



# IUCN's 2013–2016 Programme Global Situation Analysis



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## The global context for our work

### Contents

<b>Acronyms .....</b>	<b>2</b>
<b>Introduction .....</b>	<b>3</b>
<b>Biodiversity and Human Well Being – how are we doing? .....</b>	<b>3</b>
The state of biodiversity in 2011 .....	4
Human Wellbeing in 2011.....	11
<b>Direct Drivers of biodiversity loss .....</b>	<b>17</b>
<b>Underlying drivers of change – what's new.....</b>	<b>17</b>
Demography.....	17
Politics and Institutions.....	19
The Global Economy .....	21
Climate Change .....	23
Technology.....	25
<b>Cross-cutting Issues.....</b>	<b>27</b>
Rights and conservation.....	27
Gender equity .....	28
<b>Implications the IUCN Programme 2013-16.....</b>	<b>29</b>
<b>References.....</b>	<b>30</b>

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## Acronyms

ABS	Access and Benefit Sharing
AR4	Fourth Assessment Report of the IPCC
CBD	Convention on Biological Diversity
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CSD	UN Commission on Sustainable Development
DAC	Development Assistance Committee (of the OECD)
DESA	Department of Economic and Social Affairs
FAO	Food and Agriculture Organization of the United Nations
FDI	Foreign direct investment
GBO	Global Biodiversity Outlook
GDP	Gross Domestic Product
GMO	Genetically modified organism
GtCO <sub>2e</sub>	gigatonnes of carbon dioxide equivalent
IBAT	Integrated Biodiversity Assessment Tool
ICT	Information and Communication Technology
IEA	International Energy Agency
IGO	Intergovernmental organization
IPBES	Intergovernmental Platform for Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change
IRGC	International Risk Governance Council
MDG	Millennium Development Goal
MEA	Multilateral environmental agreement
NGO	Non-governmental organization
OECD	Organization for Economic cooperation and Development
REDD	Reduced Emissions from Deforestation and Forest Degradation
TEEB	The Economics of Ecosystems and Biodiversity
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
WCC	World Conservation Congress
WEO	World Energy Outlook
WHO	World Health Organization

# IUCN Programme 2013-2016 Global Situation Analysis

## Introduction

IUCN is the world's premier conservation Union with a Mission of "A just world that values and conserves nature" and a mission to "influence, encourage and assist societies throughout the world to conserve the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable."

At the 2008 World Conservation Congress in Barcelona, Spain, IUCN Members adopted "Shaping a Sustainable Future", IUCN's Programme 2009-2012. That Programme identified a set of key issues upon which IUCN would focus for those four years and while progress on many of the proposed results of that Programme has been good it is certainly

not complete. Therefore, IUCN proposes to use the 2009-2012 Programme Framework as the foundation for its work in 2013-2016, incorporating updates and revisions as appropriate to our evolving situation. This situation analysis provides some context for the new Programme. It is not intended as an in-depth examination, similar to the situation analysis completed for the 2009-2012 Programme ([Keeping an Eye on Nature](#)) but rather as an update of significant events and changes at global level that have taken place since the last time IUCN reviewed the global context in 2006.

## Biodiversity and Human Well Being – how are we doing?

Humanity and nature are inextricably linked yet we live within the 'Environmentalists' Paradox' (Raudsepp-Hearne *et al.*, 2010) wherein human well being continues to improve while the state of the environment continues to decline. Reasons that have been posed for this paradox include everything from lag times in biodiversity's response to human actions to emerging technologies promoting a decoupling of the fundamental relationship between man and nature.

Whatever the reasons, we have reached our 'planetary boundaries' when it comes to

biodiversity loss, climate change and global nitrogen cycles, (Rockström *et al.*, 2009) (Figure 1).

And of those three, the most serious overshoot is that of biodiversity where losses are an order of magnitude higher than the proposed 'safe operating space for humanity'.

While there is no one clear answer to the challenges proposed by the Environmentalists' Paradox, the challenge for biodiversity conservationists remains the same – achieving an equitable and sustainable future.

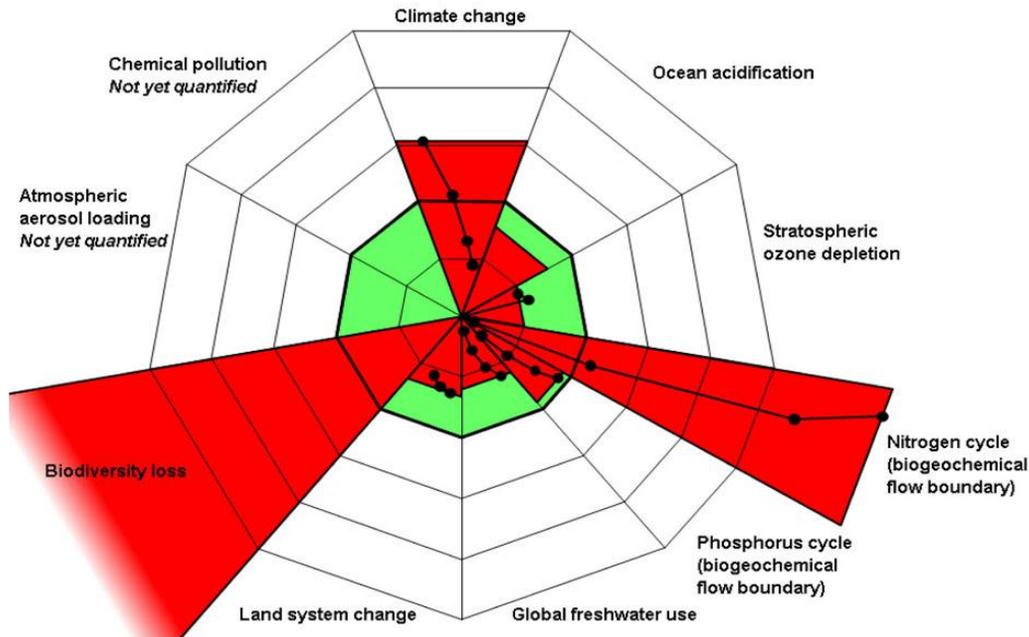


Figure 1 Planetary Boundaries (Rockstrom et al, Nature, 2009)

### The state of biodiversity in 2011

In 2005, the decline in biodiversity was documented via the results of the Millennium Ecosystem Assessment and the 2006 IUCN Red List of Threatened Species reporting on declines at both ecosystem and species level. Four years later, the 2010 Red List update reports on assessments of ~56,000 species including 18,351 within threatened categories. In recent years, significant progress has been made on assessments of major taxa and the results show that threat levels vary from 8% for dragonflies to 62% for cycads (Table 1).

The Red List Index is an indicator of changing biodiversity status over time and currently documents declines in the status of taxa (Figure 2) with the most severe declines being for coral reefs.

Table 1. IUCN Red List 2010 data on threatened taxa

Taxa	% species threatened
Mammals	21%
Birds	13%
Amphibians	30%
Cartilaginous fishes	17%
Reptiles*	18%
Bony fishes*	12%
Dragonflies*	8%
Freshwater crabs	16%
Freshwater crayfish	24%
Corals	27%
Conifers	28%
Cycads	62%
Seagrasses	14%

\* estimates derived from randomized sample approach

The Living Planet Index, measuring abundance of species, also documents ongoing declines (Figure 3). Our knowledge of the status of genetic diversity remains rudimentary but work by FAO on status of races of domestic species suggests that declines occur even in species that we are managing intensively (FAO, 2009).

The best available overview at global level of the status of ecosystem services was presented by the Millennium Ecosystem Assessment in 2005. The four main findings of this study, which engaged more than 1300 scientists from around the world, include:

- Humans have changed ecosystems more rapidly and extensively in the last 50 years than in any previous period.
- Changes in ecosystem services such as provision of crops, timber and water, have contributed substantial net gains in human wellbeing and economic development but these have been achieved at growing costs in the form of degradation of other services.
- The degradation of ecosystem services could grow significantly worse in the immediate future and is a barrier to achieving the UN Millennium Development Goals.
- The degradation of ecosystems while meeting increasing demands can be reversed under some scenarios but this will require significant policy and institutional changes.

The MA reported that 60% of the world's ecosystem services are degraded to the point where they no longer provide what we need in the way of food, water, clean air, fuel and many other services. Human exploitation of ecosystems has resulted in increased production of a small number of services such as crops and livestock offered at the cost of other services provided by nature. More specifically, the MA notes that more land was converted for crops from 1950 to 1980 than during the 150 years from 1700 to 1850. Since 1960, flows of reactive nitrogen have double and of phosphorus have tripled.

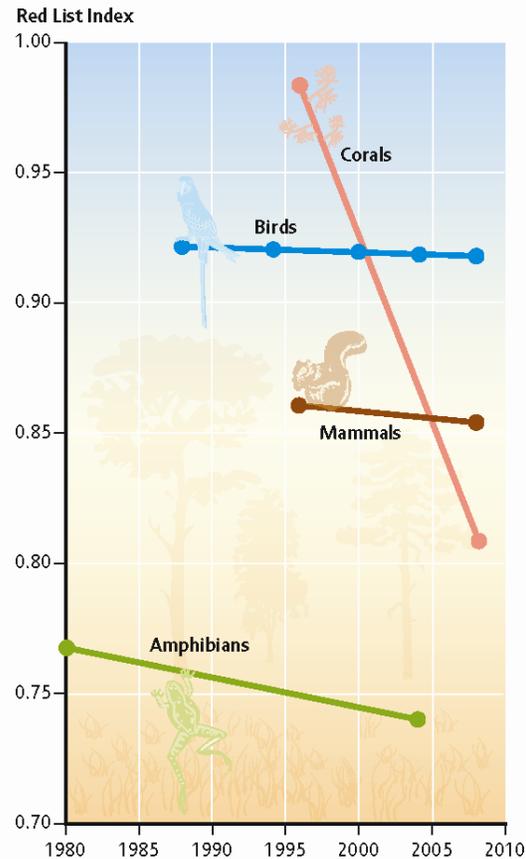


Figure 2. Red List Index for selected taxa. Source: IUCN Red List

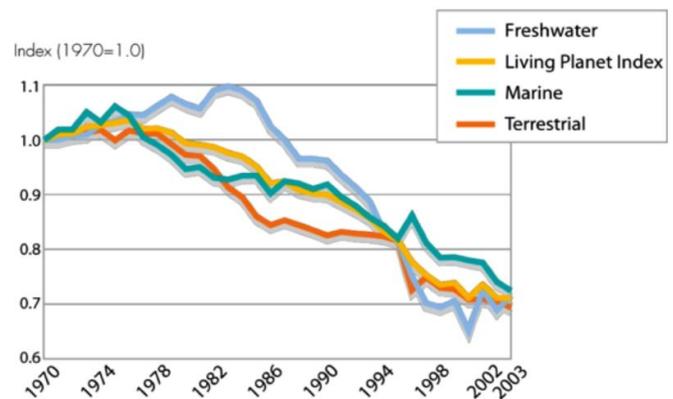


Figure 3. Living Planet Index. Source: Ioh and Goldfinger.

During the last several decades of the 20<sup>th</sup> century, 20% of coral reefs and 35% of mangrove forests were lost or severely degraded. Although noting that evidence remains incomplete, the MA experts warned that the ongoing degradation of 15 of the 24 ecosystem services examined is increasing the likelihood of serious impacts on human wellbeing. These impacts are likely to include the emergence of new diseases, sudden changes in water quality, creation of “dead zones” along the coasts, the collapse of fisheries, and shifts in regional climate (MA, 2005).

The results of the Global Biodiversity Outlook 3 (GBO3) (CBD 2010) confirm that this decline continues in all components of biodiversity and that the 2010 biodiversity target has not been met. Butchart et al (2010) reviewed biodiversity indicators and report that not only do most indicators of the state of biodiversity show declines, but indicators of pressures on biodiversity show increases. The GBO3 does point out that the existence of the target helped stimulate important biodiversity conservation action, particularly in terms of coverage of protected areas and conservation of specific species as well as in national level policy where 170 countries now have national biodiversity action plans. Scientific reviews have also documented that conservation action is having a positive impact on species status, providing a foundation to support investment in conservation action (Hoffman et al., 2010). However, these efforts are clearly not enough.

Meanwhile, increasing protected area coverage was one of the ‘good news’ stories for the 2010

biodiversity target (Figure 4) and the potential of protected areas for supporting livelihoods and climate change mitigation and adaptation as well as biodiversity conservation is increasingly recognized. Nevertheless, an analysis of threats to World Heritage sites reports that key threats affecting World Heritage properties are: ‘development and infrastructure’ and ‘management and legal issues’ for cultural properties and ‘development and infrastructure’ and ‘other human activities’ for natural properties. In 25% of State of Conservation reports for natural sites, mining is noted as a threat (UNESCO, 2010).

For biodiversity, the attention being paid to the marine realm, especially marine protected areas, is also increasing. At the 5<sup>th</sup> World Parks Congress in Durban there was recognition that <1% of the oceans were protected, as compared to 12% of terrestrial areas, but by 2009, that figure had increased to ~6% (Figure 5)

In terms of biodiversity governance, the most important event of recent years was undoubtedly the adoption, at the COP10 of the Convention on Biological Diversity (CBD), of the Nagoya ‘package’ consisting of the Strategic Plan 2011-2020 (see Box 1), the Access and Benefit Sharing (ABS) Protocol, and the Resource Mobilization Strategy. In all cases, further clarification and negotiation is still required before full implementation, but the agreements struck in Nagoya were a landmark for environmental multilateralism and provide a solid framework for action over the next decade.

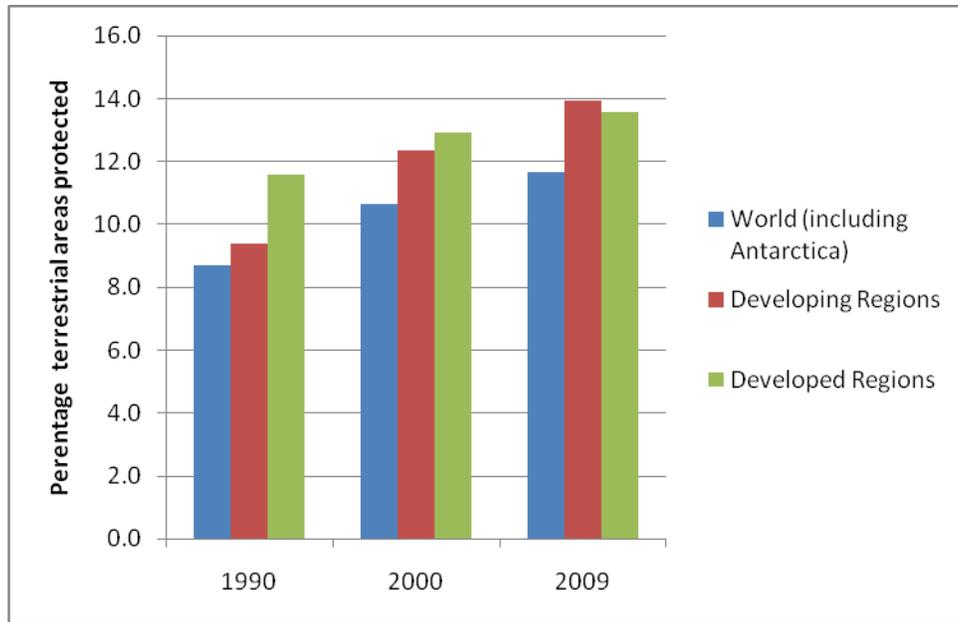


Figure 4 Trends in terrestrial protected area coverage (World Database on Protected Areas 2011)

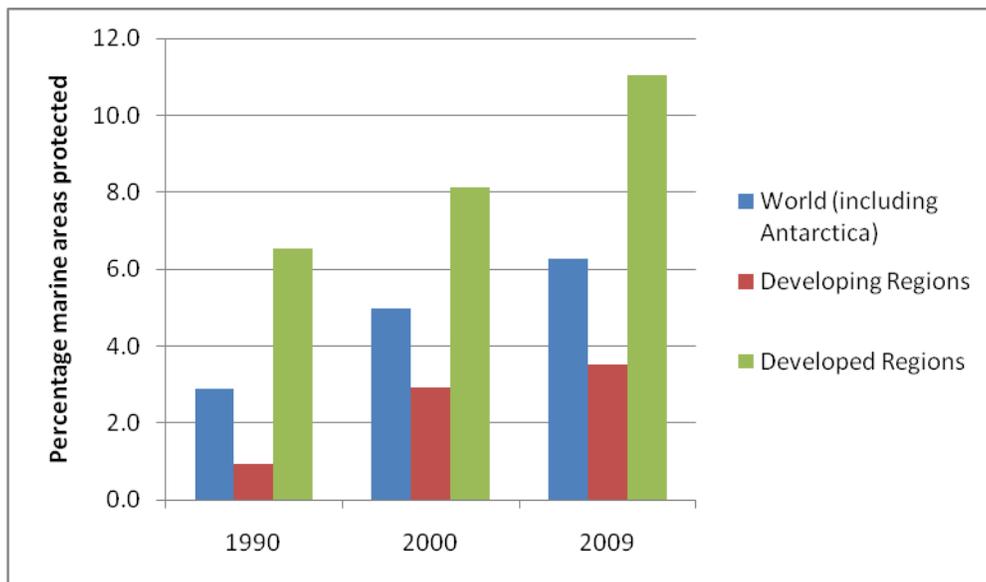


Figure 5 Trends in marine protected areas coverage (World Database of Protected Areas, 2011)

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**Box 1 - Strategic Plan For Biodiversity 2011-2020 And The Aichi Biodiversity Targets**  
(UNEP/CBD/COP/Dec/X/2)

**Strategic goal A. Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society**

Target 1: By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.

Target 2: By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.

Target 3: By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions.

Target 4: By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.

**Strategic goal B. Reduce the direct pressures on biodiversity and promote sustainable use**

Target 5: By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.

Target 6: By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.

Target 7: By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.

Target 8: By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.

Target 9: By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.

Target 10: By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.

**Strategic goal C: Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity**

Target 11: By 2020, at least 17 per cent of terrestrial and inland water areas, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem

services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.

Target 12: By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.

Target 13: By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.

#### **Strategic goal D: Enhance the benefits to all from biodiversity and ecosystem services**

Target 14: By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.

Target 15: By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.

Target 16: By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.

#### **Strategic goal E. Enhance implementation through participatory planning, knowledge management and capacity building**

Target 17: By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.

Target 18: By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.

Target 19: By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.

Target 20: By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization should increase substantially from the current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties.

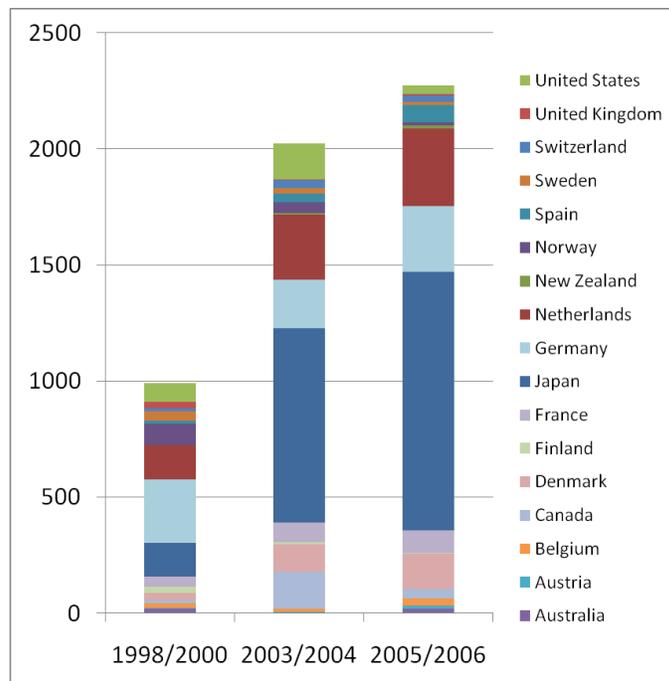
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Finance for biodiversity action is not meeting demands. The CBD estimated that global totals for national expenditure on biodiversity conservation ranged from USD 5.3-7.6 billion (CBD, 2007) but notes in Target 20 of the 2011-2020 Strategic Plan that resources will need to “increase substantially” to achieve full implementation.

Other important recent policy outcomes relevant to biodiversity governance include the UN General Assembly resolution that establishes the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES), and a broader scope for the CBD Strategic Plan. IPBES has been proposed to provide a mechanism to further strengthen the credibility, legitimacy and saliency of the information exchange processes between the scientific community and policy makers in areas relating to biodiversity and ecosystem services. Prior to the CBD COP10, six multilateral environmental agreements (MEAs) agreed to adopt the CBD Strategic Plan as the common basis for their own work in the coming years taking a significant step towards coherence in obligations, data collection and reporting.

Outside of biodiversity focused policy and governance, nature is also getting increased attention. For example, mainstreaming sustainable and equitable environment management in development continues at many levels. An overview of environmental mainstreaming action, undertaken by IIED for the Poverty Environment Partnership, highlights 46 activities by multilateral agencies, bilateral agencies, national governments, intergovernmental organizations (IGOs) and non-governmental organizations (NGOs) (IIED, 2009). The Organization for Economic Cooperation and Development / Development Assistance Committee (OECD DAC) has also recently issued a policy on integrating biodiversity into development support (OECD DAC, 2010). But, while the political foundations and overall amounts of available ODA for

environment are increasing (Figure 6), the proportion of investment in biodiversity action as part of development work has not, remaining at 2.5% of total ODA (OECD, 2008). It is noteworthy that despite the financial crisis, the OECD reported that donor countries met their commitments to increase ODA in both 2009 and 2010.



**Figure 6 ODA contributions Source: OECD 2008**

The profile of biodiversity in the business world has increased substantially in recent years. Biodiversity is now on the agenda at the World Economic Forum and over half of the World Economic Forum’s 75 Global Agenda Councils evaluating global risks recognized ecosystem and biodiversity losses as key underlying drivers. At the recent COP of the CBD, participation by business was at an unprecedented high with 56 business led or business relevant events on the agenda.

McKinsey (2010) reports that “Biodiversity now occupies a similar position in the public debate as climate change did in 2007” and goes on to say that “a majority of executives, 59 percent, see biodiversity as more of an opportunity than a risk for their companies.” The business community seems more ready to seriously engage with biodiversity conservationists for mutual benefit.

With respect to biodiversity conservation standards and tools, IUCN’s Red List of Threatened Species and IUCN’s Protected Area categories continue to feature strongly in both policy documents and scientific discussions about conservation. The IUCN Red List Index is also increasingly referenced in policy documents. Taking advantage of newer technologies and key partnerships, IUCN has

developed new conservation planning tools such as the Integrated Biodiversity Assessment Tool (IBAT), and new mapping tools including Protected Planet and Google Ocean. IUCN’s Commission on Ecosystem Management is now developing an IUCN Red List for Ecosystems (Rodriquez et al., 2010) which is expected to be available by the 2012 World Conservation Congress and therefore in use for the next IUCN Programme.

Finally, IUCN’s role in supporting international environmental governance, in particular support for the MEAs, is extending beyond the focus of identifying challenges and establishing policy to supporting implementation on the ground and communicating global conservation issues and opportunities, especially in the face of climate change.

### ***Human Wellbeing in 2011***

IUCN’s Mission and Programme position biodiversity conservation as a key component in support of human well being – for both rich and poor. This is echoed in many fundamental biodiversity conservation and sustainable development documents as well as in the newly adopted Strategic Plan of the CBD. Of the 2.6 billion people who live on less than \$2 per day, almost 2 billion live in rural areas, in countries whose economies and people are most dependent on natural resources (Ravallion et al., 2007). On the other hand, the increasing wealth of people in emerging economies such as China and India, the majority of which will be in urban centres, will undoubtedly have an impact on biodiversity as their rising disposable income supports increased consumption.

### ***The Millennium Development Goals and the environment***

In 2000, the Millennium Declaration recorded the commitment of the members of the United Nations to eradicate extreme poverty and hunger and to build a secure and peaceful world conducive to human development. Broad targets were set under the Millennium Development Goals (MDGs) and indicators were developed to assess progress. These MDGs and accompanying targets are an integrated set, with progress in achieving one MDG or target depending on also achieving others. While MDG 7 is the only goal explicitly targeting the environment, achieving each of the goals will require the support of a functioning ecosystem. In turn, achieving the other MDGs will support delivery of MDG 7 (Table 1).

<b>Table 1 Key links between Millennium Development Goals and the environment</b>	
<b>Millennium Development Goals</b>	<b>Examples of links to the environment</b>
Goal 1 Eradicate extreme poverty and hunger	<ul style="list-style-type: none"> <li>▪ Livelihood strategies and food security of the poor often depend directly on functioning ecosystems and the diversity of services they provide.</li> <li>▪ Insecure rights of the poor to environmental resources, as well as inadequate access to environmental information, markets, and decision-making, limit their capacity to protect the environment and improve their livelihoods and well-being.</li> </ul>
Goal 2 Achieve universal primary education	<ul style="list-style-type: none"> <li>▪ Time that children, especially girls, spend collecting water and fuel wood can reduce study time.</li> <li>▪ Additional income generated from sustainable management of natural resources is available to be spent on education.</li> </ul>
Goal 3 Promote gender equality and empower women	<ul style="list-style-type: none"> <li>▪ Time that women spend collecting water and fuel wood reduces their opportunity for income-generating activities.</li> <li>▪ Poor rural women often depend heavily on natural resources, but inequity and lack of secure rights limit their access to decision-making and resources.</li> </ul>
Goal 4 Reduce child mortality	<ul style="list-style-type: none"> <li>▪ Improved management of local watersheds can reduce child mortality related to water-borne disease.</li> </ul>
Goal 5 Improve maternal health	<ul style="list-style-type: none"> <li>▪ Indoor air pollution and carrying heavy loads during late stages of pregnancy put women's health at risk before childbirth.</li> </ul>
Goal 6 Combat HIV/AIDS, malaria and other diseases	<ul style="list-style-type: none"> <li>▪ Environmental risk factors account for up to one-fifth of the total burden of disease in developing countries.</li> <li>▪ Preventive environmental health measures are as important, and at times more cost-effective, than health treatment.</li> </ul>
Goal 7 Ensure environmental sustainability	All of the other goals are linked to environmental sustainability, often in very direct ways (as described elsewhere in this book).
Goal 8 Develop a global partnership for development	The complex interaction between human well-being, ecosystem services and biodiversity requires an integrated approach including partnerships between civil society, the private sector and government.

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

The 2010 review of progress on achieving the Millennium Development Goals (MDGs), whose target date is 2015, reported that progress was generally considered to be patchy (UN, 2010). For the targets within MDG7 (Environmental sustainability), the report notes that

deforestation continues although the rate is decreasing in some regions, that carbon dioxide emissions are increasing, that the 2010 biodiversity target was not achieved nor are the areas needed to conserve species being protected and that the world is unlikely to meet

the 2015 target relating to improved sanitation or improvement in the lives of slum dwellers. Achievement of other MDGs will be strongly influenced by biodiversity conservation including both food security (MDG 1) and health (MDGs 4,5,6).

Food security remains a fundamental issue for human well being. While the percentage of the population that is hungry is declining, that absolute number of affected people is rising. Two billion people suffer malnutrition and 1 billion suffer from hunger. Seventy-five percent of these people are the rural poor (IFAD, 2010). Paradoxically, we are also facing a 'global obesity pandemic'. Between 1980 and 2008, the world's population has been gaining weight although there were marked regional differences including the highest increases reported in Oceania in both sexes alongside flat

trends or decreases in central and eastern Europe for women and central Africa and south Asia for men (Finucane et al, 2011).

In the past few years, increased food costs have been a major concern and a source of instability in many countries (Figure 7). One result has been a global 'land grab' as countries expecting to have increasing food and energy needs are now buying land in other parts of the world (Figure 8). As a result of increasing food prices, particularly during the global financial crisis, and continuing food insecurity around the globe, significant political energy, at the UN as well as G8 and G20, has been invested in developing frameworks for action to achieve food security at global and national level (High Level Task Force on Food Security, 2010).

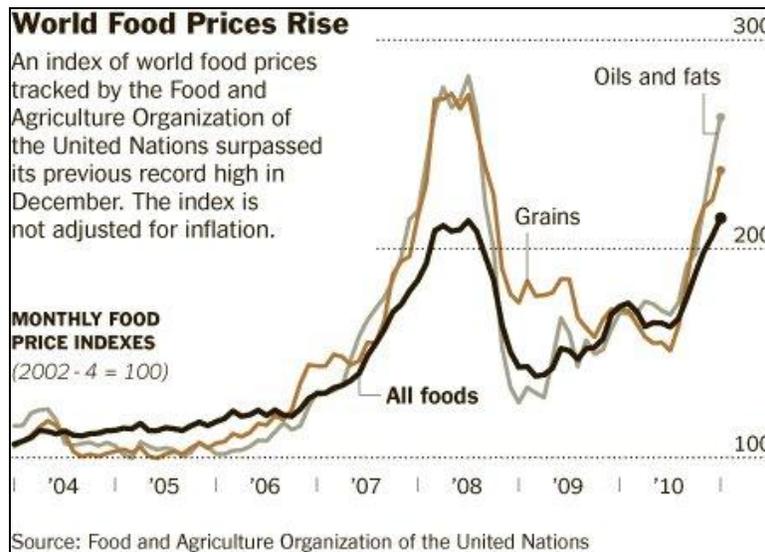


Figure 7 Global Food Price trends Source: FAO

### World land grab

Land purchased by government and private companies from each country, where areas are known

○ Total area purchased by country  
● Countries in which land has been purchased

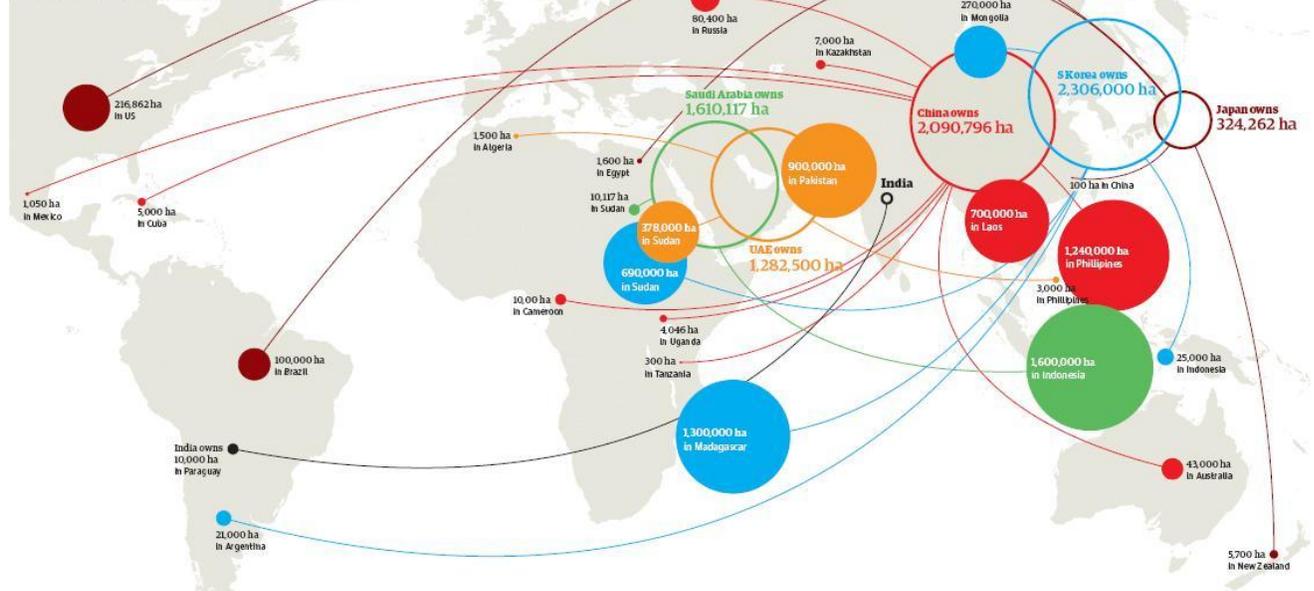


Figure 8 Rich countries reaching out to ensure food security Source: The Guardian, 2008

Meanwhile, major health concerns include the spread of potential pandemics such as avian flu, malaria, tuberculosis and HIV/AIDS along with recognition of the role that environment plays in human health. WHO reported on environmental impacts on human health noting that “13 million deaths worldwide could be prevented every year by making environments healthier. WHO reports that, in some countries, more than one third of the disease burden could be prevented through environmental improvements” (WHO, 2010). In terms of response to global health issues, some of the solutions to manage significant human health problems involve significant environmental manipulation. In terms of longer term ecosystem support for human well being, not all of these potential solutions will provide optimum outcomes and there is a potential role to help ensure global health solutions are more holistic and systemic in approach.

Key issues underlying both food security and health are those of water and energy security – both availability and quality.

The 2009 World Water Development Report (World Water Assessment Programme, 2009) notes that competition for water is already an issue and by 2030 47% of world population will be living in areas of high water stress and more than 5 billion people – 67% of the world population – may still not be connected to public sewerage systems. Seventy percent of the water that is used goes to agriculture, primarily for irrigation and 20% goes to industry and energy needs. With increasing population growth, water withdrawals have tripled in the last 50 years.

Water is increasingly acknowledged as an energy issue, and vice versa. The World Water Forum in March 2009 called for governments to integrate water and energy policies and incentives. The World Economic Forum and

WBCSD also developed guidance on these issues. Meanwhile, at events such as the Stockholm Water Week, the World Bank and UN were promoting investment in major infrastructure like big dams because of the need to respond to climate change, control flood waters and provide water for irrigation, as well as need for clean energy options. Now more than ten years since the World Commission on Dams delivered its findings, a multi-stakeholder roundtable coordinated by the International Hydropower Association with the World Wide Fund for Nature and The Nature Conservancy (amongst others) has finalized the Hydropower Sustainability Assessment Framework. Given previous opposition to such projects due to the

potential environmental degradation, the damage to peoples and communities and the sometimes imperfect engineering that causes dams to silt up and eventually fail, there is likely conflict ahead over the issue of dams.

The UN has declared 2005-2015 as the International Decade for Action: Water for Life, in response to increasing concerns about the impacts of growing water scarcity. Researchers have developed a water footprint indicator and shown that water use efficiency is highly variable around the world (Figure 9) with particularly high footprints in the developed world.

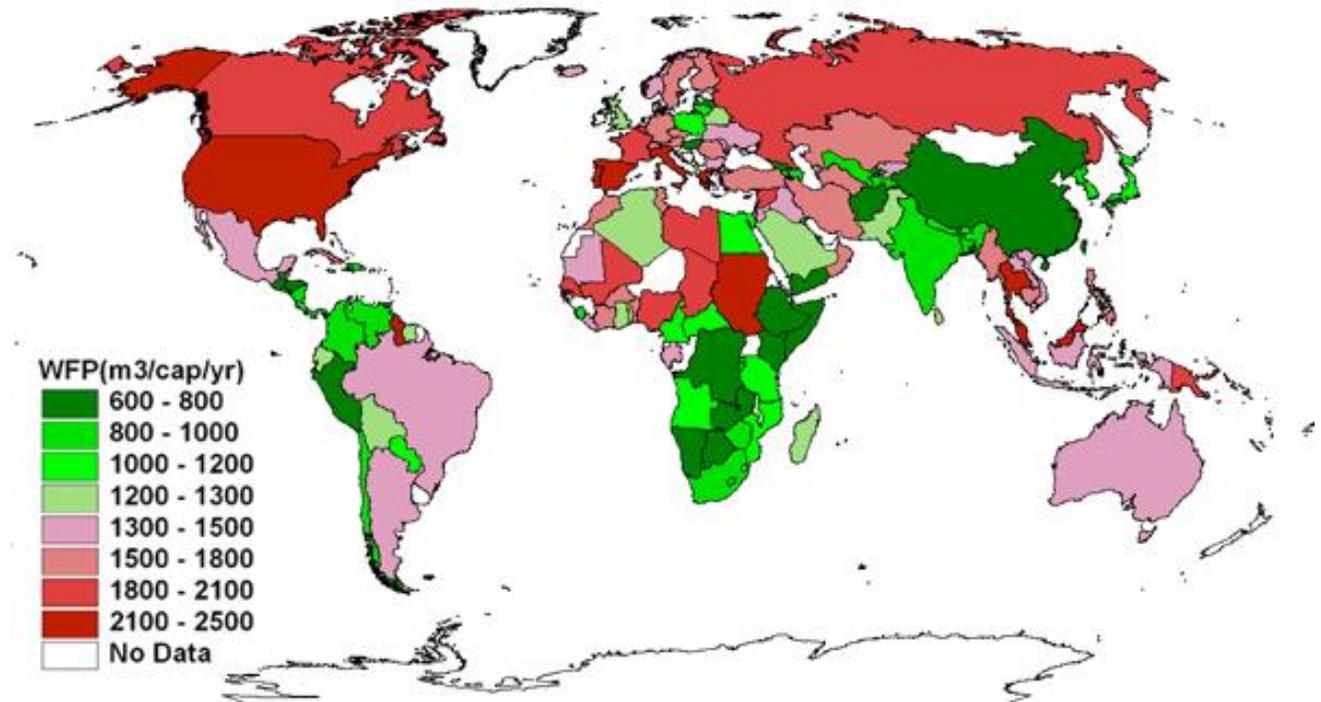


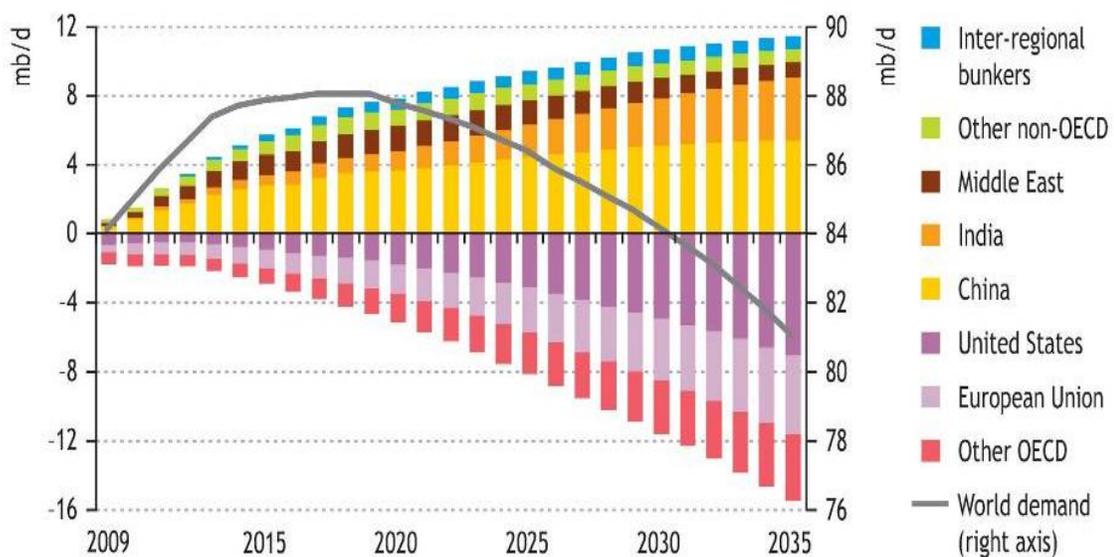
Figure 9 Water Footprints - green means at or below global average of 1240 m<sup>3</sup>/cap/yr

In 2006, world energy demand was predicted to double by 2030. However, the World Energy Outlook (WEO) 2010 (OECD/IEA, 2010) has revised down this prediction. Between 2008 and 2035, the WEO projects the following:

- Total energy demand grows by 36%, or 1.2% per year; far less than the 2% rate of growth seen over the prior 27 years.
- Renewables will be contributing just 14% of the total, and this includes hydro.
- 93% of all the demand increase comes from non OECD countries (mainly China and India).
- Oil remains the dominant fuel (although diminishing in total percentage).

- In 2010, some 1.4 billion people – equivalent to one fifth of the global population – do not have access to modern energy sources, and 2.7 billion people – or 40% of the global population – depend on traditional biomass sources such as firewood for cooking

Within this WEO energy scenario, which is an optimistic one, in OECD countries the use of coal and oil decreases by 2035 and reliance on other energy sources increases (Figure 10). China, which is and will be one of the most 'energy hungry' countries, is projected to not only increase use of coal and oil but has also become a leader in renewable energy production..



**Figure 10 Change in oil demand by region in the 450 scenario compared with 2008. Source, WEO 2010**

Over the past few years, the discussions around biofuels has evolved from talking about direct impacts of deforestation and related greenhouse gas emissions to indirect effects including indirect land use change and impacts on food production and markets

The energy industry was prominent in the headlines in both 2010 and 2011 as a result of the massive oil spill in the Gulf of Mexico and its potential cost (currently USD 40 billion and counting) and the damage to nuclear power plants consequent to the Japanese earthquake in March 2011. These incidents have caused governments, regulatory authorities and even

energy companies themselves to re-consider safeguards including contingencies and to improve technology to minimize the potential of environmental and humanitarian disasters subsequent to breakdowns in energy infrastructure.

All energy options potentially present threats to biodiversity from biofuels and invasive species to bird and bat mortality from wind farms and the environmental community is increasingly split with regards to the costs and benefits of the available energy options.

## **Direct Drivers of biodiversity loss**

The direct drivers of biodiversity loss are familiar to conservationists globally and were confirmed in the recent Global Biodiversity Outlook 3 (CBD, 2010). – habitat loss and degradation, climate change, excessive nutrient load pollution, overexploitation and unsustainable use, and alien invasive species. Habitat loss continues across all ecosystems, often as a result of land conversion for agriculture and infrastructure. Impacts on biodiversity, from changes in species phenology, distribution and reproduction, are already being reported at current levels of climate change. Buildup of phosphorus and

nitrogen in aquatic systems is causing dead zones in important ecosystems while the FAO reports that one quarter of fish stocks are over exploited and another half are fully exploited. Increasing trade and travel means the threat of invasive species is likely to increase with potential threats to food security, human health and economic development unless additional action is taken. Through the 2013-2016 Programme, IUCN will seek to address the majority of these factors, particularly through the combined efforts of its Membership, Commissions and Secretariat.

## **Underlying drivers of change – what’s new**

Today’s world has many interrelated forces that drive change in biodiversity. These underlying drivers are considered here under the topics of demography, politics, and technology. Additional underlying drivers of climate change and the economy are considered separately under the relevant Thematic Programme Area description. It’s important to remember that these drivers can have both positive and/or negative impacts on biodiversity – depending on the situation, the driver and the state of biodiversity. Each can be a challenge for biodiversity conservation yet each also represents an opportunity for conservation.

### ***Demography***

The human population quadrupled during the 20<sup>th</sup> century, increasing from about 1.5 billion in 1900 to about 6.9 billion in Feb 2011 (US Census Bureau, 2011) with the majority of that growth in developing countries (Figure 11). Projections of 8-11 billion people by 2050 are complemented by additional impressive statistics including the fact that by 2030 India’s population is expected to surpass that of China to become the world’s most populous nation. This explosive population growth reached a peak of 2.1% growth rate in the late 1960s, the most significant demographic process since the beginning of the industrial revolution. Since that time, the population growth rate has fallen

dramatically and, in contrast to centuries past where populations were affected by major conflicts and epidemic diseases, in today's world the fall is related to voluntary choices to limit the number of children (Cohen, 2005).

### Box 1. Key global population projections

#### Total numbers

- Assuming that fertility levels continue to decline, the world population is expected to be increasing by about 33 million persons annually by 2050.
- Future population growth is highly dependent on the path that future fertility takes but population growth until 2050 is inevitable even if the decline in fertility accelerates.
- The population growth of the 49 least developed countries is still the fastest growing in the world, at 2.3% per year.
- During 2010-2050, nine countries are expected to account for half of the world's projected population increase: India, Pakistan, Nigeria, Ethiopia, the United States, the Democratic Republic of Congo, the United Republic of Tanzania, China and Bangladesh, listed according to the size of their contribution to global population growth.

#### Demographics

- Globally, the number of persons aged 60 or over is expected almost to triple, increasing from 739 million in 2009 to 2 billion by 2050.
- Globally, life expectancy at birth is projected to rise from 68 years in 2005–2010 to 76 years in 2045-2050.
- In terms of annual averages, the major net receivers of international migrants during 2010–2050 are projected to be the United States, Canada, the United Kingdom, Spain, Italy, Germany, Australia and France. The major countries of net emigration are projected to be Mexico, China, India, the Philippines, Pakistan, Indonesia and Bangladesh.

Source: UN, 2009

But population growth alone does not tell the whole story. As the UN findings (Box 1) show, the proportion of elderly people in the population is increasing, especially in developed countries and from 2005 onwards they will have more people aged 60 years and older than children aged 4 years or under. At global level, this shift of the number of older persons exceeding the number of children is expected by 2045. (Cohen, 2005).

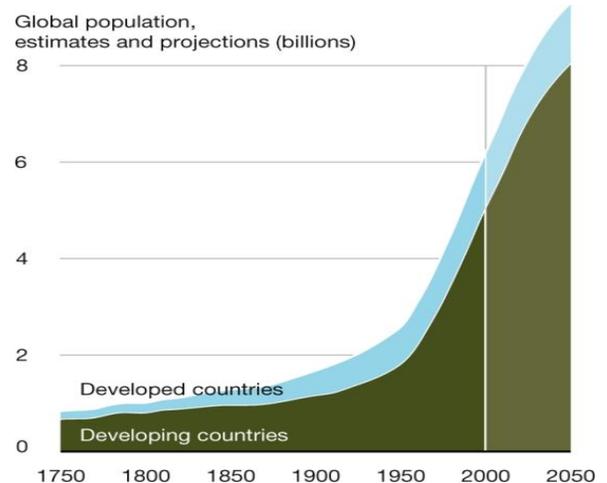


Figure 11 Population growth projections to 2050

Source: UN DESA, 2009

While the older segment of the population remains the fastest growing, globally, in the less developed regions the number of children - 1.6 billion, (UN, 2009) - and the number of young people - 1.0 billion - are both at all time highs, posing a major challenge to their countries, which are faced with the necessity of providing education and employment<sup>1</sup>. The situation in the least developed countries is even more pressing because children under age 15 constitute 40 per cent of their population and young people account for a further 20 per cent.

Another demographic trend receiving attention is that of "missing women" which refers to unbalanced sex ratios in populations. It was first identified through the work of Sen (1992) and according to UN estimates, the sex ratio at birth

<sup>1</sup> UN definitions – children - up to 14 years of age; young people - 15-24 years of age

has increased globally from a stable 1.05 in the early 1970s to a recent peak of 1.07 (UN, 2009). There are more 'missing women' in the developing world, especially in Asia and sub-Saharan Africa and the skew occurs not just at birth but also throughout adulthood. Causes that have been implicated include preferences for male children (and resulting abortions of female fetuses) and access to health care (Anderson and Ray, 2010).

Other important shifts include that, as of 2007, more people lived in cities than in rural areas, meaning more than 50% of the world's population lived on less than 4% of the earth's surface. The number of cities of one million or larger was 76 in 1950, 522 in 1975, 1,122 in 2000, and is set to exceed 1,600 by 2015. Using current population projections to 2050, most of the forthcoming growth in population will be in cities with poor countries having "to build the equivalent of a city of one million people each week for the next 45 years" (Cohen, 2005). In addition, as of early 2009, the majority of the world's people were classed as "middle income", denoting new spending power and the accompanying impact of increased consumption on natural resources.

One other perspective of population is related to number of households as opposed to number of people. Liu *et al.* (2003) reported that even when population numbers are stable or declining, if the number of households increases, the demands on natural resources will also increase.

A new demographic challenge is the emergence of "environmental migrants", especially in response to climate change. Populations living in low-lying island nations, such as the Maldives or Tuvalu, or in vulnerable coastal areas, such as parts of Bangladesh and Florida, will pose environmental challenges as well as social, economic, and security ones.

Meeting the needs of these changing populations will inevitably have impacts on the environment. For example, increasingly cramped urban areas will need to expand –

often into important nearby arable land, thereby limiting productivity of those lands. Demographic shifts will also mean increasing public-sector spending on healthcare and family support sectors with a potential trade-off of reducing investments in other public goods, including environmental management.

Consumer choices will also have important implications for biodiversity conservation. Influencing these choices towards more sustainable options depends on identifying motivations for decisions and implementing communications/awareness raising activities based on that information. Recent research on consumer behaviour in the developed world suggests that consumers make choices based not primarily on environmental motivations but on factors including perceived status of such choices (Griskevicius *et al.* 2010); what is deemed to be the 'social norm' (Goldstein *et al.* 2008); and whether or not one feels one has already been 'green' (Mazar and Chen, 2010).

### ***Politics and Institutions***

Biodiversity is both a global and local good that often spans geopolitical boundaries. Therefore, environmental governance through multilateral action is an important means of achieving conservation. In the past few years, the ability of multilateral fora to be effective has certainly been called to question with the failure of the UNFCCC talks in Copenhagen to come to a clear agreement on future action and the continuing challenges to reach agreement on the Doha Development Round at the World Trade Organization (WTO). In addition, tense discussions at venues such as the CITES COP15 over the listing of bluefin tuna or at the World Heritage Committee meetings over site nominations demonstrate that while biodiversity conservation is increasing in profile, it is also facing challenges from political and economic priorities.

A more positive outcome was achieved when agreements were reached at the CBD COP10 on the Nagoya package which includes i) a Strategic Plan 2011-2020, ii) An Access and

Benefit Sharing Protocol, and iii) a Resource Mobilization Strategy, and then, a few weeks later, at Cancun where UNFCCC negotiators reached agreement on aspects of particular relevance to biodiversity such as Reduced Emissions from Deforestation and Forest Degradation (REDD+) and the role of ecosystems in adaptation.

2012 will be an important year for IUCN with the convening of the World Conservation Congress in Jeju, Korea. But 2012 will also see several other important global meetings, in particular Rio+20 convened by the UN Commission on Sustainable Development (CSD). In preparation for that gathering, which will focus on i) the contributions of a green economy to poverty alleviation and sustainable development; and ii) ways to improve international environmental governance. CSD stakeholders have confirmed high-level 'ownership' of the sustainable development agenda but noted that implementation of measures was often constrained by inadequate resources. They identified several priorities for accelerating progress toward sustainable development including protecting biodiversity, promoting good environmental governance; and mainstreaming education for sustainable development (UNCSD, 2010).

While discussions on environmental issues in international venues continue, today's international political agenda is largely focused on economic and security issues, including recovery from financial crises, terrorism, and conflict. Armed conflict today is of particular concern for biodiversity as over 80% of the major armed conflicts in the second half of the 20th century happened in the biodiversity hotspots, areas that contain the entire populations of more than half of all species of plants and more than 42% of all vertebrates. Two-thirds of the world's thirty-four hotspots experienced warfare during that time (Hanson et al., 2009). Trends in armed conflict show that interstate wars have decreased since the establishment of the UN but civil society conflict remains an important issue although there is an interesting decrease starting from the time of dissolution of the USSR. A possible reason for this shift is suggested by systemicpeace.org in a complementary graph on national governance that highlights trends over the same time period (Figure 12) in which democracies are increasing over time while autocracies decrease.

At the time of writing, increases in civil unrest in the Middle East and resulting changes to government could have a positive impact on environmental governance in the region.

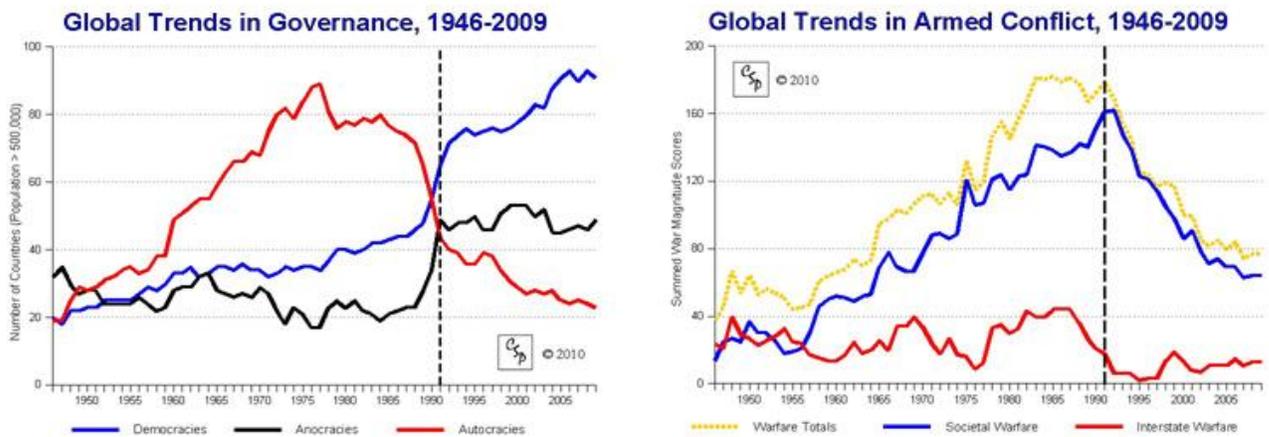


Figure 12. Global Trends in governance and armed conflict Source: www.systemicpeace.org

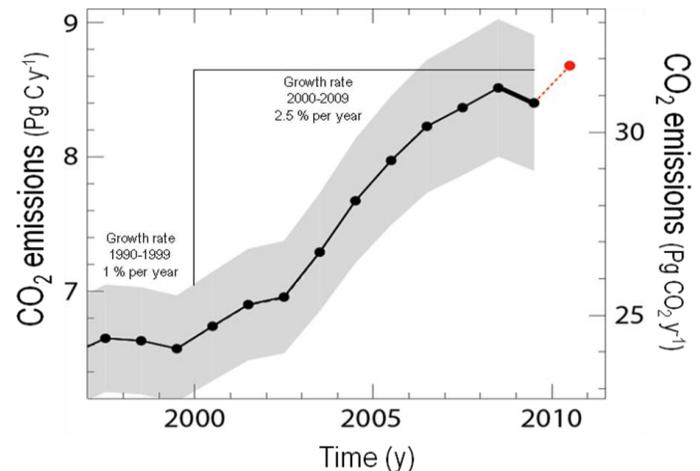
## The Global Economy

In 2006, the world spoke of the BRICS (Brazil, Russia, India, China, and South Africa) as the emerging economies to watch. Today, Brazil, China, and India stand out as increasingly important global players on political, economic and environmental agendas. While foreign direct investment (FDI) flows decreased globally in 2008, largely as a result of decreased flows from the developed world, the FDI from emerging markets of Brazil, China and India actually increased. Of all FDI from developing economies, in 2008, 30% came from those 3 countries (Sauvant et al., 2010). By 2014, China is expected to invest \$70 billion, up from \$49.5 billion in 2009 and much of that investment will be by firms engaged in extraction of natural resources (Reuters, 2010). In addition, China dominates world trade in many market segments, holds over US\$2 trillion in foreign reserves, and is an increasingly important player in global capital markets (Sauvant et al., 2010).

Meanwhile, international negotiations on economic issues relevant to biodiversity continue. For example, the Doha Development Round, within the WTO discussions, is 'celebrating' its 10<sup>th</sup> anniversary with some signs of political will towards a conclusion. In 2010, the G20 summit in Seoul called for "across-the-board negotiations to promptly bring the Doha Development Round to a successful, ambitious, comprehensive, and balanced conclusion" and leaders of Asia-Pacific states at the APEC summit in Yokohama echoed the need for conclusion to the Doha Round. It remains to be seen if such a conclusion can be achieved, what form it might take, or what the impacts on the environment might be.

The financial crisis of 2008/2009 had significant impacts beyond that of banking and financial services, outputs and profits. Among other impacts, the crisis resulted in a massive shift in debt burden from the private to the public sector in most developed economies. This was accompanied by a drop in economic output and trade, provoking governments to increase

public spending in an effort to avoid depression. More recently, developed country governments have sought to restore fiscal balance and reassure their bond-holders by imposing public spending cuts. Secondary effects of the crisis included cuts in interest rates (again to stimulate investment), leading to dramatic shifts in exchange rates and increased inflationary pressures. Meanwhile, many private investors have sought to reallocate capital from financial to so-called "real" assets, which has in turn bid up the prices of commodities (e.g. food, fuel and minerals), along with other contributing factors (e.g. drought, political instability). But awareness of the need and benefits of sustainability practice and biodiversity conservation also became better known. The financial downturn provided a brief reprieve in carbon dioxide emissions as levels fell 1.3% compared to 2008 although emissions for 2010 are expected to climb again (Figure 13, Global Carbon project, 2010).



**Figure 13 Global carbon dioxide emissions Source: Global Carbon Project, 2010**

Studies undertaken in 2009 (AT Kearney, 2009) reported that businesses that had established sustainability practices fared better through the crisis than those that didn't. Another silver lining to the 'cloud' of the financial crisis was the opportunity it provided some countries to integrate sustainability concerns into their economic stimulus packages, e.g. South Korea's Green Growth Strategy. Many countries around

the world (e.g. Germany, South Africa, Ecuador, and Indonesia) have since begun developing their own national 'green growth' or 'green economy' strategies.

One important tool for greening the global economy is better understanding the value of the environment to our economy, as well as the costs of inaction or failing to conserve it. In 2006, the Stern Report provided a landmark estimation of the costs of climate change, in economic terms, and this effort paved the way for a complementary study on the value of nature, namely The Economics of Ecosystems and Biodiversity (TEEB). TEEB (2010) estimated that if we do not halt biodiversity loss today, the cumulative costs to human well-being by 2050, from the loss of forest goods and services alone, could more than Euro 4 Trillion (7% of global GDP). TEEB highlighted the value of biodiversity and illustrated the wide range of policy and market mechanisms that are increasingly being used to "internalize" the value of natural capital in public and private decision-making. Other highlights from TEEB reports include:

- The value of investing in conservation – for example the investment needed for protected areas globally is ~ USD45 billion yet the benefits received from effectively managed protected areas is ~USD 4-5 trillion. (TEEB, 2010)
- The economic potential of ecosystem investments to support climate change action – for example, TEEB highlighted the Eliasch Review (2008) which reported that halving deforestation generates net benefits of about USD 3.7 trillion including only the avoided damage costs of climate change, and
- The particular role that ecosystem services play in supporting livelihoods of the poor, through determination of GDP of the poor (Gundimeda and Sukhdev, TEEB D1)

While TEEB was underway, several initiatives relating to achieving a 'Green Economy' began. In the words of the Green Economy Coalition, these groups are seeking ways to build "A resilient economy that provides a better quality of life for all within the ecological limits of one planet".

The release of the TEEB report is a big step towards providing methodologies whereby biodiversity values can be incorporated into policies. At the same time, we are seeing increasing acceptance of the need to internalize the costs of biodiversity loss. Many countries have begun to make initial steps towards a more comprehensive integration of environmental concerns into their economies, notably through national-level green growth or green economy strategies. However, it is still unclear the extent to which biodiversity concerns will be reflected in such strategies, which have yet to result in significant change. Most significantly, the potential effects of such strategies on economic growth remain an important source of controversy, with some developing countries fearing that 'Green Economy' policies could result in "conditions and standards that justify unilateral restrictions in trade, finance and aid"(South Centre, 2010).

Working towards a green economy requires not only changing economic policies and approaches but fundamental shifts in production and consumption patterns. For the past 3 years, National Geographic has calculated a Greendex, which looks at consumer choices and the environment, and the findings have been consistent with India, China and Brazil scoring relatively highly and consumers in the US consistently coming out at the bottom (Figure 14). Financial incentives are one means by which governments, business and civil society can encourage behavior change but research shows that this will need to be supplemented by changes in societal attitudes that establish environmentally sustainable choices as the norm. Conservationists will need to develop communication strategies that

promote solutions that will tangibly change

people's lives for the better. It's a tall order.

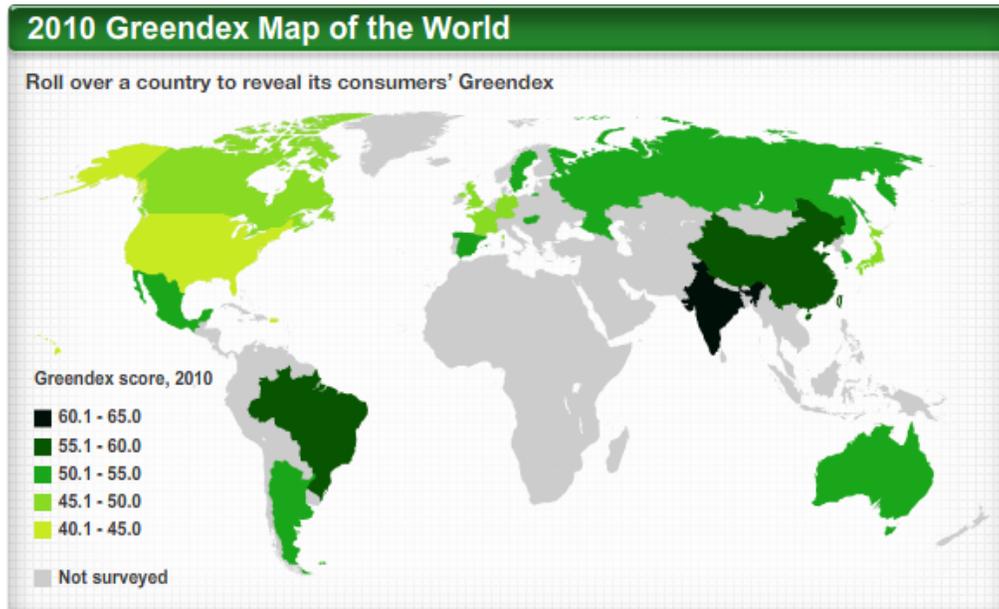


Figure 14 Greendex – higher numbers for more environmentally conscious consumers Source: National Geographic, 2010

### Climate Change

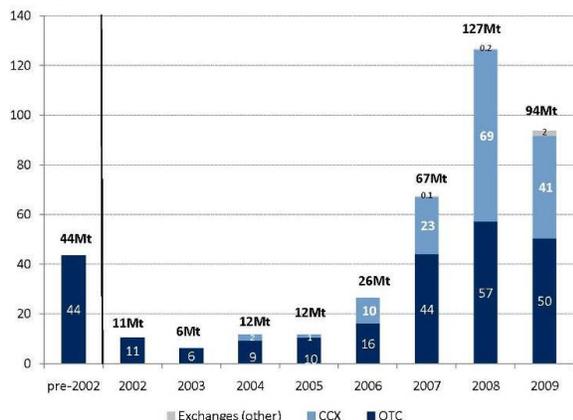
The world's climate continues to change, with 2010 tying 2005 as the warmest year on record and 2010 as the wettest on record in terms of global average precipitation. The IPCC's 4th Assessment Report (AR4), published in 2007, highlighted the continuing rapid pace of climate change across the globe, and showed regional differences. The interpretation by policy makers of the AR4's conclusions led them to agree that the increase in global average temperature should not increase by more than 2°C above pre-industrial levels. Achieving the 2°C target for limiting the temperature increase means stabilizing the atmospheric concentrations of greenhouse gases at around 450ppm CO<sub>2</sub>. This in turn would require that by 2050 global emissions of CO<sub>2</sub> (the major greenhouse gas) need to be reduced by 50-85% over 2000 levels. Global climate policy therefore currently aims at a temperature increase of not higher than 2°C, a stabilization target of 450ppm CO<sub>2</sub>eq. and a peaking of emissions in the next 10-20 years.

However, in the conservation world, these targets are regarded as insufficient. Research is reporting that many biodiversity components, eg. coral reefs, are showing impacts at levels well below 450 ppm. There are calls for the 2°C target to be revised towards a more stringent 1.5°C. The small island states and other vulnerable countries are particularly vocal, as sea level rise concomitant with a 2°C would threaten their very existence.

The climate change policies currently in place, collectively, are not enough to put the world onto a path for limiting global temperature increases under safe levels. Only vigorous implementation of commitments before 2020 will enable a 2°C goal to be met, otherwise it will be "all but impossible to achieve" (World Energy Outlook, 2010). More specifically, UNEP (2010) reports that emission levels of approximately 44 gigatonnes of carbon dioxide equivalent (GtCO<sub>2</sub>e) (range: 39-44 GtCO<sub>2</sub>e) in 2020 would be consistent with a "likely" chance of limiting global warming to 2° C. but

continuing under current practices results in global emissions as high as 56 GtCO<sub>2</sub>e (range: 54-60 GtCO<sub>2</sub>e) in 2020, leaving a gap of 12 GtCO<sub>2</sub>e.

Carbon markets have been operating since 1989 but their growth in the 21st century has been remarkable, stimulated by the Clean Development Mechanism of the UNFCCC Kyoto Protocol, and by the EU's Emissions Trading Scheme, which began in 2005. The Ecosystem Marketplace 2010 documents the growth but also notes that the financial crisis of 2008/2009 had an impact on carbon markets as well – although the impact was not severe enough to stop an overall growth trend (Figure 15)(Hamilton et al., 2010)



**Figure 15 Transaction Volume for voluntary carbon markets Source: Ecosystem Marketplace**

Attention is increasingly focusing on the oceans where the issue is not just about temperature but also about chemistry, specifically ocean acidification and its impact. Ocean acidification – a direct consequence of increased human induced carbon dioxide concentrations (CO<sub>2</sub>) in the atmosphere – is a threat to the integrity and diversity of the ocean and the sustainable management, conservation and equitable use of natural marine resources.

The UNFCCC COP15 meetings in Copenhagen in December 2009 were widely heralded as an ‘historic event’ at which a new global change regime would be adopted. In the event, the results of the meetings did not live up to expectations and they ended with an

unambitious, non- legally binding Accord being ‘taken note of’ by the Conference of the Parties. The UNFCCC negotiations remain dominated by the quest for a global treaty that will fill the post 2012 vacuum, when the first commitment period of the Kyoto Protocol ends.

The Cancun Agreements, achieved at UNFCCC COP 16 in December 2010, go some way to ‘anchor’ into the UN process the mitigation pledges made in the Copenhagen Accord by developed and developing countries. These pledges, if implemented, still fall short of what is needed to limit global warming to 2°C above pre industrial-levels but they do include adoption of a ‘balanced package of decisions’ on issues such as REDD+; adaptation; technology transfer; finance governance; capacity building.

The decision on REDD+ addresses the need for safeguards and co-benefits, such as impacts on and benefits for biodiversity. It also recognizes the full and effective participation of stakeholders, including particularly women, indigenous peoples and local communities. The details of how this decision will impact REDD+ in practice need to be defined. Indeed, REDD Readiness is increasingly being implemented on the ground, including through the support of mechanisms such as UNREDD and the World Bank’s FCPF. Issues such as benefit sharing and distributional mechanisms are emerging as critical make-or-break problems that need to be solved as to ensure equitable and sustainable approaches to REDD.

There is increasing recognition of the potential role of ecosystems in climate change adaptation and growing political support (e.g. UNFCCC Cancun Adaptation Framework); increased donor support (e.g. the UNFCCC Adaptation Fund is now functioning); and increasing practical experience and knowledge sharing on the ground. The UNFCCC Cancun Adaptation Framework recognizes the role of sustainable natural resource management as an adaptation action and the CBD has promoted the concept of ecosystem-based adaptation. Ecosystem-

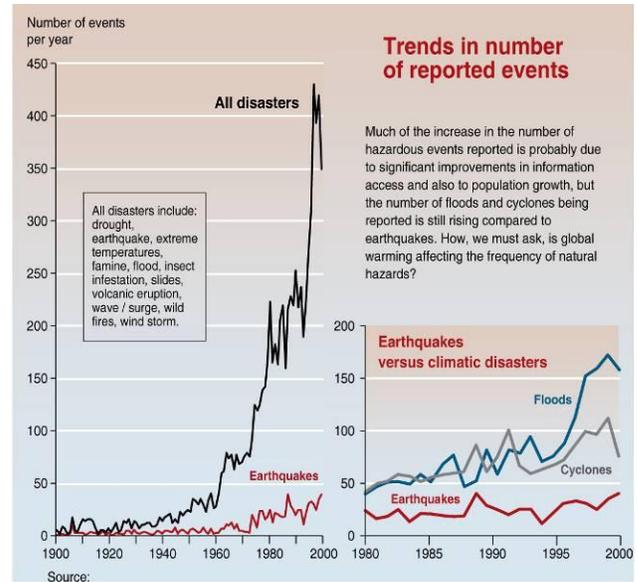
based adaptation solutions are already included in several national adaptation plans, including the NAPAs, and there is scope to expand implementation of these solutions on the ground.

At the same time, reducing vulnerability to natural hazards is increasingly relevant as the number and scale of disasters is increasing (Figure 16) and the potential role of ecosystem management in reducing vulnerability becomes more apparent. From the flooding in Pakistan to earthquakes across the globe, the scale of human suffering is huge. There is evidence to support the idea that climate change is one reason for the increase in some types of these extreme events and so a fundamental component of disaster risk reduction relates to climate change mitigation and adaptation. As the potential for climate change adaptation to decrease vulnerability to those events becomes more evident, there is growing political support for adaptation (e.g. UNFCCC Adaptation Framework); increased donor support (e.g. an Adaptation Fund now functioning); and increasing practical experience and knowledge sharing on the ground.

## Technology

### Communications and IT

At the time of the 1992 Earth Summit in Rio de Janeiro, few people had a mobile phone, the internet was in its infancy, and laptops were better considered portable desktop computers.



**Figure 16 Trends in numbers of disasters ( UNEP Grid Arendal, 2005)**

In 20 years, information and communications technology (ICT) has made remarkable advances, resulting in both costs and benefits to biodiversity. While ICT does present environmental challenges (due to energy consumption and waste management issues), increasingly it is being mobilized to improve the management of ecosystem services and biodiversity. For example:

- Portable devices, especially mobile phones, enable farmers to greatly enhance their productivity and profitability through better and immediate access to prices that are being paid for their crops, weather forecasts, and improved irrigation regimes.
- Increased public access to information about the environment resulting in increased awareness and appreciation for the natural world as well as support policy development and implementation through access to online resources (for example, databases and courses).

- Remote sensing, often using satellites to help collect spatially-based information from Earth, has become a mainstream environmental management technology being used in a wide variety of contexts.

ICT can and should help play a pivotal role in addressing the challenges of sustainable development. All indications are that these technological advances will continue to accelerate, providing quick and easy access to an increasingly broad range of important information that can lead to a more sustainable future.

#### Geoengineering as a solution to some of our global challenges

Certain types of geo-engineering, which is the deliberate modification of the environment to achieve specific outcomes, are rapidly advancing, especially in terms of finding climate change mitigation solutions that don't involve decreasing emissions. With respect to climate change, aspects of geo-engineering being explored include managing solar radiation, for example through creation of solar sulphur aerosols, carbon capture and storage techniques or employing biochar as a carbon sink, and ocean fertilization. The side effects of these technologies remain largely unknown (Royal Society, 2009).

At least one geo-engineering technology, ocean fertilization by iron to promote the growth of carbon-sequestering phytoplankton, has been tested, leading to considerable debate in global environmental policy arenas; governments have agreed a moratorium on further testing of this technology through policy decisions including CBD COP IX decision 16, and the decision of the 29<sup>th</sup> consultative meeting of the contracting parties to the London Convention and London Protocol.

Mathews and Caldera (2007), looking specifically at the question of managing solar radiation, reported that while geo-engineering solutions may provide some mitigation, these

technologies also masked increases in greenhouse gas emissions. Should geo-engineering solutions fail or be stopped abruptly, the result could be very rapid climate change, with warming rates up to 20 times greater than present-day rates. They conclude that simply relying on geo-engineering without complementary efforts to reduce carbon emissions presents high risks for the global climate system.

#### Biotechnology/nanotechnology

Biotechnology can be defined as any application of technology to biological systems and current applications include nanotechnology, biomimicry, genetic modification and synthetic biology.

Nanotechnology involves working at the atomic scale, roughly one-billionth of a metre in size. Global investment in nanotechnology in 2005 was US\$ 10 billion and this is expected to increase to US\$ 1 trillion by 2011–2015 (Navarro *et al.*, 2008). Benefits for people in medicines, electronics and the environment are expected. However, the potential for nanoparticles to also have detrimental effects has also been recognized, especially with so many unknowns surrounding their use (Navarro *et al.*, 2008). Sutherland *et al.* (2008) included nanotechnology among 25 novel threats facing biodiversity. The International Risk Governance Council (IRGC) also notes that while nanotechnology presents great potential benefits it also poses serious risks with significant social, economic, political and ethical implications and suggests that because issues raised by nanotechnology are more complex and far-reaching than many other innovations, decision makers need to manage for the uncertainties and risks associated (IRGC, 2007).

Biomimicry is the applications of models and processes from nature to industrial or agricultural designs to solve human problems. It is based on the principle that, through the process of evolution, nature has learned what works, what is appropriate and what is sustainable. We are already using biomimicry

applications in our everyday life and Velcro, inspired by the common burr, is the classic example. As the value of nature in supporting improved livelihoods through application of biomimicry becomes more common, the intrinsic value of all biodiversity as a living laboratory for future needs is more and more apparent.

Genetically modified organisms (GMOs) are increasingly prevalent in many countries and are being used in many sectors, from agriculture to health to energy supplies. IUCN Members have acknowledged this growing trend and, while noting the potential of GMOs to improve livelihoods and promote development, have expressed concern regarding the potential negative impacts of GMOs on food safety and the environment and called for a moratorium on their use until they can be proven safe (see IUCN Resolution WCC3.007). Potential negative impacts of GMOs include a reduction in biodiversity, threats to human health, unexpected consequences of gene transfer between plants, and creating pests or weeds that are resistant to controls. Recent research documenting the spread of GM crops to the wild and unintended consequences of GM application as a means of controlling parasites (Lu, 2010) remind us that we still have much to learn about system level impacts of such targeted interventions.

Synthetic biology involves the engineering of new biological systems, parts, or devices that

## **Cross-cutting Issues**

### ***Rights and conservation***

In 2009, the UN issued a report on the links between human rights and climate change (OHCHR, 2009), concluding that climate change threatens human rights and that human rights law places responsibilities on countries to act against climate change, including through international cooperation. Within that OHCHR report, is also recognition of the intrinsic link between the environment and the realization of a range of human rights. Policies and laws have

do not exist in nature, and the re-design or re-engineering of existing biological elements thereby creating entire new organisms or metabolic units (IRGC, 2008) As an emerging branch of biology, most of the work in this field does not yet have commercial applications. Advocates see potential in bioremediation (for example, degrading pesticides and removing pollutants), bio-sensors that can detect toxic chemicals, or engineering micro-organisms that can produce new sources of energy. Opponents suggest that synthetic biology could pose substantial risks, including unintended detrimental effects on the environment of the accidental release of synthetic organisms, such as those designed originally for bioremediation.

### Knowledge Generation

While lack of comprehensive knowledge about biodiversity has been identified as a constraint to implementing conservation, but in some parts of the world, great efforts are being made to address this issue. Science Metrix has analyzed knowledge creation in the sciences by tracking scientific outputs on the Web of Science and determined that particular 'hotspots' are China, Republic of Korea and the Middle East (Science Metrix, 2010). Biodiversity hotspots are well represented in areas that are generating more science in the recent 15 years compared to the 15 years before that. If these patterns continue, unknowns about biodiversity in key areas will hopefully not present such a constraint to IUCN's work.

established that environmental degradation may interfere with many rights, including rights to life, health, privacy, and property, as well as components of the right to an adequate standard of living, such as water and food. (Knox, 2010). The conservation community has also recognized that "conservation practices can affect human well-being and at times have undermined human rights, including local livelihoods, through human rights violations, forced resettlements and impacts on local livelihoods, especially of indigenous peoples

and local communities". In response, IUCN adopted Resolution WCC 4.056 (Rights-based approaches to conservation) to promote conservation policies and practices that are respectful of rights, especially of indigenous peoples and local communities.

The issue of rights-based approaches to conservation is particularly relevant for minority indigenous peoples who, as recently as thirty years ago, had few rights in most countries. Until relatively recently, indigenous groups often had no legal standing or formal land rights but the 2007 United Nations Declaration of the Rights of Indigenous Peoples make it unthinkable for IUCN to carry out activities affecting local people without the free, prior and informed consent of the people directly involved.

For conservation this is a critical development. Local communities, and especially indigenous people, are often the most politically and economically marginalized peoples yet they are often the stewards of the most biologically-rich areas. According to Sobrevila (2008), traditional indigenous territories cover up to 22% of the world's land surface and support 80% of the planet's terrestrial species diversity.

### **Gender equity**

Gender equity is a fundamental principle for IUCN's work. In 1997, the Union noted the need for a 'gender-focused approach to achieve sustainable development' (IUCN Resolution WCC1.5) and in 2000 adopted a Gender Policy (IUCN Resolution 2.28).

In 2010, the UN released "The World's Women 2010" a report that shows that progress towards gender equality has been made in some areas, such as school enrolment, health and economic participation. However, much more needs to be done to close the gender gap in critical areas such as power and decision-making (women typically only hold about 17% of seats in national parliaments) and literacy since women continue to comprise 2/3 of the world's 774 million illiterate people. The Gender

Empowerment Measure (Figure 17, UNDP, 2005 – indicator on a scale of 0-1) shows substantial variation across continents.

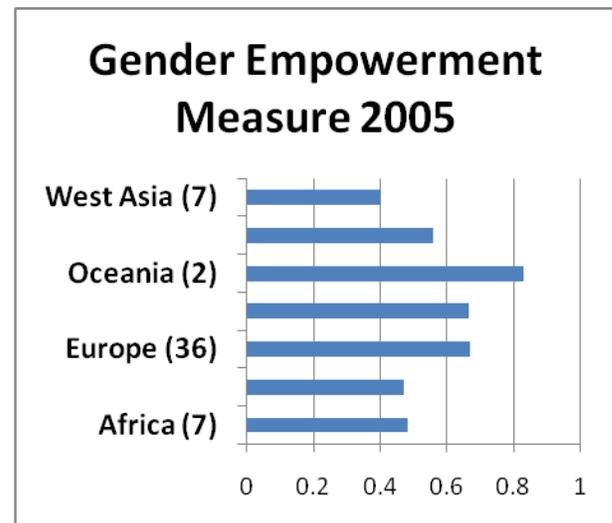


Figure 17- Gender Empowerment (UNDP, 2005)

MDG3 is about empowering women and promoting gender equity. The 2010 update on progress achieving the MDGs notes the following progress on MDG3:

- The developing regions as a whole are approaching gender parity in educational enrolment but girls of primary-school age from the poorest 60 per cent of households are three times more likely to be out of school as those from the wealthiest households so poverty is a major barrier to education.
- In every developing region except the CIS, men outnumber women in paid employment with women left to engage in more vulnerable informal employment with lack of benefits and security.
- Women are slowly rising to political power (19% of parliamentarians globally are women as compared to 11% in 1995), but mainly through support from special measures such as quotas.

## Implications the IUCN Programme 2013-16

The past few years have confirmed that biodiversity continues to be threatened and the pressures causing biodiversity loss are increasing. In spite of this, when measured at global or national level, human well being is not yet noticeably affected. Can this situation continue much longer? When will our socio-economic systems hit the tipping point beyond which we will see impacts on our own lives?

While the conservation community works to support sustainable development and poverty reduction in the developing world, it is increasingly clear that actions in the emerging economies and developed world will have a significant impact on biodiversity and human well being. In fact, some countries – especially Brazil, China and India – may have more significant impacts on biodiversity and human well being in the future, both by their own environmental efforts but also by their actions on the global economic scene. Achieving IUCN's mission will require change in consumer choices in wealthy developed countries as well as supporting sustainable livelihoods of rural poor in the developing world. And the growing interest of the business world, who respond to consumer demand, in engaging in conservation action should be harnessed.

There is growing political interest and investment in issues that have strong relevance to biodiversity conservation including food, water and energy security, support for the role of environment in addressing climate change and poverty reduction, respecting human rights and achieving equitable access to resources that are vital to support livelihoods..

From financial crises to numerous disasters – from the disappointment at Copenhagen to the successes at Nagoya – recent years have seen many surprises and uncertainty about what the future may bring in our rapidly changing world. Decision-makers are challenged to identify the best option for an unknown future. The

biodiversity community is building the evidence that nature should be an important part of the solutions. Those solutions should strive to achieve system-wide transformation and resilience – keeping our options open no matter what the future may bring. .

IUCN's value proposition has relevance for today's global agenda and provides opportunities for 2013-2016

- IUCN remains the provider of key biodiversity information and standards (the IUCN Red List of Threatened Species, Global Invasive Species Database, the IUCN Protected Areas categories, the World Database of Protected Areas, Tematea modules, Ecolex – gateway to Environmental Law, and the soon to be completed IUCN Red List of Threatened Ecosystems) and, as a result, should play a key role in the implementation of IPBES.
- There is an important niche in identifying how to manage conflicts between the need to promote biodiversity conservation and political and economic priorities at all levels. IUCN's unique membership and convening power as an 'honest broker' can help to bridge these challenges.
- Given the protracted and technical nature of ongoing negotiations in several multilateral forums, IUCN will likely continue to have opportunities to provide relevant information for the Parties, in support of achieving the goals of sustainable development
- IUCN must continue to act as nature's ambassador to the UN

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