

A SUMMARY OF  
PROCEEDINGS:  
28-30 JUNE 2011



Smith School  
of Enterprise and  
the Environment



# WORLD FORUM

11  
20  
12

ON ENTERPRISE &  
THE ENVIRONMENT

VALUING ECOSYSTEM SERVICES

available data  
data  
data + process  
... bottom up

What do when  
projections are wrong?

✓ S  
Technology  
Enviro.  
Economics

✓ P

Global NOT just  
interdisciplinary.


Collaboration  
on the ground & in  
the research office.

Indirect means of  
influencing behaviour.

What innovative source  
of finance can be sourced  
for biodiversity protection

Systems  
knowledge  
Identification.

Cultural  
Change.

Educational  
Tools 

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## Introduction

**Professor Sir David King**, *Founding Director, Smith School of Enterprise and the Environment*

**Professor Laurent Mermet**, *AgroParisTech and Smith School of Enterprise and the Environment*

The impact of humanity on the planet is in danger of sacrificing the very ecosystems that provide the air we breathe, the food we eat and the biological diversity that sustains life as we know it. Failure to address these challenges will result in a planet that can no longer sustain our civilisation.

While progress has been made in raising awareness and mobilising action – including new goals, valuation tools and action strategies on a global scale – we have yet to solve the systemic causes that continue to thwart meaningful, measurable change.

The Smith School of Enterprise and the Environment at the University of Oxford is working closely with business, governments and academia to find solutions to these challenges. In June 2011, we held our third World Forum in Oxford, the theme of which was Valuing Ecosystem Services: From New Commitments to Strategic Action.

Bringing together global leaders from all sectors, the World Forum took as its starting point the Nagoya biodiversity commitments of 2010. Over two days of in-depth dialogue between participants, breakout groups and panel discussions, we coordinated a candid and critical exploration of current progress, potential future scenarios and key systematic opportunities and avenues for action.

The idea was to avoid revisiting old ground, and to resist discussing biodiversity in the abstract without any connection to concrete action. As we come to the end of ten years of work assessing the scale of the problem and the tools, commitments and indicators available (a process concluded by the Nagoya summit), we wanted to use the Forum to kick-start a new discussion about how to find a way forward.

This report captures the key outputs from the World Forum and summarises the debates and discussions that took place. It is intended to serve as a record of the ideas that were exchanged, and as a source of inspiration for future action. We would value any feedback in response to this publication, plus any thoughts it might provoke on the preservation of ecosystem services and, crucially, how to break down barriers to change.

We hope you enjoy the report.



*Professor Sir David King, Founding Director,  
Smith School of Enterprise and the Environment*



*Professor Laurent Mermet, AgroParisTech  
and Smith School of Enterprise and the Environment*

## Welcome and opening remarks

Speaker: Sir David King



I am delighted to welcome you all to the third Smith School World Forum on Enterprise and the Environment. Each year, the World Forum has been a topical event. In the first year we considered whether low carbon economic growth is feasible. In the second, we looked at the future of low carbon mobility. From the dialogue and debate around these topics, we have at the Smith School developed very substantial and on-going bodies of work. And this is what we hope to achieve again with this year's World Forum, Valuing Ecosystem Services.

Framed by a series of diverse activities, this World Forum will take a fresh look at ecosystem services and search out solutions to the problems before us. Over the next two days, we need to pick up from where the Nagoya summit ended. You've not been invited here to hear sad tales of biodiversity loss, but to consider how we move forward. Our aim is to capture and exchange new ideas, findings and best practice examples to generate the momentum we must have to press on.

“In our long journey from the birth of civilisation to the present day, we have transformed the planet and shown little respect for nature. Our footprint is enormous.”

The wonderful planet we live on has co-evolved over the last four billion years to generate living species. As James Lovelock would say, it is the only known 'living planet'; but its conditions don't just *happen* to be perfect for us as human beings. Everything – the planet's gravity, climate, atmosphere, co-inhabitants – fits us because we have evolved into it. We are therefore a part of the ecosystems upon which all living things depend.

The chances of there being another planet like Earth are close to zero. Cosmologists like to suggest we should look for an alternative living planet as a possible 'second home' for the human race. But there is no planet B for us. If we wreck our ecosystems, we can't just jet off to another world and repeat our errors there. As human beings, we are totally dependent upon the properties of this planet alone.

Over the centuries, we have controlled the planet to meet our needs and used our intelligence to serve us as individuals. Human beings have become 'the God species', to borrow a phrase from Mark Lynas. We have taken over the right to create; we have adapted to all kinds of conditions and adapted everything around us – in the process achieving remarkable wellbeing for humanity. In fact, compared to 500 million in the Middle Ages, our global population now stands at around 7 billion and is set to reach 9 billion by 2050. While this growth is a mark of our success, we now need to demonstrate a different sort of intelligence; a collective intelligence and responsibility that enables us to manage the planet for its anticipated mid-century population.

In our long journey from the birth of civilisation to the present day, we have transformed the planet and shown little respect for nature. Our footprint is enormous. We have caused mass deforestation in order to feed ourselves; polluted our atmosphere; turned green lands into desert. Our urban development sprawls to the ocean's edge. Our waste mountains pile high.



“There is no planet B. If we wreck our ecosystems, we can’t just jet off to another world and repeat our errors there.”

Clearly, we cannot continue in this way. Following Nagoya, we need to act collectively to find ways to stabilise and then reverse the damage we have caused. And we know it can be done. The Chinese, for example, are currently in the process of recovering and regenerating the Loess Plateau; a desert region the size of France whose topsoil was destroyed by agricultural practices hundreds of years ago. According to the Chinese government, this area will be fully re-greened by 2020, and already a vast section has been successfully restored.

It can be achieved; we can bring about a recovery of the planet’s devastated regions, but we’re running out of time. If we are to succeed in halting the decline of ecosystem services, we need to act together and we need to act now. We have to put wellbeing over wealth, common good over personal greed; to shift from rampant consumerism to a more sustainable way of living. Just how we do this is the major challenge of this meeting.

## Taking on the Challenge

In this opening session, global policy makers discussed the new scale of biodiversity issues, underlining specific concerns linked with their personal responsibilities. They also highlighted examples of best practice, showing where progress is being made to reverse ecosystem damage and rebalance the needs of society and the environment.

### Speaker 1: Governor Tiao Viana, *Governor of Acre, Brazil*



The state of Acre is situated in the southwest tip of the Northern Region of Brazil. Occupying an area of 164,221 km<sup>2</sup>, it is home to 700,000 Brazilians, 15 indigenous populations and three of the last non-contacted groups of Indians on the planet.

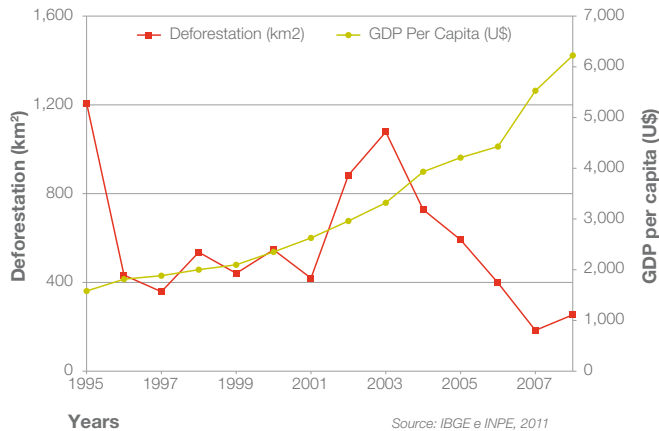
In the last 12 years, Acre has made remarkable progress in tackling ecological degradation and promoting social justice and wellbeing. It has reduced deforestation, reversed illiteracy and created sustainable and economically-viable local industries. Most significantly, Acre has turned the traditional growth model for forested countries on its head, showing that environmental preservation and economic development can be achieved simultaneously. In this way, Acre has become 'an experimental workshop' in the heart of the Amazon, not to mention a best practice case study and beacon of hope for the rest of the world.

#### Focus points

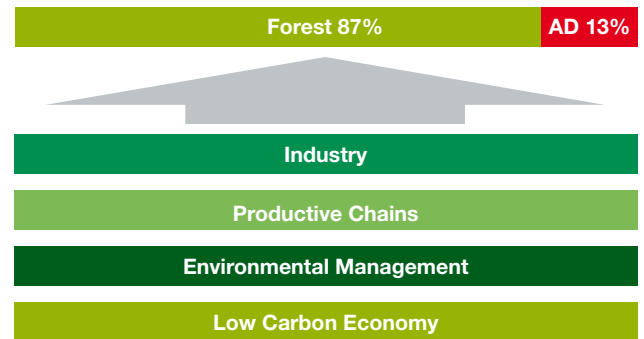
- Previously, 98% of Acre's timber industry was illegal. Now, 98% is based on sustainable wood extraction. With 88% of its forest areas preserved, the government has also implemented state-wide plantation schemes, creating 32,000 hectares of reforested land.
- As a result of these efforts to protect and re-grow forested areas, Acre's GDP is now three times higher than it was 12 years ago. As the graphs below demonstrate, Acre has found a winning formula for increasing GDP – which since 1995 has risen steadily as deforestation has declined – and linking environmental protection with socio-economic development.
- To relieve pressure on its forests, Acre has also pursued a 'commodity solution' to assist the programme of reversal. Farmer families, fisheries and fruit processing facilities have all received government support, and over \$650 million has been generated by fisheries alone. Native rubber has been used for the production of condoms, among other things, while domestic nut, fruit and cosmetic industries have helped to create local employment opportunities. But if the experiment is to work in the long term, Acre needs to penetrate international markets and establish joint ventures with foreign companies. Inevitably, ethical foreign investment will be critical to making the process truly successful and sustainable. Political sustainability is also at stake, and a constructive dialogue between politics and business will be essential to future progress.



## Gross Domestic Product and Deforestation



## Improvement Quality of life of the Acre people



“Acre has shown the world that economic development can be achieved quickly, but also in an ethical and environmentally sustainable way.”

## Fact

In 12 years, illiteracy in Acre has been reduced from 24.5% to 12.7% among young people aged 15 and over.

## Question

Rather than relying on aid, can developing nations follow Acre's example and use tradable native commodities to create a viable marketplace?

## Taking on the Challenge

**Speaker 2: Ambassador Hans Brattskar, Director, Climate and Forest Initiative, Norway**



The carbon storage provided by the world's forests is one of the most vital of all ecosystem services, and its depletion is estimated to account for about 17% of annual greenhouse gas emissions. The Stern Review identified the reduction of these emissions as one of the most cost-effective and rapidly available large-scale mitigation options. Preserving carbon storage, and reducing emissions from forest destruction, is therefore essential if we are to reach the goal of limiting global warming by two degrees above pre-industrial levels.

Taking up this challenge, the Norwegian Climate and Forest Initiative began its work in April 2008. Its main purpose is to support the establishment of a REDD Plus mechanism under the UN climate change convention to reduce carbon emissions from deforestation and forest degradation in developing countries. In support of this programme, in 2011 the Norwegian Government will be spending US\$ 400 million and a total of more than US\$ 400 million in 2010-2012; it has also pledged to provide up to \$1 billion each to Brazil and Indonesia for the verified emissions reductions. However, issues of medium and long-term financing remain unresolved, and unless a predictable system to reward countries for reduced emissions from forests is established, the overall impact of REDD Plus will be limited. Tens of billions a year could be needed to halt net deforestation by 2030. While this sounds expensive, it is still "a bargain" when you consider that, according to the Eliasch Review, the world may face costs of US\$ 1 trillion a year by 2100 if the international community does not act to reduce deforestation.

### Focus points

- REDD Plus is affordable. The cost of inaction, however, could be huge. There are powerful economic drivers behind deforestation, and if we do nothing the global demand for palm oil, timber, sugar, soy and beef, and the need to feed 9 billion people by mid-century, will continue to increase pressure on the world's tropical forests.
- Forests are of more value to society alive than dead, but people and markets need to be convinced of this. So, the challenge for REDD Plus is to create incentives and provide support for countries to develop without destroying their forests. Indeed, if we ascribe an economic value to carbon storage, the economic rationale for deforestation will be dramatically weakened. But we will not succeed unless the worldwide demand for food, fibre and other commodities is tackled by: 1) increasing productivity on land already in use; 2) shifting agricultural expansion to non-forested areas; and 3) reducing the demand for global commodities that drive deforestation.
- Traditional conservation schemes have done a lot of good and still have a role to play. But if we are to make a difference on a larger scale, we need to change the calculus by which private sector money moves and develop more innovative sources of funding. Not to mention more innovative mechanisms of payment. To give a REDD Plus credibility, 'results' rather than 'need' should define levels of financing, and payments should only be made once their viable outcome has been achieved.



“At first I thought I was fighting to save the rubber trees. Then I thought I was fighting to save the Amazon rain forest. Now I realise I’m fighting for humanity.”

*Chico Mendes, Brazilian activist*

### Fact

The typical pattern in forested countries is high deforestation in the early phase of economic development, which later slows and is ultimately reversed. This process is known as ‘the forest transition curve’.

### Question

How do we motivate and enable developing countries, many of which are still in the initial phase of economic development, to leapfrog the forest transition curve?





# Session 1: Valuing Ecosystem Services

## Chair's introduction

Mr Andrew Mitchell, *Director, Global Canopy Programme*

In this session, panel members considered how meaningful change must be informed by the patterns of the past. They looked at recurring challenges and solutions to better identify what parts may be truly new, as well as the implications for action.



Valuing ecosystem services is a complex process. It involves ethics, ecosystems, economics and politics. It involves communities of wealth creators; those who depend upon the natural capital that underpins climate, food, water and health security. And it involves communities of the poor; those who 'own' this natural capital and provide ecosystem services to us all. The question before us is: how should we value the flow of benefits between these two parties?

There are no quick or easy answers. But one thing is certain: achieving attitudinal and behavioural change will be critical if we are to make progress in this area. For example, efforts to reduce smoking in the west have failed when predicated on economics or science. Messages such as 'smoking is expensive' or 'smoking is unhealthy' simply don't have an impact on people. But tell them that 'smoking is uncool' – that's when they tend to listen.

It's a question of attitude.

And so too with natural capital. The science of climate change and the irrefutable evidence of environmental degradation have failed to alter people's behaviour. So how do we achieve the attitudinal change necessary to protect natural capital and ecosystem services? We need to think carefully about the scientific information we are 'putting out there'; about how we are arguing our case and how, through our questioning and messaging, we can bring about a change in behaviour – not only in companies, but in politicians, the public and in the flow of global finances.

Here we look at both the historical and ethical aspects of this question.

## Session 1: Valuing Ecosystem Services

**Speaker 1: Professor Patrick Blandin**, *Professor Emeritus, Museum National d'Histoire Naturelle, Paris*

### How to value Biodiversity and Ecosystem Services: A Long-Standing Argument



The history of environmental protection is the history of competition between aesthetic and utilitarian values. Over the last 100 years, the proponents of these opposing values have lobbied governments and international bodies

in an attempt to achieve their respective goals.

In the late nineteenth century, individuals on either side of the Atlantic expressed concerns about industrial development and the future of life on earth. At first, figures like French landscape painter Rousseau and American naturalist John Muir argued for the preservation of nature on purely moral and aesthetic grounds. But by the early twentieth century, more utilitarian views were being articulated. In 1909, for example, the Chief of the United States Forest Service, Gifford Pinchot, called for the conservation of natural resources “for the service of man”. And in 1923, at the First International Congress for the Protection of Nature, in Paris, Louis Mangin made strong links between “natural protection and economic transformation”.

Throughout the twentieth century, the two arguments developed in parallel: on the one hand, the preservation of nature; and on the other, the conservation – and “prudent exploitation” – of natural resources.

#### Focus points

- Before the Second World War, the focus in Europe was mainly on the protection of nature. But in 1948 UNESCO and other bodies came together in Fontainebleau, France, to create the International Union for the Protection of Nature (IUPN). IUPN founding documents and spokespeople urged for the conservation of natural resources and the creation of “official ecological services”. At this time, Julian Huxley, UNESCO Director General, linked the protection of nature with social and economic issues, thus defining the three pillars of sustainable development that have endured to this day.

“Policies regarding biological diversity first need to demonstrate in economic terms the contribution biological resources make to the country’s social and economic development.”

*Conserving the World’s Biological Diversity, 1990 quote*



“Conservation is not conservatism. It is management of the resources of the environment – air, water, soil, minerals, and living species, including man – so as to achieve the highest sustainable quality of life.”

*Gerardo Budowski, Director General, IUCN.*

*Address to the United Nation Conference on the Human Environment, Stockholm 1972*

However, before long the interests of the IUPN were broadened; a move that was reflected in its name change in 1956 to the International Union for the Conservation of Nature and Natural Resources (IUCN).

- In 1968, the Biosphere Conference in Paris laid further foundations for sustainable development, although the first direct use of the phrase did not come until 1980, in IUCN's *World Conservation Strategy*:

“Humanity's relationship with the biosphere will continue to deteriorate until a new international economic order is achieved, a new environmental ethic adopted,

human populations stabilise, and sustainable modes of development becomes the rule, rather than the exception.”

- The term ‘biodiversity’ was coined in 1985; it was an invasive word that pushed aside the previously discussed concepts of ‘nature’ and ‘natural resources’. And in 1992, the UN Conference on the Environment and Development (the Rio Convention) acknowledged the ‘intrinsic value’ of biodiversity. However, two years earlier, the publication *Conserving the World's Biological Diversity* acknowledged that ethical principles alone could not be expected to drive change in human behaviour.

### Fact and action

In 2011, the loss of biodiversity continues. We must realise that we are responsible for the adaptive capacity of living systems, and for the future of the planet. Sustainable adaptability must be our target.

### Question

Can the moral and utilitarian views of man's relationship with the natural world ever be fully reconciled?

## Session 1: Valuing Ecosystem Services contd

**Speaker 2: Professor David Macdonald**, *Director, WildCRU, Zoology Department, University of Oxford*

### Acting for Conservation: Evolving Contexts over Recent Decades



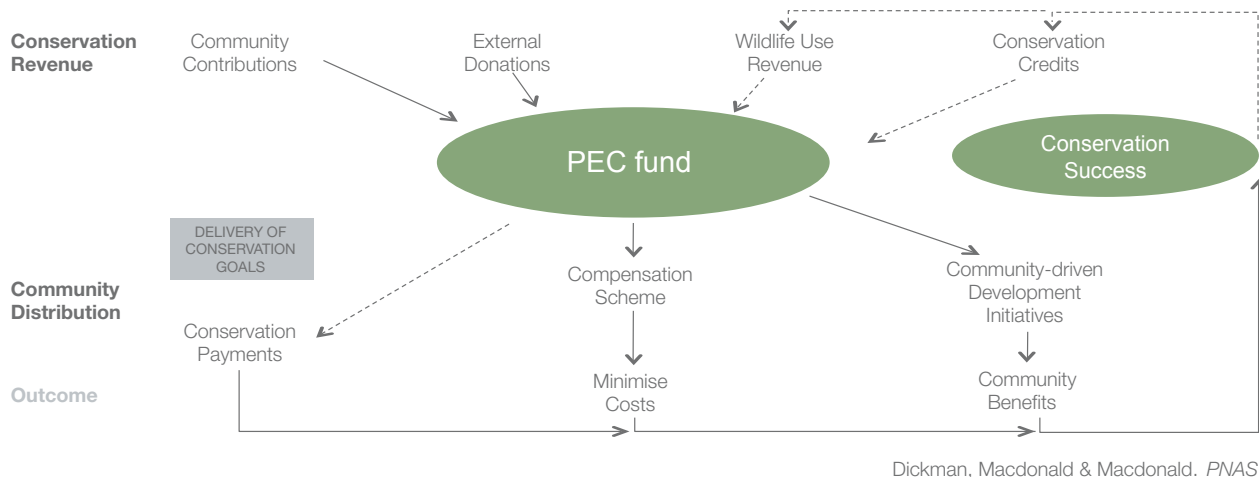
Even if people are culturally well-disposed towards flora and fauna, when they come into contact with nature there is often conflict of some sort or another. Nature can cost people money; it can also earn people money. And modifying human behaviour towards nature hinges on economics.

In 1993, 5,000 pastoralists in Bhutan were encircled by a newly designated national park. Legislation was introduced restricting the farmers' use of the forests and banning the killing of wildlife. Conservationists rejoiced, as the park safeguarded about eight wild tigers. But in the following year, over 20% of the 274 farmers in the park reported losses of livestock. These farmers earn about US\$250 a year, of which a tiger or leopard attack on cattle costs them about 84%.

In Bhutan, as elsewhere, the conservational 'value' of protecting one species is pitched against the cost of depredation in another. So, how do we value nature? Who pays, and by what mechanism?

#### Focus points

- Unfortunately for the imperilled species of the planet, humans tend to place great value on rarity. A 24-cent stamp printed in 1918 now sells for US\$800,000. Due to the medicinal properties of its swim bladder, the last giant yellow croaker fish in China sold for US\$130,000. And for sports hunters, rarity also increases desirability and inflates prices.
- Bad practices that exacerbate extinction risk should be tackled through local initiatives based on the Conservation Quartet of Research, Education, Implementation and Community Involvement. For example, in areas where reprisal killings for depredation threaten predator species, behaviour can be modified through education and incentivisation (see below). In Zimbabwe, where hunting quotas on male lions were previously set in the absence of reliable data (resulting in unsustainable lion losses), improved research has helped to stabilise the problem. Indeed, with accurate data on the number of lions in certain reserves, management practices have now been changed for the better.
- Regulation and incentivisation are also critical, and are currently being explored through two innovative conservation programmes. The Biodiversity Impact Compensation Scheme (BICS) awards financial compensation to those disadvantaged by predation. The Payments to Encourage Co-Existence (PECS) programme, meanwhile, is designed to deliver tangible financial benefits to incentivise conservation. Each is predicated on the belief that, on the path to sustainability, we need a combination of biology, economics and action. By delivering payments for the achievement of conservation goals, we can start to shift attitudes and behaviours 'in the field'.



“There is a difference between armchair values and on-the-ground situations, and this difference also comes down to economics. We can’t monetise our outrage at species extinction, but protecting livestock and livelihoods carries a very real price tag.”

*Conference delegate*

### Fact

Yearly in the Congo, bushmeat equivalent to four million cattle is harvested. The human population increases 2.4%, and 1% of the forest is felled.

### Question

Could a PECS programme be twinned with REDD Plus, thereby combining the benefits of co-existence with carbon reduction?





## Session 2: Building Blocks for Change

In this session, panel members assessed the tools, mechanisms and strategies that were added to the biodiversity toolbox in preparation for – and emerging from – Nagoya. In particular, they considered their strengths and the challenges that now await their implementation.

### Chair's introduction

Dr Derek Yach, *SVP, Global Health and Agricultural Policy, PepsiCo*



It is not unusual to feel an overwhelming sense of dread when we consider the proximity of extinction among certain species in the natural world. But anxiety should not be the focus of our work. Indeed, we need to convert our fears into action, into positive implementation. As the poet TS Eliot famously said: “anxiety is the handmaiden of creativity”.

In the last couple of years, the CEO of PepsiCo has been trying to find out what companies’ legal responsibilities are with regard to the environment and human health. Having trawled through decades’ worth of case law, she has put forward the argument that since companies are granted their licences in perpetuity, they need to act accordingly. This means becoming stewards of the environment and

protecting human wellbeing should be seen as legal requirements, rather than moral issues with which they can choose to engage or not.

This legal argument, combined with more emotional imperatives, is driving companies to look ahead and secure supply chains that are increasingly vulnerable to climate change and other factors. And if the growing sense of urgency within corporations is aligned to discourse within governments, we should be able to achieve meaningful implementation.

Here we look at the international policies and commitments which set the framework for action, and peer inside the new economy-based toolbox.

## Session 2: Building Blocks for Change

**Speaker 1: Rt. Hon. Simon Upton, *Environment Director, OECD***

### International/National Policy and Commitments: Compliance



While there are plenty of international agreements relating to biodiversity, there is no framework for international compliance. Compliance and implementation remain firmly in the hands of nation states. As stated in

Article 3 of the 1992 Rio Convention on Biodiversity, nations “reserve the sovereign right to exploit their own resources pursuant to their own environmental policies”. And although states must “ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or areas”, the emphasis is on national, locally-focused environmental policies and activities.

But we live in a world where commerce is global. And the environmental risks associated with the pursuit of commerce – in particular, biodiversity loss and climatic change – are also global. The path we are currently on in terms of population and economic growth will continue to drive biodiversity loss through increased demand for food, agricultural land and natural resources. Climate change is also set to be one of the key pressures on biodiversity to 2050, and if we don’t tackle these global problems through a coordinated global response, all local efforts will very probably count for nothing.

#### Focus points

- The OECD anticipates that with the increased demand for growth to 2050, we will require 35% more food, 37% more energy and 70% more resources. We need huge improvements in efficiency if we’re going to reach these targets and still have a liveable planet.
- In the absence of international compliance, the OECD has developed a Green Growth Strategy for governments.

The thinking behind this strategy is as follows: Whatever the hopes and commitments of international biodiversity negotiators, we won’t make progress unless the contribution of natural capital (and the ecosystem services flowing from that capital) forms part of the basis on which governments evaluate economic performance and assess their ability to provide rising living standards.

According to the OECD, the three main developments that will have a positive impact on biodiversity are:

- 1: Removing or reforming environmentally harmful subsidies \*
- 2: Harnessing finance and investment for biodiversity protection and sustainable use
- 3: Improving data and metrics to measure national activities and inform preservation.

\* *We are currently spending somewhere between US\$300-500 billion on fossil fuel subsidies. If we remove these subsidies, there will be significant income gains for developing countries and 10% less emissions globally.*

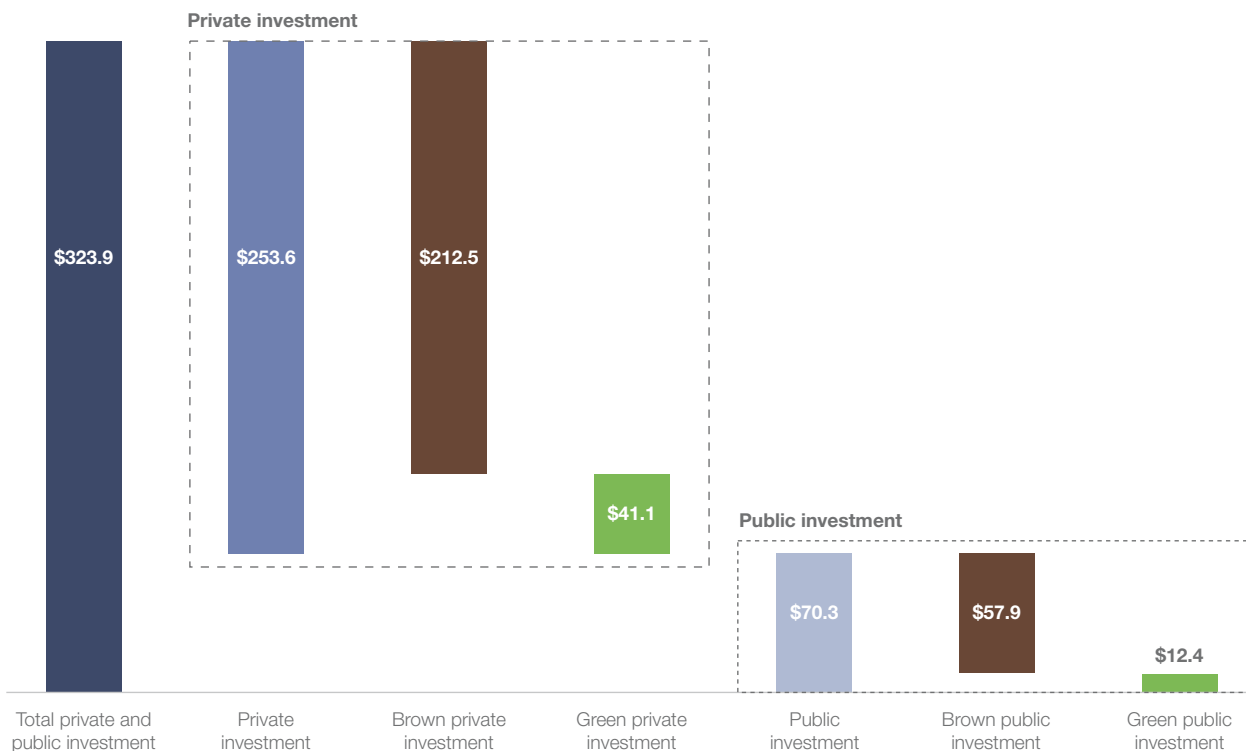
- It is through structural change in consumption and production, rather than traditional conservation and protection, that we will fundamentally alter the rate of biodiversity loss. Unless this approach becomes mainstreamed and led by finance and economic ministries, the OECD predicts that we will fail to achieve our goals. So, the agenda now needs to be mainstreamed in the work of economic agencies, not left to environment agencies.

# “You can’t manage or protect what you don’t know about”

Simon Upton

## Significantly scale-up finance for biodiversity conservation and sustainable use

North to South Investment Flows to Emitting Mitigation-specific Sectors, USD Billions (2009)



Source: updated from Corfee-Morlot et al. 2009; OECD calculation based on OECD DAC-CRS, UNCTAD WIR (2010), World Bank (2010)

### Question

How do we reinforce the connection between biodiversity, agricultural diversity and dietary diversity, and bring on board the private sector to help strengthen food supply?

## Session 2: Building Blocks for Change

**Speaker 2: Ms Sandra Bessudo**, *Environmental Advisor to President Juan Manuel Santos, Colombia*

### International/National Policy and Commitments: Implementation



Colombia is one of the most bio-diverse countries in the world per square kilometre. With 46 million inhabitants, it is home to 69 indigenous populations, including between five and seven non-contacted groups in the Amazon. It has the world's largest number of birds, reptiles and orchids, and the second largest number of plants, amphibians, freshwater fish and butterflies. Encompassing five geographical areas, the country boasts 311 terrestrial and marine ecosystems, not to mention the best preserved section of the Amazon basin and a vast array of genetic resources.

President Juan Manuel Santos is committed to protecting the 'mega-diversity' with which his country is "blessed", and firmly believes in green and sustainable growth. But despite its dynamic emerging economy (among the top 30 in the world), Colombia has a very unequal distribution of wealth. The government has therefore put in place a series of 'development locomotives' to help increase employment, reduce poverty and ensure financial sustainability for the country. As part of these commitments, all environmental policies put before the President must contain a poverty-mitigation focus and help to boost employment.

#### Focus points

- The five 'development locomotives' chosen to stimulate the country's economic growth are: extractive industries, agriculture, infrastructure, housing and innovation. As these sectors have potentially high environmental impact, the

Colombian Government is committed to close coordination and legislative controls across these areas.

- The Colombian Government is in the process of creating a new Environment and Sustainable Development Ministry. It has a 'green constitution' with 16 articles already in place. These include a Renewable Natural Resources Code for Environmental Protection, laws protecting indigenous reserves, a National Policy for the Integrated Management of Biodiversity and Ecosystem Services, and a National Development Plan which bans extraction and mining in moors and wetland areas, coral reefs and mangroves.
- Colombia was the first country to sign the Nagoya protocol, and is now preparing an implementation plan to meet Nagoya commitments by 2020. Measures are in place to boost bio-commerce and competitiveness, including the development of eco-pastures to help reduce deforestation and maintain soil quality. Today, 12% of Colombia's terrestrial areas, and 1% of its marine areas, are protected; under the Nagoya commitments, the aim is to expand these areas to 17% and 10% respectively. Colombia is also "building a comprehensive climate change policy" and gearing up for REDD Plus.

However, in order to achieve these targets and gain entrance to the OECD, Colombia needs responsible private sector investment and continued funding from, and collaboration with, the international community.





“In an economy like ours, that wants to be sustainable and competitive, we must define very clearly the role and value of ecosystems that sustain this growth.”

*Ms Sandra Bessudo*

“Biodiversity is to Colombia what oil is to Saudi Arabia”

*Edward O. Wilson*

## Session 2: Building Blocks for Change

**Speaker 3: Mr Robert Peccoud**, *Research Director, Agence Française de Développement (AFD)*

### International/National Policy and Commitments: Finance



The issue of financial commitment has always been part of the biodiversity agenda, and was supposed to occupy a central position in last year's Conference of the Parties (COP). Admittedly, a 'strategy for resource mobilisation' was defined in Nagoya, and commitments to "substantially [increase] financial resources" for biodiversity were set out. But details as to the extent of these resources, and the mechanisms by which they will be delivered, were shelved until the next COP in New Delhi, 2012. Ultimately, financing issues were the weakest outcome of Nagoya, and voluntary public funding remains the principal agent in financing biodiversity.

During Nagoya, every participating country was asked to set a baseline for their current biodiversity financial expenses. However, there was no clarity or consensus as to what actually constitutes a 'biodiversity commitment' in financial terms. This lack of definition remains a fundamental challenge in achieving consistency in the accounting process.

#### Focus points

- When it comes to accounting for biodiversity, AFD bases its methodology on the Rio Biodiversity Markers. Using this system, in 2010 AFD Biodiversity Commitments amounted to €85 million globally. At Nagoya, France pledged to double its biodiversity-oriented Official Development

Assistance (ODA) to €200 million by 2012, and now has to find a way to deliver this amount. Such commitments, however, often lead to innovation, and focusing on the 'how', rather than the 'why', is in itself a success for biodiversity.

- The issues confronting the biodiversity accounting process should not be underestimated. Even if we find a common model of accountability upon which everyone agrees, how can we be sure it will be applied? We need a system in place which enables us to reinforce and monitor biodiversity commitments, or else the credibility of the commitments themselves will be seriously undermined.
- The very fact that there was an aid agency such as AFD attending the Nagoya conference is in itself encouraging. Several years ago, this would not have happened. The task now is to "find strength in the truth of the challenges we face". The complexities of the accounting process should fuel determination rather than doubt; as Dr Derek Yach pointed out in his opening session remarks, "anxiety is the handmaiden of creativity" (TS Eliot).

“We shall grieve not, but rather find strength in what remains behind, in the primal sympathy which having been must ever be.”

*Wordsworth*

### Fact

At Nagoya, Japan announced the mobilisation of US\$2 billion dollars within three years, and the European Union pledged US\$120 million dollars for the Life Web Initiative, focusing on the reinforcement of capacity in protected areas.

### Question

How do we arrive at a universally-accepted definition of a ‘financial biodiversity commitment’?

## Session 2: Building Blocks for Change

**Speaker 4: Mr Pavan Sukhdev**, *Founder and CEO, GIST Advisory and McCluskey Fellow, 2011, Yale University*

### The New Economy-Based Toolbox: The TEEB Approach



Engaging the private sector with environmental issues will be one of the greatest challenges of the next two decades. Specifically, building recognition and awareness among corporations of their impact on biodiversity, and working with them to find solutions, is something we urgently need to address.

According to Trucost, the monetary value of environmental degradation caused by the top 3,000 listed companies (encompassing energy, agriculture and manufacturing) totals US\$2.25 trillion. This amount is about 3.5% of global GDP, and roughly one third of the profits of these companies. The task now is to convince corporations that such a business model, which leads to private profits and public losses, is totally unsustainable.

In response to these challenges, The Economics of Ecosystems and Biodiversity (TEEB) study has developed a structured approach to appraising ecosystem services and galvanising action.

#### Focus points

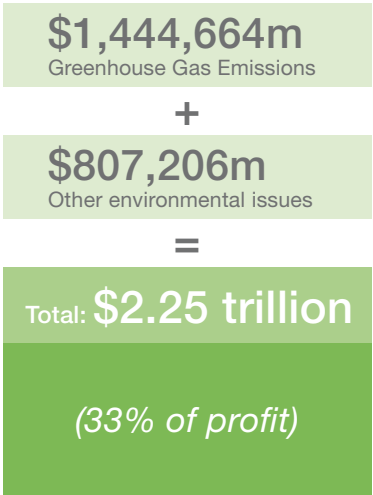
- The implementation of the TEEB approach follows a six-step process: 1. Specify and agree policy issues with stakeholders; 2. Identify which ecosystem services are most relevant; 3. Define the information needs and select appropriate methods; 4. Assess ecosystem services; 5. Identify and appraise policy options; 6. Assess distributional impacts of policy options.

These six steps are designed to enable people to diagnose the problems facing ecosystem services, and to devise appropriate responses.

- The toughest instrumental challenge over the next two decades will be “getting REDD Plus right”. REDD Plus is critical, as it offers the fastest and most effective climate mitigation option, and brings together social and ecological solutions. However, while there is political consensus surrounding REDD Plus, we need agreement and understanding as to how the programme’s structures will actually work. This is particularly true of the financial mechanisms, because if the rewards and incentives are not in place, the private sector will not engage. The capacity to deliver REDD Plus is also a major consideration; having the will and motivation is one thing, but in reality getting a project like this off the ground will be a major undertaking.
- TEEB is a huge knowledge resource, and there is a different TEEB focus for different end-users, such as policy makers, local administrators and businesses. Over 60 institutions and over 500 people have been working on TEEB, and the study makes key recommendations in a number of areas, be it the measurement of business externalities, subsidies, ecological infrastructure, or systems of national accounts.

**The toughest problem:  
private profits, public losses**

Top 3,000 listed companies



**Source:** Top 3,000 corporations  
(estimate by TRUCOST for UN-PRI)

**The toughest political challenge:  
targeting social returns on investment**

Estimates of costs and benefits of restoration projects in different biomes

Biome / Ecosystem	Typical cost of restoration (high scenario)	Estimated annual benefits from restoration (avg. scenario)	Net present value of benefits over 40 years	Internal rate of return	Benefit / cost ratio
	US\$/ha	US\$/ha	US\$/ha	%	Ratio
1 Coral reefs	542,500	129,200	1,166,000	7%	2.8
2 Coastal	232,700	73,900	935,400	11%	4.4
3 Mangroves	2,880	4,290	86,900	40%	26.4
4 Inland wetlands	33,000	14,200	171,300	12%	5.4
5 Lakes / rivers	4,000	3,800	69,700	27%	15.5
6 Tropical forests	3,450	7,000	148,700	50%	37.3
7 Other forests	2,390	1,620	26,300	20%	10.3
8 Woodland / shrubland	990	1,571	32,180	42%	28.4
9 Grasslands	260	1,010	22,600	79%	75.1

**Note:** costs are based on an analysis of appropriate case studies; benefits have been calculated using a benefit transfer approach. The time horizon for the benefit calculation are 40 years (consistent with our scenario analysis horizon to 2050); Discount rate = 1%, and discount rate sensitivity by flexing to 4%, consistent with TEEB 2008). All estimates are based on ongoing analyses for TEEB (see chapter 7 TEEB D0 forthcoming). As the TEEB data base and value-analysis are still under development, this table is for illustrative purposes only.

**Question**

How do we get governments to recognise the importance of ecosystem restoration, and to invest public money in public wealth?

**Answer?**

The restoration of ecosystems brings climate adaptation benefits, and therefore offers a social return on investment. For example, mangrove and coral reef restoration increases fish stocks, which helps to boost food security.



## Session 2: Building Blocks for Change

**Speaker 5: Mr James Griffiths**, *Managing Director for Ecosystems, World Business Council for Sustainable Development (WBCSD)*

### The New Economy-Based Toolbox: Engaging the Private Sector



WBCSD's Guide to Corporate Ecosystem Valuation (CEV) is a new tool within the Economy-Based Toolbox. It has been inspired, influenced and informed by the TEEB process and is designed to help companies improve their decision-making by understanding the 'biodiversity bottom line' – that is, by undertaking ecosystem valuation to quantify their business risks and opportunities.

Global companies are starting to think more about biodiversity issues and the value of ecosystems. Companies both impact and depend on ecosystems and ecosystem services, and the business case for action in this area is compelling. Firstly, ecosystem change creates business risk, which in turn can lead to innovation and opportunities. Secondly, the expectations of key stakeholders, such as customers, investors and governance boards, are increasing by the day, while operational and regulatory risks loom large. By using CEV, companies can begin to engage with these issues and integrate ecosystems into their business strategies.

#### Focus points

- In the absence of strong governance, implementation and funding, companies need to take action by: 1. Measuring, managing and mitigating their dependence and impacts on ecosystems; 2. Innovating and taking a leadership role in the development of new markets, eco-efficient goods and services; 3. Greening their supply chain through sustainable sourcing and ethical procurement; 4. Working in partnership to find business solutions that will help halt ecological degradation.
- The CEV Guide provides a framework for improving business practice through the quantification of ecosystem impacts. It advises companies how to measure their footprint and value the ecosystems associated with it. Crucially, it is NOT a standalone methodology or pricelist of ecosystem services. It asks initial screening questions to establish whether or not a company needs to conduct a CEV. It then takes companies through a five-stage methodology: scoping, planning, valuation, post-valuation and, most importantly, embedding improved practices across core operations.
- Within the CEV process, monetary valuation – as opposed to quantitative and qualitative valuation – is the most critical, as this will have the biggest impact on corporate decision-making. Once the CEV process is complete, companies find they can save costs (e.g. through cheaper and more effective waste management); reduce taxes (through deductions in federal taxes); create new revenue streams and assess liability and compensation risks.

# “We see the value in ecosystem valuation.”

*WBCSD member CEO's statement*

## Examples of Ecosystem Valuation during CEV Road-Testing

Quantify physical ecosystem benefits realized through the process of matching undervalued or waste materials from one company with the needs of another

*US BCSD / Houston By-Product Synergy*

Prioritize water use and land management options relating to biofuel production in an ecologically and culturally important location

*Veolia Environment*

Assess the financial and ecological benefits associated with replacing a storm-water management system with a constructed wetland

*US BCSD / CCP*

Assess the economic value of ecosystem services produced under different management scenarios for forested land

*Weyerhaeuser*

### Fact: The value of ecosystems:

- The minimum estimate of the loss of natural capital through deforestation is €1.35 trillion a year – approximately the total GDP of the UK or France in 2010
- The contribution of insect pollination to agriculture output is US\$ 190 billion a year – approximately eight times Walmart's total operating income for 2010

*Source: The Economics of Ecosystems and Biodiversity TEEB for Business 2010*

## Session 2: Building Blocks for Change

Speaker 6: Dr Trista Patterson, *Economist*

### The New Economy-Based Toolbox: The Green Economy



At present, there are unsustainable contradictions at work in the world. Firstly, in order to be able to pay for ecosystem services, people have to earn more. Increased earning is predicated upon economic growth, which in turn is (currently) predicated upon the production of energy, materials and waste – all of which impacts ecosystem services and requires us to pay more in order to preserve them. Secondly, we've become dependent on systems – for example banking, healthcare, retirement systems – that we tend to think are 'too big to fail'; systems that serve as promises, and in which we place our trust rather than trying to resolve our inherent contradictions. These systems tend to pass conflict and consequences to future generations.

As a result, we are in deep ecological debt. We are out-consuming the available level of natural capital and nature's interest per year. We are also strategising about the provision of ecosystem services, whereas our cultural instinct is always to consume more. In the words of Ban Ki-moon, the time has come for a 'green economy revolution'.

#### Focus points

- The Bank of Natural Capital, part of the TEEB study, aims to communicate why and how we should value nature. It offers a space for dialogue on issues relating to nature's intrinsic worth and economic benefits. Young people are using this space and others like it, for example the social network TEEB4Me, to share ideas and information. And the ability to share, more than to own, is highly valued among the younger generation in particular. On Twitter, @TEEB4me has around 6,000 followers on two channels,

encompassing 19 languages and 67 countries. It peaks at approximately 5,500 posts/views a day.

These communications channels are part of a massive, conscious and growing global network that is allowing people to connect with and care about other people in geographically diverse locations. They offer an excellent way to bridge the development gap.

- Through 'snapping' technologies and QR codes, increased flows of information are enabling people to make consumer choices that are more consonant with their values. Such coding will mean that detailed information about a product's provenance and journey along the supply chain can be embedded at point of purchase. This could lead to a new generation of informed and empowered ethical consumers.
- Adolescent girls hold immense power in terms of poverty alleviation. There are 600 million adolescent girls on the planet. About a quarter of them never go to school. For each girl in a developing country who gets seven years of schooling, she marries four years later, has 2.2 fewer children, and will earn between 15-20% more. Educated women go on to spend 90% of their income on their families, as opposed to men who spend 30%. Empowering and educating young girls is therefore critical to reducing poverty, limiting global population growth, and achieving a more sustainable future.

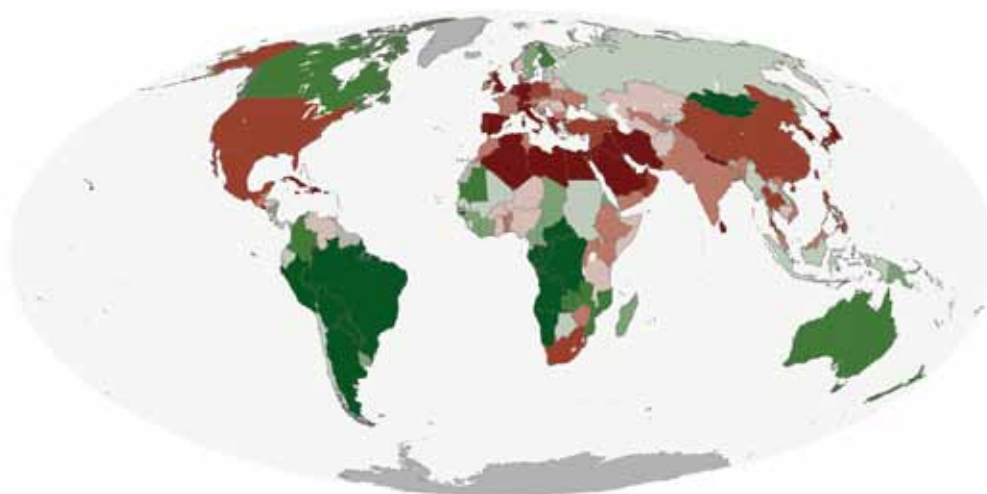
“Culture eats strategy for breakfast.”

*Mark Fields, Ford Motor Co*

“Just because it’s free, doesn’t mean you don’t pay for it”

*World Forum delegate*

**Percentage of Earth’s biocapacity used: 151%**



2007

- Footprint more than 150% larger than biocapacity
- Footprint 100-150% larger than biocapacity
- Footprint 50-100% larger than biocapacity
- Footprint 0-50% larger than biocapacity
- Biocapacity 0-50% larger than Footprint
- Biocapacity 50-100% larger than Footprint
- Biocapacity 100-150% larger than Footprint
- Biocapacity more than 150% larger than Footprint
- Insufficient data



*Global Footprint Network,  
ECDI Map 2007,  
[www.footprintnetwork.org](http://www.footprintnetwork.org)*

**Ecological debtor and creditor countries**

## Fact

Currently, an average American child will spend 8.5 hours consuming media, and an additional 1.5 hours ‘texting’, yet less than four minutes of unstructured outdoor play per day.

## Links

<http://www.facebook.com/TEEB4me>

<http://bankofnaturalcapital.com/>

## Session 2: Building Blocks for Change

**Speaker 7: Professor Sir Bob Watson, *Chief Scientific Advisor for Defra***

### Knowledge, Indicators and Databases: Assessment Tools



The assessment of knowledge is critical. Over the years, we've seen the development of a number of international biodiversity assessment tools. These include the UK National Ecosystem Assessment, the Millennium Ecosystem Assessment, the Global Biodiversity Assessment, the Intergovernmental Panel on Climate Change, and the International Assessment for Agricultural Science and Technology for Development, to name but a few.

Most recently, collective international experience and expertise in this area has led to the creation of the Intergovernmental Panel on Biodiversity and Ecosystem Services (IPBS), which has been endorsed by the UN General Assembly. While its governance and management structures have yet to be finalised, the IPBS aspires to be comparable to the Intergovernmental Panel on Climate Change in its influence and scope, but with an even broader mandate.

#### Focus points

- For assessments to succeed, stakeholder ownership and participation are critical. All stakeholders need to

be included in the scoping, preparation and peer-review process, and in the governance structure. And to ensure transparency, contributing experts need to be involved in their individual capacity, rather than as representatives of governments or organisations. Assessments also need to be balanced both intellectually and geographically, and to include both local and global perspectives.

- Non-governmental governance structures are typically driven by scientists, but achieve limited buy-in from other stakeholders, especially governments. If assessments are non-governmental, they need to be tied to intergovernmental processes and conventions; for example, the Millennium Ecosystem Assessment approached each of the biodiversity-related Conventions – CBD, CMS, CITES, CCD and Ramsar – to ascertain their policy priorities and evidence needs. Intergovernmental governance structures, meanwhile, are far-reaching and typically driven by governments, but tend to have limited support from external stakeholders. And supply-driven approaches to assessment are ineffective, as seen with the Global Biodiversity Assessment (1993-1995) which achieved minimal impact on international policy formulation.



- The best option is a hybrid route combining governmental and non-governmental approaches, as demonstrated by the Assessment of Agricultural Science and Technology for Development (2004-2008). This assessment was unique, being multi-scale and multi-stakeholder and involving all parties at all stages of the process. The hybrid approach is an incredible social experiment and “the right way to do things”, but is seldom favoured by governments.

Taking the intergovernmental path, the IPBS will comprise four main pillars of work. It will deliver assessments at the global, regional and sub-regional scale; it will stimulate (but not fund) research; it will generate capacity-building, and it will provide tools to enable policy-makers and decision-makers to use the information it produces. Governments are currently debating how to involve non-governmental stakeholders.

“The benefits that we derive from the natural world and its constituent ecosystems are critically important to human wellbeing and economic prosperity, but are consistently undervalued in economic analysis and decision-making.”

*Key valuation message from the UK National Ecosystem Assessment*

## Session 2: Building Blocks for Change

**Speaker 8: Professor Ouyang Zhiyun**, *Director, State Key Lab of Urban and Regional Ecology, Research Centre for Eco-Environmental Sciences, Chinese Academy of Sciences*

### Knowledge, Indicators and Databases: Pressure, Action and Implementation



China is a country rich in physical and biological diversity. Its geography comprises plateaus, plains, tropical rain forests, alpine meadows and deserts. It boasts a wealth of bird and animal life, and after only Colombia

and Brazil has the highest number of plants species (32,000) on the planet.

But much of this biodiversity is under pressure from huge population growth, rapid urbanisation and ecological crisis. What's more, far from being a distant future threat, these problems are very much here and now. Many of China's species are currently endangered; there are high levels of desertification and deforestation, and water resources are scarce and polluted. The immediacy of these issues is leading to immediacy of action, with the challenges posed to ecosystem services motivating national policy-making and accelerating implementation.

#### Focus points

- Due to loss of natural habitat and ecosystem degradation, 18.8% of China's mammal species are now endangered, while 15.4% of its birds and 3.4% of its plant life are also under threat. China's dwindling water resources mean there is 2,220M<sup>3</sup> of water per capita, which is about one third of the global average. Forty five billion tonnes of soil is being lost annually through erosion; areas of rocky desertification now total 88,000km<sup>2</sup>; and 90% of China's grasslands have been 'somewhat degraded'. Sandstorms also affect air quality throughout northern and eastern China, including Beijing and Tianjin.
- In response to these problems, the Chinese Government has implemented a series of ecosystem conservation and restoration programmes. These include 'ecosystem service spatial pattern assessments', and 'ecological sensitivity pattern assessments', which are intended to identify those ecosystems most critical for national and regional ecological security. By identifying conservation priorities and objectives, these measures have enabled the government to create 'ecosystem function zones' and 'ecosystem function areas' (50 in total) through which a national protection policy is being delivered.
- Through these ecological zones and areas, China is working to restore crucial ecosystem services, such as wind erosion control, sandstorm protection, water resource conservation and flood mitigation. And since 2008, the government has also been delivering ecological financial transfers in an effort to guarantee sustainable eco-service supply. In the two years to 2010, the number of counties located in 'ecosystem function areas' receiving financial support rose from 221 to 451.

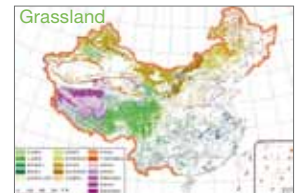
## Ecosystem service spatial pattern



China has almost all kinds of terrestrial ecosystem types in the world:

- Tropical rain forests
- Alpine meadows
- Deserts

Ecosystems	Million ha	%
Forest	195.8	20.4
Grassland	390	40.6
Wetlands	38.5	4.0
Croplands	150	17.4



### Fact

In the last 50 years, 50% of China's foreshore wetlands have been lost, its mangroves have decreased by 73% and 80% of its coral-reefs have been lost.

## Session 2: Building Blocks for Change

**Speaker 9: Dr Simon Stuart, IUCN Species Survival Commission**

### Knowledge, Indicators and Databases: Biodiversity Monitoring



Biodiversity monitoring has been carried out for decades. However, most datasets are geographically biased, with information tending to come from wealthy countries. They are therefore too narrow in focus, and tend to be skewed towards terrestrial ecosystems with insufficient coverage of aquatic and marine ecology. Taxonomic bias is also a problem, with vertebrates such as birds and mammals receiving disproportionately high representation.

Global datasets on biodiversity have grown significantly in the last decade – for example, the IUCN Red List Index, the Living Planet Index and the Marine Trophic Index. But datasets and indicators on the benefits of biodiversity, such as ecosystem services, are still too few and far between. All the while, ecological conditions are worsening, the pressures on biodiversity are rising rapidly, and political efforts to find solutions are stagnating (c.f. Mr Robert Peccoud, page 20, on the financial irresolution of Nagoya). And while an aggregated, all-encompassing index for biodiversity is unlikely (and almost certainly not useful), the need for more focussed indicators remains urgent.

#### Focus points

- The new biodiversity indices *have* been of value, making it possible to monitor progress on the Convention on Biological Diversity's (CBD) 2010 Target. They are also being used to monitor Millennium Development Goal 7 on environmental sustainability, and played a key part in

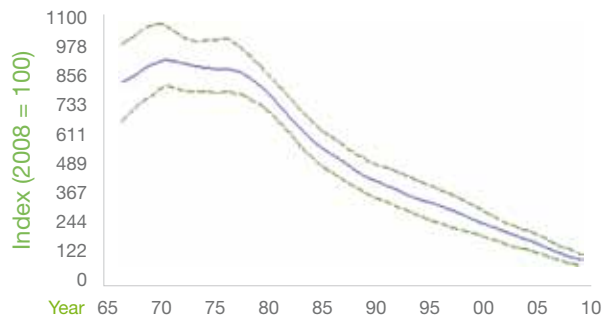
framing the new CBD 2020 Targets. The new indicators have also been important in terms of attracting attention among the scientific and policy-making communities.

- The new indices have also shown significant and largely irreversible changes in species diversity. We now know, for example, that the distribution of species on earth is becoming more homogenous. Humans have increased species extinction by as much as 1,000 times over background rates typical throughout the planet's history, and 10-30% of mammal, bird and amphibian species are currently threatened with extinction.
- The challenge now is to increase the global coverage of biodiversity indices and reduce the element of bias. We need strong data in order to continue to monitor properly the world's biodiversity, and better monitoring of the services provided by biodiversity to the human race. And as ever, proper budgeting and financing of monitoring processes and mechanisms remains critical.

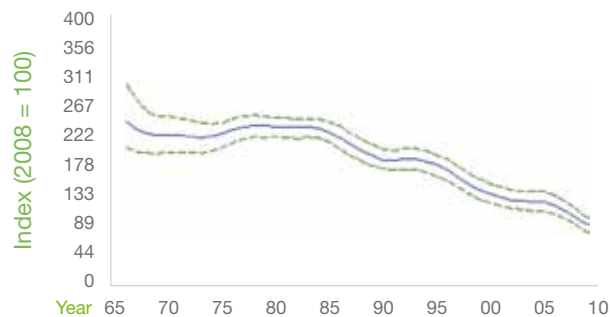
While it is perhaps too early to say whether indicators impact on biodiversity trends, there are clear examples of people using the information supplied by monitoring data to tackle ecological problems, both locally and nationally. It is hoped that improvements in monitoring and biodiversity indices could one day result in serious policy changes on, for example, subsidy reform, international assistance for biodiversity, climate change and sustainable production and consumptions plans.



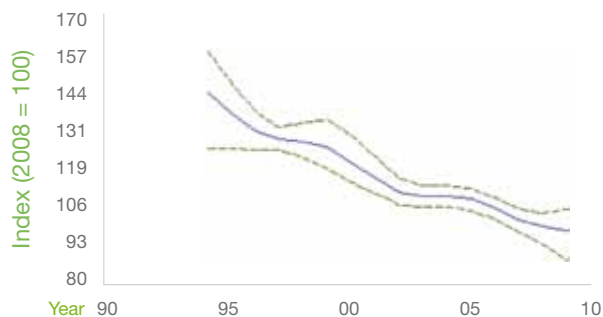
CBC/BBS UK 1966 - 2009: Turtle Dove



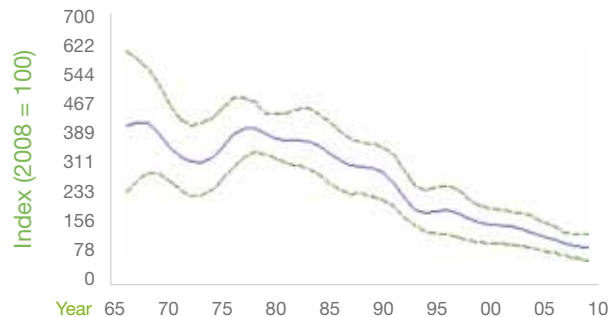
CBC/BBS UK 1966 - 2009: Cuckoo



BBS UK 1994 - 2009: Swift

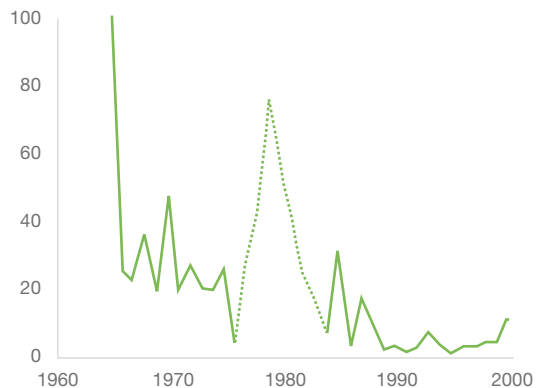


CBC/BBS UK 1966 - 2009: Yellow Wagtail



Woodland fungi: Chanterelle

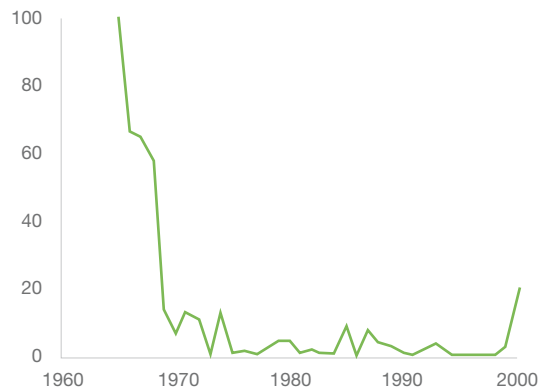
Index (1965 = 100)



Source: NMV

Red-scaled curtain fungus

Index (1965 = 100)



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## Session 3: Biodiversity Futures: Accomplishments and Opportunities

In this third session, panel members considered the significant streams of futures work currently under way. Participants were then invited to discuss elements of a futures research agenda to support new strategies.

### Chair's introduction

Dr Angela Wilkinson, *Futures Director, SSEE, University of Oxford*



There is a common misunderstanding that the future is somehow 'over there', waiting for us to arrive. But in fact it is already here, shaping and influencing the present. We only have to look at the situation in China, as described by Professor Ouyang Zhiyun at this World Forum (see page 30), to see that the urgency of biodiversity loss – and the need for appropriate policy responses – is very much here and now.

Indeed, consideration of the future is not an option, but an essential part of our reality. The future is where facts and hopes and imaginations combine. It is not neutral; in fact, it has been described by the Dutch in their review of futures work as "the playing field of power". And it is not just about what is going to catch up with us from the past, but how we overcome the failure of imagination when presented with major challenges.

To date there has been less attention on biodiversity futures than on other areas of futures study. For example, anecdotal evidence suggests there are around 1,000 energy

scenarios and 350 climate change scenarios currently available, whereas we have only a handful of ecosystem and biodiversity assessments. Furthermore, biodiversity futures work has been contained to scholarship circles, and has not been connected to the business sector. As a result, biodiversity futures are not linked to corporate futures, which means biodiversity is not part of the core strategic agenda for major companies and remains a somewhat peripheral issue.

But the future is coming at us: we can stick our heads in the sand and hope to react well to what is coming. We can anticipate and adapt to what we are confident will happen. Better still, we can navigate between what is known and knowable and still open and uncertain to create a better future. The critical time horizon for decision making in relation to biodiversity is much sooner than many people – particularly corporations – anticipate. In this section we hear about recent developments in futures studies aimed at clarifying the present by engaging with different futures and identifying options towards a future that is desirable, sustainable and attainable.

## Session 3: Biodiversity Futures: Accomplishments and Opportunities

**Speaker 1: Professor Kathy Willis, *Tasso Leventis Chair in Biodiversity, University of Oxford***

### Scenario Setting using Lessons from the Past



When it comes to biodiversity futures, we need to challenge certain widely-held assumptions and broaden our approach to scenario predictions. For example, many people subscribe to a 'scorched earth'

scenario for Africa, in which everything dries up as a result of temperature increase. While this is certainly a possible future outcome, it is not the only one. Indeed, the IPCC's 2007 future climate scenarios for Africa show increased precipitation in certain areas.

There are in fact two major climatic scenarios for Africa we should consider. These are: warmer with reduced precipitation, and warmer with increased precipitation. Additionally, we have to consider the fact that there will be increased atmospheric CO<sub>2</sub> in all regions. When addressing biodiversity futures, we need to consider the range of possible responses to all these predicted climatic changes, and to do this we need to use long-term ecological records as well as more common modelling methodologies.

#### Focus points

- The usual approach to future scenarios is to look at the predictive output from models. These models take the present-day situation of a species and its 'climatic envelop', then predict the future climatic envelop and work out where the species 'will be' – a process which often results in the predicted loss of climatic space and the threat of extinction.

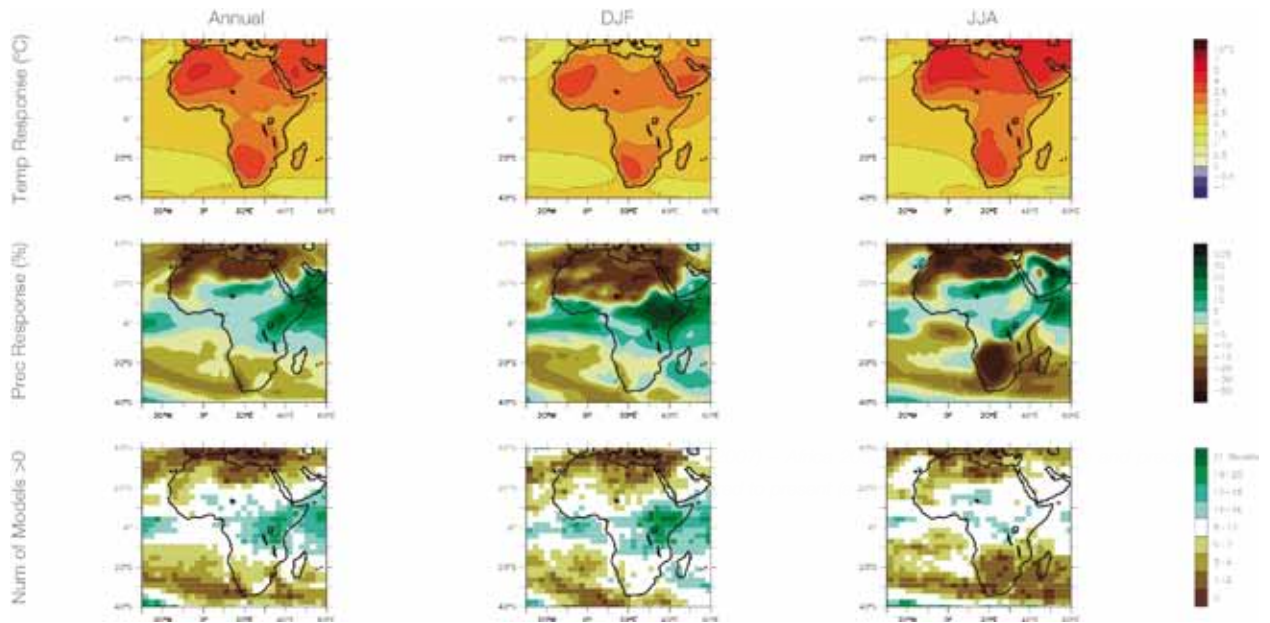
For example, the modelled range shifts for 277 African mammals, using IPCC climate change predictions, show that between 25-40% of mammals will be critically

endangered or extinct by 2080. Likewise, modelled range shifts for 330 plant species in the Fynbos biome, South Africa, predict the loss of between 51-65% of species due to the reduction in suitable climate space.

- The problem with these models is that they are highly sensitive to the algorithms used, and they do not take into account important aspects of the dynamics of ecological change. They are also often coarse in scale, and focus on individual species rather than landscapes, which is not particularly helpful for landscape planning. We need, therefore, to break out of the structural rigidity of modelling and consider other approaches to biodiversity futures.
- One such approach is to scrutinise data from past ecosystem responses to specific climate scenarios using fossil records. Future scenarios for central Equatorial Africa provide a good example. Between 4,000-7,000 years ago, this region was warmer and moister than present. Extensive fossil records demonstrate that during this time there was a large increase in woody trees and shrubs, and tropical plant species moved up to 400-500 kilometres northward from their current location. In many areas, this resulted in the 'greening' of the landscape currently occupied by the Saharan desert. Such an approach can therefore provide additional information for scenario planning; information that is critical when determining potentially important regions for tropical forest cover and the ecosystem services they provide.

Taking the long-term past as an analogue, as a means of looking forward, we can begin to assess the potential risks and opportunities for ecosystem services in the years and decades to come. But we urgently need landscape planning tools to map and evaluate these different future scenarios.





“Global scenarios are designed to aid the formulation of a robust group strategic direction by challenging individual and more widely held assumptions, so highlighting potential risks and opportunities.”

*Shell 2010 Global Scenario Report*

## Session 3: Biodiversity Futures: Accomplishments and Opportunities

**Speaker 2: Dr Jon Hutton**, *Director, United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC)*

### Biodiversity Scenarios



Quantitative scenarios are coming of age as a tool for evaluating the impact of future development on biodiversity and ecosystem services. But while we are making increasing use of scenarios and associated models – following the example set by corporates such as Shell – there are still major problems at various stages within the process.

When considering future scenarios for biodiversity, the reality is that land-use explains about 80% of biodiversity change. Within land-use, agriculture is of course the major driver of change, and this role will only intensify in the coming decades. Therefore the need to establish the relationship between biodiversity and ecosystem services is urgent, and we need to use our increasingly sophisticated – if still flawed – modelling techniques to address the big ‘what if’ questions.

#### Focus points

- The use of biodiversity scenarios and models follows a three-stage process. It starts with the development of scenario storylines, as used in the Millennium Ecosystem Assessment and various IPCC working groups. A good example is Global Environment Outlook GEO4, which developed four key scenarios around Markets, Policy, Security and Sustainability.
- These scenarios are then taken, with their projections of human population growth or greenhouse gas emissions, and fed into various models which convert indirect drivers of change into direct drivers, such as land-use or climate change. The final stage involves shaping biodiversity models – from local species models to international frameworks such as GLOBIO, which is embedded in the Millennium Ecosystem Assessment.
- But the system is by no means perfect. Scenarios are intended to provide an alternative view of the future, but they are not predictions and it is crucial they are plausible. Unfortunately, many are often highly implausible and presented as unassailable fact. Models, meanwhile, are seldom tested and have no room for feedback. Their verification therefore has to be taken on trust. Many models also disagree and can be difficult to interpret. For example, MiniCam projections of forest land simultaneously suggest that forests could increase by 25% by 2050, or decrease by 50%. Biodiversity also has many dimensions and metrics, compounded by poor or incomplete data, which the present scenario and modelling system does not take into account.



### Scenario Storylines

**Global Orchestration:** Globally connected society that focuses on global trade and economic liberalization and takes a reactive approach to ecosystem problems but that also takes strong steps to reduce poverty and inequality and to invest in public goods such as infrastructure and education.

**Order from Strength:** Regionalized and fragmented world, concerned with security and protection, emphasizing primarily regional markets, paying little attention to public goods and taking a reactive approach to ecosystem problems.

**Adapting Mosaic:** Regional watershed-scale ecosystems are the focus of political and economic activity. Local institutions are strengthened and local ecosystem management strategies are common; societies develop a strongly proactive approach to the management of ecosystems.

**TechnoGarden:** Globally connected world relying strongly on environmentally sound technology, using highly managed, often engineered, ecosystems to deliver ecosystem services, and taking a proactive approach to the management of ecosystems in an effort to avoid problems.

“Scenarios consistently indicate that biodiversity will continue to decline over the twenty first century. However, the range of projected changes is much broader than most studies suggest, partly because there are major opportunities to intervene through better policies, but also because of large uncertainties in projections.”

*Scenarios for Global Biodiversity in the 21st Century, Science 330, 1496*

## Session 3: Biodiversity Futures: Accomplishments and Opportunities

**Speaker 3: Mr Ged Davis, Co-President, Global Energy Assessment**

### Framing for the Future



In the late 1990s and early years of the twenty first century there emerged a strong desire to better understand the longer-term development of biodiversity. Experts conducted a number of watershed scenario developments and assessments, among these were the WBCSD 2050 scenarios, the IUCN 2023 scenarios and the Millennium Ecosystem Assessment (MEA) 2050 scenarios. These scenarios were found useful, touched a chord with many stakeholders and provided a starting point for more recent work.

The WBCSD, IUCN and MEA scenarios offered new insights, concepts and triggers for futures options. They focused on cross-sector collaboration, not just large institutional change. They also provided a basis for policy and strategy development by enterprises. But most importantly, they framed their scenarios upfront. And framing is absolutely critical. The way you frame, and who you frame for – this is what matters most in futures scenarios. Only through an intense effort on relevant framing can we identify novel and useful options and thus encourage stakeholders to do something constructive with the scenarios.

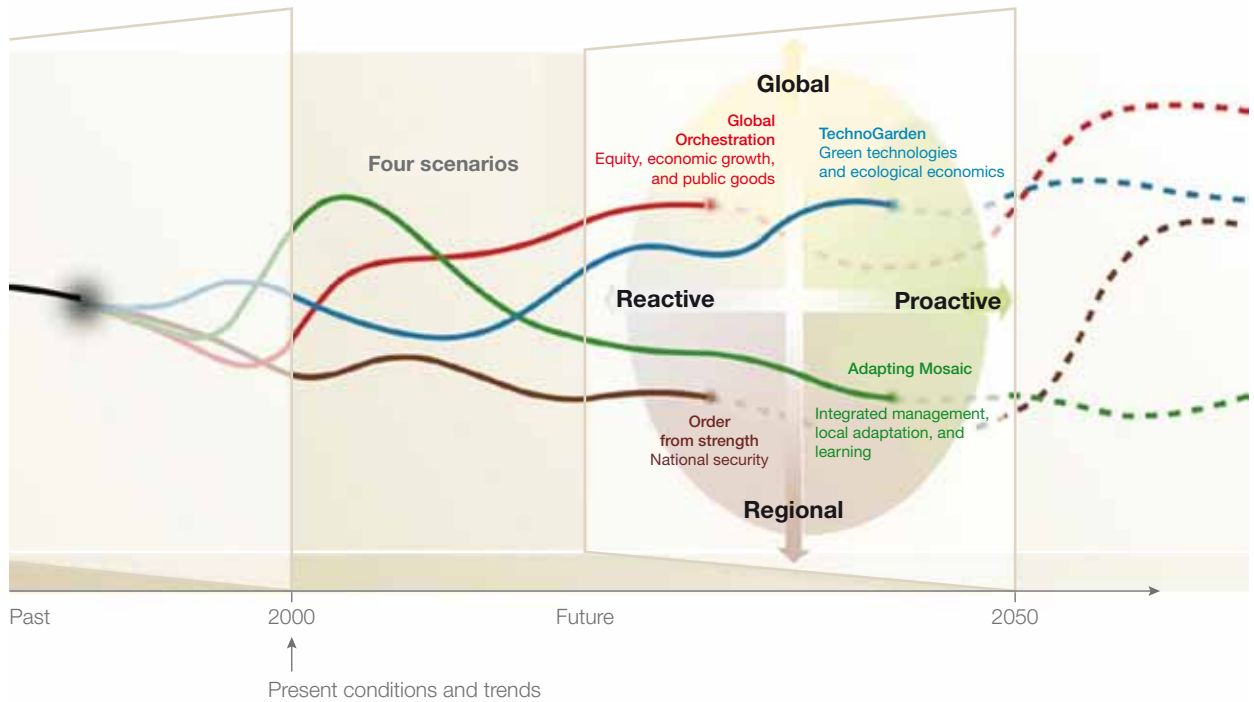
#### Focus points

- Focused and relevant framing in futures exercises enables us to engage our audience. And engagement is one of the key features of good scenario work. Engagement is all about going to people and showing them what we've found; explaining the challenges they face, and discussing how we can work together to look at new options. It acts as a stimulus for imagination and action.

- Today we're veering away from straight scenario work and looking more at sustainability corridors, which are a key component of our efforts to create a viable world by 2050. Through sustainability corridors, policy tools and databases are focused on individual areas, rather than on individual countries, and can be used to develop a more rigorous set of sustainability options.
- Framing has tended to be around governance and institutional structures, and our ability to address environmental issues. But whether this should remain the fundamental approach to framing is very much open to question. One thing is clear: better science will lead to new and better framing, which is absolutely critical. Indeed, scenarios degrade quickly. For example, scenarios that look out 40 years frequently become obsolete after only five years, partly due to new science that emerges which needs to be incorporated in the development of new scenarios.

To this end, we need to focus on database and model development. We also need to focus the research agenda not just on mitigation but also on adaptation options. Ultimately, however, while metrics and indicators are crucial, we must get the dynamics of biodiversity and ecosystem services right if we are to make progress in this area.

## Millennium Ecosystem Assessment (MEA) scenarios.



The four scenarios are based on a range of approaches directed toward improved governance and greater economic development: 'Regional' versus 'Global', and ecosystem service management: 'Reactive' versus 'Proactive'.

## Session 3: Biodiversity Futures – breakout sessions

### Consolidated Summary

After the plenary presentations of Session 3, the participants broke into three groups, each with the same brief: to take time to seriously consider the massive changes facing biodiversity in the coming decades; then, in light of this, to explore the most important avenues of work for biodiversity futures.

The findings of the groups were presented by their respective reporters: John Robinson, Gary Kass and Audrey Coreau. They had many points in common, and are presented here in consolidated form.

Three overarching points run across all the findings:

- Economic, behavioural, political and cultural dimensions are critical to the biodiversity futures agenda, but are not currently well represented in research. Looking forward, these dimensions need to be promoted to occupy a much more central role in biodiversity futures research.
- Research on biodiversity futures has to be connected with action in order to be relevant and useful. This was an issue participants felt to be crucial, considering the extent of the biodiversity crisis.
- Work on the future behaviour of ecosystems has to be intensified to help us anticipate and adapt to conditions that may be rapidly changing. It also has to differ from those of the present and recent past.

These points have important consequences on the way we study biodiversity futures; on the kind of strategies we should study, and on priority topics for work on biodiversity futures.

### The way we study biodiversity futures

Work on biodiversity futures must mobilise more academic resources and acquire a more established place in academia. This will help us understand the complexities of rapidly changing natural and human systems. It must also more actively involve a wider range of stakeholders. But it is not a matter of choosing between more research and increased stakeholder involvement: both are needed and must be better connected.

The investment of academic communities in futures work is increasing, but only gradually, and certainly needs encouragement. As for intensified interaction with actors, various terms were used in the groups to designate that aspect of research: for example, ‘action-research’ and ‘trans-academic research’. But its importance was underlined again and again, based on considerations ranging from the need to communicate effectively with stakeholders if research is to be impactful, to the very useful input that stakeholders can have on research in which behavioural, political and cultural issues occupy a central position.

Biodiversity issues and drivers are present at all levels, from the local to the global. So, work on biodiversity futures has to be conducted on all levels as well (particularly in terms of better and more relevant case studies). More intense and innovative forms of exchange between local and global works also need to be developed further.

Another dominant theme in the groups was the fact that the future of biodiversity was determined by complex systems in which the social, technological, ecological, economic and political (STEEP) are deeply intertwined. Systems of a very different nature, embedded in one another, are decisive for biodiversity futures. Developing more approaches that help us understand such complex interdependencies is essential. This

also implies diversifying and reinforcing interdisciplinary forms of work on biodiversity futures.

Our own discussions on biodiversity – for instance on business strategies, NGO actions, public policies, international governance and priority research programs – are themselves part of the system that drives biodiversity futures. In-depth reflexive approaches are of the essence here. For instance, we need to give careful consideration to the way we communicate biodiversity issues. What meanings do the terms we use when discussing biodiversity issues impart? How are narratives constructed, received and used?

Of course, many of the challenges encountered in biodiversity futures are not unique to this domain, but apply widely to other aspects of our future, and to the field of futures studies. This led participants in Session 3 to propose that we reassess how well the Futures Studies ‘tool kit’ is used in studying biodiversity futures. This would help us to mobilise more accessible resources, and to see whether or not the existing toolkit is fit for purpose.

### The strategies we should study

In terms of the possible broad orientations of futures work, the participants’ proposals were driven by three major concerns.

The first is that we have to explore (and deal with) possible near-future situations that will be substantially different to anything we’ve encountered before. In response to this consideration, two complementary strategies were put forward. One focuses on looking for “the least harmful or most sustainable pathways”. The other involves exploring possible system designs very different from those we have now, and reflecting on their feasibility and on the lessons to be learned from this process.

The second major concern is the pressing need to establish action on biodiversity issues on a much larger scale. This could be accomplished through various forms of futures work that would help to explore new possibilities in:

- A. Drivers of change, agents of change and new leadership options.
- B. The evaluation of governance system capacity for adequate anticipation, and proposals for improved procedures within such systems.
- C. The improvement of communication around biodiversity futures, including framing issues, language, exchange of knowledge and changes in ethics and values.
- D. New, more reflexive and more powerful approaches to building scenarios and other forms of narratives about biodiversity futures.
- E. The possible use of new information and communication tools in support of change.

The third concern expressed by participants is the need for clearer confrontations and articulations between sector-based futures. Sector-based concerns like agriculture and food, water, urbanism, and energy are currently the subject of in-depth futures work, both in academic research and lively policy debate. These sector-based futures have major consequences on possible (or impossible) futures of biodiversity, and should be studied and discussed in-depth. This is not to say that we should not study futures by sectors; rather, we should connect serious sector-based futures works actively and in an innovative and appropriate way. This is essential for an issue like biodiversity, which is impacted and driven by changes in virtually all sectors of activity.

## Session 3: Biodiversity Futures – breakout sessions

### Priority topics

Discussions among participants in the breakout groups also brought to the fore some more specific topics for research and debate. Indeed, our ability to discuss usefully issues in biodiversity futures relies not only on creating and using the right tools for synthesis, but also on our continued investment in understanding better the various dynamics at play.

There is much work to do in the many disciplines that focus on the multi-faceted human dimension of biodiversity issues, from psychology and anthropology to history and economics. Will social tipping points come into play over the next 20 years, for instance through the growing alumnus of environmentally-aware and trained people? To what extent can economic tools for biodiversity, such as payment for ecosystem services, be generalised at scales that would make a difference globally? These are just two key questions among many. In every case, and in each specialised study area, it will be crucial to consider quite different future contexts and scenarios.

Action on biodiversity issues is also highly dependent on knowledge from ecology and other disciplines within environmental science. We urgently need to know more about ecosystem functioning, the relations between biodiversity, ecosystem functions and ecosystem services; about resilience, threshold effects, interactions and the multi-scale complexities involved in ecosystem change.

In ecology and environmental science, different futures possibilities should be taken into account for two very different reasons. The first is that social, economic and technical

drivers are pushing ecosystems into states so different from the present and recent past that a growing level of anticipation has to be integrated into our knowledge. The second reason, which sometimes seems harder for scientists to accept, is that ecology itself has considerable uncertainties of its own, so that even with a great understanding of social drivers available, there would remain an important need for conjecture within ecology itself.

We also need to ask questions about the adequacy of the existing techniques for anticipatory governance. For instance, the tools we use for prior assessment of projects, plans, programmes and policies. Are these the right tools for bringing biodiversity loss under control through public or corporate policies? What is missing? Is something completely different needed? And what management tools could be imagined or tested?

Finally, the question of ecological limits is an important one to take up again, recognising their hybrid biophysical and socio-political nature. Working on limits provides one of the relevant frameworks for synthesis to connect our understanding of complex social and ecological issues with negotiations and policy. How can we manage the intertwined business of understanding limits in ecosystems, and of deciding on limits in our projects?

These are just some of the questions asked, and some the key issues engaged with, in the Session 3 breakout groups.







## Session 4: Breaking Barriers – breakout sessions

### Introduction

In the past, our ability to take meaningful action on biodiversity issues has been hindered by long-standing impasses and sensitive underlying issues. At the World Forum on Enterprise and the Environment, delegates were asked to consider how we can cut through these Gordian Knots to achieve measurable progress, and what action we can start taking today.

Divided into breakout groups, delegates discussed and tackled issues in the following five crucial areas:

greening the economy; accounting and accountability for ecosystems; organisational patterns for new strategies; forests and commodities; and marine ecosystems.

Looking beyond statements and good intentions, the groups focused on actionable ideas for change and workable future solutions.

Here are some key findings.





## Session 4: Breaking Barriers – breakout sessions

### Group 1: Green the Economy: Financial Needs and Tools

**Lead: Professor Mr Herman Mulder**, *Independent Advisor*. **Contributors: Ms Ann Pettifor**, *PRIME (Policy Research in Macroeconomics)*; **Mr Joshua Bishop**, *Environmental Economist*; **Mr Giuseppe van der Helm**, *European Sustainable Investment Forum*. **Facilitator: Mr Leo Johnson**, *Sustainability & Climate Change, PwC*

The world is currently in the midst of a major transformation, with fundamental power shifts taking place. Economic growth, capital formation and technological innovation are increasingly occurring in the South. Investors and tax payers are requiring more accountability from, and influence within, companies and public authorities. Customers are becoming interested in product backstories and origins. And governments are increasingly resource-stretched as the private sector thrives.

Amid these transformations, many people predict a new crisis that will be triggered by social injustice, on-going planetary exploitation and ecosystem degradation. With the “GDP of the poor” hit hard by global financial turmoil and environmental pressures, the plight of the ‘bottom billion’ will reverberate through our systems and supply chains. Because in today’s globalised world, it is increasingly the poorest who are at the start-point of our networks of transaction and supply.

If we are to avert this crisis and achieve a sustainable future – a future in which 9 billion people might live in peace, free of extreme poverty and with equal access to health and wellbeing – we need to mobilise funding to accelerate biodiversity preservation.

#### The Challenges

Finance itself, however, is not the major obstacle. The amounts needed for biodiversity preservation (US\$ 300-400bln p.a.) are not insurmountable, and there is sufficient capital to protect and invest in ecosystem services. Indeed, ecosystems demand extremely low rates of interest.

The problem is more to do with an absence of political will and progressive corporate thinking. Business is still not sufficiently aware of its dependencies, risks, impacts and opportunities in relation to biodiversity. And we need business on board if we are to achieve the necessary paradigm shift and put the value and price of natural capital at the heart of our economic systems.

Admittedly, there have been some encouraging developments in the private sector over the last ten years, and international business has begun to engage with the sustainability agenda. But this process will only be accelerated if conservation becomes coherently and consistently embedded in strategic, legal and fiscal frameworks.

The transition to a new, green economy is feasible, plausible and supported by sound evidence, as recent studies – such as the TEEB Report and the UNEP’s Green Economy Report – have convincingly argued. But in the words of Martin Luther King, “we cannot walk alone”; we need intensified policy, program and project coordination between governments, academia and the public and private sectors to put the wheels of change in motion.

#### Actions and solutions

In our efforts to engage business with biodiversity issues, it is important to remember that companies won’t pursue these measures without a guaranteed ‘return on investment’. We therefore need to set out the long-term value to business of corporate sustainability. For example, the ‘rewards’ of engagement, such as brand enhancement and reduced

costs, risks and liabilities, need to be communicated in a clear and compelling way. Communities are also more likely to grant businesses licence to operate if they see evidence of good corporate behaviour.

To this end, disclosure is critical, and recent moves towards integrated corporate reporting – which brings financial and sustainability information together – should be applauded and encouraged. Puma's 2010 corporate report provides an excellent model, showing how the combination of financial and non-financial information enables a company to prove that sustainability is at the heart of its ethos and operations. If sustainability trends are reflected throughout a report, the implication is that these trends are also reflected and respected within the company as whole. And while financial information gives useful insight into past performance, non-financial information provides insight into a company's future strategy, and is therefore of enormous value to stakeholders.

Integrated reporting is still in its infancy. But once more companies and auditors get to grips with this new approach to disclosure, a vital step-change should ensue. In fact, improved transparency across governments and business as a whole is integral to the transition to a green economy. And many now believe that disclosure on biodiversity impacts and activities should be made mandatory by 2020, alongside legislation to compel companies to describe and quantify their long-term risks.

Along similar lines, companies that can demonstrate board-level support for sustainability and biodiversity will also help to drive meaningful change. Indeed, biodiversity initiatives that begin in a company's PR department will lead nowhere fast.

It is also thought that government taxation and regulation could be employed to motivate corporations and investors to behave more responsibly towards the environment. Taxing the 'bad', and rewarding the 'good', for example, could help to bring about long-term changes in corporate strategy.

Elsewhere, attention needs to be given to how we engage the general public. Customers are becoming more sensitive to and inquisitive about the origins and consequences of their purchases. Through social media and marketing campaigns, we need to harness the energy of ethically-minded consumers; because their purchasing behaviours will also play a key role in the transition to a green economy. As we've seen with the recent events of the Arab Spring, democracy is increasingly driven from the bottom-up rather than the top-down, a trend that has been greatly enabled by social networks. Social cohesion is a key factor for stability, and social networks are proving a positive force in uniting, mobilising and inspiring people in the pursuit of justice and equality.

But in order to engage the general public and achieve lasting behavioural change, we need to present biodiversity issues in a fun and aspirational way. Public communications on biodiversity have to be relevant to their target audience. Clarity and relevance are key, and issues on people's doorsteps, values closer to home (such as water metering in the UK), will have more immediate impact as a focal point for action.

Ultimately, conservation and biodiversity are not yet built into our economic models or our everyday social behaviours. We therefore need to think "refreshingly differently". Because the financial wherewithal is there to achieve our biodiversity goals; it's the barriers in people's minds and in our corporate and political systems that we need to overcome.

## Session 4: Breaking Barriers – breakout sessions

### Group 2: Accounting and Accountability for Ecosystems: Next Steps for Valuation and Indicators

**Lead: Professor Gretchen Daily**, *Stanford University*. **Contributors: Professor Ed Barbier**, *Department of Economics and Finance, University of Wyoming*; **Mr Richard Stathers**, *Schroders*; **Dr Yann Laurans**, *Iddri (Sciences Po) and Ecowhat*; **Dr Mallika Ishwaran**, *Environment and Growth Economics, Defra*

These days, ecosystems are widely viewed as ‘capital assets’ among the scientific community. According to an article in *Science* volume 289:

“...If properly managed, [the world’s ecosystems] yield a flow of vital services, including the production of goods (such as seafood and timber), life support processes (such as pollination and water purification), and life-fulfilling conditions (such as beauty and serenity).”

P. Dasgupta, writing in *Environmental and Resource Economics*, agrees with this assessment, but warns that “like reproducible capital assets (roads, buildings, and machinery), ecosystems depreciate if they are misused or overused”. The main difference is that degraded or damaged ecosystems can seldom be repaired or replaced. And how do we go about measuring and allocating such an asset?

Natural ecosystems and their services fall into the special category of “non-renewable resources with renewable service flows”. If ecosystems are left relatively undisturbed, the flow of services from their regulatory and habitat functions is available in quantities that are not affected by the rate at which they are used. The problem is, most of the benefits arising from ecosystems are ‘non-marketed’, meaning their true values are not properly measured. Failure to measure these values can lead to ecosystems being ‘under-priced’ in land use decisions, which in turn leads to them being converted rather than conserved.

For example, in tropical regions the social and ecological value of mangroves is ten times larger than the returns made on shrimp farming. And yet mangroves are frequently destroyed to

make way for this industry, with private profits being put before public losses in the decision-making process.

#### Comparison of land use values per ha, Thailand, 1996-2004 (US\$1996)

Land use	Net present value (\$) per ha (10-15% discount rate)
<b>1. Shrimp farming:</b>	
Net economic returns	1,078 – 1,220
<b>2. Mangrove replanting and restoration:</b>	
Total cost	8,812 – 9,318
<b>3. Ecosystem goods &amp; services:</b>	
Net income from collected forest products	484 – 584
Habitat-fishery linkage	708 – 987
Storm protection service	8,966 – 10,821
<b>Total</b>	<b>10,158 – 12,392</b>

*Barbier, E.B. “Valuing Ecosystem Services as Productive Inputs.” Economic Policy, January, 49:177-229.*

#### Challenges

Correctly valuing ‘non-market’ ecosystem services is essential to ecosystem conservation. In order to do this we need to ‘trace’ the link between the production of ecosystem services and the benefits that these services generate. We also need to deepen our knowledge and understanding of ecosystem functions, and integrate ecological and economic modelling in order to better value ecosystem services.





## Session 4: Breaking Barriers – breakout sessions

### Group 3: New Organisational Patterns for New Strategies

**Lead: Dr Tiphaine Leménager**, *Economic and Social Research Division, AFD*

In order to halt biodiversity loss, we need more than just tools and money. We also need to change the way we organise ourselves.

Many books expounded the theory that in order to achieve success, you need to organise your enterprise. It is a principle that holds true for businesses, institutions and armies alike. Organisational decisions are a key part of any institutional strategy. They directly impact the way actions are implemented and the way results are achieved.

But how do we begin to organise ourselves to take better account of biodiversity? The answer to this question depends upon the nature of the organisation. NGOs, companies and governments all have very different relationships with biodiversity loss; their priorities and constraints are different, and so too are their organisational challenges. Here are a couple of contrasting perspectives.

#### The corporate: Mark Buckingham, Monsanto

*"We have a big footprint on biodiversity because agriculture has [a big footprint], but we need to find ways to make agriculture part of the solution. Monsanto succeeds when farmers succeed, and [when it comes to sustainability] yield is a key factor. If we increase yield, we can reduce the impact of each unit of food produced."*

To this end, Monsanto has established three main commitments for achieving sustainable yields:

1. Working with farmers to double yields of corn, soy, cotton and canola crops from 2000-2030.

2. Decreasing resource use intensity by 33% by 2030.

3. Increasing farm income levels, including 5 million additional resource-poor farmers, by 2020.

Monsanto is also changing the way it organises itself in order to meet the biodiversity challenge. These changes include the creation of a Corporate Affairs and Sustainability division, an expanded R&D budget, and a conscious move towards strategic partnership working.

Realising it cannot achieve its sustainability goals alone, Monsanto has forged a partnership with the Brazilian NGO, Conservation International (CI). Under this arrangement, CI has been delivering biodiversity training and education to Monsanto staff. In turn, armed with new knowledge Monsanto is now encouraging farmers to restore degraded areas, and to use progressive agricultural methods that do not threaten forest habitats.

#### The NGO: Fabio Scarano, Conservation International

*"Changing a strategy is very hard. It means adopting new rules, new activities... new capacities, new skills."*

Following the results of the Millennium Ecosystem Assessment, Conservation International (CI) undertook a major strategic change. Rather than avoiding, lambasting and battling organisations whose methods it disapproved of, CI decided it could make more of an impact by working alongside its corporate opponents. Putting past enmities aside, CI now works with a range of companies to help improve their environmental performance and reduce their biodiversity footprint. It has come to the conclusion that dialogue is more productive than discord,

and that black-and-white views of ‘good versus bad’ ultimately lead nowhere.

Along the way, CI has also questioned whether it’s a case of ‘conservation versus development’, or ‘conservation needing development’. The organisation now focuses not only on protected areas but green economies and private financing, and talks in terms of ‘increasing productivity in an unproductive land’. Seeking global reach and influence, CI now treats the private sector as a partner (not a sponsor), government as a client and society at large as a target audience.

	CI strategy then	CI strategy now
Mission	Biodiversity	Biodiversity, Ecosystem services, Human well-being
Delivery	Protected areas, ecosystems, species	Green economies
Territory	Watersheds and protected areas	Municipalities and states
Science	Biological	Interdisciplinary: sustainability sciences
Funds	Philanthropic	Private increasing

CI strategy’s evolution (Fabio Scarano, WFEE, 2011)

**The academic: Dr Robert Hahn, founder of the Reg-Markets Center**

Endorsing CI’s shift in strategy, Dr Hahn believes that “the perfect is the enemy of the good,” and that “we need to make political compromise in order to move forward.”

Identifying an “underinvestment in public good”, Dr Hahn proposes four key action points to help deliver positive strategic change:

1. Results-based policies; a synthesis of literature and results to enable us to see what does and doesn’t work.
2. Recognition that solutions depend on context; we can’t take a one-size-fits-all approach to tackling – for example – deforestation; different countries and regions will require different approaches.
3. Harnessing social networks to bring about policy and behaviour change, with closer attention required on how we mobilise constituencies to support potential solutions.
4. More thought on how we frame and communicate biodiversity issues to both public and political audiences.

**Conclusions**

There is clearly a lack of expertise regarding organisational challenges in the biodiversity sector. But it’s not a question of finding the right organisational pattern. We need to tailor the organisational solution to the particular challenge at hand, and to give careful consideration to the social, political and environmental context in which an organisation is operating.

We also need to think about how individuals work together within organisations, and how organisations work with one another. The increase in cross-sector partnerships in the last decade is delivering radical change in decision-making and action, and “institutions now need to learn to live in a more experimental world”. A world in which the old divisions and oppositions are set aside in the name of progress; and a world in which partnerships deliver the strength, coordination and resolve often lacking at government level.

## Session 4: Breaking Barriers – breakout sessions

### Group 4: Forests and Commodities

**Lead:** Dr Glyn Davies, *Director of Programmes, WWF-UK*. **Contributors:** Mr Rod Taylor, *WWF International Forest Programme*; Mr Mike Barry, *Head of Sustainable Business, Marks and Spencer*; Mr Stuart Clenaghan, *Co-Founder & Director, Green Gold Forestry Ltd*

Forests cover about 30% of the planet's land surface. Of these forests, about half are in tropical regions. The annual rate of deforestation is 13 million hectares a year, although this is unevenly distributed and almost all deforestation occurs in the tropics, with temperate and boreal forests remaining stable and even expanding in some areas.

Tropical forests are the most ecologically diverse terrestrial systems on the planet, boasting the highest percentage of biodiversity per square mile in the world. They offer multiple assets and functions, including water purification, flood control and – most crucially – carbon sequestration. As discussed on page 6 of this report, the carbon storage provided by the world's forests is one of the most vital of all ecosystem services. Indeed, if the current rates of deforestation can be halved between now and 2020, as much as 29 billion tonnes of carbon could be retained. Reducing deforestation will also have positive implications for the many plant and animal species supported by tropical forests.

However, funding to tackle deforestation and climate change remains a problem. The Stern Review estimated that US\$200 billion a year is needed to support effective climate change adaptation and mitigation, yet only half that amount was pledged at the Copenhagen UNFCCC COP in 2009. Similarly, an estimated US\$50 billion is needed annually in funding for REDD Plus, although only US\$4.5 billion has been committed up to 2012, and the majority of this has yet to be dispersed.

All the while, the rate of consumption of forest products, and the conversion of land to support food production, means that deforestation, biodiversity loss and the release of GHGs

are accelerating at an alarming rate. And with the anticipated global population growth to 9+ billion by 2050, even more land will be needed in the coming decades for food, timber, fibre and biofuels. Plantations (which account for about 7% of global forest cover) have the potential to provide two-thirds of the world's wood and fibre needs; and at present there is sufficient land space for agriculture. But over time increasing consumer demands will undermine this existing capacity and place even greater pressure on our forests.

### The Challenges

While there is widespread understanding that protected areas are essential to addressing the combined losses of carbon and biodiversity, the actual number of designated zones is woefully insufficient. To make matters worse, progress is being hampered by the lack of available tools for holistic land-use decision-making. All too often decisions are made based on short-term benefits or sector-specific interests, which undermine longer-term sustainable options for a green economy. This situation is compounded by uncertainty over land tenure and ownership, resulting in a lack of clarity over future land use.

As mentioned above, the rate of natural resource consumption is also a major challenge. Approximately 1.5 planet's worth of productivity is consumed each year, which means we are devouring the biological capital needed to generate natural resources, thereby reducing our capacity for future production. This unsustainable rate of consumption is exacerbated by a shift towards meat-and-dairy-based diets in expanding economies (especially China), which requires greater areas of land for the production of animal feed.



In terms of finance, a needs-based investment model has dominated overseas development assistance in recent years, and investments now need to be based on the demonstration of tangible results. What's more, Governments and investors will only increase capital flows once there is more certainty about land-use and sustainable production systems.

## Actions and solutions

With urgent action needed, many agree a clear target would help to focus international efforts. WWF's objective of 'zero net deforestation and forest degradation by 2020 (including near zero loss of natural forests)' is felt to be a useful guide.

Improving governance is also critical. With better governance, the world would have enough productive forest and land for agriculture to meet current demands, without the need for further conversion. To this end, governments have a crucial role to play in providing regulations for forest finance and management. The Brazilian Forest Code, for example, has had a positive impact on reducing deforestation,<sup>1</sup> and the moratorium on timber extraction from the Atlantic Forests of Paraguay has stopped all forest loss in the area.

Governments also need to determine tax and subsidy regimes, providing incentives for sustainable management of forest and forest lands. These measures would help set a 'level playing field' for private sector investment and trade, particularly when supported by high standards of governance and transparency.

In the longer term, as populations and incomes grow, maintaining 'near zero' forest loss will require forestry and farming practices that produce more while using less land and water, and while generating less pollution. New consumption patterns will also be required – patterns that address poverty while eliminating the waste and over-consumption of the rich.

On the subject of land-use, action is needed to garner political support for tools that determine clear principles for land-use planning and decision-making. Integrated land use plans will be required on a regional scale to provide multiple benefits that cannot be achieved in a single place or time. Such plans should help to clarify land use and tenure issues for governments and investors, in turn eliciting greater financial commitment for biodiversity protection.

Certification will also help to identify responsible and well-managed companies that integrate sustainability into their business, such as the Forest Stewardship Council and the Roundtable on Sustainable Palm Oil. One recent approach has been to develop certifiable systems of production, and to seek to maintain the natural resource stock in perpetuity. A good example is the European Forest Law and Enforcement in Trade initiative, which seeks to exclude all illegally (and therefore generally unsustainably) sourced timber from the European market.

Finally, further roundtable agreements will be required to improve the use of certification as a market instrument, and to help incorporate the principles and criteria of sustainability into production systems. Certification tools will also only have a major impact once they are applied across a large proportion of forest production systems. In the meantime, they offer a focal point around which progressive companies and consumers can congregate. For example, the Sustainability Consortium comprises nearly 50 of the world's largest retailers and brands with collective revenues of over \$1 trillion. As this group presses its suppliers for sustainably-produced goods, so sustainability is forced down the supply chain, providing a flicker of hope and respite for the world's natural resources.

<sup>1</sup> Since the conference, the Brazilian Forest Code is facing changes which could undo hard-won efforts to reduce deforestation.



## Session 4: Breaking Barriers – breakout sessions

### Group 5: Marine Ecosystems

**Lead:** Dr Raphael Billé, *Head of Biodiversity Programme, IDDRI*. **Contributors:** Professor Ove Hoegh-Guldberg, *GCI, University of Queensland*; Mr Stephen Olsen, *Coastal Resources Centre, University of Rhode Island*; Ms Adriana Fabra, *Senior Advisor to the Pew Environmental Group, The Pew Trust*; Dr Anthony Ribbink, *Director, Sustainable Seas Trust*. **Facilitator:** Mr Joseph D'Cruz, *Regional Environment Advisor, UNDP*.

Oceans cover two thirds of the planet and support the lives and livelihoods of billions of people. The forecast out at sea, however, is far from good. Our oceans are in a state of decline which, if left unchecked, will lead to the demise of the very ecosystems that support humankind. As Dr Alex Rogers, Scientific Director at the International Programme on the State of the Ocean (IPSO), observes: "If the ocean goes down, it's game over."

The single biggest threat to our oceans may turn out to be climate change, which brings the twin perils of rising sea temperatures and acidification. We've already seen one degree of change, and in the next few decades, with increased CO<sub>2</sub> interacting with water, there will be more acid in our oceans than there has been in the last 14 million years.

At the same time, ocean oxygen content is starting to drop. Primary productivity in oceans is also decreasing by 1% a year; coral reefs are declining by 1-2% a year, and kelp forests at the same rate. According to IPSO, these conditions resemble those that preceded the mass extinctions of the past.

Through over fishing, illegal fishing and destructive fishing methods, we are also putting intense pressure on global fish stocks – 60% of which are currently overexploited. Industrial fishing comprises more than 1.3 million vessels; using technology to reach into every depth and corner of the ocean, these fleets haul in 85 million tonnes of fish a year. With too many boats chasing too few fish, and with generous subsidies fuelling overcapacity, it is feared that many of the world's remaining commercial fisheries will collapse by 2025. Already,

around 90% of the world's large fish have disappeared through overfishing, which threatens food security and jobs as well as biodiversity.

### The Challenges

There is currently no sufficient protection of biodiversity out at sea. The United Nations Convention on the Laws of the Sea (UNCLOS) 1982 is an incomplete regulatory system which, by recognising the freedom of fishing on the high seas, has failed to effectively protect some of the most threatened marine biodiversity. In 1995 the Fish Stocks Agreement complemented the UNCLOS framework with important principles and strengthened power devolved to regional fisheries management organisations. But regional regimes have also failed to manage resources sustainably in the areas under their remit. The ICCAT, for example, has been unable to counter the near extinction of the blue fin tuna.

In fact, at least 15% of global fishing is illegal, unregulated or unreported, despite several concerted political efforts to tackle such practices over the last few years. There is also an issue of compliance, which is extremely difficult to address. How do we make sure states effectively enforce measures taken at the international level when so many of them are flags of convenience? How do we ensure selective fishing methods are used to avoid by-catch and discards? We simply don't have the capacity to patrol and police 71% of the Earth's surface, hence alternative options have to be implemented, such as port state control and trade market-related measures.



But there are other major challenges much closer to shore. Indeed, most human impact on the marine environment is concentrated along our coastlines. Over the years there has been massive migration towards the ocean's edge, and half of the world's population lives on the 10% of land considered 'coastal'. Indeed, the coastline is where industry, energy and tourism combine to put enormous pressure on ecosystems, and where good governance is hard to achieve.

### Actions and solutions

If the ocean is to continue functioning at a level capable of sustaining life as we know it, we need to tackle climate change and alleviate the other pressures we exert upon it.

Regarding fisheries and fish stocks, it is believed we can make a big impact through enlightened regulation and ownership schemes. The National Oceanic and Atmospheric Administration (NOAA), for example, has put into effect a catch-shares programme in more than 50 fisheries in the US. In the Gulf of Mexico, where heavy-handed regulation previously caused a decline in fish stocks, the catch-shares system has shifted the focus to ownership. Now, the interests of the fishermen are aligned with the health of the seas, which has improved the fishermen's livelihoods and made fish stocks more resilient. Such schemes work by linking people more directly to enforcement, thereby reducing the need for enforcement through Marine Protected Areas (MPAs).

There is no silver bullet, though – catch shares will not work everywhere, and solutions must be tailored to specific contexts. In more general terms, we need to develop a marine economy based on biodiversity rather than biomass. And to do this,

we need to reverse the economic incentives for fish stocks. With oceans so difficult to patrol, and compliance at sea so difficult to enforce, we have to make sure it is in the interest of communities to adopt best practice. We can regulate all we like, but people have to feed their families, so they need to be incentivised (through catch-shares or similar schemes) to make their fishing practices sustainable and to keep their marine environments clean.

So, rather than fishermen fighting each other for every last fish, we need to achieve a shift in systems and mindsets so that industries come to value nature in abundance (c.f. the demise of the giant yellow croaker, page 12), and are motivated to preserve its diversity. And if we are to achieve a step-change towards ocean abundance, self-management and ownership by 2050, we have to end damaging fishing subsidies.

Others believe strongly that our primary focus should be on the pH of the oceans; because if oceans are not stabilised chemically and physically, then all other efforts will be worth very little.

Nevertheless, issues of financing and governance remain critical, and we need to consider the cost of managing our oceans and how we create these financial flows, with private sector engagement combined with public finance likely to be vital.

We also have to change people's perception and understanding of their dependence on the oceans, communicating the fact that the seas are not just 'some mysterious force' or holiday destination, but a vital biodiversity and life-support system it is our moral and existential duty to preserve.



## Conclusion

**Professor Laurent Mermet**, *AgroParisTech and Smith School of Enterprise and the Environment*



Biodiversity loss is by no means a new issue. We have seen it in action for decades. Debates on how to stop biodiversity loss are not new either, as the speakers in Session 1 of the World Forum on Enterprise and the Environment demonstrated in a striking way.

Over the two days of the Forum, through intense presentations and discussions, we considered some exciting and innovative ideas. We also confronted some persistent and intractable issues. Session 2 demonstrated both the emergency and scale of the challenge, and the energy and creativity that's being invested in finding viable solutions. But the latter still seems to be always one step behind the former. In many ways, the lack of sufficient action and change in the midst of growing concern suggests procrastination on a global scale.

Some conservation biologists have dubbed this the 'knowing-but-not-doing' gap; the gap between our awareness and scientific understanding of the issues, of the changes required, and the comparatively limited impact of conservation action. French philosopher Jean-Pierre Dupuy proposes a remarkable analysis of this issue in his book, *Enlightened Catastrophism*. For him, the crux of the problem is not that we do not know enough about the challenges that lie ahead. It's more that we do not *believe* in what we know; not with the intensity and commitment that translates into meaningful action.

In his book, Dupuy establishes the difference between two sorts of time: 'project time', which relates to our aims, actions and tools; and 'historical time', which relates to large-scale transformations in human and non-human systems. While we act a lot in 'project time', we cannot act, at least directly, in 'historical time'. This gap between scales of time can lend a sense of futility to our efforts, and fuel a vicious circle of procrastination. It is also a gap that cannot be filled in, but

instead has to be bridged if we are to address the large-scale and long-term issues we are currently confronting.

Systematic work on building such bridges lies at the core of futures studies, which were explored in Session 3 of the Forum. Futures studies help to connect the day-to-day business of the present with long-term and large-scale issues and trends. In this way, they can help us to act strategically – i.e. in such a way that actions appropriately chosen in 'project time' may produce effects that will be felt on a much wider scale.

Biodiversity conservation, as the phrase suggests, is largely a matter of trying to stabilise certain ecological situations. But at the same time, it will be more and more about navigating massive changes in societies and ecosystems. This requires more intensive study and debate about possible biodiversity futures; studies and debates that reach beyond scrutinising the losses we will incur if things continue on their present track. The presentations and discussions in Session 3 provided many useful ideas for a richer agenda in this area – an agenda which the Smith School of Enterprise and the Environment and, we hope, other participants in the Forum, will use to guide further efforts in the coming years.

However, as much as we need to look forward, we also need to look to the present and the biodiversity crisis that is playing out in real time all around us. Throughout the Forum – and in particular in the various breakout groups of Session 4, which each addressed a particularly tough and complex issue – we witnessed the intensity of communication and activity presently at work in the field of biodiversity.

The discussions during the Forum have made one aspect of the present situation quite striking: the degree to which, in the course of the last few years, the four types of actors – business, government, environmental NGOs and academia –

have converged in the views they express. This is reinforced by looking at the Forum's participants list: many have been active in two, three or even all four of these domains over the course of their career. This should not lead us to strategic naiveté, of the sort that would conclude that if we are all on the same page, change will come easily. It should rather help us redirect our attention to new forms of confrontation and new frontlines in the battle over biodiversity.

In fact, the Forum's discussions provided many examples where typical confrontations between business and NGOs, for instance, have given way to confrontations within firms, and within NGOs, on strategies regarding biodiversity issues. The same holds true of course for government and academia. Beyond the relief and enthusiasm that new convergences rightly elicit, we must also focus our attention on those places where decisive confrontations continue to unfold, maybe in changing forms. We may for instance be attentive to two issues:

Firstly, most actions on biodiversity issues now rely on arrangements (projects, agreements) where heterogeneous actors are involved together in complex ways. This can create momentum for change; it can also allow for a blurring of identities, strategies and responsibilities that promote procrastination.

Secondly, the increasing support for industries that have positive effects on biodiversity is good news. But as some speakers in Session 2 made strikingly clear, businesses, consumers, governments, and academics continue to invest massively in 'brown' industries and technologies that have detrimental effects on biodiversity. Support to 'green sectors' will be of little avail if we do not manage to curb the development of brown sectors. In many cases, however, we derive significant benefits from precisely those activities we so badly would want to stop – again, a major and classic cause of procrastination.

This is not to express a preference for confrontational strategies over collaboration. It is simply to state that we build our future through tense, highly complex negotiations, and that these imply a high level of ambivalence in the co-existence of struggle and collaboration.

In the field of biodiversity, the way this is played out is now changing dramatically and quickly. The World Forum on Enterprise and the Environment has allowed participants to identify aspects of current change that are directly relevant for them: these include emerging challenges they will want to pay more attention to, and new opportunities for collaboration and action.



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