



THE FOUNDATION  
FOR SCIENCE AND  
TECHNOLOGY

## DINNER/DISCUSSION SUMMARY

### Can a value be put on biodiversity?

Held at The Royal Society on 6<sup>th</sup> May, 2009

The Foundation is grateful for the support for this meeting from the Biotechnology and Biological Sciences Research Council, the Department for Environment, Food and Rural Affairs and the Natural Environment Research Council.

**Chair:** **The Earl of Selborne KBE FRS**  
Chairman, The Foundation for Science and Technology

**Speakers:** **Professor Robert Watson CMG**  
Chief Scientific Adviser, Department for Environment, Food and Rural Affairs  
**Pavan Sukhdev**  
Study Leader for The Economics of Ecosystems and Biodiversity Study (TEEB), and Project Leader, Green Economy, UN Environment Programme and Chairman, Global Markets Centre, Mumbai, Deutsche Bank  
**The Lord May of Oxford OM AC Kt FRS**  
Oxford University and Imperial College, London

**First respondent:** **Professor Georgina Mace CBE FRS**  
Imperial College, London

PROFESSOR WATSON said that putting a value on biodiversity raised questions about true human wealth. He saw it as based on built, natural, and social capital. There were many shortcomings in conventional economics, and few took sufficient account of the health of ecosystems. Ecosystem services had obvious market value, whether economic, cultural, educational, agricultural or relating to human health and security. The Millennium Ecosystem Assessment had been very useful in this respect. With Steve Albin he was now chairing a national assessment, whose results would be published during the next couple of years. Some elements were obviously global, some national and some local.

There was an obvious connection with climate change which represented a major threat to our society with mostly negative consequences. Here the major factors were how best to mitigate and even more adapt ourselves to the consequences. The adverse effects included species extinctions and new risks, for example to coral reefs, and cloud forests. Any undermining of ecosystems could do grave damage to the economy as a whole. The adverse effects would be more evident in poor than in rich countries (for example in the role of mangrove swamps and wetlands, and other natural devices for buffering against extreme events). We should set aside areas for conservation and promote reforestation as well as find new ways of generating renewable energy. In every case a balance of advantage had to be struck. A classic example was in the dispute over the Catskill Watershed in New York.

A fundamental requirement was to look at the economics of pricing: to remove perverse subsidies, avoid excessive exploitation, bring in externalities and use both market and non-market incentives to establish appropriate pricing policies. We all had to get out of our silos and see these problems together in devising international, national and urban strategies, and – a vital point – improve our understanding of people's behaviour. Our future lay in the way in which we used natural capital.

MR SUKHDEV spoke of his work on The Economics of Ecosystems and Biodiversity (TEEB). It was always

difficult to relate nature to money, or give value to ecosystem services. Our current system was geared to production and consumption. Biodiversity had many dimensions, ranging from richness and rarity of species to biomass, genetic diversity and natural productivity.

The Interim Report of the Economics of Ecosystems and Biodiversity Project had been published in May 2008, and laid out the threats on a global basis including loss of species and its implications for humans. In the last thousand years or so there had been the biggest loss of diversity in human history, and the reasons included encroachment on natural areas, uses of agriculture and building of infrastructure. The effects included strong links with poverty and loss of welfare. Indeed the loss of welfare would be around seven per cent of GDP by 2050. Loss of natural capital was well illustrated by what had happened to world fisheries which had suffered from perverse subsidies, loss of income and jobs, and damage to human health. It had been well said that nature was the treasury of the poor, and nowhere was this clearer than between treatment of land in the Dominican Republic on one side and in Haiti on the other. Some countries were already looking into payments for conservation, including Costa Rica, Panama and Guyana.

He added that in The Economics of Ecosystems and Biodiversity Phase 2, to be published in the next twelve months, some of the gaps would be filled in. There would be better valuation, clearer methodology, and more accurate assessment of the effects both direct and indirect. A good example was in the field of medicine. Destruction of natural habitats might deprive us of the means of coping with such diseases as cancer and Alzheimers. Future TEEB reports would cover science, policy and administration, business, and depletion of natural assets, including water (now under threat from climate destabilization).

LORD MAY spoke of the enormous and increasing human impact on the Earth. During the last one hundred and fifty years human population had increased some seven times, humans now used forty per cent of net primary productivity, and some sixty per cent of runoff water. Of all the nitrogen

fixed from the atmosphere in 2007 fifty-five per cent was by the Haber-Bosch process for fertilizer production. The IUCN Red Books showed the percentages of plants and animals, including reptiles, fish and insects, under threat. We still did not know how many species now existed, or how many had become extinct. Projections for the future showed extinctions on the scale of those that had taken place during the long history of the Earth.

The total value of biodiversity was comparable with that of global GDP in conventional economics. Of twenty four ecosystem services, fifteen were now degrading, four were improving and five remained to be assessed. We had to establish the true costs of failure to conserve and to locate the areas most in need of conservation. In doing so we should bring in not just the human footprint (as assessed by WWF) but also to look at the effects on equity and disparities between rich and poor. The problems of the social impact had been relatively neglected: not just from the point of view of utility but also those of ethics, culture and human motivation.

PROFESSOR MACE then introduced the discussion. She referred to the need for better definition of biodiversity which meant different things to different people. This added to the difficulties in measuring the value of a factor which was non-linear with irreversible effects. We certainly had to take better account of the social impacts and the place of markets in influencing human behaviour.

In discussion the following points were made.

- Species were adapting to change when they could, and this was evident at all levels. In considering species loss we had to go beyond regret for the past or hope for the future.
- People were now more aware of the hazards of climate change, but they had yet to reckon with biodiversity whose importance was underestimated or misunderstood. There was of course an International Convention on Biodiversity, but action to cope with species loss often had to be taken at local rather than global level. This meant improving public understanding and involving policy makers at all levels, especially local.
- There was a crying need for better evaluation of what was going on, and better measurement of species loss. They should perhaps be brought into national accounts, together with new ways of measuring wealth and wellbeing (such as now being undertaken in a variety of places, ranging from the Joseph Stiglitz/ Amartya Sen commission to the work of the Club of Rome and even in such papers as the Financial Times). There was obvious difficulty in dealing with local issues within a framework of universal values. We had to decide how to bring understanding of the issues into our educational systems as well as society in general.
- The world was becoming better aware of environmental issues, but understanding of biodiversity was among the most difficult, well illustrated by the difficulty of translating it into terms comprehensible to Finance Ministers. Should more use be made of the threat to such charismatic species as polar bears? We needed to do more to motivate public interest and curiosity, and to take account of irrational as well as rational human behaviour.
- We needed a new branch of economics to cover human behaviour. Someone should produce a film or

book whose impact could be comparable to that of Al Gore's "An Inconvenient Truth". Although the need to limit human proliferation was of great importance, it was even more essential to change the current culture of consumerism. Here the role of the private sector was critical.

- Although the information now available about damage to ecosystem services might be incomplete, it was good and reliable so far as it went. In some respects it was easier to measure the damage to plants and vertebrates than to invertebrates, and in particular the worms and micro-organisms whose functions were vital to life itself. Nor did we properly reckon with the effects of such human activities as use of nitrogen fertilizer (as brought out recently by President Obama).
- People today might be preoccupied with the credit and financial crisis, but the threats to the natural environment were of much greater significance. Above all we had to measure things properly, understand what we were doing, and draw the right conclusions for future policy and behaviour.

Sir Crispin Tickell GCMG KCVO

#### Web Links:

Biotechnology and Biological Sciences Research Council  
[www.bbsrc.ac.uk](http://www.bbsrc.ac.uk)

Department for Environment, Food and Rural Affairs  
[www.defra.gov.uk](http://www.defra.gov.uk)

Department of Zoology, University of Oxford  
[www.zoo.ox.ac.uk](http://www.zoo.ox.ac.uk)

The Foundation for Science and Technology  
[www.foundation.org.uk](http://www.foundation.org.uk)

Imperial College, London  
[www3.imperial.ac.uk](http://www3.imperial.ac.uk)

Interim Report of The Economics of Ecosystems and Biodiversity (TEEB)  
<http://ec.europa.eu/environment/nature/biodiversity/economics/>

Natural Environment Research Council  
[www.nerc.ac.uk](http://www.nerc.ac.uk)

Technology Strategy Board  
[www.innovateuk.org](http://www.innovateuk.org)

UK Research Councils  
[www.rcuk.ac.uk](http://www.rcuk.ac.uk)

United Nations Environment Programme - Green Economy Initiative  
[www.unep.org/greeneconomy/](http://www.unep.org/greeneconomy/)