

WORLD CONSERVATION

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January 2008

A world without biodiversity?



Food heroes

Lessons from
landslides

Sacred species

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The World Conservation Union (IUCN)
Rue Mauverney 28
1196 Gland, Switzerland
Tel +41 22 999 0000
Fax +41 22 999 0002
worldconservation@iucn.org
www.iucn.org/worldconservation

Editor: Anna Knee
Managing Editor: John Kidd
Circulation: Cindy Craker

Contributing editors:

Sarah Halls
Deborah Murith
Olivia Pasini
Rachel Wasser

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Please e-mail the *World Conservation* team at worldconservation@iucn.org, or telephone us on +41 22 999 0116.

Next issue

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Spice of life

Why we're talking about diversity.



Take your pick: A world in which we all dress the same, speak the same language, eat the same food and listen to the same music. All our natural areas are ploughed up for roads, buildings and corn plantations, and all that's left of wildlife are battery-farmed chickens and dairy cows—a world without diversity.

Or, a world that is prosperous, peaceful, healthy, colourful, vibrant and resilient—in short, a diverse and sustainable world.

There is growing recognition that diversity—biological as well as linguistic and cultural diversity—is the lifeblood of sustainable development and human welfare. Diversity is key to resilience—the ability of natural and social systems to adapt to change. Every week brings news of yet another devastating flood, landslide or hurricane while the conservation community shakes its head in dismay—protecting people from the full force of these disasters could be so simple and so cheap if we let nature act as a buffer.

Mankind has drawn on diversity throughout history, for basic needs such as food and shelter, but also in much deeper cultural and spiritual ways. People are drawn to the beauty of nature for recreation, relaxation and inspiration. In recent years, we're seeing diversity in increasingly practical terms—as a source of cures to diseases and helping us adapt to changing conditions such as global warming.

But we are rapidly losing diversity, despite all the warnings. We know that ancient civilizations collapsed because of environmental damage. We understand how monocultures contributed to agricultural disasters like the Irish Potato Famine. Excessive development and consumerism are destroying our natural systems, standardizing landscapes and eroding cultures. Stress,

obesity and community breakdown are increasing rapidly. We know current growth rates are not sustainable and are not leading to the life we want. The world knows it has to change and has the means to do so. So what's stopping us?

In the western world, we have become so far removed from biodiversity that we've forgotten how much we use it in our daily lives and how seriously we're affected by its loss. When we eat a wild salmon steak, we rarely think of the species that the salmon depends on to thrive. When we fell a mature tree to make a table, we lose a host of lichens and invertebrates; part of an entire web of life is lost. Yet people in the developing world know exactly what's at stake as they set out each morning to gather fuelwood from a dwindling forest, travel ever further to hunt animals for food and collect medicinal plants to treat their sick children.

While many believe we're on a fast-track to self-destruction, many others refute this apocalyptic world vision. They believe the battle is alive in keeping the world's myriad landscapes, species, cultures and languages intact. They say the mainstream media is largely to blame for peddling feelings of doom and gloom and, that with awareness of environmental and social issues at an all-time high, the tide is finally turning. The world is connecting as never before. As Paul Hawken puts it in *Blessed Unrest*, the combined environmental and social movements have, like nature itself, organized from the bottom up, in every city, town and culture, from multi-million dollar NGOs to single-person causes, and are expressing people's needs worldwide. We are starting to reconnect with our environment and with each other.

But this issue isn't dedicated to *how* we save diversity, it's about *why* we need it in the

first place. Conservationists feel they are banging their heads against a wall because the rest of the world doesn't seem to be listening. Or, more likely, we're not doing very well at getting the message across. That's why, in the run-up to the IUCN Barcelona Congress with its theme, *A Diverse and Sustainable World*, we're going back to basics, asking the question: How can we expect to tackle poverty and climate change if we don't look after the natural wealth of animals, plants, microorganisms and ecosystems that make our planet inhabitable? By making the scientific, social, economic and cultural case for keeping diversity, the articles highlight just how much it supports nearly every aspect of human life. But the arguments for conserving biological and cultural diversity should not be all utilitarian. For many people, we should save it simply because it exists, and has done for millennia.

If we don't hurry up and convince governments, politicians, business leaders and the public why we need diversity and how urgent it is that they mobilize to save it, the world will move on and our fate will be sealed. We need to do better at showing how much progress has been made and how much more can be done. It's time to get our collective act together. In Barcelona the world will be watching us. ■

What is?

Biodiversity: the variability among living organisms from all sources including terrestrial, marine and other aquatic ecosystems, and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems.

An **ecosystem:** a community of plants, animals and smaller organisms that live, feed, reproduce and interact in the same area or environment.

An **ecosystem service** is a service people obtain from the environment. Ecosystem services are the transformation of natural assets (soil, plants and animals, air and water) into things that we value. They

can be viewed as **provisioning** such as food and water; **regulating**, for example, flood and disease control; cultural such as spiritual, recreational, and **cultural** benefits; or **supporting** like nutrient cycling that maintain the conditions for life on Earth. Ecosystem 'goods' include food, medicinal plants, construction materials, tourism and recreation, and wild genes for domestic plants and animals.

Doctor Nature

Cures for AIDS and some cancers could be at our fingertips if we did a better job of looking after biodiversity, says Eric Chivian.

We humans are an integral part of nature, and our health depends ultimately on the health of its species and ecosystems. Surely, the extinction crisis could be stopped in its tracks if the world better understood the critical role that biodiversity plays in providing new medicines, clean water and protection from disease?

Over millions of years, species have developed chemicals that protect them against infections and diseases and allow them to capture prey and defend themselves—chemicals that have become some of today's most important pharmaceuticals. With the loss of plant, animal and microbial diversity, we're losing the chance to discover new medicines that could end the suffering of millions of people and save national economies billions of dollars each year.

Amphibians contribute to human medicine in many ways, from chemicals they contain that may lead to new painkillers and drugs to treat high blood pressure, to their roles in biomedical research. They may help us figure out ways to prevent bacteria from developing resistance to antibiotics, a

phenomenon causing great alarm among doctors as they struggle to keep one step ahead of their patients' infections. The Waxy Monkey Frog from South America manufactures potent antibiotics in its skin that attack bacteria and fungi, including some that cause infections in people with weakened immune systems, such as those with HIV/AIDS. These compounds have worked for millions of years, without their microbial targets developing effective resistance to them.

Tropical rainforest species have given us quinine, the first major treatment for malaria, quinidine from the Cinchona Tree, used for heart conditions, and cancer-fighting drugs from the Rosy Periwinkle plant, which have revolutionized the treatment of acute childhood leukemia and Hodgkin's Lymphoma. Temperate species have also yielded some of our most useful drugs—the 'wonder drug' aspirin was originally derived from salicin, extracted from the willow tree.

Species also provide medical research models that help us understand human physiology and disease. Consider the polar bear. During its several month hibernation it is largely immobile and doesn't eat, drink, urinate or defecate, yet it does not starve, become dehydrated, lose bone mass or die from the build-up of urinary wastes. If we stop urinating for only a few days, we die. There is no cure for people with end-stage renal disease, but if we understood how bears recycled their urinary wastes into new proteins, we could possibly treat renal failure.

We may be losing new medicines and clues for research before species have been studied for their medical potential, or even before they have been discovered. Considered commercially worthless, the Pacific Yew tree was routinely discarded during logging operations until it was found to contain the compound Taxol, now considered one of the most effective chemotherapeutic agents for ovarian, breast and other cancers. How many species like the Pacific Yew are being lost without our ever knowing whether they contain wonder drugs?

The story of gastric-brooding frogs from the rainforests of Australia provides a tragic example of lost potential. The females of both species of these frogs swallowed their fertilized eggs, which then hatched in their stomachs and developed before being vomited into the outside world as fully-formed tadpoles. In the mother's stomach, the tadpoles secreted a substance that prevented their being digested. New insights about treating gastric ulcers might have been

uncovered by studying these frogs, but these studies are no longer possible, as both species are now considered extinct.

Species diversity has been shown to help protect people from Lyme disease, the most common human vector borne disease in the US. The disease is caused by bacteria carried by a tick whose preferred host is the white-footed mouse. Having large numbers and types of vertebrates in Lyme areas 'dilutes' the bacterial population, and makes it less likely for people to become infected. It also means more predators for the mice, keeping their populations low, thereby reducing the risk of human exposure. Forest fragmentation reduces vertebrate diversity, so as people move closer to forest edges and break up forested areas with development, we may see an increase in Lyme cases. This same mechanism of pathogen 'dilution' may apply to other vector-borne diseases such as West Nile virus disease.

To help stem the loss of species, scientists from a range of disciplines, from industrialized and developing countries alike, are working to catalogue the critical links between biodiversity and human health. We hope our efforts will guide policy makers in developing innovative policies, based on sound science, that safeguard biodiversity. We're convinced that once people recognize how much is at stake with their health and lives, and with the health and lives of their children, they will do everything in their power to protect the global environment.

Eric Chivian, M.D. is Director of the Center for Health and the Global Environment at Harvard Medical School. In 1985 he shared the Nobel Peace Prize for co-founding International Physicians for the Prevention of Nuclear War.

<http://chge.med.harvard.edu/>

IUCN is collaborating with the Center for Health and the Global Environment on a book *Sustaining Life: How Human Health Depends on Biodiversity* which will be published in April 2008.



Medicinal plants for life

More than 70,000 plant species are used medicinally somewhere on Earth and it is likely that 15,000 of them are threatened by over-harvesting or habitat loss. Capacity to monitor the conservation status of medicinal plants, set sustainable harvest levels, and devise cost-effective alternatives is extremely limited. The scale of medicinal plant use has also outpaced the knowledge and tools needed to implement effective conservation activities. IUCN's Medicinal Plant Specialist Group, part of the Species Survival Commission, is working to reverse the fortunes of this invaluable

resource by supporting efforts towards medicinal plant conservation and sustainable use. Members provide information, tools and policy advice, focusing on actions that reduce threats to endangered species and habitats. The Group is developing an International Standard for Sustainable Wild-Collection of Medicinal and Aromatic Plants and will soon publish updated global Guidelines on the Conservation of Medicinal Plants with WHO, WWF and TRAFFIC.

www.iucn.org/themes/ssc/sgs/mpsg



Bouncing back

Resilience—the capacity of a system to absorb disturbance, undergo change and still retain essentially the same function, structure and identity—is becoming a buzzword in ecological and business communities alike.

Ecosystem resilience is the capacity of an ecosystem to tolerate disturbance without collapsing into a different state. A resilient ecosystem can withstand shocks and rebuild itself when necessary. Resilience in social systems means the added capacity of humans to anticipate and plan for the future. In business it can be viewed as the ability to rapidly adapt and respond to risks and opportunities, to maintain continuity and enable

growth. Natural systems are inherently resilient but just as their capacity to cope with disturbance can be degraded, so can it be enhanced. The key to resilience in social and ecological systems is diversity. For example, in a grassland ecosystem, several different species will commonly perform nitrogen fixation, but each may respond differently to climatic events, thereby ensuring that even though some species may be lost, the process of nitrogen fixation within the grassland ecosystem will continue.

www.resalliance.org

A taste of paradise

Increased food production and biodiversity conservation can be compatible. Sara Scherr of Ecoagriculture Partners explains.



Governments are beginning to pay greater attention to biodiversity conservation and are putting in place policies to protect natural areas and promote the sustainable use of biodiversity. As positive as these moves are, many people continue to overlook one of the most important factors affecting biodiversity, not least because it is often viewed as a primary culprit in biodiversity loss: agriculture.

But agriculture is not always a threat. Farming and forest communities have long practiced sustainable farming and play an important role in the stewardship of important flora and fauna. Viewing agriculture simply as a threat is counterproductive since the growing global population and income are expected to increase the demand for food by 50–100% over the next few decades. A more constructive relationship with agricultural production is needed if we are to meet the multiple challenges of producing more food, protecting biodiversity, providing sustainable incomes for the world's poor and restoring degraded lands.

'Ecoagriculture' is a new paradigm for understanding and managing biodiversity, agriculture and rural livelihoods together within a landscape. The term ecoagriculture is new, but the concept is not; for centuries, rural communities have found ways to integrate their food production with ecosystem stewardship and livelihood development.

Conservation of wild biodiversity and ecosystem services is considered by many to

be an ethical imperative. But there is also considerable motivation for agricultural landscape managers to conserve biodiversity since it is fundamental to ecosystem function, and therefore critical to maintaining crop yields, farm inputs and raw material. Ecoagriculture is key to conserving biodiversity in these landscapes. It can incorporate the diversity of approaches, management practices and planning frameworks found in the fields of agriculture, conservation and rural development.

Broadly, ecoagriculture relies on six basic strategies of resource management, three focused on the agricultural parts of the landscape mosaic and three on natural areas. In production areas, farmers can sustainably increase agricultural output and reduce costs using methods that enhance habitat quality and ecosystem services through practices like organic agriculture, agroecology, conservation farming and agroforestry. These approaches minimize agricultural waste and pollution, manage resources in ways that conserve species, water and soils, and use crop, grass and tree combinations that mimic the ecological structure and function of natural habitats.

Farmers or other conservation managers can protect and expand natural areas with activities that also provide benefits for adjacent farmers and communities, as well as reduce conflict with them. These include minimizing or reversing conversion of natural areas, often by increasing production in

farmed areas, and protecting larger patches of high-quality natural habitat. Managers can also develop ecological networks and corridors linking natural areas.

The size and configuration of agricultural and natural components are important landscape design issues. Conservation of wild species that are highly sensitive to habitat disturbance requires large, well-connected patches of natural habitat. But many wild species, including those that are threatened, can co-exist in compatibly-managed agricultural landscapes, even in high-yielding systems. Involving all stakeholders in evaluating the landscape, developing a vision of future priorities, resolving conflicts and developing work plans, is key to success. The outcomes of planning and negotiations among the multiple stakeholders in any landscape depend on local cultures and philosophies of land management.

Washington DC-based NGO, Ecoagriculture Partners works with IUCN and other organizations to scale up implementation of ecoagriculture across the world. It is developing a Landscape Measures Resource Centre that will help multi-stakeholder groups in ecoagriculture landscapes to evaluate, plan and monitor their activities. Other projects provide useful resources for community-to-community knowledge-sharing, toolkits for market development, leadership development courses and access to research. IUCN is collaborating with Ecoagriculture Partners in East Africa and Mesoamerica to support landscape projects in those regions and its Livelihoods and Landscapes initiative which has many sites in agricultural landscapes promises to be a source of ideas and lessons for ecoagriculture. ■

Sara Scherr is President and CEO of Ecoagriculture Partners. She is a member of IUCN's Commission on Environmental, Economic and Social Policy.

www.ecoagriculture.org

In *Farming with Nature*, published by IUCN and Ecoagriculture Partners, researchers and practitioners around the world synthesise what is already known about managing ecoagriculture landscapes, and highlight key knowledge gaps.

Food heroes

Local communities have conserved the diversity of agricultural species for thousands of years. Supporting them is key to achieving global food security, says M.S. Swaminathan.

Global food security is entering a critical phase. International prices of wheat, rice, maize and other crops are increasing due to escalating demand. With oil prices reaching record levels, both farmland and grains are being diverted for biofuel production. Climate change, resulting in more frequent drought, floods and pest epidemics, is adding unprecedented stress. Against this backdrop, the conservation and sustainable use of biodiversity, particularly agricultural biodiversity—the plants, animals and micro-organisms used for food and agriculture—should assume top priority.

Plant and animal breeding has been practiced for thousands of years by tribal and rural people who make a significant contribution to food and health security, yet this remains largely unrecognized and unrewarded. They have spent hundreds of years observing, experimenting and selecting species and genes for desirable qualities such as drought-resistance, and have amassed a vast knowledge bank. This fact received little attention until the UN Food and Agriculture Organization promoted the concept of Farmers' Rights and the Convention on Biological Diversity (CBD) recognized the conservation traditions of tribal and rural families. Biodiversity is the feedstock for biotechnology. With every species and gene lost, we are limiting our options for future success, particularly in adapting to climate change.

The CBD calls on Parties to respect, preserve and maintain the knowledge, innovations and practices of indigenous and local communities engaged in traditional lifestyles as well as ensuring the equitable sharing of benefits arising from their use. The absence of an internationally-agreed system for sharing economic benefits from the commercial use of biodiversity with the primary conservers and holders of traditional knowledge is leading to a growing number of accusations of biopiracy being committed by business in developing countries.

Equity in benefit sharing is fundamental to retaining the on-farm conservation traditions of rural and tribal families. Institutions belonging to the Consultative Group on International Agricultural Research (CGIAR) are adopting a Material Transfer Agreement procedure which will help prevent the monopolistic exploitation of public-funded research on plant genetic resources for commercial profit. But benefit-sharing procedures still need to be developed at the individual and community levels.

For individual farmers or innovators, the same procedures for seeking recognition and reward as those available to professional plant breeders can be used but help is needed in obtaining patents under national legislation. The problem is more complex in the case of benefit sharing with entire communities. Procedures are available for identifying the area from which critical genes responsible for the commercial success of a new variety came. Thanks to molecular techniques, this possibility also extends to genes controlling quantitative traits like yield and quality. Appropriate reward can be given from the Community Biodiversity and Gene Funds proposed to be established under Biodiversity and Plant Variety Protection Acts in several developing countries.

India is so far the only country that has a law recognizing the rights of both breeders and farmers; it acknowledges the triple role of a farmer, namely as a cultivator, conserver and breeder. The Indian Plant Variety Protection and Farmers' Rights Act rewards farmers and farm communities through the National Gene Fund for their invaluable contributions to the

conservation and improvement of genetic resources. In areas rich in agrobiodiversity like the Koraput region, tribal families have preserved and improved rice genetic material over many centuries. Tribal families who have conserved important genetic material for the public good at personal cost were recently honoured by the Indian Government with the first Genome Saviour Award.

Recent research breakthroughs have opened up enormous opportunities for creating new genetic combinations of great value to food, health and livelihood security. Super wheats, capable of yielding about 8 t/ha are now in the breeders' 'assembly line'. These plants have a complex pedigree and are derived from species from several countries. This illustrates the importance of genetic resources conservation and exchange and the need for the multilateral system of access and benefit sharing enshrined in the International Treaty on Plant Genetic Resources for Food and Agriculture.

Commercialization is leading to over-exploitation of habitats rich in biodiversity like rainforests and coral reefs. It is important



that we reverse the paradigm and create an economic stake in conservation. Conservation, cultivation, consumption and commerce should be dealt with in an integrated manner. Public policies should promote the diversification of food habits resulting in the revitalization of former food traditions which involved a wide range of food plants. Community level gene, seed, grain and water banks should be promoted to ensure local level food and water security. The future of our food and health security systems will depend upon our success

in making biodiversity conservation everybody's business. ■

Professor M.S. Swaminathan is Chairman of the M.S. Swaminathan Research Foundation and a former IUCN President. He was acclaimed by *TIME* magazine as one of the 20 most influential Asians of the 20th century.

www.mssrf.org

Future options

The world is losing its livestock breeds at an alarming rate, according to a 2007 report by the UN Food and Agriculture Organization (FAO). About 20% of the world's breeds of cattle, goats, pigs, horses and poultry are currently at risk of extinction. At least one livestock breed a month has become extinct over the past seven years, with their genetic characteristics lost forever. The FAO said modern agricultural methods had overlooked the benefits of genetic traits that have evolved in breeds found in developing countries. Features

such as resistance to disease or adaptation to climatic extremes are being lost. Uganda's indigenous ankole cattle, for example, could become extinct within 20 years. They are being replaced by Holstein-Friesian cows, which produce more milk, but cannot walk the long distances required to reach the nearest water supply. Genebanks need to be established to ensure the long-term survival of breeds from developing nations and safeguard livestock diversity, according to FAO.

www.fao.org

Caring for the relatives

Plant species genetically related to those in cultivation are called crop wild relatives and their genes are used to boost the nutritional value, disease resistance and productivity of our food crops. However this genetic diversity is at risk in the wild: more than one in 20 of the Poaceae species—crops such as wheat, maize, barley and millet—are threatened with extinction. Just last year the wild apricot *Armeniaca vulgaris*, the origin of all cultivated apricots, was classified as Endangered on the IUCN Red List of Threatened Species. IUCN's Crop Wild Relatives Specialist Group (part of the Species Survival Commission) is working to protect wild plants with socio-economic value. The group works to conserve these species through *ex situ* and *in situ* projects, awareness raising, and training for species assessments.

Lessons from landslides

Karen Sudmeier-Rieux says it's time we learned from past mistakes and let ecosystems play their role in protecting against natural disasters.

My nerves couldn't take it anymore—I had to get out of the jeep. We were in excellent hands with IUCN's Islamabad driver Khalil but being stuck between two trucks, Neelum River 100 metres below me and loose boulders towering overhead was more than I could stomach.

Accompanied by a young geologist from the University of Lausanne, we had come to Kashmir's Neelum Valley to study landslides triggered by the devastating 2005 earthquake. Nevertheless, I wasn't eager to witness a 'live' landslide—especially not on Neelum Valley road, wide enough at places for only one vehicle and blocked for 47 days following the 7.6 Richter scale tremor. This was the only access road to a major valley just north of Muzaffarabad, capital of Pakistani-administered Kashmir, and site of some of the worst earthquake destruction. Neelum Valley is also one gateway to the Himalayas, home to Machiara National Park, snow leopards and the highly endangered Western Horned Tragopan Pheasant.

Entering the steep valley, we clearly saw the largely forested left bank and the right bank that was almost cleared of trees to make way for grasslands, terraces and houses. The reason for this contrast is historic: the left bank had remained under state forest protection; the right bank was largely converted into private landholdings, shamilat lands, or common areas under private management. Population density had squeezed houses onto any available spot on the steep hills, seemingly ready to tumble at the slightest shake. This is exactly what occurred on 8 October 2005 when more than 1,000 landslides were triggered, sweeping away houses, schools and roads.

Our initial hunch was that road building, grazing and poor terracing created fragile slopes that were vulnerable to landslides. These were bound to be more numerous on the degraded right bank. After analysing high-resolution satellite images, modeling a number of factors related to landslides, and 60 days of field work, our hunch was confirmed. Deforestation combined with

grazing and poor road building had created the conditions for over half of the landslides we surveyed. Our study, funded by the Geneva International Academic Network, included a survey of two villages that had been exposed to landslides. Many of the villagers had lost one family member, either during the earthquake or through subsequent rainfall-induced landslides, and they all continued to live in fear. Few could recall experiencing a landslide before October 2005 and few measures had been taken to stabilize slopes or drain water away from dangerous cracks.

Back home, a literature review revealed numerous studies pointing to an overall positive correlation between vegetation cover and landslides. Europe has for centuries developed protection forests having previously deforested large tracts of mountainous areas and experienced subsequent disasters. Protection forests were not easily established: some people were heavily opposed as they infringed on grazing land but eventually,

repeated flooding in the plains forced national legislation and reforestation schemes.

In many ways, Europe in the 19th century mirrors the situation of many developing countries today faced with increasing numbers of climate change-induced natural disasters. Climate change calls for adaptation, disaster risk reduction calls for mitigation—are they not the same calls for protection through sound natural resource management? After each disaster, we learn how poor management of biodiversity has exacerbated the impact on vulnerable populations: Hurricane Katrina and the destruction of wetlands, the 2004 tsunami and the destruction of sand dunes and mangroves, landslides in Haiti following

Hurricane Jeanne and deforestation, and now, Kashmiri landslides and deforestation. Protective ecosystems and biodiversity are natural barriers to natural disasters, especially critical to vulnerable populations who depend on natural resources for their livelihoods and security. Improving community resilience to physical hazards is also a question of equity and power—how often have the poor lost land in the wake of a disaster?

It is time we learned from past mistakes and work together with donors, development and humanitarian agencies, the insurance industry, and the climate change community to adapt to and prevent new ‘natural’ disasters. One major lesson we learned from our land-

slide study is how little we really know about the role of ecosystems in protecting people and their livelihoods from extreme events and how important it is to fund research in this field. ■

Karen Sudmeier-Rieux is a member of IUCN's Commission for Ecosystem Management and co-author of *Ecosystems, Livelihoods and Disasters: An integrated approach to disaster risk management*.

The Pakistan study is available at www.iucn.pk/wp-content/uploads/2007/10/GIAN_Study.pdf



Mangroves for the Future

IUCN plays a pivotal role in Mangroves for the Future (MFF), an initiative that promotes investment in natural ecosystems as essential infrastructure for coastal development. Ecosystem degradation has serious social and economic consequences from the local to global level, as was graphically shown in the aftermath of the 2004 Indian Ocean tsunami. The initiative uses mangroves as its flagship species, but works for the long-term conservation and sustainable management of all coastal ecosystems including coral reefs, wetlands, forests, lagoons, estuaries and beaches. MFF covers six focal countries (those most affected by the tsunami) in South and Southeast Asia and the Western Indian Ocean, but several other countries will join the initiative as more funding and other resources are mobilized. The MFF involves multi-partner collaboration between government agencies, UN agencies, NGOs and coastal communities. Universities, research institutions and the private sector are also involved. National Coordinating Bodies have already been established in each focal country and a series of preparatory studies is underway, which will highlight priorities for the development of projects under the initiative during 2008.

www.iucn.org/tsunami

Keeping the peace

The link between conflict and natural resources is attracting increasing attention in political and humanitarian circles.

Mounting evidence shows that competition for natural resources including fish, water, trees and wildlife, contributes to violent conflicts in many areas affected by inequities and ineffective governance. These conflicts may foreshadow more violence in coming decades, particularly where shortages of water, forests and fertile land become more acute. The social effects are cumulative: large-scale migration, political instability and economic disruptions that in turn may lead to ethnic strife, civil war and different forms of social conflict.

Resource-rich tropical forests are often a point of contention. Poor management and a lack of equitable benefit sharing

among contending parties lead to shifts in resource access and control, with the vulnerable forest-dependent communities suffering most. The resulting tensions can lead to armed conflict and even war.

Climate change could well exacerbate conflict over resources. Changing rainfall patterns will make land that previously was most appropriate for pastoralism more appropriate for agriculture, thereby pitting farmers against herders for scarce land resources. Such conflicts are most likely to occur in areas where farmers and herders have had a long history of interaction such as in the Sahel, Sudan, and parts of semi-arid Asia.

The link between national security and the environment is drawing increasing political attention, brought into even sharper focus by recent conflicts and social problems such as the displacement of people. The strain on the United Nations and the relentless calls for humanitarian relief and peace-keeping is a growing concern of wealthier nations.

Human suffering experienced in refugee camps can be overwhelming and at the same time, these camps put immediate pressure on the surrounding environment through the demand for food, building material, wood for cooking and fuel, and natural remedies for sickness. Much can be done to benefit refugees while protecting the local environment. The use of fuel-efficient stoves for example, can reduce the time people spend gathering firewood and reduce the risk of attack when outside the camp.

Appropriate management of natural resources can also help reduce the vulnerability of some communities to conflict, for example, by providing reserves and a buffer for times of stress. Investments to address environmental scarcity can be seen as investments now to avoid future humanitarian crises. When competition over land is the source of conflict (as in Somalia and Kenya), development projects that address land productivity may prevent bloodshed.

IUCN has had a long interest in the area of environment and security as it is closely linked to the Union's core work on biodiversity conservation and poverty reduction. Considerable attention has been paid to this issue through IUCN's work in the Sahel.

IUCN is partnering with aid agencies like the Red Cross, development organizations such as CARE, and humanitarian organizations such as the office of the UN High Commissioner for Refugees (UNHCR) to raise awareness of the importance of sound environmental management in reducing conflict.

On the project level, IUCN is working in East Africa with Irish Aid to develop community environmental management plans to build local capacity in managing natural resources. With UNHCR the focus of cooperation has been refugee hosting areas, involving both refugees and the local community, to improve livelihoods through sustainable resource management and land restoration. Refugees acquire the skills to better manage and benefit from their environment when they return home. ■



Talking diversity

The diversity of life is biological, cultural and linguistic, says Luisa Maffi.



When they hear the expression 'diversity of life', most people think of biodiversity: diversity in nature, at the genetic, species and ecosystem levels. Since the concept of biodiversity was coined two decades ago, biodiversity and the threats it is facing have become an object of concern not only among conservationists and academics, but also in the wider world of policy, philanthropy, the media and the general public. But in recent years, a newer, more complex and integrated understanding of the notion of diversity of life has been gaining ground—"biocultural" diversity: diversity in culture as well as nature. From this perspective, the diversity of societies, cultures and languages that have developed throughout human history is another expression of life's evolutionary potential.

Biodiversity and cultural diversity are intimately—some would say inextricably—related to each other. Humans have adapted to life in particular environments, while drawing resources from those environments to sustain themselves. In so doing, they have needed to acquire in-depth knowledge of species, their relationships, and ecosystem functions and to learn how to tailor their practices to suit their ecological niches. To a large extent, this has meant learning about stewardship and responsibility: how to use natural resources without depleting them, and often by enhancing them, to preserve options for the future—in a nutshell, the very principle of sustainable development.

This knowledge, commonly described as 'traditional environmental knowledge' has been passed on through centuries of inter-generational transmission, via language and practical teachings. It has shaped ways of life and world views, and served material as well as psychological and spiritual needs. It has led to the development of a strong 'sense of place'. Through constant innovation, this knowledge has remained alive and vibrant in those societies that have maintained a close link with

and direct dependence on the local environment, such as the indigenous and other traditional rural communities that represent the largest share of cultural diversity.

Environmental degradation poses an especially severe threat for these people. It deprives them of their subsistence base and the basis for their individual and social identity. It undermines their societal structure, organization and resilience. At the same time, the social, economic and political pressures that indigenous and local communities experience worldwide contribute to hastening environmental degradation. Such pressures often result in the displacement of these communities from their traditional territories, the introduction of alien value systems and ways of life, and the loss of traditional knowledge and local languages. Radical changes of this nature can lead to increasingly unsustainable relationships with the environment.

Supporting the resilience of indigenous and local communities is therefore both a human rights imperative and an environmental one. It presents special challenges as well as opportunities for all those involved in environmental protection and social justice. The indigenous movement has been leading the effort to link these two realms in the quest for ensuring their own rights.

Biocultural diversity research, originally spearheaded by a handful of organizations including Terralingua, and now actively pursued in academic and other fora, has contributed to our understanding of the links between biological and cultural diversity. Global and regional mapping of the overlaps between these diversities provide analyses of the factors accounting for these patterns and for the persistence or loss of biocultural diversity. Indicators of the state and trends of traditional environmental knowledge and of linguistic diversity can be integrated with biodiversity indicators to give us a picture of what is happening with

the world's biocultural diversity. Hundreds of studies and applied projects are refining our knowledge of the connections between language, culture and the environment at the local level.

At the same time, indigenous and local groups on all continents have been involved in remarkable efforts to restore the eco-cultural health of their landscapes and communities. Their activities include, among many others, revegetation, protection or reintroduction of culturally-important species, and conservation and promotion of local landraces (domesticated species adapted to the local natural and cultural environment). These efforts are *de facto* biocultural in nature, as they often combine environmental action with cultural affirmation, knowledge transmission and language revitalization.

Research, advocacy and on-the-ground projects have had a key role in promoting a biocultural perspective at international as well as national levels. The Barcelona Congress, with its theme 'a diverse and sustainable world', offers an ideal context for helping to ensure that this perspective is included in conservation policy and implementation. A pre-Congress symposium to be held in April 2008, 'Sustaining Cultural and Biological Diversity in a Rapidly Changing World: Lessons for Global Policy', organized by the American Museum of Natural History, IUCN and Terralingua, will provide a valuable opportunity for exploring how state-of-the-art knowledge can be translated into guidelines for supporting biocultural diversity and its stewards worldwide. ■

Dr Luisa Maffi is co-founder and Director of Terralingua.

www.terralingua.org



Live culture

Conservationists need to see the links between cultural and biological diversity, says Ken Wilson.



The idea that biological and cultural diversity are unrelated phenomena because they have required different western academic disciplines to study them is no longer tenable. A new sense of how to go about conservation is arising from the realization that the future of biodiversity is inseparable from that of cultural and landscape diversity.

This means going beyond doing “conservation with a human face,” or justifying conservation by the benefits sustainable natural resource management provides human societies. It means thinking in an integrated fashion about a future for *all* diversity. Most of the world’s remaining cultural and biological diversity is now concentrated in the very same places (namely the remaining indigenous territories) and faces common threats of homogenization. Advocates for conservation, for indigenous rights and for development too often fight over the future of these places, usually with unequal access to power and money. The results are not pretty. Long-term success

instead requires conservation agencies to be sufficiently nimble and humble to genuinely partner with local and indigenous communities and make “common cause” against the erosion of the uniqueness of these places.

The emerging “biocultural” philosophy for sustaining diversity seeks interventions that strengthen both biological *and* cultural diversity by valuing the connections between them. This typically involves sustaining and adapting long-standing (often invisible) systems of landscape management that are rooted in deep cultural knowledge held by marginalized peoples. In the Ngurnit Hills of the Northern Kenyan desert, for example, we’re supporting Ndorobo traditional honey gatherers in maintaining their co-evolutionary relationship with the honey guide, a bird that leads them to wild bees’ nests in exchange for the wax which it eats. They can then safeguard the future of the bird, strengthen their traditional livelihoods and protect the Acacia forests.

In Northern Australia we’re supporting the return of West Arnhem Land Aboriginal

communities to their traditional lands where they re-establish fire mosaics essential to marsupial and plant diversity. This greatly reduces carbon emissions (so enabling a new source of revenue) while caring for the country by traditional means. In Northwest Mexico we’re supporting the transmission of cultural and ecological knowledge of the Comca’ac (Seri) about their coastal desert and island land and seascapes while enabling a younger generation to integrate indigenous and western knowledge to maintain their integrity.

Adopting an integrated framework for addressing the erosion of culture and nature will be hard. It means overcoming divisions fundamental to western culture, institutional and academic tradition. It means valuing the knowledge of indigenous and traditional people without romanticizing them. It means humbly asking to engage in their ways rather than having them turn up to our planning meetings. It means quietly listening to the guardians of landscapes, understanding their stories and songs, and combining this

understanding with scientific findings on the dynamics of complex systems, especially resilience. It means leaping from familiar linear conservation approaches towards methods that embrace complexity, uncertainty and longer-term cycles.

This will be as exciting as it is difficult. It will liberate a huge amount of knowledge, creativity and talent that has been silenced because we were so excited by what we had learned in the past century that we didn't care what others had learned over the last ten thousand years. By moving away from costly top-down technocratic approaches it will also enable a vast network of problem-solving local managers to tackle our global crisis and honour the responsibilities inherent in their cultures to sustain creation's renewal.

The Christensen Fund, along with many other organizations, is investing in partnerships with local stewards of landscapes, lifestyles and cultural traditions that

sustain the biocultural diversity and integrity of the planet's remaining 'intact' areas. This means making grants to indigenous organizations and to partnerships between local stewards and their allies in the outside world—be they scientists, artists, public servants or business leaders.

Hundreds if not thousands of efforts are underway along these lines, often driven intuitively and from practical experience, and influenced by the rise of indigenous organizations and social movements like the Slow Food movement that demand an integrated perspective. And it is essential to complement support of the guardians of particular places with strengthening global networks of innovators, thinkers, artists and stewards. These networks enable the co-creation and flow of knowledge, values and action. We need all the ideas we can get; no single hero or mega-foundation is going to save the world for us. Maintaining diversity and resilience requires a

diversity of approaches and methods. Without working to re-connect cultures with nature, and values with place, biodiversity interventions alone will never save the planet. ■

Dr Ken Wilson is Executive Director of The Christensen Fund.

www.christensenfund.org

Winds of change

Sacred natural sites are refuges of biological and cultural diversity but are facing a barrage of threats.

For hundreds of years, many sacred natural sites—areas of special spiritual significance for people and communities—have helped protect the environment, providing valuable refuges for biodiversity. But their role in conservation is overlooked and undervalued. Unlike cultural sites such as Peru's iconic Mach Picchu, or Australia's Ayers Rock that are protected under the World Heritage Convention, there is no jurisdiction for sacred natural sites. And the need for protection has never been greater, with these sites threatened on every front.

Sacred sites can be rivers, lakes, mountains, marine areas or forests recognized as sacred by indigenous and traditional peoples, and as places of worship by institutionalized religions or faiths. Sacred natural sites are integral to ethnic identity and play a key role in traditional cultures and livelihoods. Although created for spiritual and cultural reasons and not for biodiversity conservation *per se*, the sacredness of nature within these sites has led people to care for it.

As useful sources of genetic material, some sacred natural sites can be used to rehabilitate degraded land and protect watersheds—in Ghana they have been used to revive degraded savannah ecosystems. The Kaya forests of Kenya are regarded as a source of cultural identity and strength by the Mijikenda community. They also provide firewood, herbal medicine, wild fruits, vegetables and fibre. Ponds and springs within the forests are often the only accessible source of clean water for neighbouring communities.

Interest in the role of India's sacred groves is increasing. Rich in biodiversity, these groves are dedicated to local deities or ancestral spirits and are cared for by local communities. In some cases, they provide a range of products used in rituals by traditional priests or shamans, or in healing, such as plants used in Ayurvedic medicine. "People simply do not exploit them, but strive to safeguard them," says Raghunandan Velankar from Research and

Action in Natural Wealth Administration in India.

While community controls once helped protect sacred sites, rural people are increasingly vulnerable to political and economic pressures outside their control. Even when sites lie within official protected areas such as national parks, communities often lose rights over them. Without security of land tenure and active participation in decisions that affect them, it is impossible for these communities to protect their land and resources.

"Development mega-projects such as dams and port facilities are severely threatening the conservation of Jukulwa, a sacred site that protects the health of nature in our Ka'sankwa territory", says Rogelio Mejia of Colombia's Gonawindua Tayrona indigenous organization, speaking about traditional lands within the famous Sierra Nevada de Santa Marta mountain. "There are also projects proposed to bring mass tourism to our

sacred mountain, which will lead to us losing control of the area and resulting in impacts on nature and our culture.”

IUCN, through its Task Force on Cultural and Spiritual Values of Protected Areas (under the World Commission on Protected Areas), supports the protection of sacred natural sites of indigenous and traditional peoples, and of holy lands of religious and faith groups.

“We greatly appreciate the important contribution that faith communities are making to the planet through caring for lands and places they deem holy,” says Rob Wild, Task Force leader. “We’re concerned however that some communities are facing difficulties in continuing their stewardship of nature. So we support improved management of their sacred and holy lands, and promote better recognition of their significance by the conservation community, government authorities and intergovernmental bodies.”

Sacred natural sites are not only significant in the developing world, but as programmes such as the Delos Initiative (created by the Task Force) aim to show, are also highly relevant in the developed world, contributing to the sustainable use of natural areas.

Although great efforts are needed to stem the current loss of these sites, there are indications of change. Sites in some countries are also being returned to their traditional custodians. In May 2006 two Australian national parks were handed back to their traditional Yuin Aboriginal owners after some 240 years of European settlement. And earlier last year, 39 Sacred Kaya Forests in Kenya were inscribed on the World Heritage list, while in Mongolia sacred texts are being used to re-establish many of the country’s 800 sacred sites.

“In recent centuries the accord between nature and humanity has been fractured. Now the wind seems to be changing and we

hope the powerful connection between sacred sites and nature will be felt once more,” says Rob Wild. ■

www.iucn.org/themes/spg/themes_sacredsites.html



Can sacredness help protect species?

Many species are held sacred throughout the world by various peoples, cultures and faiths. Are these species shielded from threats because of their sacred status? Anna McIvor and Gloria Pungetti investigate.

For animals, the answer would seem to be no: a number of sacred animals are already listed as threatened on the IUCN Red List. While sacred animals are often protected within areas where the people (who hold them sacred) live, outside those areas they are subject to threats over

which the people have no control. For example, the tiger is deemed sacred by the Bodo tribe of Assam, India, but it ranges across much of Asia and poachers continue to kill it for its skin and use in traditional medicine. However, while the Bodo people cannot protect the tiger species as a whole,

they could help in its conservation, as the area where they live could form an effective tiger reserve.

When species live entirely within the jurisdiction of the people who believe them sacred, more positive results are possible. The cui-ui lake sucker fish, which is listed as Critically Endangered, is now only found in Pyramid Lake, Nevada, in the US, which lies within the Paiute Tribe reservation. The fish was once one of the main foods of the Tribe, who call themselves Cuyui Ticutta, meaning the "Cui-ui Eaters". Following water diversions and dam construction on the river feeding the lake, the cui-ui had not reproduced for several years because it could not reach its spawning grounds. The Paiute Tribe set up a fish hatchery to rear young fish which they returned to the lake, and this, combined with several wet years has led to an increase in fish numbers.

Sacred plants fare better than sacred animals, and very few are currently listed as threatened with extinction, perhaps because many of them are cultivated. The ginkgo or maidenhair tree has been planted in temple grounds for hundreds of years by Taoists and Buddhists, and is now planted in cities around the world. Few wild populations remain, and some believe that even these may be descendants of temple trees, suggesting that being sacred may have saved this species from extinction.

Clearly, sacredness can contribute to species conservation. But it is hoped that an increasing awareness of the cultural and spiritual values of nature will allow them to play a greater role in protecting threatened species and ecosystems. A recent conference on Sacred Species and Sites organized by the Cambridge Centre for Landscape and People in association with IUCN's Cultural and Spiritual Values of Protected Areas Task Force was an important step. Participants recommended that IUCN explore options to integrate cultural and spiritual values into species conservation assessments. To follow up, a group of specialists from IUCN's Species Survival Commission will meet with social science experts at the Barcelona Congress. ■

www.cclp.group.cam.ac.uk



The big picture

For thousands of years, nature has stimulated artistic expression.



Diversity: variety and unlikeness. Diversity refers to cultural, social, political and religious differences, as well as to the variation of life forms on earth. In art, diversity could be interpreted as what calls for attention, what inspires. From time immemorial, artists have been stirred by nature. Humans have looked at their environment and created from it, from cave paintings to the decorations in Egyptian tombs and Christian churches. Today, as the natural world declines, art is still a prominent vehicle for diversity.

Celebrated painter Marc Chagall once said that great art picks up where nature ends. Others might think that art starts with nature as many artists draw on their environment for inspiration. From fashion designers to photographers, architects and painters, artists from all walks of life use diversity to fuel their inspiration.

For Martin Dartey, a Ghanaian painter and art historian, nature is the master artist and sculptor. "I paint forests, animals in migration, abstract forms from nature, but I

am also inspired by man's activities, his creations which are an extension of nature." Henri Matisse noted that an artist must possess nature. "He must identify himself with her rhythm, by efforts that will prepare the mastery which will later enable him to express himself in his own language."

It is in fact difficult to find any kind of art which does not have a natural element to it. With Paris and Milan catwalks as a backdrop, Ann McCreath, a Scottish fashion designer based in Kenya and Managing Director of Kiro Ltd, notes that her inspiration comes from the culture around her, the colours and patterns of the environment, as well as international fashion trends. For Ann, designers the world over have been influenced by the environment from the beginning of time. "The influence may be more or less abstract, but it's always there," she stresses.

"Biodiversity inspires designers and fashion stylists through the whole process of production, from choosing fabrics and garments, to locations and finding the right model for the designated theme shoot,"

notes Connie Aluoch, Fashion Editor, *True Love* East Africa Magazine, based in Kenya.

Architects also fit nature into their drawing board. Marco Carlini, from Studio Carlini in Italy who specialize in the restoration of old farmhouses, notes that he and his peers have a two-way relationship with the environment: on the one hand, they draw on it to find inspiration; on the other, they use nature directly in their work. Lord Foster from Fosters and Partners, the group that built France's Millau Viaduct (the world's tallest road bridge) and Hong Kong's Airport amongst many other prized works, pioneered ecological constructions with the Commerzbank Headquarters in Germany, the world's first ecological office tower which opened in 1997. According to the group, "the quality of our surroundings can lift the quality of our lives" and, for Lord Foster, "the optimum design solution integrates social, technological, aesthetic, economic and environmental concerns."

Buildings consume half the energy used in the developed world, while another

quarter is used for transport. "Sustainability is a word that has become fashionable in the last decade," notes Lord Foster, "however, sustainability is not a matter of fashion, but of survival."

Photographer J. Henry Fair notes that "we are at a crossroads, but I have hope because we have the power to cause change. A dollar spent on one brand of toilet paper supports deforestation and massive pollution; a different purchase decision saves the forest and supports the reuse of post consumer material. If we can convince a

"tipping point" of the population to change their purchasing habits, the message to the producers will be unstoppable."

Henry takes aerial photographs of places where Man has disfigured nature through the likes of mining or deforestation. He notes that, "my artwork, though apparently the antithesis of nature, is all inspired by it. My work is about getting people to realize the consequences of their actions."

In short, for some, art will go on without biodiversity, whilst for others, it will die. For Martin Dartey, art will tell the story of

the depletion of biodiversity, whilst for Connie Aluoch, art will cease to exist as "every species that surrounds us evokes some form of creativity that influences our lives". For Auguste Rodin, art is contemplation. It is the pleasure of the mind which searches into nature and which there divines the spirit of which Nature herself is animated—so what will be left of art as nature disappears?

Time will tell how art will evolve in a world which has less and less pristine nature and diversity to inspire its creators. ■

Empty nest syndrome?

Inspiration for the design of the Beijing National Stadium which will host this year's Olympic Games came from the avian world. Dubbed the 'bird's nest stadium' because of the twig-like structure created by thousands of metres of interwoven steel, the stadium also features green elements such as a rainwater collection system, a transparent roof providing sunlight for the grass below and a natural ventilation system. Designed by Pritzker Prize-winning architects Herzog & de Meuron, the stadium also boasts a 'cushion' system which fills the spaces within the building's facade to regulate wind and other climatic features.

Yet with such attention to detail, the nest may well be left empty on some days as Beijing's polluted air might postpone some Olympic events by a day or two, according to the International Olympic Committee. A UNEP report found that the average level of small particulate matter in Beijing's air in 2006 was eight times higher than the level recommended by the World Health Organization.

A resolution agreed on at the 3rd IUCN World Conservation Congress, on threats from Olympic Games and other major sporting events to protected areas and biodiversity, calls on IUCN to provide guidance to international sporting federations to ensure that the green does not fade in the Olympic rings.



Natural capital

Failing to view ecosystems as an economic asset is undermining our efforts towards sustainable development, says Sriyanie Miththapala.



Few people would deny that infrastructure—the facilities, services and equipment needed for society to function—lies at the heart of economic development and poverty reduction. So it is hardly surprising that development investments, national spending and overseas aid have always focused heavily on it.

However, conventional definitions of infrastructure, and the bulk of investment in it, have ignored one of its most important and productive components—natural ecosystems. Wetlands play a valuable role in wastewater purification and treatment. Coral reefs and mangroves provide a critical defence against floods, storms and tidal surges, while forests help protect water quality and supplies.

The Millennium Ecosystem Assessment provides a useful framework for understanding the economic significance of the links between ecosystem goods and services and human well-being. Like other infrastructure components, ecosystems provide the basic life support services that underlie economic development and allow society to function.

While much time and funding have been invested in man-made capital such as roads, bridges, ports and water treatment plants, investment in natural infrastructure remains extremely low. Despite the direct link between ecosystem well-being and human well-being, ecosystem under-valuation remains a persistent problem in development planning. When projects are planned, balance sheets rarely tally up the economic benefits that ecosystem services provide, or recognize that there is a tangible return to investing in their conservation. At the same time, the economic costs and lost opportunities resulting from ecosystem degradation are not considered when land use alternatives are weighed against each other.

Although economic models traditionally have been ill-equipped to deal with ecosystem values, recent advances show that it is now possible to calculate and express them in monetary terms. In many cases, the calculations used in development decisions are incomplete and therefore misleading because they underestimate or even ignore these values.

Taking marine and coastal biodiversity as an example, a more complete approach to valuation highlights the immense and traditionally uncounted value of ecosystem services. Marine and coastal tourism is the largest industry in the Maldives, accounting for 20% of GDP and 40% of employment. Associated activities produce 74% of national income, 60% of foreign exchange earnings, and 90% of government revenues. Yet national economic indicators and development statistics rarely reflect these broader values.

Ecosystem goods and services also often provide the basic infrastructure for household production and consumption, a critical set of values given that efforts to strengthen



livelihoods and alleviate poverty are the major goal in today's development agenda. In parts of Indonesia, the traditional use of mangrove products has been valued at over \$US 3,000/ha/year, contributing up to half of the income of the poorest households. In Southern Thailand, mangroves contribute more than a quarter of per capita GDP.

Ecosystem services have an enormous value in upholding economic productivity, safeguarding settlements and reducing vulnerability. On the Baluchistan coast of Pakistan, mangroves directly contribute around US\$ 1,300/ha/year to inshore fisheries (about 95% of local income), and provide the nursery and breeding habitat upon which up to half of offshore commercial fish stocks depend (valued at around US\$ 900/ha). The value of coral reefs, including coastline protection, is estimated at hundreds of thousands of dollars per square kilometre in Indonesia, and close to a million dollars in the Philippines. In Sri Lanka, coastal wetlands provide critical flood protection and water treatment services to surrounding settlements, to a value of US\$ 2,500 per hectare.

Clearly, the problem is not that biodiversity and ecosystems have no value, but rather that this value is rarely factored into land use, resource use or investment decisions. Failing to invest in ecosystems as assets is not only short-sighted in economic terms, but may ultimately undermine cost-effective, equitable and sustainable development for all.

If ecosystems are recognized as assets which yield many of the services required for

the economy and society to function properly, the human, social and financial capital that is required to sustain them (and which they, in turn, sustain) also needs to be allocated. To ensure their productivity and continued support, ecosystems need to be maintained and improved to meet both today's needs as well as intensifying pressures in the future—just like any other component of infrastructure. ■

Dr Sriyanie Miththapala is a member of the Species Survival Commission and works with IUCN's Ecosystems and Livelihoods Group in Asia.

www.iucn.org/places/asia/coastalinfo/index.htm

What's next?

Biodiversity is following climate change as the next big challenge for banks and other financial institutions.

NGO activism, increasingly stringent environmental regulations, strengthened liability laws, and shifting consumer preferences are all making business pay greater attention to biodiversity and ecosystems. Financiers are also taking note.

In a new report based on research carried out under an IUCN-Alcoa Foundation Fellowship, Ivo Mulder finds that biodiversity is increasingly relevant to a range of businesses and could become the next major challenge after climate change. Certain business sectors are more exposed to biodiversity risks than others. These include companies with a direct impact on ecosystems, such as oil and gas, mining, and construction, as well as those that have major indirect impacts through their supply chains, including the retail food sector. Companies in the tourism, fisheries, forestry and agricultural sectors,

which depend directly on ecosystem services for their profitability, are also exposed to biodiversity risk. This can include reduction in the quality or quantity of the ecosystem service they rely on (such as fish stocks or scenic beauty), damage to reputation, legal liability or increased regulatory scrutiny, and delays in permit allocation.

Financial Institutions (FIs)—including retail and commercial banks, asset managers, institutional investors and insurance companies—which finance these kinds of businesses are also vulnerable to biodiversity-related risks. FIs that cannot readily identify which companies are most at risk may be exposed to higher rates of default on loans, lower investment returns or increased insurance claims.

“Although it is difficult to systematically link biodiversity-related business risks to

tangible financial measures, such as market capitalization or credit risk, a number of case studies demonstrate the growing importance of biodiversity conservation to the financial sector,” says Mulder.

In April 2007, European Union member states introduced legislation which holds operators liable for damage to water resources, soil, fauna, flora and natural habitats, and makes the polluter pay whenever damage cannot be avoided. Biodiversity may be difficult to gauge in terms of ‘insurability’, but insurance firms need to address this if they want to stay in control of their business.

With oil and gas companies carrying out increasingly complex offshore exploration and production, the risks to both biodiversity and business also increase. In an effort to manage these risks, the investment bank Goldman Sachs has tested a new tool,



the Biodiversity Benchmark (originally developed by Fauna & Flora International and Insight Investment), to guide its investment decisions in the extractive industries.

Biodiversity is not just about risks, however. There are many emerging biodiversity business opportunities that FIs can seize, including growing markets for certified sustainably-produced commodities, such as fish, timber and organic foods. Recent estimates suggest a potential market for certified fish, timber, food and medicinal products of up to US\$ 75 billion annually by 2010. Markets are also emerging for new ecosystem services, such as biodiversity offsets, water quality and biocarbon. Prospects for market growth in ecosystem services are less clear but some suggest that these new markets could be worth as much as US\$ 10 billion annually by 2010.

Another potential opportunity involves providing due diligence or advisory services to clients that need help in managing biodiversity-sensitive projects and

in biodiversity-related insurance coverage. Around 65% of the value of the insurance premiums paid by shipping companies using the Panama Canal is environment-related, such as covering the risk of delays due to too little water or dredging. Sustainable land management of the slopes above the canal may help to reduce such risks and could provide a new source of income for rural land users.

Ultimately, the case for mainstreaming biodiversity in the risk management procedures of financial services and investing in biodiversity businesses will depend on clear evidence that biodiversity risks and opportunities are economically significant by linking them to standard financial measures. In early 2007, the environment ministers of the G8 countries and five newly-industrializing countries launched the "Potsdam Initiative – Biological Diversity 2010", which included commitments by governments to "approach the financial sector to effectively integrate

biodiversity into its decision making". Another element of the Potsdam Initiative is to launch a global study of the economic significance of biodiversity loss, inspired in part by the 2006 Stern Review of climate change. IUCN is closely involved in the development of this study and is likely to play a major role in both the research and public consultation as the project moves ahead. ■

www.iucn.org/themes/economics

Keeping it clean

Chief Executive of Air New Zealand Rob Fyfe explains why the company has such a high stake in protecting the environment.

First and foremost Air New Zealand is a tourist airline—linking our remote nation to global trading partners and enabling visitors to come and experience the unspoilt beauty that is New Zealand. Central to our nation's appeal is its 'clean green' image. The diversity of its land and seascapes, the uniqueness of its fauna and flora, and its rich culture attracts more than 2.3 million visitors each year—not bad for a country of only 4.2 million inhabitants. The growth in tourism has been driven by the nation's strong international profile and increasing air capacity.

Air New Zealand plays a major role in ensuring the country's image is maintained around the world. As one of the most active and effective marketers of New Zealand globally, we spend millions of dollars a year encouraging tourists to visit. But we see the paradox; in doing so we must manage our impact on the environment in a sustainable way.

Environmental lobbyists around the world, but particularly in Europe, are painting air travel as the new tobacco. Air travel is an easy target; a little less air travel seems a lot easier for people than fundamentally changing one's lifestyle and current behaviour, like driving less, consuming less electricity and eating less processed foods. Politicians and even environmentalists themselves have been publicly hounded for making long-haul flights. In a recent survey, one in five Australians said they were considering abandoning air travel because of its environmental impact.

As a geographically-remote nation, which relies on tourism as a major source of income, and air travel as the only realistic means to get in and out, any consumer reluctance to take long haul flights is not good news for us. Tourism is made up of around 18,000 small and medium enterprises, meaning it's fragmented and not very visible, but it employs one in 10 of us. It

contributes more than NZD 18 billion annually to New Zealand's GDP—around 10% of the total. Looking ahead, it's clear to me that making Air New Zealand the most environmentally-friendly airline in the world will be integral to the future success of New Zealand as an attractive trading partner and visitor destination, and to the country's economy as a whole.

Governments and consumers in all major countries now see the degradation of our environment as the key issue of our time. Our Government has taken a very strong stance on environmental sustainability. In essence, it has committed New Zealand to punching above its weight, demonstrating global leadership and "showing the world how to do it".

Customers big and small are factoring in environmental responsibility before making purchasing decisions, and this is something we should embrace. Working with the Government we're taking a bold

stand in support of a sustainable planet. A cornerstone to that is our long-haul fleet replacement programme. We're committing more than NZD 2 billion to acquiring what will be the world's youngest, most environmentally-friendly and technologically-advanced long-haul fleet.

And Air New Zealand's commitment to environmental responsibility will not be confined to the traditional. We're working with Boeing and Rolls Royce on the development of biofuels. The inaugural step in the relationship will be the first commercial trial of a biofuelled, Rolls Royce powered, Boeing aircraft in 2008–2009.

Much of the debate around Kyoto focuses on the cost impact of compliance, and the risk that it will make us uncompetitive as a nation, particularly if the US and

Australia continue with their stance and elect not to ratify Kyoto. We have to ask if we want to be a nation dependent on commodity producers. If our only competitive edge is as a low-cost producer, it's very hard for a nation the size of New Zealand to compete. Taking the lead on environmental performance and delivering meaningful, differentiating performance, rather than 'green-washing', can become a competitive advantage for us and enable New Zealand, our products and services to command a price premium. Our future as a nation lies in quality, sustainability and working with our environment to capitalize on our key competitive advantage—the land we live on. ■

www.airnewzealand.com

Air New Zealand is a member of the Star Alliance network of airlines that has teamed up with IUCN, UNESCO's Man and the Biosphere (MAB) Programme and the Ramsar Convention on Wetlands to launch Biosphere Connections. With the aim of promoting biodiversity conservation and the sustainable use of natural resources, the initiative uses the communications activities of the four partners including websites, publications, events and in-flight entertainment systems. It also allows the airline connections of the Star Alliance to help connect the people and places of IUCN, UNESCO MAB and Ramsar in their daily work.



Talking Heads

World Conservation asked people from a range of occupations what diversity means to them.

THE POLITICIAN

Doeke Eisma is former Chair of IUCN's Netherlands National Committee and Executive-Director of GLOBE Europe, a network of parliamentarians. He has served as a Member of the European Parliament and as a member of the Dutch Parliament.

Personally, biodiversity is essential to my well-being—I need a diversity of species, landscapes and nature around me. Because of this, I enjoy working in the field of conservation and helping to export IUCN's ideas. There is still too much ignorance of what biodiversity or ecosystems are: 90% of people today do not understand these terms, and that includes Members of the European Parliament and its Environment Committee.

Working with small and medium enterprises in The Hague and with IUCN on the “Leaders for Nature” project which brings together businesses and environmentalists, I see that business people are increasingly aware of biodiversity's importance. I am optimistic that people will value biodiversity more and more, and understand the links between species. High profile events and interventions like that of Al Gore help remind people that tropical forests and global warming, for instance, are connected.

The past five years might have seen an increase in awareness, but there is much scope for improvement. However much we try to promote biodiversity, it will never be fast enough. Through GLOBE, it's my job to influence people's way of perceiving nature and help raise awareness of diversity.

THE WRITER

Tom Hall is Travel Editor at Lonely Planet and a regular commentator on travel news and events in the media across Europe.

Biodiversity is very much key to why people travel. Twenty years ago, people simply wanted to go to India, but now they go to India to go tiger spotting. Biodiversity drives travel, with people and culture also playing a part.

Working in travel publishing, I am inspired by biodiversity and confronted by the variety of the world's species. When I am not at work, I take refuge in it!

Lonely Planet opens people's eyes to how they can make a trip to see things in a responsible fashion, enabling them to take informed decisions.

A diverse world is remarkably important to me. We live in a globalized world, and with so much being the same, diversity comes into focus. It is the differences that make things and places interesting.

The travel market has changed over the past couple of years. What was once a nice destination for experts, like botanists for example, has become mainstream. Responsible travel has also taken off. Guidebooks exemplify this, with tailored “green” tips and extensive environment sections. The authors have been a driving force in making environmental issues understood.

In terms of people being more aware of the risks linked to biodiversity loss, there is scope for progress but in terms of

travel, guidebooks need to be careful not to preach to travellers. Feeling you are being banged over the head is a turn-off, but knowing what to do best for the environment is definitely a bonus. My job can help guide people's decisions, whilst real environmental awareness comes from other sources.

THE BIOLOGIST

Susana González, based in Uruguay, is a conservation geneticist involved in research projects on endangered large mammals, especially the neotropical deer. She is Chair of IUCN's Deer Specialist Group.

Biodiversity to me means stability of life. For me diversity is essential in all contexts; from a biological perspective, but also from a social and emotional one. As well as plants and animals, I think of human society, with its different views and opinions. Life would be very boring if we were all identical!

I think people's attitude towards biodiversity is changing for the better, as demonstrated by an increasing level of responsibility and a will to find conservation solutions. In Uruguay, efforts should be made in the fields of environmental education and on raising awareness of the value of nature and native biodiversity, and of the importance of planning human activities that promote conservation. But our authorities also need to show concern and put conservation on their political agenda.

I believe people in general are more aware of the risks involved with biodiversity loss. The effects of climate change are being felt everywhere and people pay attention when it affects their lives, families, houses or jobs.

I work in the field, researching pampas deer and doing environmental education at a rural school. I'm convinced of the importance of dissemination activities; they can make a difference, raise awareness and change attitudes.

THE LAWYER

Todd J. Friedbacher is partner at the law firm Sidley Austin LLP. He counsels and represents governments and private parties on international regulatory issues arising under multilateral agreements such as those administered by the World Trade Organization.

Biodiversity means striving to achieve the right balance between our species and all others, evening out the needs of each so all species can co-exist. Biodiversity is more a personal than a professional thing for me. I deal with high profile cases related to breaking agricultural subsidy regimes in developing countries for instance. This lends itself to achieving higher biodiversity, allowing land to be put to other uses.

The push towards globalization might see economic elements overwhelm cultural, natural and other diversity, but we cannot let one of the goals of globalization (the economic one) override the others. That said, fighting globalization is like fighting gravity.

Changes are linked to the socio-economic status of individuals. People who directly depend on nature are more

connected to it, whilst affluent societies and their education systems remove us from nature. Climbing the socio-economic ladder however restores the capacity to think about biodiversity issues, it reinstates that luxury.

I certainly think that the average individual today is far more aware of the damage being done to the world. I have seen a great change in the past two years, especially in societies that are traditionally ignorant of such issues, like the US. Rich nations are the last to face critical questions linked to sustainable development.

In terms of my colleagues, everyone I know would put the environment in their top three issues when it comes to voting. People are looking to governments to provide direction, to act against climate change and species loss, and towards sustainability. We need goals, and a benchmark from which to measure progress.

THE BANKER

Mark Eadie is global head of environmental management for the investment arm of JP Morgan Chase, one of the world's largest banks. After 18 years working around the world for Shell, he spent two years as head of the Beijing office of the international environmental consultancy ERM. He divides his time between advising the bank and its clients on environmental and social risk, and on environmental initiatives.

Biodiversity is critical to sustaining the planet. It is the chaotic, seemingly unplanned, unstructured mess of biology, zoology, ecology, geography, geology, chemistry and physics that creates and sustains our world.

I don't think I can honestly say that biodiversity, *per se*, "inspires me". Diversity—in human and cultural terms—certainly does, although I have no idea why: it just seems more fun and more rewarding! Although, without biodiversity, I suspect we are ultimately doomed, if not to extinction, at least to a tedious, artificial existence.

Diversity is critical to me. Having lived and worked in many countries, I find "monocultures" stifling and uninspiring. Globalization has created a tumultuous mix of different ideas, themes, approaches and agendas. It has maybe led us to appreciate that we can't understand or order everything and that "chaos"—and especially the chaos of diversity and particularly biodiversity—is acceptable and even desirable.

People are much more aware of biodiversity, but many believe it to be a distant issue in a faraway country, like rainforests in Papua New Guinea or Brazil.

Biodiversity is on the agenda of an increasing number of colleagues, many of whom are actively looking for ways to apply the precautionary principle. In banking, there are probably fewer environmentalists than in other sectors, but this doesn't mean there is a lack of concern about doing the right thing. We are regulated and have specific obligations towards our clients and investors, yet biodiversity is one of the many factors to pull into deals when appropriate. It is not always easy, but it can be done.

We conduct assessments on a huge range of deals, projects and clients to ensure compliance with our environmental policies and to help companies align themselves with international expectations. In many cases, our approval is needed before a deal can go ahead, and this helps bankers and clients alike focus on a range of environmental, health and safety issues.

Pragmatism is critical. I get to show why it makes good financial sense to behave in a responsible manner, and it's a luxury of the job that I get to influence and promote environmental stewardship, socially responsible behaviour and biodiversity.

THE TEACHER

Gareth Haysom, based in South Africa, has worked on projects related to poverty alleviation within the tourism industry and environmental sectors. With the Sustainability Institute, he is involved in projects to support integrated and sustainable human settlements in South Africa. He is also developing a school for sustainable agriculture and biodiversity, and teaches on sustainable tourism and sustainable development at Stellenbosch University.

For me, biodiversity means the entire species system and its inter-connections, looking at how species are being depleted, and at the long-term implications.

Biodiversity is critical to food production and people's livelihoods in general; it is the golden thread that runs through everything. I use nature in my education programmes, looking into sustainable agriculture, the links that most things have with biodiversity and the implications of its depletion.

The more diverse, the more interesting! Monocultures are dull and unexciting. A lack of diversity undermines opportunities, making a diverse world even more important in the context of globalization.

From the beginning of my career, I have experienced a shift in perspectives, and the past five years have seen the sharpest increase in awareness. The messages related to biodiversity loss have become more specific, for instance on climate change and its impacts.

The risks of biodiversity loss might be discussed in academic arenas but the general population in towns for instance might not have such conversations. Awareness does not always trigger a desire for change. In terms of progress, I see a need to focus on indigenous knowledge, how it translates into cultural traditions and how it can help sustain biodiversity.

Education is central to our work. Nature forms part of the core language we use in programmes with communities. It is part of the "triple bottom line", where all levels of society are influenced by the environment.

THE ARCHITECT

Hanspeter Oester of AGPS Architecture is one of the architects striving to make IUCN's new building a showcase in sustainability.

"Architecture should be a part of nature. This has to be taken into account in all design aspects; we must always 'think sustainability' and integrate the natural assets that we find on site. At the IUCN extension it is basically about reusing storm water and using solar and geothermal energy. The overall design aims to reduce energy needs, for example, the orientation of the building takes advantage of solar radiation; waste heat will be recovered.

Nature shows us how to create effectively. I'm convinced that with buildings you can be sustainable with limited means and integral thinking. People have reservations towards solutions they don't know or haven't seen. With IUCN we're able to go 100% in the right direction. We're working with simple but sound technologies and materials that offer a long life span. Simplicity means low maintenance and durability. Like people, buildings should age gracefully." ■

Bioprospecting: securing a piece of the pie

The commercial use of biodiversity has become a highly contentious area of policy, marked by mistrust and misunderstanding. Sarah Laird and Rachel Wynberg say the arguments are far from being settled.

Bioprospecting—the exploration of biological material for commercially-valuable genetic and biochemical properties—is usually associated with the contemporary research and development of biodiversity using sophisticated technologies in research intensive industries. However, the practice of collecting, analysing, and commercializing biological material is as old as human civilization. New crop varieties, medicines, livestock, and other products have resulted from a long history of trade and exchange of genetic and biological resources, and associated traditional knowledge.

Today, the pharmaceutical, biotechnology, seed, crop protection, horticulture,

cosmetic and personal care, fragrance, botanicals, and food and beverage industries market numerous valuable products derived from genetic and biological resources. They also undertake research and development for new products, or use genetic resources in their research or manufacturing. But the ways companies demand access to resources, and use them as part of R&D programmes, or in commercial products, varies significantly by sector.

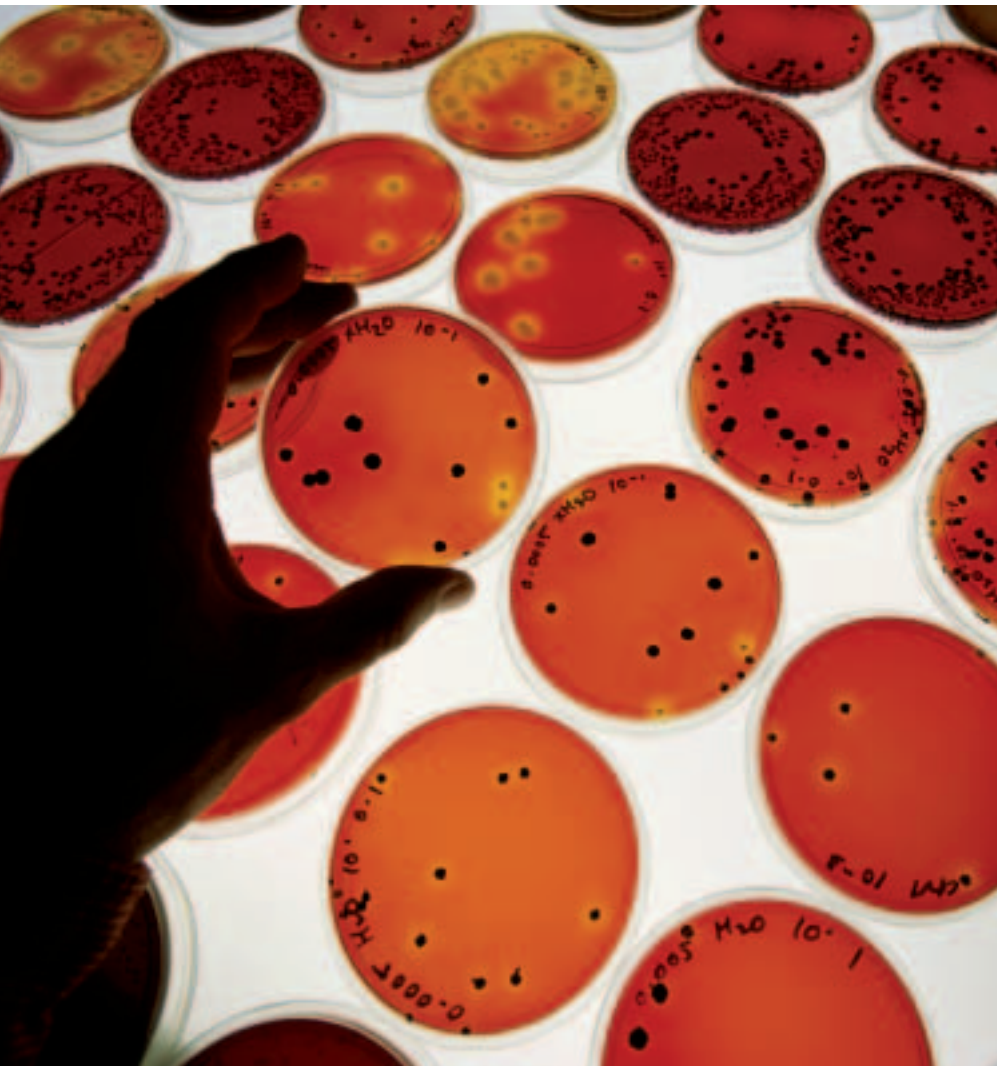
Scientific and technological advances in the 1990s led many pharmaceutical companies to lose interest in natural products as a source of molecular diversity for drug discovery and development. Natural products were

considered too slow, too costly, and too problematic from a scientific and business perspective. There were also major uncertainties because of the lack of legal clarity associated with gaining access to material under the terms of the Convention on Biological Diversity (CBD) which require equitable benefit sharing, prior informed consent, and mutually agreed terms. At the same time, however, natural product drugs developed in earlier years continued to contribute significantly to industry's bottom line, particularly in categories like infectious disease and cancer.

In the last decade, in what are now well-established research cycles, new scientific and technological developments have once again made natural products of interest. At the same time, however, they have also made it possible to look with new eyes at what is found in companies' 'backyards' and to generate more diversity in the laboratory, where existing genome sequences and databases can yield novel structures. The full impact of these developments on demand for access to genetic resources from high biodiversity areas is still unfolding, but it is likely that nature will continue to be a source for original novelty and complexity that will then be modified in the laboratory.

As a result of these advances, microorganisms are of increasing interest to the pharmaceutical and biotech industries. While plants, insects, marine and other organisms continue to be studied, new technologies allow researchers to access microbial diversity previously inaccessible to them. At the same time they are discovering a far greater number of interesting compounds in known organisms through 'genome mining'. The astounding numbers and diversity of microorganisms, combined with their all-pervasive existence, have led to renewed interest in their use for energy- and water-saving industrial processes, climate control, pollution control, biomaterials, and many other applications. When collecting from nature, biotech companies are interested in biochemical diversity found not only in areas with high species diversity, but also in extreme environments or unique ecological niches like salt lakes, deserts, caves, hydrothermal vents, and cold seeps in the deep seabed.

The US Venter Institute is undertaking a global expedition to sample microbial



abundance and diversity in marine and coastal environments. The findings will be used to design and engineer species to replace petrochemicals, better understand reef health, analyse drinking water and air quality, track and avoid emerging viruses, and understand the effects of releasing ships' ballast water. Initiatives such as these throw up a host of new questions and challenges regarding access and benefit sharing (ABS), including difficulties in assigning ownership over microorganisms, and prior informed consent and benefit sharing associated with these collections.

In recent years, concerns about biopiracy have escalated. In some cases these concerns have been necessary stimulants towards attaining equitable agreements and persuading reluctant parties to negotiate. For example, public outrage was expressed about the filing by the South Africa-based Council for Scientific and Industrial Research (CSIR) of a patent for active compounds of the Hoodia plant responsible for suppressing appetite. The indigenous San had long used the plant for this purpose, but the CSIR did not get consent to use this traditional knowledge, and the San were not acknowledged in

the patent application. International media coverage and NGO pressure forced the development of an agreement of mutual benefit to the CSIR and the San.

On the other hand, charges of biopiracy and legal uncertainty associated with accessing genetic resources are considered major impediments to commercial and academic research. A number of companies have restricted their research activities as a result, and many academic researchers find the ABS policy process is having a negative effect on basic science and traditions of trust and collaboration. Rather than coming together to create simple, workable legal and regulatory ABS frameworks, providers and users of genetic resources are increasingly estranged. The bioprospecting environment is characterized by misunderstanding, mistrust and regulatory confusion.

Under the auspices of the CBD's Ad Hoc Open Ended Working Group on Access and Benefit Sharing, negotiations are taking place to develop an international regime on ABS in relation to biological resources and traditional knowledge. Such negotiations have been ongoing for four years, and are due to conclude in 2010. The process is

intensely political and conflict-ridden, with little agreement on either the scope or objectives of the new regime. Bridging polarized views might be possible however, with improved understanding of the financial, legal, scientific and technological realities of bioprospecting and the benefits it can yield. Also needed is the development of informal processes to promote dialogue and build consensus between stakeholders. These are areas in which NGOs can make an important contribution. ■

Sarah Laird is the Director of People and Plants International, and is a member of IUCN's Species Survival Commission. Rachel Wynberg is a senior researcher, based at the Environmental Evaluation Unit, University of Cape Town, South Africa. This article is based on a paper prepared for the CBD Secretariat (UNEP/CBD/WG-ABS/4/INF/5), the full version of which can be found at www.biodiv.org.

Call of the wild

Training and awareness-raising are essential to ensure that nature-based tourism develops sustainably in Latin America, says Ronald Sanabria.

Nature-based tourism is booming. Tourists are flocking in the millions to biologically-sensitive areas that until very recently were considered too remote to access. Some argue that nature tourism is growing three times faster than the industry as a whole. According to Conservation International, tourism to biodiversity hotspots—the majority of which are located in poorer countries—increased significantly between 1990 and 2000. These naturally-endowed regions are magnets for visitors who may inadvertently threaten the very places they come to enjoy.

According to the United Nations World Tourism Organization (UNWTO), with almost 850 million people travelling each year, the tourism industry now accounts for

8% of all jobs worldwide. For developing countries, this number is even more significant: tourism is the number one source of revenue for more than 30% of the world's poorest nations.

Boasting beautiful coasts, majestic mountain ranges, colourful cultural history and some of the largest expanses of undisturbed tropical forests in the world, Latin America features enormous biodiversity and has the most to gain—or potentially lose—from the tourism boom. According to the UNWTO, the number of international visitors to Central America rose from 1.9 million in 1990 to 7.0 million last year, while in South America, visitors increased from 7.7 million in 1990 to over 20 million during the same period.

By integrating the three principles of sustainable development—ecologically, economically and socially sound practices—the tourism industry in Latin America has the potential to make travel a tool for the conservation of natural resources and cultures.

This is why the Rainforest Alliance is working in Belize, Costa Rica, Guatemala, Ecuador and Nicaragua to overhaul the tourism industry from top to bottom. "By giving hotel owners and tour operators an incentive to protect the world's beautiful and undeveloped areas, we are convinced that tourism has the potential to be a powerful agent of change," says Ronald Sanabria, director of the Rainforest Alliance's sustainable tourism programme.



Sanabria and his colleagues say there are several steps that must be taken in order to change the industry. Sustainable tourism policies must be created and implemented at both the local and national level. They want to see a greater number of alliances between the public and private sector to help broaden the effectiveness of these policies. Motivating travellers to choose responsible businesses and making sure they have access to information about sustainable tourism options is also critical. And with many businesses jumping on the green bandwagon, independent, sustainable tourism certification schemes must be supported.

Perhaps most importantly, tourism businesses often need concrete guidance in order to make their management practices more sustainable. The Rainforest Alliance has been working directly with these businesses—from small community cooperatives to luxury lodges—training them on how to adopt practices that help conserve the wildlife and people that live in and around biologically-rich areas.

“Training is fundamental,” notes Sanabria. “It generates the awareness necessary for participants to fully commit themselves to sustainable practices.”

Twenty years ago, Judy and Ken duPlooy, from the US and Zimbabwe,

respectively, followed their dream and moved to the wilds of Belize, where they opened a small hotel. Today, the duPlooy's Jungle Lodge features 22 bungalows and rooms that offer visitors an environmentally friendly base from which to enjoy the diverse natural beauty and cultural riches of the area.

The duPlooy's recently participated in a Rainforest Alliance workshop to learn about reducing energy use, recycling and providing economic benefits to local people. “The ideal for Belize is a clean tourist industry that influences the positive development of the country,” says Judy duPlooy.

Entrepreneurs who take part in the training can also have their businesses assessed to identify areas where their impact on local ecosystems and cultures could be reduced.

Participants who demonstrate a strong commitment to best management practices benefit from the Rainforest Alliance's efforts to develop effective marketing tools, and to link them with international tour operators whose clients want vacations that are not only memorable but also help conserve natural and cultural attractions.

“We believe that it is possible to change the way that tourism is developed in Latin America,” says Sanabria, “and the businesses that have participated in this programme have proven it.” ■

www.rainforest-alliance.org

Clever wetlands

Pioneering work by IUCN shows that by considering the biodiversity, livelihood and economic values of wetlands together, management plans can be drawn up that benefit both people and nature.

Wetlands contain exceptional biodiversity and generate critical services. They support the livelihoods of local communities and are an essential component of local, national and even regional economies. But despite their importance, wetlands are under increasing pressure through degradation and development. The impacts are disproportionately felt by some of the world's poorest people.

A pioneering project led by IUCN's Species Programme and Global Economics and the Environment Programme is making sure that both biodiversity and the needs of local people are taken into account when designing management plans for wetlands. Funded by the UK Darwin Initiative, the project has developed an innovative new methodology for wetland assessment which

integrates biodiversity, livelihoods and economics. Assessments are being carried out in the Lower Mekong, Cambodia and in the Rufiji floodplain, Tanzania to document the livelihood value of wetland biodiversity.

Mtanza-Msona Village is located on the Rufiji floodplain, alongside the world-famous Selous Game Reserve. Relying on a very limited and uncertain production base, the local people depend heavily on the rich wetland biodiversity for their day-to-day survival. Wetland products are a primary source of fuel, building materials, food, medicines and income. The field assessment, recently concluded, has found that wetland resources are worth almost half of per capita GDP for the residents of Mtanza-Msona. For the poorest villagers, wetland products make an even greater contribution to the

household economy—they are worth more than seven times as much as farming, the main form of livelihood. Wild foods are gathered to see people through the annual hungry season, and in times of drought they have an average value of nearly four times as much as purchased foods. As healthcare remains inaccessible or unaffordable to much of the population, wild plants also provide a critical source of medicines, to a value of more than seven times annual expenditure on 'modern' drugs and medicines.

Cambodia's Stung Treng Ramsar site, a wetland of international importance, is home to unique biodiversity including iconic species such as the River Tern, and the Critically Endangered White-shouldered Ibis, Siamese Crocodile and Mekong River Irrawaddy Dolphin. It maintains a range of important



ecosystem services in the wider Mekong and provides drinking water and sanitation for local people. The wetlands are also vital for food security and nutrition and provide opportunities for trade and exchange. Migrations of many economically- and nutritionally-important fish species such as *Trey Riel* are triggered by seasonal hydrological changes. Potential areas of conflict between priorities for conservation and human use have been highlighted through this project with respect to proposed zoning plans for the site.

In both field sites, prior to the Darwin project, conservation approaches had been

based largely on a biodiversity perspective, with little recognition of the importance of wetlands to local people. The project's results have underlined the importance of taking livelihoods into account when planning and implementing conservation. They are already helping to shape management plans for Mtanza-Msona and the Stung Treng Ramsar site, supporting pro-poor wetland conservation and sustainable use of the sites' resources for the benefit of both local livelihoods and biodiversity.

The project brings together for the first time, species experts, social scientists and

economists who have, until now, worked in isolation. By taking all three perspectives—biodiversity, livelihood and economic values of wetlands—into consideration and pooling expertise, management solutions can be found that suit both people and biodiversity. This approach also leads to better and more sustainable conservation outcomes. The methods used to conduct an integrated wetland assessment will be published as a toolkit and maps that highlight overlaps between threatened species and areas of high human dependence are being used to present the findings simply to decision makers.

Integrated assessments present the strongest case for conserving wetlands and allow local people to defend their livelihoods from developers or over-zealous conservationists. They can also act as an early warning system, highlighting areas of potential conflict between conservation and livelihoods.

Information on how valuable species are to people as a source of livelihood or food is now being fed into the IUCN Red List of Threatened Species as a key factor to be considered when making management decisions concerning biodiversity. ■

www.iucn.org/themes/ssc/our_work/freshwater/indexfreshwater.htm

Hidden wealth

New research is changing the popular view that drylands are unproductive. People living in these areas depend on a wide range of ecosystem services such as livestock, fuelwood and medicinal plants for survival.

Drylands cover more than 41% of the Earth's land surface and are home to a third of the global population. They support a diversity of land uses from farming, livestock herding, hunting and gathering to ecotourism. Trade in sustainably-used products like the medicinal plants *Devil's claw* and *Hoodia* can help boost local economies.

At least 30% of the world's cultivated plants and many of our domesticated animals and livestock originated in drylands. Wheat, barley and other cereals derive from wild, drought-resistant grasses still growing in drylands which constitute a precious genetic stock for future crops.

Most of Kenya's livestock live in drylands and half of the meat consumed in Nairobi comes from them. In Namibia,

around 70% of the population depends directly on drylands for their livelihoods. In Sudan, arid forest contributes 70.8% of national energy needs and 33% of livestock fodder. In times of drought and crop failure,

these forests provide emergency food sources like the fruits of the *Cordia africana* tree.

Most of the arid lands of the world are inhabited by pastoralists who have sustainably managed these vast areas for thousands of years.



In Mongolia, pastoral livestock are responsible for one third of GDP and are the second largest source of export earnings. Dryland pastoralism also produces several internationally-traded goods. In China, 78 million cashmere goats produce more than two-thirds of the world's cashmere fibre. In Ethiopia, the leather industry, dominated by pastoral production, is the second largest source of foreign exchange after coffee.

But the contribution of drylands to national economies is barely reflected in official statistics or national GDP. In Sudanese official statistics, the forestry sector contributes only 3.3% to the GDP whereas studies by the World Bank and the UN Development

Programme show the figure stands at 12%—Sudan is the main producer of Gum Arabic, an important ingredient in the beverage (Coca Cola) and chewing gum industry. The gap between informal and official statistics on the contribution of ecosystem services to livelihoods arises because 'informal' ecosystem services and outputs such as wild fruits or firewood and small local markets are not included in official economic data.

Politicians and natural resource managers are however starting to wake up to the economic implications of conserving drylands in terms of safeguarding livelihoods and contributions to national economies. Mounting evidence that

drylands sequester significant amounts of carbon is also helping to change attitudes.

Drylands are fragile environments that need urgent attention to avoid irreversible biodiversity loss and the consequent impact on livelihoods. Only by combining scientific evidence from research institutions with traditional indigenous knowledge from local communities can we find a new holistic management approach to safeguard these ecological treasure troves. ■

www.iucn.org/drylands

Amazing amphibians

For centuries, amphibians—frogs, toads, salamanders and caecilians—have been a subject of fascination and entertainment. They have provided food, medicines and inspiration for medical research. Recent research has revealed antibiotic properties, anti-tumour agents, analgesics and adhesive compounds in frog skin. So how can we have pushed almost a third of species close to extinction?

Amphibians are a valuable food source throughout much of the world—eaten both for subsistence and as a luxury. In many parts of the world they are used in traditional medicines by tribal and local peoples, often to meet primary health needs. More than 30 species have been recorded in Traditional Chinese Medicine alone.

Many of us have lasting memories of our first dissection in school biology classes—witnessing the anatomy and physiology of a frog at first hand. Beyond the classroom, amphibians have contributed to many important medical discoveries. Seven Nobel prizes

have been awarded based on research conducted using amphibians. While dissecting a frog, the 18th century Italian anatomist Luigi Galvani found by chance that muscle and nerve cells produce electricity. His observation helped establish the basis for studying the human nervous system.

Amphibians are increasingly recognized as an important potential source of chemical substances for use in modern medicine. A compound isolated from the skin of the endangered Ecuadorian species *Epipedobates tricolor* is a potent non-addictive analgesic considered to be greater than 100 times more effective than morphine.

Since the mid 20th century, many amphibian species have been part of the international pet trade bringing economic benefits to supply countries (but also threatening the species in some cases). The most commonly-traded species are the brightly-coloured poison frogs and the attractive mantellas from Madagascar.

Often called “canaries in the coal mine,” as a warning of environmental changes, the highly permeable skin of amphibians is more sensitive to changes in the environment, including changes to freshwater and air quality. They play an important role in ecosystem function and in controlling pests such as mosquitoes.

Amphibians have long held cultural significance in many societies. During the Maguai (frog) festival of the Zhuang people of Guangxi, China, a frog is captured, honoured and then buried to ensure good weather and an excellent harvest for the following year. In Japan, the frog is traditionally viewed as a symbol of good fortune endowed with magical powers.

Aside from their ‘usefulness’ to humans, frogs and toads display a remarkable range of colour, shape and activity. But perhaps the greatest appeal of amphibians is not visual, but acoustic as anyone who has been privy to a chirping chorus of frogs as they begin their courtship ritual in early spring will attest.

Released in 2004 and continually updated, the Global Amphibian Assessment (GAA), led by IUCN, was the first-ever comprehensive assessment of the conservation status of the world's approximately 6,000 known amphibian species. The GAA launch attracted widespread media coverage and helped raise awareness of the urgency of saving amphibians. It prompted the development of an action plan, drawn up at a summit of leading scientists, intended to save hundreds of species from fatal threats such as pollution, habitat destruction and disease. ■

Based on contributions by IUCN Species Programme staff and colleagues to “Threatened Amphibians of the World” to be published in 2008 by Lynx Edicions.

www.globalamphibians.org



Reaching the masses

With China's biodiversity under increasing threat, Countdown 2010 is proving an important catalyst for action and awareness.



From the steppes of Inner Mongolia to the mountains of Tibet, from the Yellow River to the Yangtze, China is characterized by a breathtaking variety of ecosystems and species. One of the world's megadiverse countries, China is home to nearly 15% of the world's mammal species, and to similar proportions of bird, fish and vascular plant species.

In a nation where limited resources are seen as a potential constraint to growth, China's biodiversity supports not only the health and well-being of its citizens, but also its rapid economic development. While the benefits and services provided by biodiversity cannot be precisely calculated, in 1995 the China Council for International Cooperation on Environment and Development (CCICED) Biodiversity Working Group estimated that in China they were worth between US\$ 255 and US\$ 410 billion per year.

However, China's rich natural heritage is increasingly under threat. Nearly 3,000 of the approximately 41,000 plants and animals assessed on the IUCN Red List of

Threatened Species are found in China. Widespread ecosystem degradation and habitat destruction threaten China's rivers, forests and arable land, having a severe impact on the health of its citizens and affecting neighbouring countries.

As are all Parties to the Convention on Biological Diversity (CBD), China has committed to "achieve by 2010 a significant reduction in the rate of biodiversity loss." But despite ongoing efforts, China is poised to fall far short of reaching this target.

Countdown 2010, a network of partners working together towards the 2010 target, aims to support governments in their efforts to reduce biodiversity loss by 2010. Launched in Europe in 2004, the initiative now has nearly 300 partners worldwide, including the CBD, national, regional and local governments, private sector organizations, and a wide range of NGOs. 2007 marked the beginning of Countdown 2010's expansion to a global initiative, with the establishment of hubs in Africa, South America and Asia, and most recently, in China.

Countdown 2010 faces a major challenge in China, where "most people are not familiar with the 2010 target, even relevant professionals," according to Professor Xue Dayuan, Chief Scientist on Biodiversity for the State Environmental Protection Administration (SEPA). "There's a lot of work being done on biodiversity, but not in the name of the 2010 target," he says, citing examples from the work of the Nanjing Institute of Environmental Sciences (NIES) under SEPA, an IUCN member and Countdown 2010 partner with which he is affiliated.

That Countdown 2010 in China aims to fill an important need has been underscored by the strong positive response with which it has been met. Since its launch in September, a diverse group of more than 20 Chinese and international organizations active in China have signed the Countdown 2010 Declaration and joined the regional network as partners, with several more expressing interest. Partners range from local environmental NGOs like Global Village Beijing, to big international conservation organizations active in China,



such as The Nature Conservancy, to government-affiliated NGOs and research institutes such as NIES, to the UN Development Programme – China.

Beyond its partners, Countdown 2010 has a broad range of supporters, and there is great interest in expanding beyond the current base. In particular, Countdown 2010 has been advised to reach out to media and to government. At present, although government-affiliated institutions have joined the initiative as partners and government representatives have participated in Countdown 2010 events, no Chinese government

ministry has signed the Countdown 2010 Declaration.

As Prof. Xue emphasizes, “For this campaign, we need to invite NGOs and government institutions to join together. It’s not too late—we have three years.”

As 2010 looms on the horizon and the rate of biodiversity loss accelerates worldwide, the urgency of communicating the need to reduce this loss becomes increasingly clear. In November, Countdown 2010 co-sponsored an alliance-building meeting with the EU-China Biodiversity Programme Visibility and Awareness

Component (VAC). This meeting further confirmed the willingness of Chinese conservation organizations to collaborate on communications, and the tremendous need for joint effort.

As John MacKinnon, Team Leader of the VAC puts it, “If you have over a billion people to reach, you need to have a pretty loud voice. We need to find a relay of broadcasters reaching out farther and farther to get our message to all corners of China. Only together can we have a big impact.” ■

www.countdown2010.net/china

Up front

Holly Dublin heads a network of 7,000 people dedicated to fighting the extinction crisis. *World Conservation* asked her for her views on diversity.

What does diversity mean to you, in both your private and professional life?

Diversity in the natural world, for me is a combination of abundance, composition, structure, colour, shape and texture—fur, feathers, scales, flowers, bark and leaves—and interaction between species. Diversity is what springs to mind whenever I view a landscape which seems at first sight homogeneous and static but is always more complex on closer inspection.

My favourite photo is one I took in the Serengeti-Mara ecosystem for an informal competition to see who could get the most species in a frame. I topped the list capturing nine large vertebrates in a single photo. Just think how well I might have done had I been able to capture and bring into focus all the plants and invertebrates that were living amongst the mega-herbivores!

Diversity is no two days being alike. It is having close friends from every walk of life from varying cultural and linguistic backgrounds, yet still being able to interact and function as one in a global society. From the Maasai pastoralists adapted to the African savannas, to the Tibetan farmers adapted to the harsh and windblown plateau, people living close to the land have much in common. So while we have tremendous diversity, we also share some major challenges but it is the diversity of solutions that have evolved which I find so

fascinating. The dedication and diversity of approaches found in the Species Survival Commission to save our species, from strict protection to captive breeding and reintroductions, to habitat restoration and disease management is inspirational.

With IUCN’s unique membership and strong track record, we are ideally placed to convene, facilitate and bring the best scientific and technical advice from the

Commissions to decision makers, managers and resource users.

What changes have you perceived in people’s attitudes towards biodiversity?

People change their behaviour as their awareness and understanding evolves. We still struggle to change people’s attitudes at a rate that can offset the continuing loss. We’re having to live with a less ambitious



goal of slowing the rate of biodiversity loss rather than halting the losses altogether.

I believe awareness at the international level has increased but I'm not sure this has translated into increased conservation action. I often feel people are overwhelmed by the doom and gloom stories and feel paralysed into inaction. I've also found that northern concerns for the species found in less developed parts of the world have not always translated into positive conservation action in those places. There are many cases where these concerns have led to disincentives and increased costs in affected communities who live with, 'conserve' and must be allowed to benefit from these globally-valued species.

Progress is largely site-specific. There are areas of the world where biodiversity is protected and ecosystems remain diverse and healthy. What we have come to understand is that working with local communities on ways to conserve biodiversity is more effective and the results more lasting,

though this can only ever be highly localized. It is the losses at a global scale that are more worrying.

Are people today more aware of the risks linked to biodiversity loss?

I think we're failing at raising awareness and public concern. Our message is too complex and not compelling enough. We're not presenting the links between healthy biodiversity and healthy people in a clear and simple way, probably because the relationships are too complex for most people to grasp. Most people relate to certain charismatic species but this leaves the building blocks of our functioning ecosystems—the majority of species—right off the radar screen.

A major drawback is that we cannot easily present the impacts of biodiversity loss in the same way as one can draw a graph showing the increase in temperature resulting from increasing carbon emissions. We cannot speak of biodiversity loss and its implications for the future of human well-

being in succinct soundbites. Sadly the ramifications of biodiversity loss seem more removed than other very pressing issues in people's daily lives.

One worrying but recurring theme is that people often do not seem to value biodiversity until it is lost. It is the absence of biodiversity that stimulates them rather than being surrounded by it. It also seems to be that people who rely on biodiversity and natural resources—the very people who need to do the conserving—are least able to. Biodiversity conservation has become a concern of the wealthy and enabled but not for those who still need to worry about meeting the most basic needs such as food, shelter, drinking water and health. ■

Holly Dublin is Chair of IUCN's Species Survival Commission and a member of the IUCN Council.

www.iucn.org/themes/ssc

Reinventing the wheel

Biomimicry—studying nature's best ideas and imitating these designs to solve human problems provides some of the most powerful arguments for why we should protect biodiversity. Nature is extremely efficient; everything in nature is both produced and disassembled at ambient temperature and pressure, with no waste. Nature has already solved just about any problem that humanity could possibly imagine. So why reinvent the wheel?

Studies of the silent flight of owls and the splash-less dive of the kingfisher led to significant noise reductions of a Japanese high-speed train; its front end was modeled on the kingfisher bill. The outstanding mechanical properties of spider silk have been used as a basis for new types of fibre that can be produced without toxic chemicals or extreme heat. A self-cleaning paint used on building facades was inspired by the sacred lotus flower which stays clean and dry thanks to the rough surface of its petals. Researchers have determined the exact structure of a compound that guars (Asian wild cattle) excrete as a mosquito deterrent and are now producing it synthetically. This could help control the spread of mosquitoes that carry tropical diseases like yellow fever and malaria.

The quest to use CO₂ instead of petroleum as the basis for plastic has been a 'holy grail' of chemistry for decades. In producing

a new biodegradable plastic, scientists mimicked the ability of green plants to transform CO₂ into carbon-based polymers using a low-temperature, benign manufacturing process. The new plastic has numerous applications in thin-film packaging; it can be used in the medical device, food, electronic and pharmaceutical industries.

Prairies hold soil, resist pests and weeds, and support their own fertility, all without our help. Prairie-like polycultures using edible perennial crops and biofuel feedstock plants like switchgrass would make ploughing and planting over winter obsolete. Mixtures of plants would give farms resilience, reducing the need for oil-based pesticides. Instead of an extractive agriculture that mimics industry, prairie-inspired farming is self renewing and can also help sequester significant amounts of carbon.

ZERI—Zero Emissions Research and Initiatives is a global network seeking solutions to the world's problems. It is teaming up with IUCN, UNEP, the Biomimicry Guild and the Biomimicry Institute to produce Nature's 100 Best™, a series of technologies inspired by nature that look set to change the face of humanity. The project links entrepreneurs with scientists and academics in an effort to generate a positive shift in business and society.

www.zeri.org & www.zerilearning.org

Connecting Catalonia

With the IUCN World Conservation Congress taking place in the Catalan capital Barcelona, Minister of Environment and Housing of the Autonomous Government of Catalonia, Francesc Baltasar i Albesa outlines the efforts underway to conserve the region's diversity.

Catalonia is a small, densely populated nation, with a long-standing industrial tradition and a more recently developed tertiary sector. Its landscapes, flora and fauna are extremely diverse—the region boasts alpine, coastal and steppe areas, as well as truly Mediterranean environments. It is this combination of socio-economic growth, characteristic of more developed regions, and the high level of biodiversity, found only in more sparsely populated or less developed regions, that makes Catalonia unique in Europe. The challenge of maintaining a highly developed territory and an exceptional level of biodiversity is complex.

Because of this, Catalonia has been, and continues to be, committed to growth models that make the population's lifestyle, both in cities and rural areas, compatible with our natural areas. The Government of Catalonia's objectives include waste and water management, the promotion of renewable energy sources and an improvement in air quality, with the overall aim of improving the Catalan population's quality of life, and protecting the region's ecosystems. Catalonia has one of the highest numbers of local Agenda 21s for sustainable development promoted by the United Nations.

A major step forward in land conservation and management was taken at the end of 2006 with the approval of the European network of natural areas, Natura 2000, which enables us to conserve some of the characteristic features of the biodiversity that makes a nation like ours so attractive. Natura 2000 was established taking into account Catalonia's new land use planning legislation which covers infrastructure planning and the regulation of urban and industrial areas. The management directives of natural areas make the activities currently carried out in the territory (livestock farming, agriculture, hunting and extractive industries) compatible.

With the aim of facilitating the coexistence of people and nature, the Government recently approved the Sectoral Territorial Plan for Ecological Connectivity in Catalonia. Objectives of the plan include the avoidance of habitat fragmentation, the conservation of large natural areas and allowing species to spread out over their range, as well as permitting genetic exchange between populations across protected natural areas. The Plan also has to consolidate and integrate the General Spatial and Land Use Plan of Catalonia with smaller land use and sectoral plans while incorporating the



functional and dynamic aspects of biodiversity. Biodiversity conservation must be considered in the environmental assessment of all plans and programmes promoted in Catalonia.

Spatial and land use planning will become the suitable framework for taking into account the full scope of ecological processes, moving from a view of isolated natural spaces, to one of a truly ecological network in harmony with the necessary social, cultural and economic development of the nation and where biodiversity conservation and natural areas are given the same priority as roads and railways.

Experience of working with the Europarc Network (European Federation of National and Natural Parks) as well as with

inter-regional networks such as the Working Community of the Pyrenees or the Four Motors of Europe Network and projects with other Mediterranean countries such as RINAMED is allowing us to transform the challenge of revaluing our natural areas and maintaining all forms of life in our nation, into reality.

Bearing in mind that, as a Mediterranean region, Catalonia has limited water resources and is one of the places that will be affected most by the consequences of climate change, the ability to plan our land use taking into account all needs, those of development and those of maintaining the diversity of life, will set the future of our nation. ■

The power of red

With the help of its ever-strengthening Red List, IUCN is staying focussed on its core strength of safeguarding the diversity of life, says the Union's Director General, Julia Marton-Lefèvre.

IUCN is first and foremost an organization that cares deeply about the diversity of life and whose fundamental expertise is on species and ecosystems. We know that sustainably managed natural resources support peace. We know that we must tackle climate change if we're to safeguard biodiversity and the lives of the people who depend on it, and we also recognize the potential of biodiversity to help mitigate global warming or adapt to it. We have shown that we can help reduce poverty by ensuring that nature continues to provide the poor with much-needed resources while sustainably managed resources can be key to economic growth.

The proposed new IUCN Programme strengthens the Union's heartland work on conserving the diversity of life while developing more effective interventions linked to sustainable development in the areas of climate change, energy, ending poverty, and economy and markets.

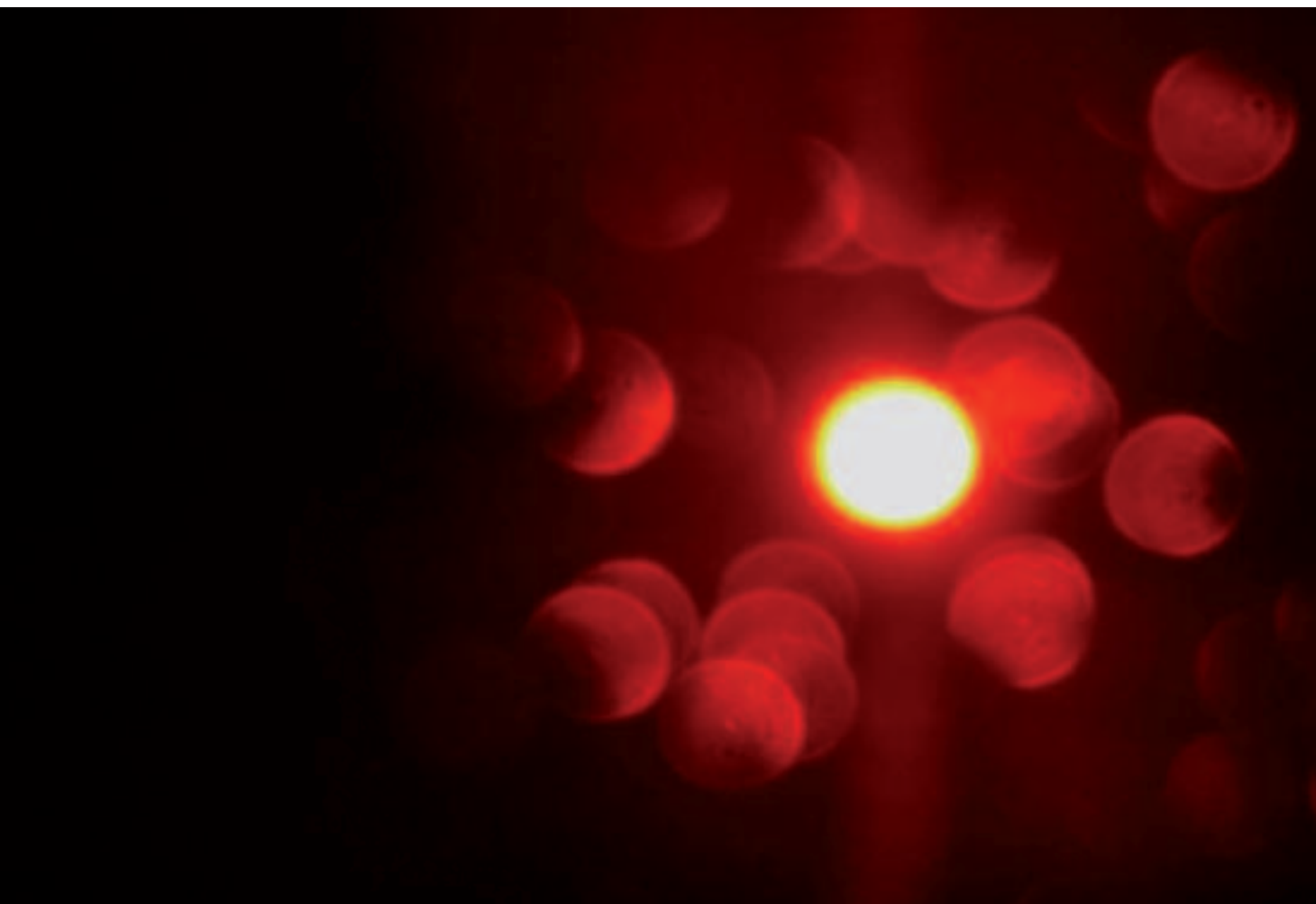
Central to our work is the IUCN Red List of Threatened Species which is going from strength to strength in providing the Union with the information it needs to save biodiversity. Regarded as the world's most authoritative inventory of the conservation status of species, its system of categories and criteria provides an objective and understandable framework for identifying species at risk of extinction.

Far more than a list of species and their status, the Red List is a powerful tool providing information on population size and trends, geographic range and habitat needs of species. Through the Red List we can find out if a species is being over-hunted, whether it is considered sacred, or whether it is protected by international law. We can find out whether biological traits such as a slow reproductive rate make it susceptible to over-harvesting or whether its restricted range makes it vulnerable to climate change within

its habitat. We can also find out if a species is of particular value to people as a source of food, medicine or livelihood. The increasing inclusion of distribution maps and photos is helping to make the Red List a 'one-stop shop' for biodiversity information and a key tool for decision making.

As a sobering indictment of what we humans have done to our natural world, for many years the Red List has been too big to publish as a book. Instead the information is available as a searchable online database with the information freely available to all who can act on it. This includes government agencies, wildlife departments, NGOs, natural resource planners, researchers, the private sector and many others. The Red List helps target precious funding to where it can be most effectively used.

Every year the launch of the updated Red List attracts extensive media coverage; the Red List is starting to become a



household name, raising awareness among the public and governments about the decline of biodiversity. Parties to environmental treaties such as the Convention on Biological Diversity all need access to the most up-to-date scientific information on biodiversity when making decisions.

The Red List is a joint effort of IUCN's Species Programme and Species Survival Commission (SSC). The SSC acts as custodian of the Red List, develops and maintains standards for assessments, and convenes a large volunteer network to contribute data and expertise. The Species Programme manages the data collection. Together with the SSC it helps to maintain scientific standards and produces associated Red List products such as regional species assessments. It

also coordinates the input of key IUCN members who are Red List Partners. Collectively, this network holds the most complete scientific knowledge base on the biology and current conservation status of species.

Nearly all governments have agreed to reduce biodiversity loss as a way to fight poverty. Another critical function of the Red List is monitoring progress in reaching targets such as the Countdown 2010 target to reduce biodiversity loss.

Many species are not listed as threatened simply because information on them is not available so there is a race against time to get more assessments done. IUCN and its networks are teaming up with a wider range of partners to increase coverage. They are also working with industry to find out how

to package the Red List information to make it most useful to 'customers'.

The aim is to ensure that the Red List serves as nature's early warning system, identifying threats early enough so that corrective action can be taken. In time, and given the support it needs, the Red List will be able to tell us what contribution particular species make to an ecosystem and what happens to that ecosystem and to human well-being if a species disappears.

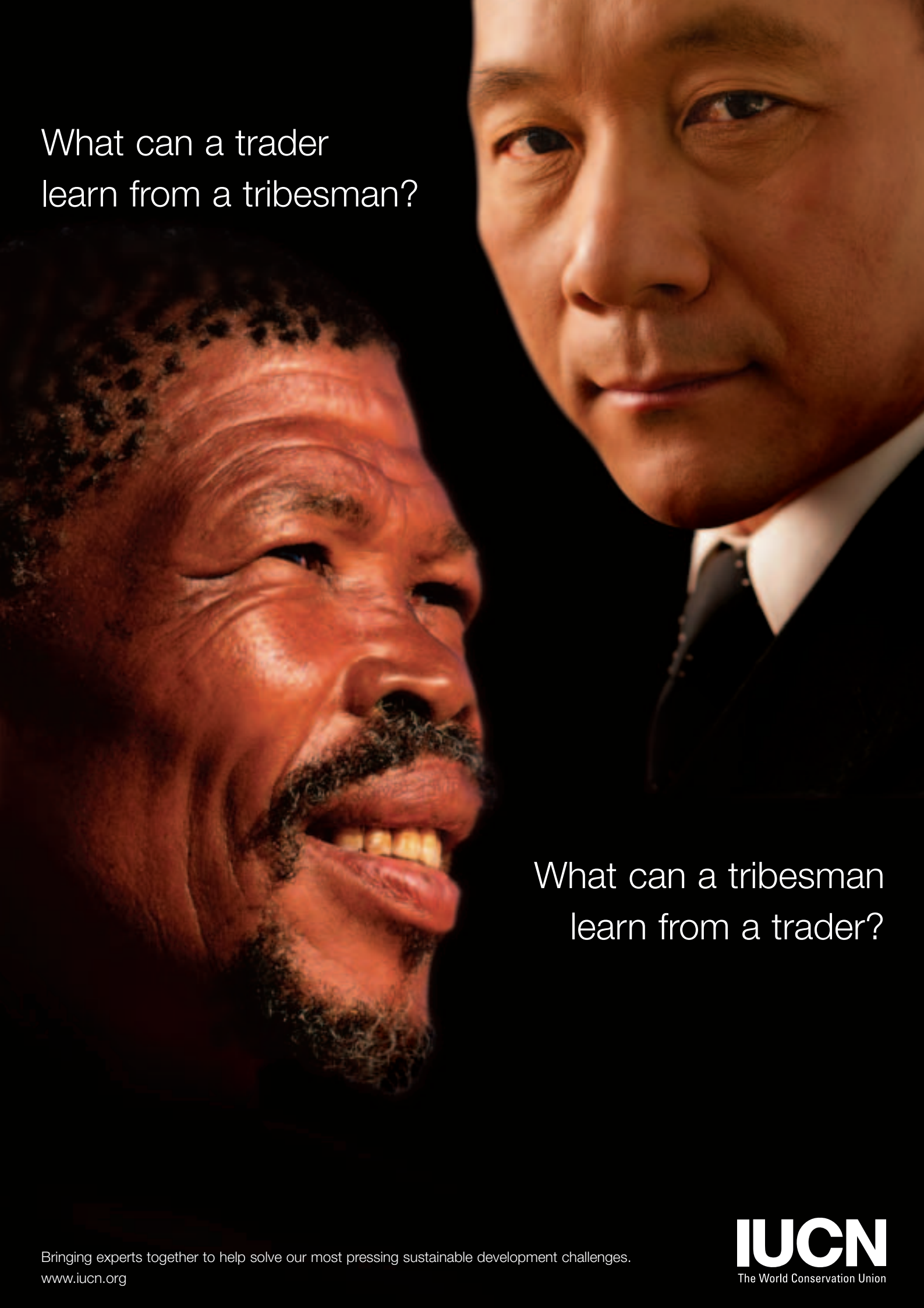
It's a long process to make the Red List achieve its full potential, but the will is strong. Quite simply, conservation would be lost without it. ■

www.iucnredlist.org

When the bees disappear

In his book *Le jour où l'abeille disparaîtra...* (The day the bees disappear...), Deputy Head of IUCN's Species Programme, Jean-Christophe Vié talks about the importance of biodiversity. Aimed at the general public, the book refers to Jean-Christophe's experience living and working in various parts of the world as well as his work with the Species Programme and Species Survival Commission which he joined 15 years ago. "We face constant difficulty in communicating properly the importance of our work and explaining why biodiversity matters, so I hope this book helps a little," he says. The title comes from a quote attributed to Einstein claiming that if bees disappear, humans will only have four years to live. Jean-Christophe suspects the quote was invented, possibly by bee-keepers to help defend their cause, but it is widely used because it shows how much we depend on biodiversity using, as an example, the critical role bees play in pollination.





What can a trader
learn from a tribesman?

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