Arctic, whose ecosystems are now threatened by climate change, contamination and wilderness fragmentation, and have become important barometers of global environmental change.

UNEP

James Leape, who has directed the conservation and science initiatives of the David and Lucille Packard Foundation since 2001, has been appointed Director General of WWF International, succeeding Dr. Claude Martin, who retires after 12 years at the helm of the organisation in December.

Horberman/Getty Images

Municipal

(Eco)services

Obed Mlaba describes the importance of ecosystem services to cities and shows how local action can ensure millennial change

It is a matter of concern that the role of local government in meeting the Millennium Development Goals has not been more broadly acknowledged. Local government directly provides many of the basic services that are the focus of the Goals, such as water, sanitation, public health, energy, and housing. Its planning and regulatory functions also accord it an increasing role in protecting the natural resource base, on which many of the global poor still directly depend for survival. So equitable and sustainable access to these basic needs and to the natural resource base – both key to achieving the MDGs – can only be realized through strong, decentralized local government and an informed, supportive citizenry.

Local government's pivotal role in implementing sustainable development was profiled at the World Summit on Sustainable Development (WSSD) at a session entitled Local Action Moves the World. There, 900 participants from 69 countries inaugurated Local Action 21 – the new action-oriented phase of Local Agenda 21, – as a motto, mandate, and movement for advancing sustainability at the local level. Similarly, the Local Government Declaration delivered to the Summit concluded:

'We live in an increasingly interconnected, interdependent world. The local and global are intertwined....Ten years after Rio, it is time for action by all spheres of government, all partners. And local action, undertaken in solidarity, can move the world."

Sustainable development is being achieved in Durban through implementing the eThekwini Municipality's Integrated Development Plan (IDP) – a legally mandated and Council – adopted manifesto for city change which has ensured that sustainable development has become "a fundamental driver of the City Strategy." While it prioritises service provision and economic development, Durban's IDP is different to many others in clearly profiling the importance of the natural resource base in ensuring long-term urban sustainability.

This approach is directly in line with Goal 7 of the MDGs, which highlights the environment's central role in providing the goods and services that sustain human development. Managing and protecting the environment is also a key factor in ensuring that the targets set in the other Millennium Development Goals are achieved. Better natural resource management, for example, increases the income and nutrition of poor people, while improved water and sanitation management reduces child mortality, exposure to diseases such as malaria, and the risk of disaster from floods.

Natural resources

Durban's IDP outlines the interdependence of development and environment in a chapter entitled "Sustaining the natural and built environment". This acknowledges that "all development must function in harmony with the natural resources and processes upon which human health and the economy so often depend". A key tool in achieving this integrated vision is the eThekwini Environmental Services Management Plan (EESMP), the Council-approved plan to protect the city's natural resource base of the city.

City residents benefit from a range of environmental goods and services provided by its natural ecosystems – including fuel and food, flood prevention, water provision, breakdown of waste, and recreational areas. Unspoilt landscapes also give people a sense of place and a feeling of well-being. Different types of open space supply different benefits e.g. grasslands supply grazing, while rivers supply water. People use ecosystem benefits on a daily basis – e.g. soil for agriculture and rivers for fishing and recreation – but ▶

their supply and demand must be balanced to ensure that they remain available for both current and future generations.

To illustrate the importance of this resource, the total annual value of the environmental goods and services supplied by the natural resource base (as delineated in the EESMP) – excluding tourism - has been estimated at US $453 million, about a quarter of the city's municipal budget.

Difficult challenges

Given the importance of the natural resource base to Durban's sustainability, much attention is being paid to ensuring the EESMP's successful implementation. One of the most difficult challenges is that most of the environmentally sensitive land in the city is privately owned. Tools have been developed – or are under development - to secure the benefits from the city's natural assets, while facilitating much needed development. Over the past three financial years, for example, limited funds have been allocated to acquire land in circumstances where regulating development would mean an almost total loss of economic return. This is not the preferred approach (because of the cost of land and subsequent management responsibilities) and is only used in threatened priority areas, and where there are no other options for protecting the land.

Another tool that has been employed successfully is using conservation servitudes registered in favour of the municipality to protect the environmentally sensitive parts of a property. These remain in the ownership of the titleholder, but are protected, and may only be used for conservation or passive recreation purposes. Property taxes can also be used as an incentive to encourage development in appropriate places. At present, vacant city land attracts the highest taxes, providing an incentive to develop it regardless of its qualities, at times leading to environmentally unacceptable development. Investigations are well advanced into mechanisms for offering meaningful and binding tax incentives to landowners to retain and manage land of the highest environmental quality - while having little impact on the City's rates base.

Natural environment

Work is also under way on using the socio-economic benefits that flow from sustainably protecting and managing the natural resource base. Durban's municipal area includes large tracts of rural land: its communities are almost completely dependent on the goods and services provided by the natural environment for products such as fuelwood, water, building materials, productive grazing and agricultural land and craft materials. These areas offer a range of opportunities including:

- Providing goods and services important for the sustainable livelihoods and the well-being of local residents;
- Local economic development opportunities associated with the supply of unique natural products and services, such as water and land–based eco-tourism and craftwork;
- Providing services that benefit a much wider population, such as water resource protection – which benefits most of the people of the eThekwini Municipality.

Future beneficiaries

A coordinated management system is being developed to ensure that these opportunities are protected and used sustainably; through it, job creation for poor and disadvantaged communities and environmental management will proceed hand-in-hand. This will ensure that present benefits to people and the economy are secured, and maximised for both current and future beneficiaries.

By adopting this kind of proactive approach, eThekwini Municipality has established itself as a global leader in natural resource management, providing clear evidence that local action is essential to responding to the challenges of the MDGs ■

Obed Mlaba is mayor of Durban

Glibbery/UNEP/Still Pictures

R. Bernardo/UNEP/Still Pictures

Life at the Extreme

VITALY CHURKIN describes the fragility of biodiversity in the Arctic and says that conserving it is a global challenge and responsibility

Life in the Arctic has adapted to extreme conditions of seasonal darkness and cold, followed by a brief intense burst of growth during a short summer season when food becomes plentiful. Arctic animals must therefore survive long periods when food is limited or unavailable, or migrate to more southerly latitudes. When sunlight reaches the oceans in the spring, plankton rapidly bloom, creating a burst of growth in Arctic marine ecosystems. Similarly, the growth of plants on land begins a summer feast for terrestrial animals, allowing the breeding and raising of young, and enabling storage for the coming winter.

Arctic biodiversity generally boasts relatively few species compared to lower latitudes – although they often have large populations – reflecting high genetic, morphological and behavioural diversity. Highly specialised phyto-plankton and sea ice algae species form the foundation of the marine food webs: they are specially adapted to extremes of darkness and cold, and to the freshwater–brine conditions of the sea ice – ocean interface. Mosses and lichens, similarly specially adapted to the Arctic, are the foundation for many terrestrial food webs.

Intricately linked

Terrestrial, freshwater and marine Arctic biodiversity are intricately linked through the interplay between terrestrial and marine species, habitats and ecosystems. Seabirds nest on land but may feed on fish and invertebrates in the ocean, lakes and rivers. Salmon, arctic char and several other fish species cross from the marine to the freshwater ecosystem to breed. Polar bears den on land in snow banks, but only survive by hunting, almost exclusively out on the sea ice. Seals make dens on sea ice and hunt in the ocean. Indigenous peoples – relying heavily on the integrity of ecosystem services – use living resources across all the Arctic's marine, terrestrial and freshwater ecosystems and habitats: the sustainability of their cultures therefore directly depends on sustaining its biological resources. Ecosystem functioning and integrity strongly depend on the diversity and activity of the soil, flora, fauna, and microbes. But little is known about this diversity, how it will change and what the consequences will be in a changing environment.

Losing one or two species can therefore lead to the collapse of an entire food web, and unbalance an entire ecosystem

Ecological balance

Arctic biodiversity is experiencing increasing stress from sources including climatic warming and associated melting of sea ice, pollution and the transport of contaminants, habitat fragmentation from development, over-harvesting of wildlife, and invasive species. Species adapt to some degree to these stresses, but their relatively small number in the Arctic means that the ecological balance may critically depend on only one or two of them, rather than on several with overlapping ecological roles, as in lower latitudes. Losing one or two species can therefore lead to the collapse of an entire food web, and unbalance an entire ecosystem.

Warming trends, and resulting fluctuations in snow cover and lake/river ice, are impacting ecosystems from the base of the food webs upwards. Changes in the abundance of mosses and lichens will probably lead to changes in the migratory patterns of reindeer and ▶

caribou, their breeding behaviour and population dynamics. Reindeer herding and caribou hunting is vital to the economic and cultural sustainability of many indigenous communities. Lemmings and voles, relying on mosses and lichens for food, are also affected by change – which in turn impacts raptors like the snowy owl and carnivores like the Arctic fox. Polar bears and seals are under threat from the reduction of sea ice, and the indigenous communities that hunt them are finding that their numbers are declining.

Invasive species

More southerly flora and fauna are shifting northwards as the climate warms, moving into niches occupied by Arctic species – as are bacteria and viruses to which northern species have never been exposed, and against which they have no immunity. The Arctic Ocean prevents terrestrial species already living at the northernmost coastal boundaries of their habitats moving further north, so those along the northern Arctic coasts are now among the most threatened in the world by invasive species, declining food resources and loss of habitat.

One of the greatest changes of all is expected to occur when scrubs and trees invade the tundra, displacing its habitats and species. In some places, where the forest is near the Arctic Ocean coast, this displacement will be complete, as the invading vegetation brings a new flora and fauna. This major change in biodiversity will, in turn, lead to increased warming since forests absorb and retain more heat than reflective snow and tundra vegetation.

More than 80% of the approximately 370 indigenous settlements in the Arctic tundra regions are on the coasts. Early melting of sea ice and late freezing of lake and river ice are disrupting migration and hunting patterns, while increasing diseases of fish and plants are endangering the quality of food.

Sustainable development in the Arctic is one of the primary goals of the Arctic Council – a high-level intergovernmental forum comprised of the eight Arctic countries (Canada, Denmark, Finland, Iceland, Norway, Russia, Sweden, and the USA), six indigenous peoples' organisations (Aleut International Association, Arctic Athabaskan Council, Gwich'in Council International, Inuit Circumpolar Conference, Russian Association of Indigenous Peoples of the North (RAIPON) and Saami Council) and official observers (including France, Germany, the Netherlands, Poland, the United Kingdom, IGOs, NGOs, and other international bodies).

The Arctic Climate Impact Assessment (ACIA), recently completed under the Council's aegis, thoroughly assessed the current and potential future impacts of climate change and UV-B radiation on biodiversity. The Council's Conservation of Arctic Flora and Fauna Working Group (CAFF) is mandated to protect Arctic biodiversity and establish marine and terrestrial protected areas. Working closely with indigenous communities – whose active participation is crucial to achieving sustainable development – it is launching the Circumpolar Biodiversity Monitoring Programme (CBMP).

Early melting of sea ice and late freezing of lake and river ice are disrupting migration and hunting patterns, while increasing diseases of fish and plants are endangering the quality of food

The purpose of the CBMP – which was fully endorsed by the Arctic Council ministers in November 2004 – is conserving Arctic biological diversity through an international network of coordinated efforts to halt or significantly reduce Arctic biodiversity loss, and providing information for the sustainable use of the Arctic's living resources for the indigenous peoples of the Arctic and other Arctic residents, as well as stakeholders inside and outside the region. One of the primary ways CAFF will collect status and trend information on Arctic biodiversity is through cooperating with indigenous communities and launching circum-Arctic community-based monitoring initiatives.

Monitoring natural and anthropogenic impacts to the food webs and ecological functions of the Arctic environment and ecosystems, provides critical information about the status and trends of species and the integrity of the food webs on which they depend for survival. This directly relates to the socio-economic and cultural stability of Arctic resident societies.

Sustainable development

Preserving the Arctic's biodiversity cannot be achieved by the Arctic countries alone. The migration of birds and marine mammals link the integrity of its biodiversity and ecosystems to all other regions of the globe. 279 of the approximately 450 species of birds which have bred in the Arctic region seasonally migrate to other parts of the globe, reaching everywhere except the Antarctic interior. Thirty reach southern Africa, 26 reach Australia and New Zealand, and 22 reach southern South America, while several pelagic species reach the southern oceans. Virtually all the world's major ecosystems support Arctic breeding birds: they occupy every major habitat in every major region.

The CBMP will help signatory countries meet the Millennium Development Goals – particularly Goal 7, ensuring environmental sustainability and the target of significantly reducing the rate of biodiversity loss by 2010. Conserving Arctic biodiversity is a global challenge, touching virtually all the world's major terrestrial and marine ecosystems, and requiring a high level of international cooperation. Balanced ecosystem functioning and services are inextricably linked to sustainable development. This fundamental principle is the foundation for long-term conservation and sustainable use of Arctic biodiversity, and for the sustainable development of Arctic communities ■

Ambassador Vitaly Churkin is Chairman of Senior Arctic Officials, Arctic Council

Rosing/UNEP/Still Pictures

Nelson A. Daaz/UNEP/Still Pictures

Discounting Ecosystem Losses

PARTHA DASGUPTA explains why economists and environmentalists should unite in insisting that the declines in biodiversity and ecosystem services must be tackled immediately

Of all global environmental problems, the ones relating to a decline in biodiversity and ecosystem services are the most neglected. International discussions on climate change, for example, may remain tense, but the issues are at least on the table. But these two related declines remain on the back burner thanks to the widespread belief that ecosystem losses are someone else's problem. The urban citizen in the West can at least imagine climate change for the worse, but the role played by ecosystems in our lives is elusive. How many people know or care about micro-organisms in the soil and water, or the nitrogen overload in today's environment? Acknowledging that millions and millions of natural processes enable humanity not only to live, but to run modern economies, would require that we study the findings of ecologists – and, more generally, of environmental scientists. But how many of us are prepared to do that?

Ecosystems – which range in size from whole biomes to small ponds – are capital assets. They maintain a genetic library, preserve and regenerate soil, fix nitrogen and carbon, recycle nutrients, control floods, filter pollutants, assimilate waste, pollinate crops, operate the hydrological cycle, and maintain the gaseous composition of the atmosphere. Their degradation is like the depreciation of roads, buildings, and machinery – but with two big differences. Firstly, the damage is frequently irreversible: at best the systems take a long time to recover. And, secondly, ecological processes are overwhelmingly non-linear, meaning that an ecosystem can collapse abruptly, without much prior warning. Imagine what would happen to a city's inhabitants if the infrastructure connecting it to the outside world were to break down without notice. Vanishing water holes, deteriorating grazing fields, barren slopes, and wasting mangroves are spatially confined instances of such breakdowns.

Ignoring the ecological basis of the Millennium Development Goals, therefore, would be a move of conscientious stupidity

So, one prominent message of the Millennium Ecosystem Assessment is that the services ecosystems offer humanity are not just luxuries – like landscapes of aesthetic beauty – but economic necessities. Another is that declines in these services are felt mostly by the world's poorest, most of whom rely on them directly for their livelihoods. Thus, when wetlands, inland and coastal fisheries, woodlands, forests, ponds and lakes, and grazing fields are damaged – owing, say, to agricultural encroachment, nitrogen overload, urban extensions, the construction of large dams, organisational failure at the village level, or resource usurpation by government – it is the traditional dwellers who suffer. They often have no alternative source of livelihood, and migration is usually not an option. By contrast, rich eco-tourists or importers of primary products have alternatives – there is always something else, often somewhere else. So the question of whether there are substitutes for natural capital is not just one of technology and consumer preferences; the poor suffer from a lack of substitution possibilities in ways that the rich do not. Ignoring the ecological basis of the Millennium Development Goals, therefore, would be a move of conscientious stupidity.

I believe, however, that even if the degradation of ecosystems were taken seriously, it would remain on the back burner. As with climate change, powerful voices would claim that the decline in ecosystem services is not today's problem, but one for the future. They would say that because big losses would occur only then, the costs of doing something now to stem the decline are too large in comparison.

Economic disruptions

How does that argument work? It works by a practice economists and accountants have made popular, of discounting future costs and benefits at a positive rate. To see what discounting means, suppose commercial banks are offering you an annual interest rate of 5 %. A thousand dollars deposited with them now would grow to a thousand and fifty dollars next year. So, a promise of a thousand and fifty dollars next year would be equivalent to a ▶

thousand dollars now: you would use a 5 % discount rate to make that future thousand and fifty dollars equal to a thousand dollars today. Economists use this line of reasoning to justify the use of a positive discount rate for comparing future benefits with current costs. Reducing ecosystem declines (just as reducing global carbon emissions) would involve large costs now, but the benefits from averting possible economic disruptions would be enjoyed only in the somewhat distant future. Prominent economic models of climate change, for example, show that the costs are greater than the sum of the discounted benefits. Doing something now, they imply, would be to throw money away on a comparatively bad project – and that self-same argument could be used for ecosystem protection.

Investment decisions

Environmental scientists, however, frequently ask why the global community should discount future costs and benefits at all when making collective investment decisions. Why not simply subtract the sum of all costs from the sum of all benefits?

There are two reasons why a society could wish to value present and future costs and benefits differently. First, a future benefit would be of less value than that same benefit today, if society is impatient to enjoy the benefit now. So, impatience is one reason for discounting future costs and benefits at a positive rate. Secondly, if people expect to grow richer over time, their collective need for further increases in consumption would be less in the future than it is today, other things being the same. Rising consumption levels therefore provide a second justification for discounting future costs and benefits at a positive rate. (I am neglecting uncertainty in future consumption, which would merely reinforce the argument developed below.)

Future benefits

Philosophers argue that societal impatience is ethically indefensible, because it favours policies that discriminate against future generations merely on the grounds that they are not here now. Once we accept their argument, we are left with only the second reason for discounting future costs and benefits. But if rising consumptions provide a society with a reason for discounting future benefits at a positive rate, declining consumptions would provide that same society with a reason for discounting future benefits at a negative rate. Empirical evidence from societal and personal choices suggests that the rate a society ought to use for discounting future benefits is something like three times the %age rate of change of average consumption. (This means that if per capita consumption is expected to grow at 2 % per year, society ought to discount future benefits at 6 % per year. On the other hand, if per capita consumption is expected to decline at 2 % per year, future benefits ought to be discounted at minus 6 % per year. Notice, though, that applying a negative discount rate amplifies costs and benefits in the distant future when viewed from the present - they are not attenuated, as they would be if positive rates were used instead to discount them. (If declining consumptions appear to be an unfamiliar phenomenon, recall that sub-Saharan Africa has experienced them for over three decades.)

Declining economy

Admittedly, private investors would, in all likelihood, be using a positive rate to discount their personal future earnings even in a declining economy. They would do so because the interest rate offered by commercial banks on deposits would most likely remain positive. But there is no contradiction here: in the presence of economic distortions, we should expect a wedge between the rates private investors use to discount their own future earnings and the rates the world community ought to use to discount collective costs and benefits in the future.

Ecosystem degradation

Consider now those scientific experts who are persuaded that if nothing substantial is done today to curb biodiversity losses and ecosystem degradation (or, for that matter, emissions of greenhouse gases), there is a non-negligible chance that world output of goods and services, suitably weighted across regions and income groups, will decline. To them neglecting biodiversity and ecosystems in proposals for attaining the Millennium Development Goals would appear intuitively wrong. And they would be right. Biodiversity loss, ecosystem degradation, and climate change, taken together, are an example of a global "tragedy of the commons", meaning that the rates that should be used for evaluating the collective costs and benefits of stemming the tide do not bear any obvious relationship to market rates of interest. If declining economic output is a serious possibility in the future, the discount rates that should be used should be negative. There is no necessary conflict between environmental scientists' intuitions and economists' reasoning ■

Sir Partha Dasgupta FBA FRS is the Frank Ramsey Professor of Economics at the University of Cambridge and Fellow of St. John's College, Cambridge

Christop Busse/Still Pictures

At a glance:
Ecosystem Services

Three major problems associated with our management of the world's ecosystems are already causing significant harm to some people, particularly the poor, and unless addressed will substantially diminish the long-term benefits we obtain from ecosystems:

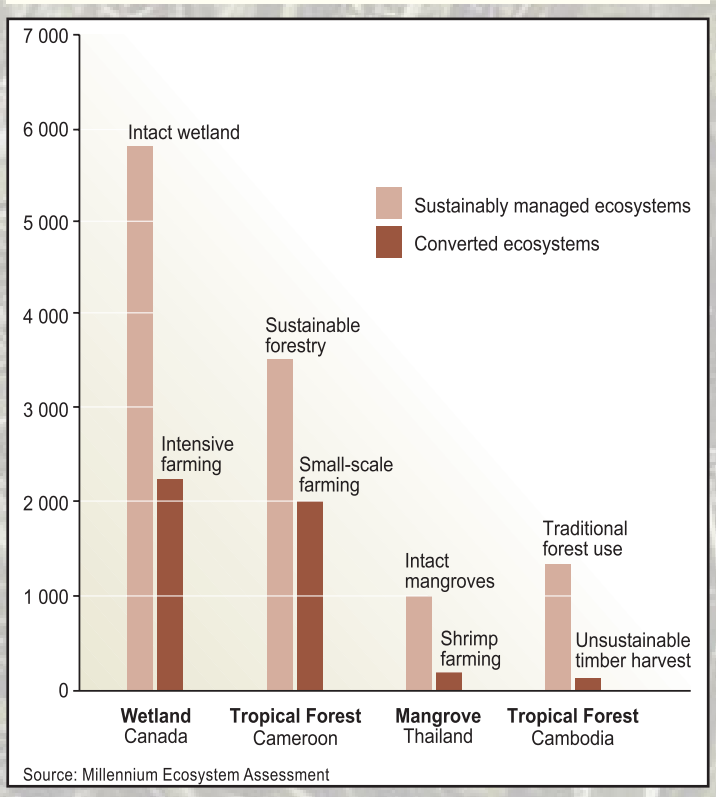
■ First, approximately 60% (15 out of 24) of the ecosystem services examined during the Millennium Ecosystem Assessment are being degraded or used unsustainably, including fresh water, capture fisheries, air and water purification, and the regulation of regional and local climate, natural hazards, and pests. The full costs of the loss and degradation of these ecosystem services are difficult to measure, but the available evidence demonstrates that they are substantial and growing. Many ecosystem services have been degraded as a consequence of actions taken to increase the supply of other services, such as food. These trade-offs often shift the costs of degradation from one group to another or defer costs to future generations.

■ Second, there is established but incomplete evidence that changes being made in ecosystems are increasing the likelihood of nonlinear changes in ecosystems (including accelerating, abrupt, and potentially irreversible changes) that have important consequences for human well-being. Examples of such changes include disease emergence, abrupt alternations in water quality, the creation of "dead zones" in coastal waters, the collapse of fisheries, and shifts in regional climate.

■ Third, the harmful effects of the degradation of ecosystem services (the persistent decrease in the capacity of an ecosystem to deliver services) are being borne disproportionately by the poor, are contributing to growing inequities and disparities across groups of people, and are sometimes the principal factor causing poverty and social conflict. This is not to say that ecosystem changes such as increased food production have not also helped to lift many people out of poverty or hunger, but these changes have harmed other individuals and communities and their plight has been largely overlooked. In all regions, and particularly in sub-Saharan Africa, the condition and management of ecosystem services is a dominant factor influencing prospects for reducing poverty.

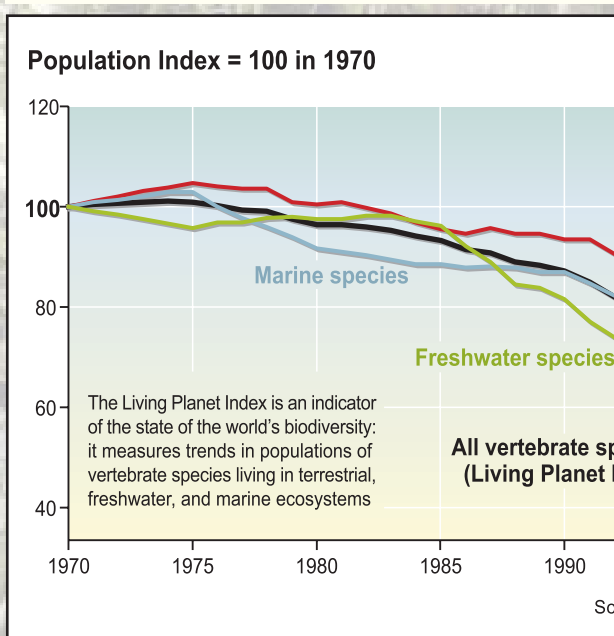
'Ecosystems and Human Well-Being', a Synthesis Report of the Millennium Ecosystem Assessment, 2005, Summary for Decision-Makers, pp.1-2

Economic Benefits under Alternate Management Practices



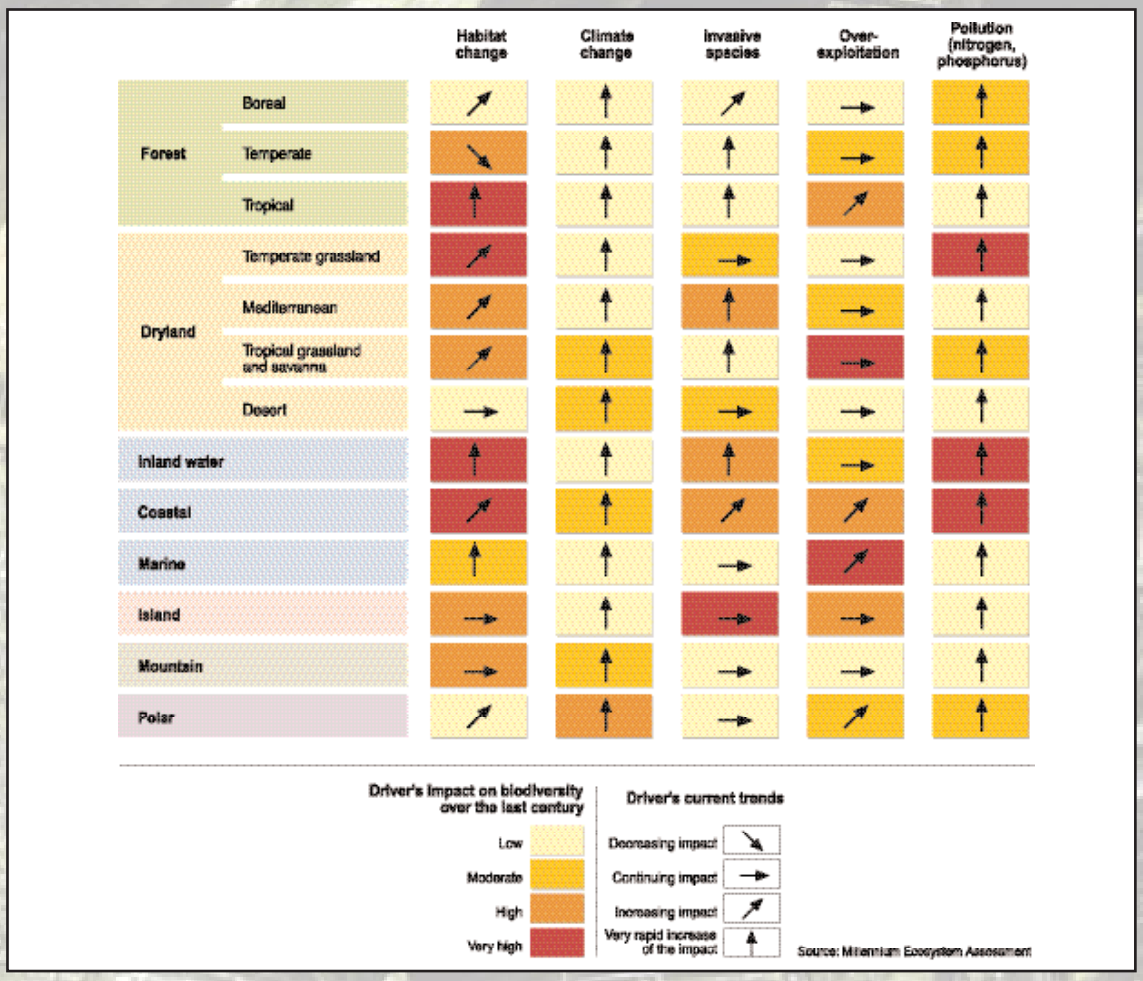
Source: Millennium Ecosystem Assessment

The Living Planet Index (incorporating data on the abunda terrestrial, marine and freshwater species)

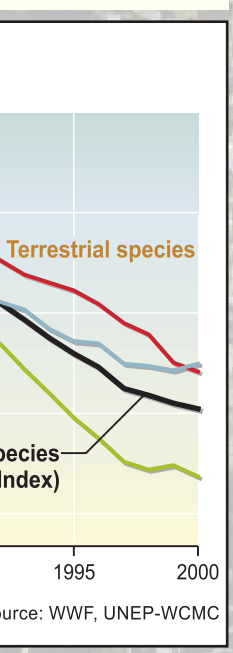


UNEP/Still Pictures

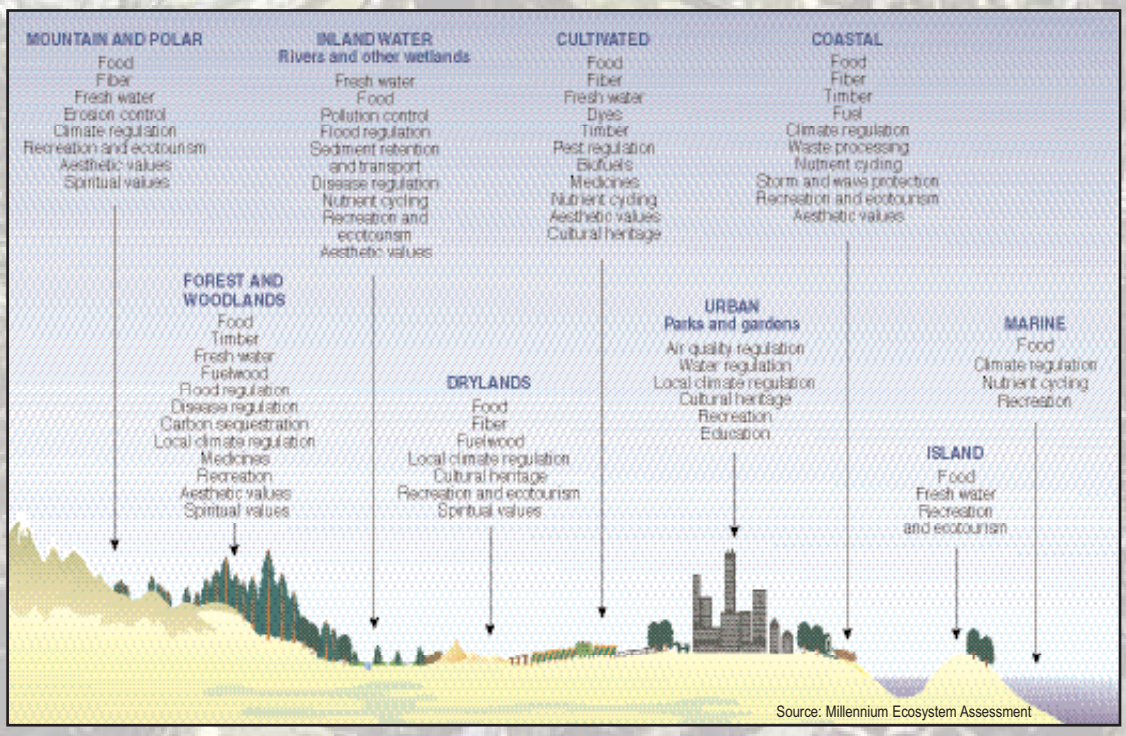
Main Direct Drivers of Change in Biodiversity and Ecosystems (global trends, based on expert opinion)



ance of 1,145



Ecosystems and some of the Services they Provide



Twin *Tracks*

Angela Cropper

explains the close interrelationship between tackling poverty and safeguarding ecosystems and the services they provide to humanity.

It has long been clear that the needs of the poor are not being met as a natural outcome of the 'development process'. Their situation is getting relatively worse, the gap between their levels of well-being and those of others is widening - and consequently a conscious, concerted and determined effort is needed to alleviate their condition. So the global governmental community's resolution at the 2000 Millennium Summit to make a special commitment to address the multiple pressing needs of poor societies – reflected in the eight Millennium Development Goals (MDGs), and their fifteen targets – was a moment of renewed hope for poor societies and peoples across the world.

Most of the poorest of the poor, targeted by the Goals, depend directly and heavily for subsistence on ecosystem services – the benefits to humans from the use and existence of ecosystems. So it was fortuitous that a related, but separate process had already begun to explore the feasibility and usefulness of undertaking an assessment of them.

Most of the poorest of the poor, targeted by the Goals, depend directly and heavily for subsistence on ecosystem services

What came to be known as the Millennium Ecosystem Assessment (MA) was carried out from 2001 to 2005. Its findings form a significant body of information, analysis, and synthesis about the ways in which ecosystems are relevant to human well-being and thus to the MDGs.

During those years these two agendas intersected at various points, complementing each other in substance and with overlap among their participants. A series of task forces comprising the Millennium Project – carried out under the aegis of the Office of the United Nations Secretary General – explored what is required to move towards achieving the MDG targets. The MA meanwhile was not just assessing the condition of the Earth's ecosystems and trends in their performance, but seeking to illuminate and deepen understanding of the relationship between the services they provide, the ways in which human actions affect them, and the consequences for the well-being of societies. In doing so, it sought to combine learning from natural and social science, and to integrate understanding of local communities, including indigenous ones. Through a scenario-building process, it posited various plausible future worlds indicating the kind of outcomes that could occur for ecosystems and human well-being, given different policy approaches and international orientations. Under one such outcome, degradation of ecosystem services could grow significantly worse during the first half of this century, becoming a barrier to achieving the MDGs. But three of the four scenarios show that significant policy changes could partially mitigate the negative effect of growing pressures on ecosystems – though the needed changes are large, and not currently underway.

Urgent interventions

The results and implications of the Millennium Project are be considered by the High Level Plenary of Heads of State and Government at the UN General Assembly. This also provides an opportunity for governments to consider the findings of the MA and the ways in which the Earth's ecosystems might either constrain meeting the MDGs under existing conditions and trends and scenarios, or contribute to their achievement through appropriate and urgent interventions.

The MA finds that there has been considerable progress over the last 50 years in responding to the human needs encompassed in the MDGs. The global economy increased six-fold between 1960 and 2000, while the world's population doubled from 3 to 6 billion. Food production increased 2 - times; water use doubled; wood harvests for pulp and paper production tripled; timber production ▶

The global economy increased six-fold between 1960 and 2000, while the world's population doubled from 3 to 6 billion

Au Kim Cheong/UNEP/Still Pictures

increased by more than half; and installed hydropower capacity doubled.

But these gains have not been equitably distributed: hence the need for the special effort represented by the MDGs. They have also come at the cost of debilitating the capacity of ecosystems to continue to contribute the same level of services: hence the need for special attention to natural resources if the Goals are to be achieved.

Sean Sprague/Still Pictures

The MA assessed 24 ecosystem services, and found that 15 of them have been degraded or are being used unsustainably. Its findings reveal that, in the past 50 years, human actions have changed ecosystems more rapidly and extensively than in any comparable period in human history. For example, in the last decades:

- 20% of the world's coral reefs have been lost,and another 20% degraded;
- 35% of the area of mangroves have been lost;
- there is now 3-6 times as much water in reservoirs as in natural rivers, while withdrawals from rivers and lakes has doubled;
- the biological diversity of the planet has been altered: the distribution of species is becoming more homogeneous; the population size, range (or both) of most species across a number of taxonomic groups is declining; and 10-30% of mammal, bird, and amphibian species are currently threatened with extinction.

Social conflict.

The MA's Synthesis Report shows that "the harmful effects of the degradation of ecosystem services …are being borne disproportionately by the poor, are contributing to growing inequities and disparities across groups of people, and are sometimes the principal factor causing poverty and social conflict." This is particularly evident in sub-Saharan Africa, Central Asia, parts of South and Southeast Asia, and some regions in Latin America, where ecological change is expected severely to constrain countries' ability to meet the MDGs in time.

The MA makes evident that Earth's ecosystems are vital to realising many of the MDGs. It outlines how the condition and trends of many of those ecosystems would constrain socio-economic achievements. And it also indicates the possibilities – given appropriate policies, institutions and management – that ecosystems present for livelihoods, income-generation, human health and security, and environmental and socio-economic sustainability. It reveals that the MDGs and their targets are a set of highly interdependent objectives that need to be approached through integrated strategies rather than through isolated interventions, with particular attention to improved management of ecosystems and their services – and that this is a prerequisite for achieving the targets on poverty, hunger, gender equality, water and sanitation, and health.

Ecological challenges

Achieving the MDGs, therefore, calls for as much urgent attention to the natural resource side of this equation as to the human one, since it is clear that the latter relies upon the capacity of the former. Continuing deterioration will damage the prospects for achieving the MDGs for poor societies and groups who directly and heavily depend on the services of the natural world.

The MA can serve governments as a basis for identifying, and responding to, ecological challenges and opportunities, as it indicates a range of interventions that may help arrest the decline in ecosystems and realise their potential contribution to achieving the MDGs ■

Angela Cropper, President of The Cropper Foundation, is co-chair of the Millennium Ecosystems Assessment Panel.

Au Kim Cheong/UNEP/Still Pictures

Sustain Biodiversity,

Eliminate Rural Poverty

TEWOLDE BERHAN GEBRE EGZIABHER says that globalisation both deepens poverty and degrades the environment, and calls for it to be reorientated

Achieving the Millennium Development Goals – aimed at improving the life of the poorest and permanently reducing the disadvantage of social groups by ensuring environmental sustainability – will have a greater impact on Africa than anywhere else. For it is now the continent with the highest %age of poor and disadvantaged people.

Most of its poor are rural. They meet their needs by using the renewable natural resources – mostly biological ones – that their immediate environment can provide. Understandably, therefore, their impact on their immediate ecosystems is intense, and their knowledge of them intimate.

Population dynamics

Globalization is increasingly intensifying this impact by perturbing the demands that the rural poor make on their immediate ecosystems. It is doing so by changing population dynamics, by superimposing global demands upon local ones on the ecosystem, and even by modifying the environmental factors – such as the climate – that had hitherto maintained it. So it is obvious that, if the Goals are to be achieved, biodiversity in the broad sense – i.e. including ecosystems, communities, species, varieties and their subcellular components – must be maintained and sustainably and justly used.

Abject poverty is unbearable whether in an urban or a rural setting: so the rural poor should not attract greater attention simply because of where they live. However, their meagre incomes are subject to greater unpredictability than those of their urban counterparts. They all live off what their immediate ecosystem produces. Most cultivate crops, with or without rearing animals, though some are entirely pastoralists. Their produce is subject to seasonal, annual and periodic vagaries of the weather, pests and diseases. On the whole, they cannot even store food produced in good years for use in bad ones: they are technologically handicapped. Nor can they transport food from areas of surplus production to those scarcity: they are infrastructurally handicapped. Nor yet can they buy agricultural produce from the market when their own agriculture fails them: they are financially handicapped. Therefore, they are not as well off as their average annual production would suggest – but, rather, as poor as their lowest annual production dictates.

Norms of globalization

Their urban based governments are usually of little help in removing these handicaps. They are usually run by the urban elite, who have little understanding of their problems and merely mimic urban-centred Western governance systems which they studied at school, and which are now lauded and promoted by the international laws and norms of globalization, with its intrinsic individualistic Western values. Any initiative that the rural poor could take, organized as local communities, to overcome their weaknesses as individuals and mobilize initiative is thus undermined: they remain reduced to insignificance even though they constitute the overwhelming majority in their countries. Consequently, they are forced individually to try to satisfy their needs at the expense of the ecosystem's future ability to meet them. Virtually all the rural poor realize the deterioration they are causing to the ecosystem, but they have no option but to continue.

Devegetation results because wood is burnt for fuel or used to meet other needs▶

– such as house construction, furniture, fencing – while grass is overgrazed by domestic animals. Farms lose their fertility with the harvested crops because they are not compensated through manuring, fallowing or even crop rotation. Biodiversity is decimated. Thus land degrades. Soil is eroded by water and wind. The hydrological cycle is disrupted. Floods after rains, and desiccation in the dry season, become common. Desertification sets in. The whole process is accelerated by climate change, which is, itself, exacerbated by the process of land degradation.

When all this inevitably causes famines to strike the rural poor, the urban-centred, wealthy part of the world usually pours out money and grain to help save lives. Some lives are indeed saved. But the relief does not go further, to help reverse the process that impoverishes the victims in the first place. That would take commitment over an extended period to solve the root causes of technological, infrastructural and governance handicaps. So the crises of famines and continuing biodiversity loss keep recurring at ever shorter intervals, breeding dependency among the rural poor rather than helping them help themselves.

Traditional knowledge

In spite of their worsening condition, they continue to be prey to the globalising individualistic urban rich, who prescribe "Free Trade" as a panacea for all ills. Trade indeed improves life when there is enough production to trade with - and when it is among equals and thus genuinely free. Instead, the disabled agricultural system of the rural poor is pitted in against the industrialized world's highly subsidized agriculture. That is why the Agreement on Agriculture of the World Trade Organization (WTO) is now so contentious – and why the United Kingdom's call to dismantle the European Union's Common Agricultural Policy is timely.

Even discontinuing agricultural subsidies, though good, would not suffice. The WTO's Agreement on Trade-related Aspects of Intellectual Property Rights (TRIPs) is being used to rob the biodiversity and traditional knowledge of the impoverishing communities of the poor rural world. Though these are the communities' own innovations, they are being patented or protected by breeders' rights by rich companies. Genetic engineering of crops has made these patents contagious, so that farmers cannot opt to continue planting their own seed. Cross-pollination introduces patented genes from fields of genetically engineered crops to those planted with conventional ones. Article 34 of TRIPs then turns the farmers, whose crops have been thus contaminated, into infringers, who must pay royalties to the patent owners. Global partnership is thus poised to turn the rural poor into new serfs through the genes that were taken from them in the first place.

Negotiated system

It would, however, be possible to turn globalization into a freeing force for the rural poor, but this would require a genuine global re-orientation. Article 8 (j) of the Convention on Biological Diversity (CBD) could be used to start a new global process of letting them benefit from their innovations as indigenous and local communities. It would require further developments in international law to recognize their rights: the African Model Law on the Rights of Local Communities, Farmers and Breeders and on Access to Biological Resources is an example of how it could be done.

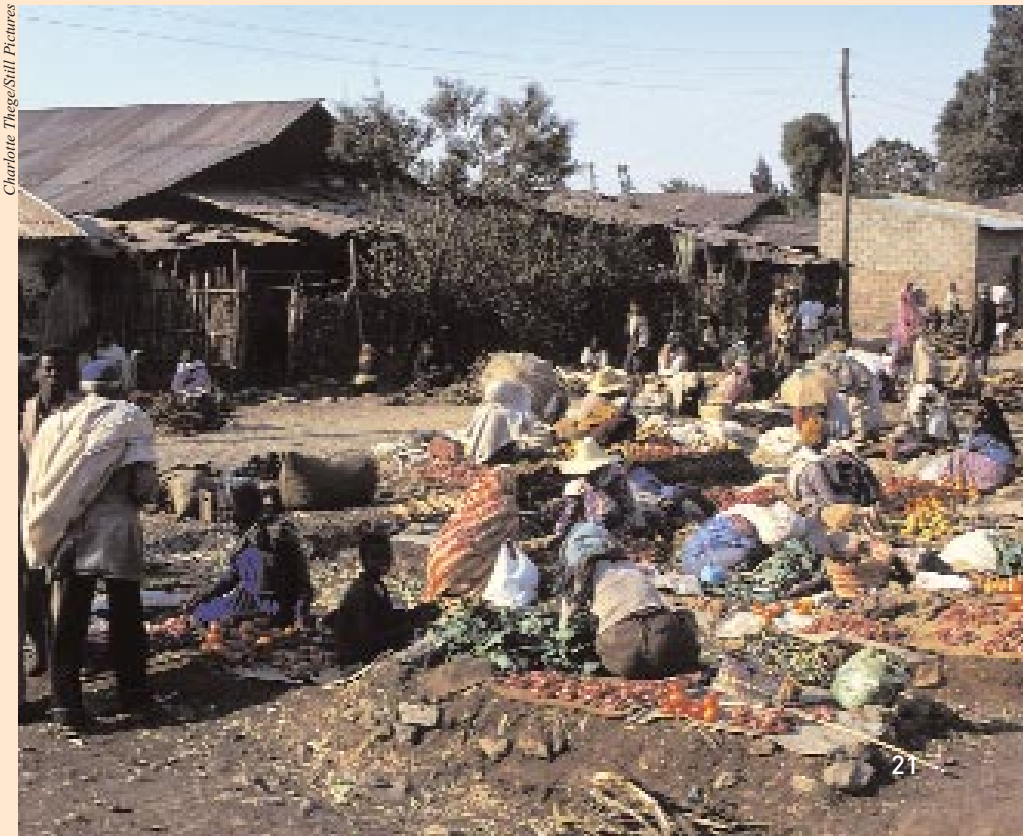
The ongoing negotiations on access and benefit-sharing could also be made to help, but only if the negotiated system does not entrench the patenting of life by making it a trigger for sharing benefits.

Genuine participation

These developments will, of course, have to be complemented – in fact preceded – by others in the rural poor's countries. Good governance – which is sensitive to the needs of the poor, works to promote their interests, and fosters their genuine participation in their own administration and ecosystem management – has to become the norm. This can only happen when it is allowed not just by the states of the rural poor, but by those of the urban rich as well.

Since the rural poor are the most embedded of humanity in local ecosystems, and since they thus know and feel them the best, their consequent emancipation would reverse the land degradation syndrome and save biodiversity and the biosphere. Humanity has no choice but to do this. Otherwise, the urban rich will themselves degrade like the land – and perhaps erode away like the soil ■

Tewolde Berhan Gebre Egziabher is Director General of the Environmental



Charlotte Thege/Still Pictures

Eilleen Herling/UNEP/Still Pictures

Everything **Connects**

ACHIM STEINER describes how achieving all the Millennium Development Goals depends on ecosystem services, and says that investing in them is the only rational response.

Human well-being ultimately depends on nature to provide ecosystem services. These are the result of complex relationships and processes of the components of biodiversity – genes, species and ecosystems – working together. Their benefits come in many forms, from the provision of the basic necessities of life – such as food, water, medicine, clean air – to the aesthetic inspiration for our culture and society. They are the foundation of our daily lives, though most of us use them without being conscious of the intricate web of processes involved. Yet we are losing the biological diversity that provides the foundation on which they rely. While only one of the Millennium Development Goals – MDG7 on environmental sustainability – explicitly targets the environment, achieving each of the others requires the support of functioning ecosystems. In turn, achieving the goals on poverty, education, health, food security, equality and partnerships will support the delivery of MDG 7 (see table) During the past 12 months the World Conservation Union (IUCN) has engaged in a sustained effort to convince decision makers of the need to ensure MDG 7 is not forgotten in the global development effort. It has suggested concrete actions to help maintain biodiversity and the ecosystem services which contribute directly to the achievement of the other Goals.

It is difficult to measure the-long term impacts of biodiversity loss and

Human exploitation of ecosystems has resulted in the increased production of a small number of key services such as crops and livestock, but not of the others provided by nature

of the impaired delivery of ecosystem services, but the recent Millennium Ecosystem Assessment (MA) chillingly concludes that there will be substantial costs to society unless we take action to mitigate the decline in ecosystem services. Of course, the total loss of such services would mean the end of life on Earth; more realistically, any loss will have an impact on our wellbeing. Unfortunately, we do not yet adequately value those services in economic terms or understand the trade-offs that we are making when we allow unbridled economic gain without incorporating social and environmental concerns.

Increased production

The MA reports that 60% of the world's ecosystem services are degraded to the point where they no longer provide what we need in the way of food, water, clean air, fuel and many other needs. Human exploitation of ecosystems has resulted in the increased production of a small number of key services such as crops and livestock, but not of the others provided by nature.

The more than 1,300 MA experts from 95 countries warned that – that though the evidence is still incomplete – the continuing degradation of 15 of the 24 ecosystem services they examined is increasing the likelihood of serious impacts on our lives. These may include the emergence of new diseases, sudden changes in water quality, shifts in regional climate and the collapse of such important food sources as fisheries.

IUCN believes that the necessary responses are feasible, but must be backed up by political will and targeted financing. Environmental ▶

conservation alone cannot achieve the MDGs, but it can and does make a major contribution. A sufficient body of evidence shows that conserving and using biodiversity sustainably can help reduce poverty and increase human health, equity and security. Conversely, we also have clear evidence that environmental mismanagement undermines livelihoods, human security and sustainable development. Investments in biodiversity conservation will help maintain the flow of ecosystem services and, in turn, yield both immediate and long-term dividends to human well-being.

We must act now. The focus of an effective response requires improving frameworks for the governance of natural resource management, increasing investment in sustaining ecosystem services for people, and adopting relevant technologies, including a shift to landscape-scale management. Each of these must be addressed in an integrated way, since they are interlinked and not mutually exclusive. Investing in the sustainability of natural resource use should not be seen as an environmental tax on development: on the contrary, It is a rational investment strategy to ensure long-term economic growth and development. Politicians and economic leaders must embrace this vision if the MDG targets are to be more than just statistical dreams ■

Achim Steiner is Director General, IUCN – The World Conservation Union

Key Links between the Millennium Development Goals and the environment

Millennium Development Goals	Examples of links to the environment
Goal 1. **Eradicate extreme poverty and hunger**	● **The livelihood strategies and food security of the poor often depend directly on functioning ecosystems and the diversity of services they provide.** ● **Insecure rights of the poor to environmental resources limit their capacity to protect the environment and improve their livelihoods and well-being, as does inadequate access to environmental information, markets, and decision-making.**
Goal 2. **Achieve universal primary education**	● **The time that children, especially girls, spend collecting water and fuelwood can reduce the time they spend on study.** ● **Additional income generated from sustainable management of natural resources is available to be spent on education.**
Goal 3. **Promote gender equality and empower women**	● **The time that women spend collecting water and fuelwood reduces their opportunities for income-generating work.** ● **Poor rural women often depend heavily on natural resources, but inequality and lack of secure rights limit their access to decision-making and resources.**
Goal 4. **Reduce child mortality**	● **Improved management of local watersheds can reduce child mortality related to water-borne disease.**
Goal 5. **Improve maternal health**	● **Indoor air pollution from burning wood and other biomass and carrying heavy loads, such as fuelwood and water, during late stages of pregnancy, put women's health at risk before childbirth.**
Goal 6. **Combat HIV/AIDS, malaria and other diseases**	● **Environmental risk factors account for up to one-fifth of the total burden of disease in developing countries.** ● **Preventive environmental health measures are as important, and at times more cost-effective, than health treatment.**
Goal 8. **Develop a global partnership for development**	● **The complex interaction between human wellbeing, ecosystem services and biodiversity requires an integrated approach including partnerships between civil society, the private sector and government.**

*** Goal 7: Ensure environmental sustainability**

Sources: taken from UN Millennium Project 2005, DFID et al. 2002; UNDP 2002.

Use Wetlands *Wisely*

GORDANA BELTRAM shows that destroying wetlands, in the name of human well-being, is also destructive to society and to sustainable development

People perceive wetlands in very different ways, but all understand that there can be none without water, even if it is not there all the time. Wetland ecosystem diversity and the provision of its services depend on the frequency, quantity and quality of water flowing into, retained in, or flowing from the ecosystems. Wetlands are biodiversity – rich, and important as habitats for species that depend on water and for those which share aquatic and terrestrial ecosystems.

These important roles were recognised by the global treaty signed in Ramsar, Iran, in 1971 and further elaborated during the more than 30 years in which the Convention on Wetlands has developed. The 2002 World Summit on Sustainable Development in Johannesburg emphasised the growing scarcity of freshwater. In 2004 and 2005, the Commission on Sustainable Development devoted sessions to the management of water for people and nature, and in March 2005 the UN launched the International Decade for Action, "Water for Life". Water and wetlands, therefore, are at the forefront of international thinking. Yet, the capacity of wetlands to deliver services important both for human well-being and for the continued functioning of natural systems has declined.

Threatened ecosystems

The recently released Millennium Ecosystem Assessment (MA) firmly supports two important, and seemingly contradictory, situations:

– Wetlands contribute to a high biodiversity and consequently provide critical ecosystem services, but at the same time, they are – and continue to be – the most threatened ecosystems worldwide.

Population growth and increasing economic development have been indirect drivers of the degradation and loss of both inland and coastal wetlands. Paradoxically, they are destroyed using arguments and strategies which aim to improve human well-being. They are converted to arable or urban areas, over-harvested and over-exploited for their resources, and drained because their water influx is being used solely for human needs. Water flows are increasingly overloaded with nutrients and other pollutants, causing dramatic change – and possible collapse – in wetland systems.

Wetlands deliver many services that contribute to human well-being – and thus help achieve the MDGs

The driving forces destroying or degrading wetlands, while aiming at improving human well-being, may vary. But the result is always destructive for societies depending, directly or indirectly, on the ecosystem services they provide. Recent studies prove that the healthier the wetland ecosystem, the better it serves human needs.

Many wetlands are the most productive and species-rich ecosystems of all. They are also important for maintaining the water cycle. They are key players in retaining water in a landscape, recharging the aquifers, controlling floods, thus regulating flows in the global water system.

Current demands

Wetlands deliver many services that contribute to human well-being – and thus help achieve the MDGs. There are four interdependent types of them: provisional, regulating, cultural and supporting. Supplying fish and drinking water are two of the most important provisioning services of inland waters. The people of Cambodia, for example, largely depend for animal protein on the fish catch in Tonle Sap and associated wetlands. There are similar examples in Africa and the Americas; and fishing and harvesting aquatic plants in wetlands is a source of subsistence and income for local communities on all continents. Meanwhile groundwater, which is most commonly recharged through surface wetlands, is the principle supply of renewable fresh water for 1.5 to 3 billion people worldwide. Yet the MA has confirmed that the use of both of these two critical ecosystem services is now well beyond levels that can be sustained even at current demands, much less at future ones.

Destructive power

Among their regulating services, wetlands play a major role in treating and detoxifying a whole variety of wastes in water. Some, for example, have been found to reduce the concentration of nitrates by more than 80%. Many – such as flood plains, lakes and reservoirs – diminish the destructive power of floods, and losing them increases risks of inundations. Nearly 2 billion people live in areas of high flood risk, which will be increased with wetland ▶

Jeff Greenberg/Still Pictures

loss or degradation. Similarly coastal wetlands and vegetation play an important role in reducing the impacts of storm surges from the sea.

Wetlands are also important in regulating the global climate by sequestering and releasing carbon in peatlands, estimated to cover 3-4% of the world's land area. They are thought to hold 540 Gt of carbon, representing about 25-30% of the amount stored in soils and terrestrial vegetation. Inland waters also contribute to the regulating of local climate.

The cultural services provided by wetlands range from aesthetic, educational and spiritual ones to recreational and tourist opportunities. Wetland biodiversity attracts visitors and water provides recreational activities, benefiting visitors and local people alike.

Enormous damage

Human activities caused more than half the wetlands of Europe, North America, Australia and New Zealand to be lost over the 20th century, and are still doing enormous damage worldwide. They have now been joined by a new and increasing threat – the invasion of alien species. Estuarine systems are among the "invaded" ecosystems, with introduced species causing major ecological changes.

Estuarine systems are among the "invaded" ecosystems , with introduced species causing major ecological changes

The ecological consequences include habitat loss and alteration, altered water flow and food webs, the creation of novel and unnatural habitats (often subsequently colonized by other invasive alien species), abnormally effective filtration of the water column, hybridization with native species, the introduction of highly destructive predators, and introductions of pathogens and disease. All these impacts affect ecosystems, and influence our ability to achieve the MDGs.

Market failures

Physical and economic water scarcity, and limited or reduced access to water, are key factors limiting sustainable development in a number of countries. Trade-offs between different wetland ecosystem services need to be considered to ensure sustainable development. Cross-sectoral approaches implemented at the catchment scale (such as river basin management and integrated coastal zone management) are critical in designing actions supporting the Millennium Development Goals. The primary focus on wetlands and water must address the indirect and direct drivers of change and include actions to eliminate production subsidies, sustainably intensify agriculture, slow climate change and nutrient loading, correct market failures, encourage stakeholder participation and increase the transparency and responsibility of government and private sector decision-making.

Achieving commitments

Ensuring the future of wetlands and their services requires maintaining the quantity and quality of the natural water regimes on which they depend, and the frequency, amounts and timing of water flows. There are methods and tools available to apply this approach at the catchment scale, to assess the "environmental flows" needs of wetlands and socio-economic development requirements, to address the trade-offs for water allocation between ecosystem services and to ensure that there is enough water allocated to meet the objectives agreed by the wider stakeholder community. Intergovernmental environmental commitments must be considered jointly if they are all to be achieved. Although trade-offs may differ in specific locations, progress towards achieving commitments – such as the MDGs – is generally likely to be less when they are addressed in isolation, than when they are addressed jointly.

Ecological character

The Ramsar Convention's 'wise use' concept, back in the 1970s, promoted the need for a cross-sectoral approach and integrated management of wetland ecosystems. Now, using the MA conceptual framework, it is still the leading concept for maintaining ecological character of wetlands in the context of sustainable development. It will ensure the delivery of ecosystem services to support human well-being, and thus the achievement of the Millennium Development Goals ■

Gordana Beltram is Under-Secretary at the Ministry of the Environment and Spatial Planning, Slovenia, and Chair of the Standing Committee of the Ramsar Convention on Wetlands

Star profile: Salma Hayek

Old, Green Soul

Growing up in the torrid Gulf Coast port of Coatzacoalcos gave the Mexican actress Salma Hayek her first taste of environmental destruction – and this, in turn, helped to decide her career. Now 38, the petite beauty is at the heart of rapidly growing green activism among some of Hollywood's most sought-after stars.

Coatzacoalcos was, and still is, a petrol refining centre and Hayek's Lebanese-born father worked in the oil business. Chemical spills were routine, and local beaches were often closed because they were polluted by tar – so she and her friends went to the cinema instead, which nurtured her love of films.

It also bred scepticism about political leadership. "I'm proud to be Mexican, but we've been lied to a bit too often by Government", she says.

Always a rebel (she was expelled from a Catholic school for stunts like setting all the nuns' clocks back), she became a soap-opera superstar in Mexico, but gave it up to try to make it in Hollywood. It was tough at first. She struggled to learn English – a task made harder by her dyslexia – and suffered prejudice. "People would see my name and picture and want to meet me, and then they would realise that I was Mexican and want to send me away", she recalls.

She finally got her break opposite Antonio Banderas in the 1995 film, Desperado. More big parts followed and, at the same time, her interest in the environment deepened – partly through a relationship with the star and green activist, Edward Norton. They parted in 2003, but her environmental commitment continues.

This commitment and her celebrity climaxed at this year's Oscar ceremonies, where she arrived in an environmentally-friendly Toyota Prius, rather than the traditional gas-guzzling limo. Stepping out of the hybrid car, wearing a low-cut Prada dress made her the star of the ceremony, even though she didn't even have a nomination.

"I personally own and drive a hybrid car, and I love it", she adds. "With global warming threatening us all, driving a fuel-efficient car like a hybrid is something that everyone can do to protect our planet."

Not long afterwards, on Earth Day (22 April), she joined Jake Gyllenhaal – star of the global warming movie, The Day after Tomorrow – at Iqaluit in the Arctic in a protest backed by Global Green USA, the US affiliate of Green Cross International, founded and led by Mikhail Gorbachev.

With other US celebrities, businessmen, politicians and environmentalists they stood with 700 Inuit on the ice spell out the words "Arctic Warning" in English, and "Listen" in Inuktitut. "The place itself literally illustrates what's going on", she says recalling how the ice is melting, threatening the Inuit's food supply and culture.

"They are facing a problem with suicide, because it's hard to adjust to that evolution", she adds. "And I think this is exactly what we are doing; we are committing, in our civilisation, suicide and self-destruction."

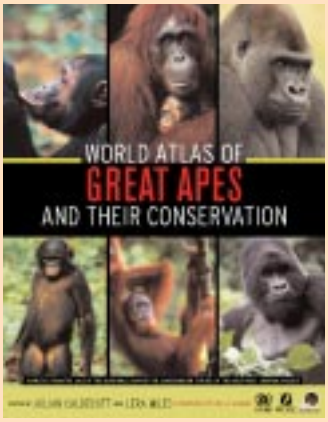
Hayek carries her commitment to combating global warming into support for the BP Solar Neighbours Programme, which aims to get solar photovoltaic panels into poor homes in Los Angeles. Under the Programme, BP donates a complete system to a low-income family every time a celebrity buys one for his or her house.

She has also worked as a volunteer at a sanctuary rehabilitating beached dolphins, helped present the US Live 8 concert in Philadelphia and has campaigned against smoking and domestic violence.

Scriptwriter Robert Towne, who has written the screenplay for her upcoming film Ask the Dust, says: "She's a wise person. A very old soul" and says she is like a "grandmother, though certainly not physically, of course." **G.L.**

Images courtesy of Global Green USA

BOOKS & PRODUCTS



Our closest living relatives, as the ***World Atlas of Great Apes and their Conservation*** shows, are on the very edge of extinction. The Atlas, created in association with UNEP' **Great Apes Survival Project (GRASP)**, provides a comprehensive overview of what is currently known about all six species of them: chimpanzee, bonobo, Sumatran orangutan, Bornean orangutan, eastern gorilla and western lowland gorilla. Edited by **Julian Caldecott** and **Lera Miles**, and published by the **University of California Press,** it gives a thorough background on ape behaviour and ecology for each species, including habitat requirements, the ape's ecological role, and the possible consequences of their decline. It also offers a full description of the threats, of current conservation efforts and of additional protection needed for each species across its entire range.

The **M.S. Swaminathan Research Foundation** held a special international conference in Chennai, India in August on the 'human centred sustainable development paradigm' to celebrate the 80th birthday of its founder, after whom it is named. **Prof. M.S. Swaminathan** – often described as the primary architect of the Green Revolution of the 1960s and 1970s – has been described by TIME magazine as one of the 20 most influential Asians of the 20th century, alongside only two others from India: Mahatma Gandhi and the poet Rabindranath Tagore. The recipient of 46 honorary doctorate degrees from universities around the world, he holds the UNESCO Chair in Ecotechnology at the Foundation.

The first **International Media and Environment Summit** will bring together media, government, scientists, campaigners and civil society to debate how the environment is reported, and to find better ways of serving an audience hungry for information and inspiration, Organised by News **World Nature**, and taking place in Kuching, Sarawak from November 30 to December 2 it will also feature a wildlife film festival.

Ecomom is a new Japanese language quarterly magazine aimed at women, mothers and families with an interest in saving the planet. The publication features tips on recycling and energy, next to recipes, children's activites, and information on eco-friendly trips and products. For more information or to subscribe see the ***ecomom*** website http://nikkeibp.jp/ecomom

Infiniti, the first solo album by the Pakistani rock star, **Salman Ahmed**, aims to break new ground both musically and in using music to further peace and sustainable development. Ahmed, the founder and lead guitarist of Asia's leading rock band, **Junoon** – who was featured in Our Planet earlier this year – says that he chose the name because "we are infinite beings who are here on earth for a short journey. Our imagination is unlimited, and our power to change our environment is immense." It includes a song on AIDS called Al-vida (goodbye) which Ahmed, a **UN Goodwill Ambassador** for **UNAIDS**, is planning to produce as a video for **World AIDS Day.**

NGOs are in the best position to prevent the widespread extinction of species, according to a new book, **Building the Next Ark**: **How NGOs Work to Protect Biodiversity.** Its author, **Prof. Michael M. Gunter** of Rollins College, Florida, aims to offer a detailed prescription for how they can improve their species protection efforts.

Hedgerows made of **Vetiver grass**, a tropical grass found widely in Thailand, have been found greatly to reduce soil erosion and to mitigate some of the worst effects of hurricanes and extreme storms. The fast-growing grass forms a dense green hedge, and if this is planted along counter lines, it effectively traps eroded silt, forming an earth embankment. It also has a huge, deeply penetrating root mass, which stabilises soil and slopes. The **Vetiver Network**, based in Maryland, USA, says that it has proved highly successful in applications from Madagascar to China.

UNEP/Still Pictures

Save our **SEEDS**

FRANCISCO REIFSCHNEIDER describes the importance of saving biodiversity in securing the world's food supplies

Biodiversity – the web of life, linking people to ecosystems – provides enormous benefits, including aesthetic, cultural, ecological, economic, educational, environmental, genetic, medical, recreational, scientific, and social services.

Humans and plants have had a close relationship ever since the birth of agriculture over 10,000 years ago. Plants, including food crops, are an important part of agricultural biodiversity, vital for nourishing and sustaining human society. And our dependence on them is growing.

Less than a dozen crops now feed most of the world's six billion people. Three cereals – maize, rice and wheat – alone supply 80 to 90 % of world caloric intake. Maize is the backbone of food security for Africa, providing 40 % of food calories in the eastern and southern parts of the continent alone. Rice is the principal food source for half of the world's population, including some of the poorest people in Asia. Worldwide, demand for wheat is surging: consumption has doubled in the last 30 years.

Natural resources

Plants are also a major source of drugs vital for human health and well-being. Of the top 20 drugs with an estimated market value of $6 billion, two are derived from natural resources, eight from synthetics modeled on natural compounds, and seven had pharmacological activity defined from natural products. Plant biomass also provides fodder for livestock, building materials, and soil

Of the top 20 drugs with an estimated market value of $6 billion, two are derived from natural resources

conservation practices. Microbial diversity plays an important role in drug development and the manufacture of processed foods.

Yet biodiversity is being lost at unprecedented rates. One-third of terrestrial biodiversity is in vulnerable 'hot spots' accounting for 1.4% of the Earth's surface and is threatened with complete loss from natural disasters or further human encroachment. Such harmful practices as slash-and-burn agriculture, habitat conversion, massive exploitation of common pool resources, and the introduction of non-native species are major contributors to biodiversity loss. Conflicts and natural disasters also exact a heavy toll on biodiversity. Meanwhile, the Food and Agriculture Organisation estimates, budgets for many of the 1,470 genebanks worldwide have either been cut (as in 28% of developing countries) or have remained static (in a further 29%).

Conserving biodiversity

For over 30 years, the Consultative Group on International Agricultural Research (CGIAR) and its partners have recognized the importance of conserving biodiversity for sustaining the world's food supplies, both now and into the future.

It supports a network of 15 international agricultural research centres, of which 11 have genebanks that hold the world's largest collection of over 600,000 samples of crop diversity. These seed samples represent one-tenth of the world's unique samples of major food crops, with a large concentration of traditional farmers' varieties. The collections include not only important 'pillar crops' such as maize, rice and wheat but also 'orphan crops' such as cassava, cowpea, pearl millet, potato, sorghum, and yams. These crops are not attractive for private sector▶

investment but are major sources of income, food, and nutrition for millions of poor farmers.

CGIAR's efforts in conserving agricultural biodiversity span the entire spectrum: collection, characterisation, distribution, and regeneration. Its scientists work with farmers who traditionally save seeds from one season for planting in the next. Ex situ conservation involves storing seeds stored in genebanks under controlled environments. In situ conservation is done in farmers' fields and the wild. In vitro conservation is done in laboratory settings.

The collections are a valuable global public good, and a pivotal part of the global conservation effort. Saving seeds is costly: collectively, the CGIAR Centres spend over US$6 million annually. Simply holding a seed sample costs less than $1.50 per accession per year for most crops, except for maize, which costs $2.16, while in vitro conservation of cassava costs $12.

Naturally resistant

CGIAR's actions fully support international and national biodiversity conservation strategies, including the Convention on Biological Diversity. The recently-approved International Treaty on Plant Genetic Resources for Food and Agriculture has acknowledged the importance of its collections, and commended it for holding them in trust for the benefit of humanity.

Exchanging germplasm is vital for the agricultural research enterprise. A recent CGIAR study showed that the vast majority (over 80 %) of the more than one million samples exchanged over the past 10 years went to universities and national agricultural research systems in developing countries. Agricultural researchers there use them to develop new crop varieties which have higher and more stable yields and better nutritional content, use less water and are naturally resistant to pests, disease and climatic stresses such as droughts and floods. The exchange of germplasm is affected by national legislation and growing awareness and concern about intellectual property rights and biopiracy.

CGIAR's global efforts in conserving biodiversity have led to notable scientific advances that benefit poor people, including:

- Quality Protein Maize containing twice the amount of beneficial amino acids (lysine and tryptophan) is currently grown in over 25 countries in Africa and elsewhere.
- New rices for Africa that combine the high productivity traits of Asian varieties and the ruggedness of African rice are now being planted on 100,000 hectares across Africa, 10,000 of them in Uganda alone.
- S-35, a new sorghum variety, is being grown on nearly 30 % of the total rainfed area for sorghum in Cameroon and Chad. Benefits include higher grain yields, and reduced production costs.
- New cassava varieties (Tropical Manioc selection) grown extensively in Sub-Saharan Africa are achieving on-farm yield gains of 40 % even without fertilizer.
- New bush bean varieties resist root rots and produce yields more than double those of commonly grown local varieties in east Africa. A recent impact study shows one of them was being grown by 80 % of farmers in one Kenyan district and by 42 % in another.
- CGIAR seed collections were instrumental in rehabilitating local genebanks in conflict-affected countries such as Afghanistan, Burundi, Rwanda, Somalia, and Timor-Leste – efforts critical for restoring growth and helping lay the foundations of durable peace.

Agricultural biodiversity

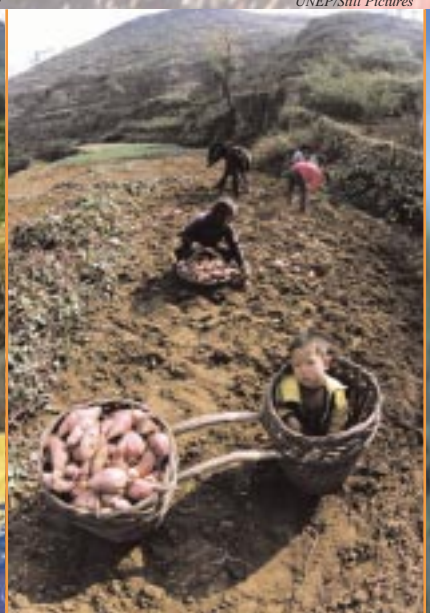
Agriculture contributes an average of 30 % of total gross domestic product in Sub-Saharan Africa, the only region not on track for achieving the Millennium Development Goals. Agricultural biodiversity has a major role in improving the productivity, profitability, and sustainability of agriculture in developing countries. Supporting science-based efforts in promoting sustainable agriculture can create the next generation of farming technologies that will increase agricultural productivity, create wealth, reduce hunger and promote environmental sustainability. Saving biodiversity is indeed a useful way to benefit poor people ■

Francisco Reifschneider is Director of the Consultative Group on International Agricultural Research

Dev Pradyot/UNEP/Still Pictures

KampoonMidsen/UNEP/Still Pictures

UNEP/Still Pictures



Mark Edwards/Still Pictures

T. Balabaadkan/UNEP/Still Pictures

Schneider/UNEP/Still Pictures

Storehouses and Safety Nets

DORIS CAPISTRANO describes how the many services provided by forests are essential to meeting the Millennium Development Goals and calls for reforms to realise their potential

Forests are a critically important resource for many of the world's extremely poor and disempowered people. Approximately 350 million, including around 60 million indigenous people, live in forested areas. Many – and especially those in fragile, remote or conflict-affected areas – suffer poverty, exclusion and injustice. Forests provide safety nets that keep many people from falling further into poverty – especially during times of drought, war and economic collapse – and their resources provide incomes that allow some to escape it.

Extreme poverty

Collecting, processing, using and selling wild and semi-domesticated plants and animals from forests provides, on average, 20% or more of the household income of most extremely poor people. Women and children tend to be heavily involved in livelihood activities which provide food, fuel, fibre and other products – and seasonal employment when other options are not available. Forests yield over 3.3 billion cubic meters of wood – including 1.8 billion cubic meters of fuelwood and charcoal – and a variety of non-wood products of significant subsistence and commercial value. Up to 60 million people worldwide are employed in the forestry and wood industries. Forests are thus a vital resource for realising the Millennium Development Goal (MDG) of reducing extreme poverty and hunger.

Vector-borne diseases

Forests are also critically important for achieving the MDGs on reducing child mortality, improving maternal health and combating HIV/AIDS, malaria and other diseases. They serve as a valuable storehouse of knowledge, biodiversity and genetic resources that are important for human health. Forests, particularly in the tropics, provide habitat for at least half of the world's known plant and animal species. Clearing and logging them – and other forms of forest disturbance – can have positive or negative implications for many vector-borne diseases, including malaria.

Empowering women

Some two billion people, about a third of the world's population, rely on plants and animals – a large portion of them from forests and natural environments – as their primary source of medicine. Knowledge of medicinal plants and animals and their uses is often held and kept alive by women. Securing women's rights and access to forests resources, giving women due recognition and a fair share of the benefits from their knowledge, and providing them with capacity-building support to add value to their forest-related livelihood activities, can all enhance women's status, build their assets and help realise the MDG of empowering women.

Climate change

Forests are vital to ensuring environmental sustainability, a goal essential to achieving all the other MDGs. More than three-fourths of the world's freshwater comes from forest catchments. With about half the world's terrestrial organic carbon stocks, forests and woodlands play a major role in the global carbon cycle – and thus in accelerating or decelerating global ▶

climate change. Apart from these critical ecological functions, forests provide important cultural services, including a sense of place, identity and security for communities in and around them.

Unfortunately, much of the forests' contributions – through provisioning, environmental regulation and supplying cultural goods and services – are ignored or discounted in development planning and day-to-day resource use decisions. Forestry is generally accorded a low priority compared to other resource sectors. Forests continue to decline in many parts of the world, especially the tropics, under pressure from logging, road and infrastructure-building, agricultural expansion and other forces. Distortions in perceived costs, benefits and trade-offs from alternative land uses and ineffective cross-sectoral coordination mechanisms have resulted in over-exploitation and under-investment in forestry.

Forestry and agro-forestry have a vast unrealised potential to serve sustainable development and poverty reduction goals. Yet, many forest-related policies unfairly discriminate against the poor and prevent them from investing in sustainable forest management and in their own development. The more valuable forests are, the more likely it is that the poor will lose access to them, as better-off and more powerful groups seek to control these resources and influence their governance – including forest-related institutions, policies, practices and decision-making processes.

Basic information

Forestry in developing countries is typically plagued by institutional capacity weaknesses, lack of basic information necessary for effective forest management and weak or inconsistent legal and regulatory frameworks. It is also constrained by serious governance challenges, of which corruption is the most pernicious and deep-rooted.

Corruption, and its insidious effects on governance, hits the poor hardest. It undermines efforts to make forest use sustainable and equitable, and renders most regulations and control mechanisms worthless. Its manifestations in forestry include give-away logging concessions, illegal logging and smuggling operations, large-scale encroachment on forestlands, and fraud and tax evasion schemes. It is reflected in the lack of accountability of government agents, corporations and powerful actors who often receive preferences and subsidies at the expense of poor people who depend on forests for their livelihoods. The lost revenue in taxes and royalties due to forest-related corruption totals at least $10 to 15 billion a year, and this does not include associated ecological and social costs. It is a drain of much-needed resources that could have gone to development and poverty alleviation.

Realising forestry's considerable potential contribution to meeting the MDGs rests largely on reforming policies and strengthening overall forest governance. Policy experiments over the past three decades have shown that when enabling conditions exist and institutions and property rights are clear and function well, forests can be used more sustainably and their benefits shared more equitably among stakeholders.

Initiatives that improve poor people's use and control of forest resources have been important entry points for governance reforms

Community forestry and pro-poor forest policies, for example, have resulted in around 25% of the world's forests being managed and controlled by local communities. Decentralising forest management – though often problematic and conflict-ridden, particularly during its early stages – can encourage laws and regulations that are more responsive to local stakeholders and can help communities increase their share of benefits from logging concessions. Initiatives that improve poor people's use and control of forest resources have been important entry points for governance reforms, despite the tendency of powerful groups to want to dominate. Coupled with capacity building, networking among the poor and marginalized, and partnerships with allied groups and key actors, such initiatives can help level the playing field and form the basis for more lasting poverty alleviation and sustainable development.

Opening opportunities

Yet the forestry sector will need more than incremental innovations if it is truly to make progress in meeting the MDGs. Indeed, it will require a concerted and proactive approach to policy and governance reforms, centered on securing poor people's forest rights, strengthening their capabilities, and opening opportunities for them to compete in the market for forest products and services. Key elements of this reform agenda must include clarifying and enforcing forest tenure and access regimes, reducing regulatory burdens and hidden taxes on poor people, supporting local enterprises consistent with sustainable forest use, rooting out corruption, enforcing just laws, and protecting poor people and communities from unjust partnerships that harm their interests and their forest resources. Only when unnecessary constraints on poor people are removed, will they be able to chart their own path out of poverty and towards the sustainable development envisioned in the Millennium Development Goals ■

Doris Capistrano is the Director, Forests and Governance Center for International Forestry Research (CIFOR)

Luiz C. Marigo/ Still Pictures

R. Kawakami/UNEP/ Still Pictures

UNEP/ Still Pictures

Cal Vonberger/ Still Pictures

Aviva Basson/UNEP/ Still Pictures

Extinction *is forever*

The loss in biodiversity greatly affects everyone's lives, and will go on doing so. We have been brought up with animals, plants and many other things, around us. We cannot imagine being without them.

Everything in the environment contributes to its sustainability. If even a little part of it is lost, the environment will become unstable, and there will be more losses in biodiversity. If, for example, the number of bears in Japan's forests were to fall, the populations of the animals they hunt would rise, and, in turn, the biodiversity that these prey species live off would surely lessen.

Japan covers a small landmass, and has over one hundred million people living on it, but three quarters of its area is still abundant with nature. Japan is rich in biodiversity, but it is highly threatened. As land is limited, farmers cannot afford to let harvests fail, and therefore use agricultural chemicals for better growth of crops and so on. This has affected many creatures, especially animals that relate with water. Take the tremendously beautiful Japanese crested ibis. In 1981 only five of these birds were reported still to be alive. They were captured and kept in captivity. Many attempts were made to breed them but none succeeded. By 1998 only one was left and now it, too, has gone. The Japanese crested ibis is extinct.

We cannot forget biodiversity when thinking of the future. If coming generations blame us for making creatures extinct, we have no excuse we can give them. It isn't fair that they will not be able to see what we have seen because we failed to take action. We cannot revive species, as some movies have done for dinosaurs – and, even if we could, it would not be wise without knowing their habits. As a contribution to real-world action, the eco-club in my area raises salmon eggs in schools every year, releasing the young fish when they become big enough.

Biodiversity is very important for achieving the MDGs. An unstable balance of nature brings famines and crop failures. If the ecosystem gains balance, sustainable development becomes possible. It is not an easy task, but if we do not take action, nothing will happen. So let us join together to make a better future.

by Ritsuya Kishida, 14 years, Japan
Junior Board Member, Children's World Summit for the Environment 2005