

## THE ECONOMICS OF ECOSYSTEMS AND BIODIVERSITY (TEEB)

‘**The Economics of Ecosystems and Biodiversity**’ presented an interim report<sup>1</sup> on Phase I of TEEB at the 9th Conference of the Parties of the Convention on Biological Diversity in May 2008 in Bonn. TEEB is an initiative to draw attention to the global economic benefits of biodiversity and the costs of biodiversity loss and ecosystem degradation.

The G8+5 Environmental Ministers initiated TEEB in Potsdam in 2007. Various EU governments and the European Commission provided funding and support for this study, which was a cooperative effort of institutes mainly from Europe, India and the Americas.

Under the study leadership of Pavan Sukhdev, TEEB was also recently presented<sup>2</sup> at a special session at the IUCN world congress – exploring issues around ‘mainstream’ biodiversity and ecosystem values in economics, markets and business. Honored by IUCN Director General Julia Marton-Lefèvre, other panelists in this event included Tom Albanese, Chief Executive of mining giant Rio Tinto, Georgina Mace, Professor of Conservation Science at Imperial Collage London and Mr Jochen Flasbarth, Director General at the German Federal Ministry for the environment.

As one of the key funding institutions for the project in collaboration with the European Commission, Mr. Flasbarth highlighted on the importance of this study in enhancing the importance of biodiversity.

The report on the TEEB Phase I provides first steps towards a general framework for the evaluation of biodiversity loss and conservation. It also acknowledges that major scientific challenges remain. The second phase of TEEB, starting in autumn 2008, aims to address several of these challenges.

In **Phase II**, TEEB seeks to show that economics can be a powerful instrument in biodiversity policy, both by supporting decision processes and by forging discourses. The legitimate and effective use of economic instruments in biodiversity conservation, however, depends on their appropriate application and interpretation. Several products are envisaged for Phase II, all needing different kinds of additional expertise:

Phase II will aim to demonstrate that policies can be changed when we are able to better take into account biodiversity values to people.

**End-user interfaces:** To have an impact, TEEB results need to be set into the context of different end-users. Thus, TEEB will engage end-users in order to provide them with tailor-made final products and will create tool kits for different end users. These include political decision makers, administrators, business enterprises and consumers:

- **For Policy-makers and Administrators:** guidance for policy-makers, covering subsidies and incentives, environmental liability, new market infrastructure, national income accounting, cost-benefit analysis, cost-effectiveness analysis, and methods for implementing PES and ABS, building on a review of existing policies with the potential to be scaled up or replicated elsewhere.

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<sup>1</sup> Report can be found under the following link <http://ec.europa.eu/environment/nature/biodiversity/economics>

<sup>2</sup> See presentation attached

- **For Enterprises:** how to quantify and disclose, mitigate or offset corporate impacts on ecosystems and biodiversity.
- **For Consumers:** for individuals and consumer organizations, guidance on how to reduce their impact on wild nature and influence producers through their private purchasing decisions - this will include steps to disclose the ecological footprints of goods sold, in terms of land, water and energy use.

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Web: <http://ec.europa.eu/environment/nature/biodiversity/economics>



# The Economics of Ecosystems and Biodiversity

IUCN Director General's Special Event

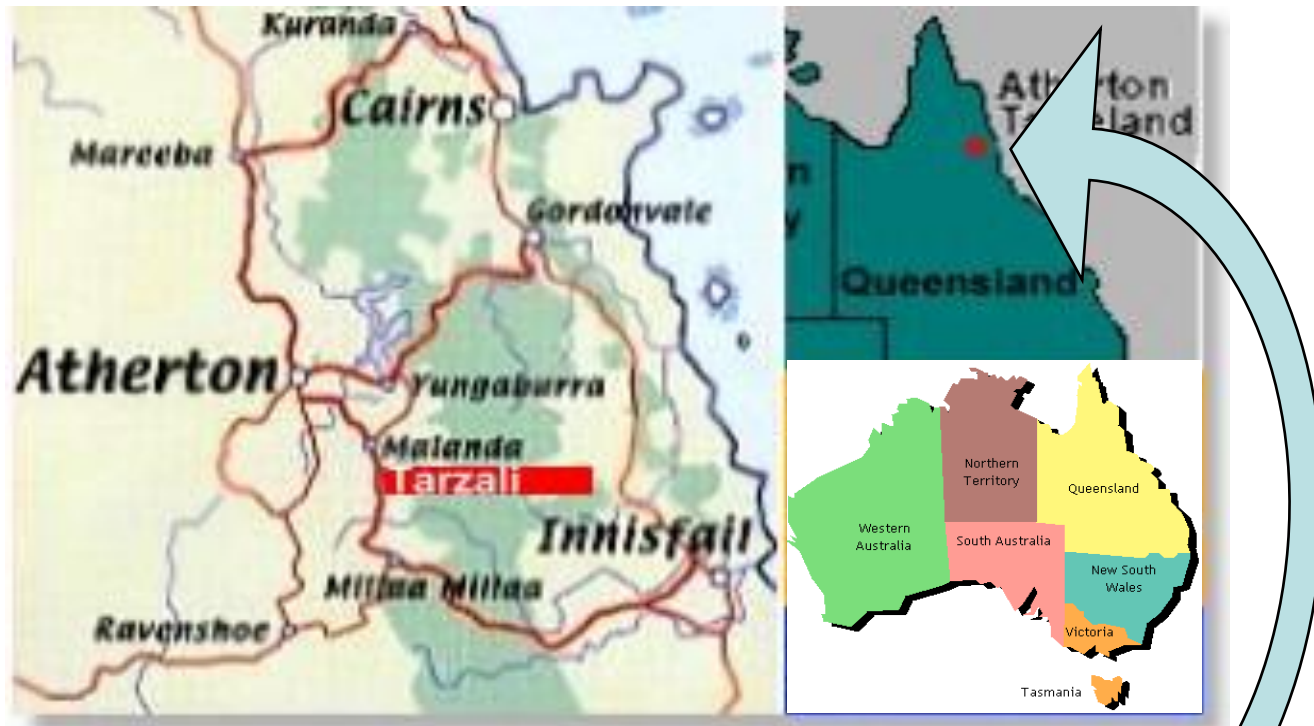
6<sup>th</sup> October, Barcelona

4<sup>th</sup> World Conservation Congress

Pavan Sukhdev

(Study Leader, TEEB)





Tarzali, Atherton Tablelands, North Queensland



## Complex Mesophyll Vine Forest (CMVF-1(b)).... Day 1

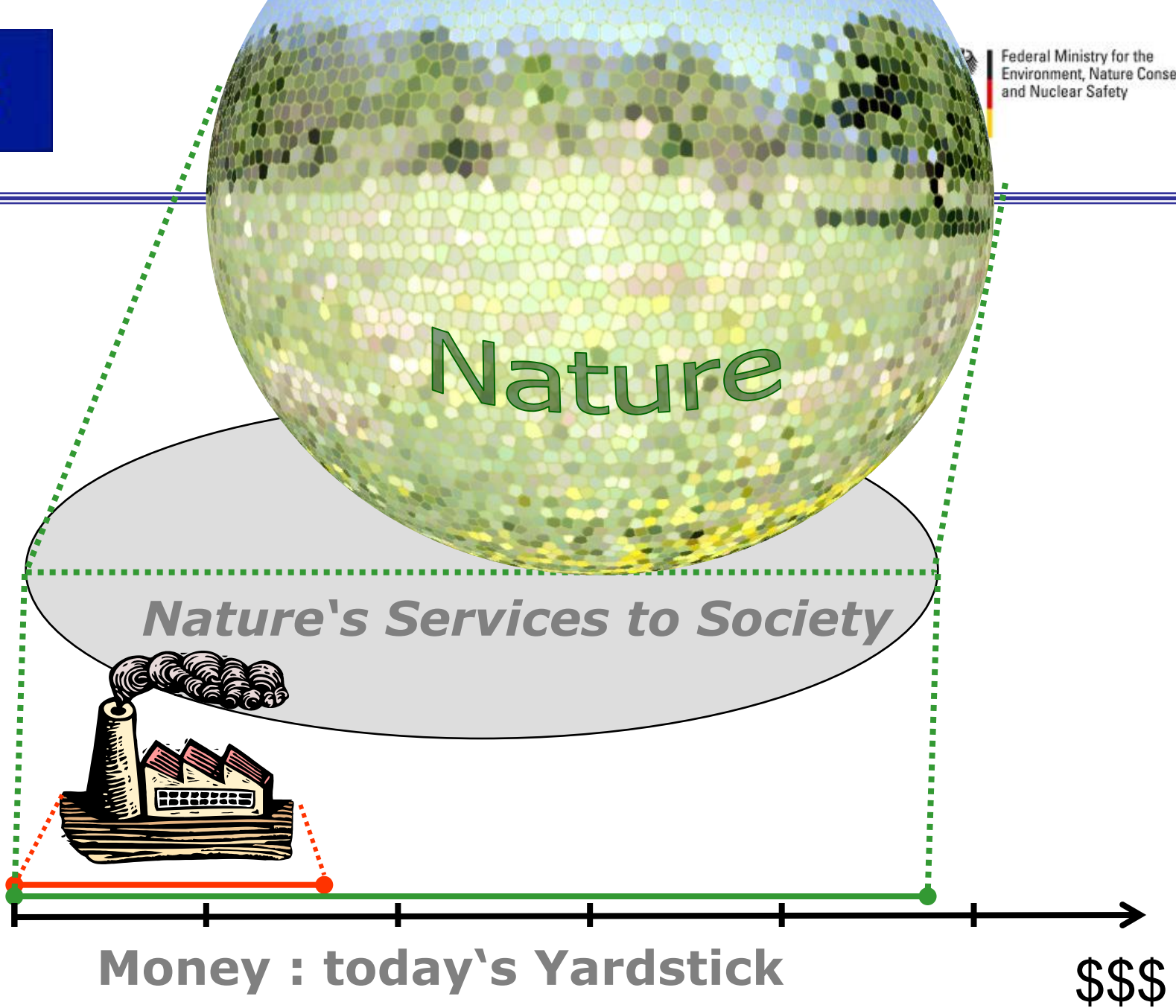


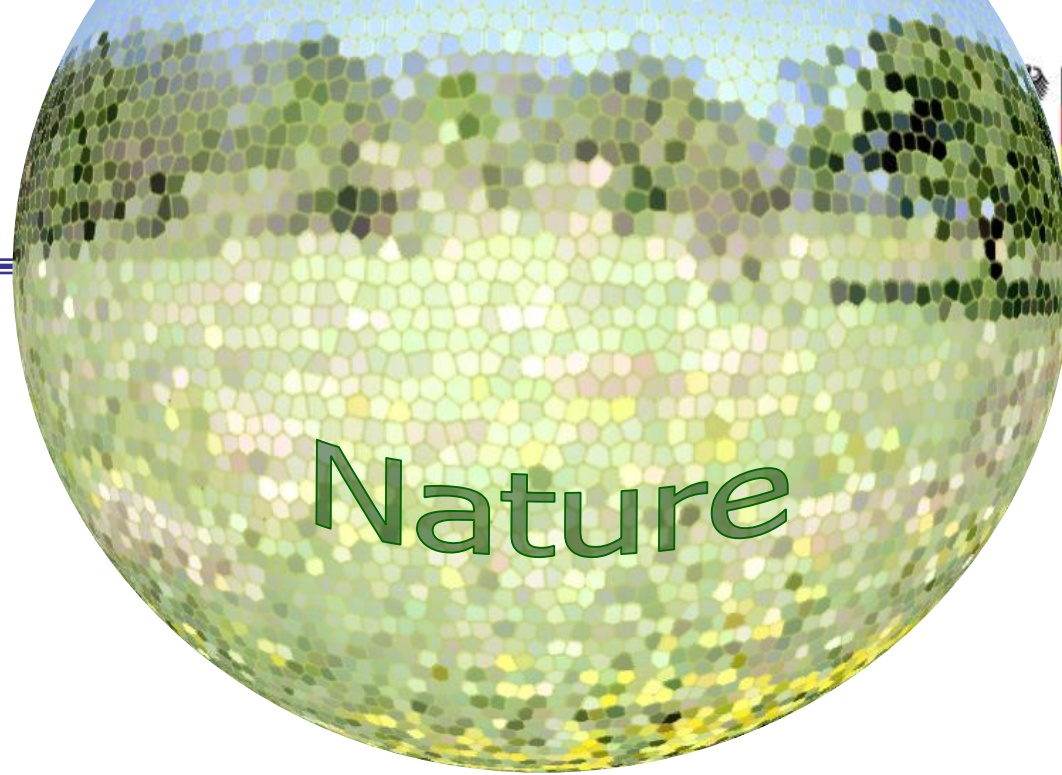
## TREAT Volunteers



Complex Mesophyll Vine Forest

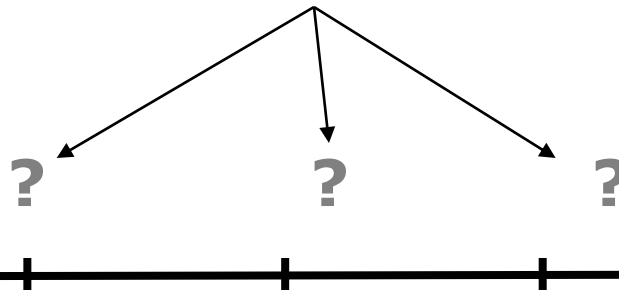
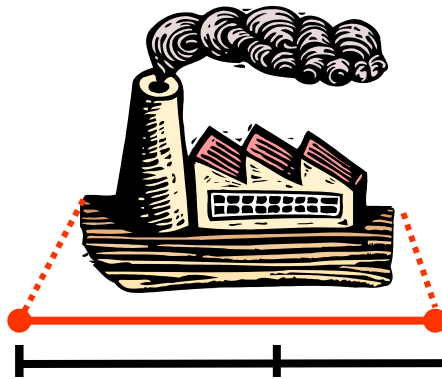






# Nature

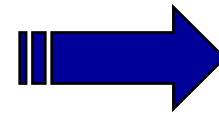
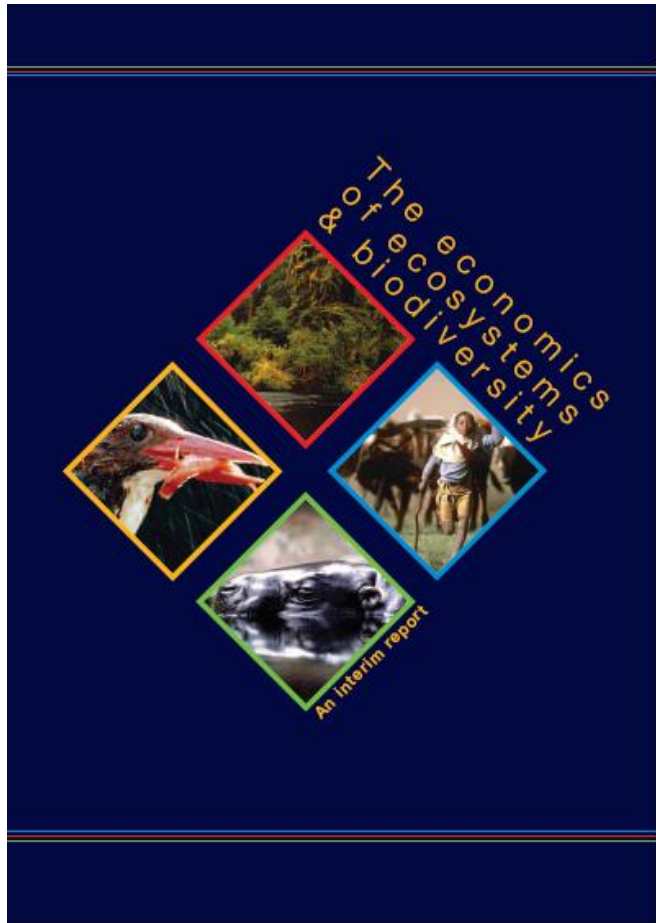
**No Value = No Counterweight ...**



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# TEEB – Interim Report COP-9, Bonn, May 2008



Economic Size &  
Welfare Impact of  
Losses



Deep Links with  
Poverty

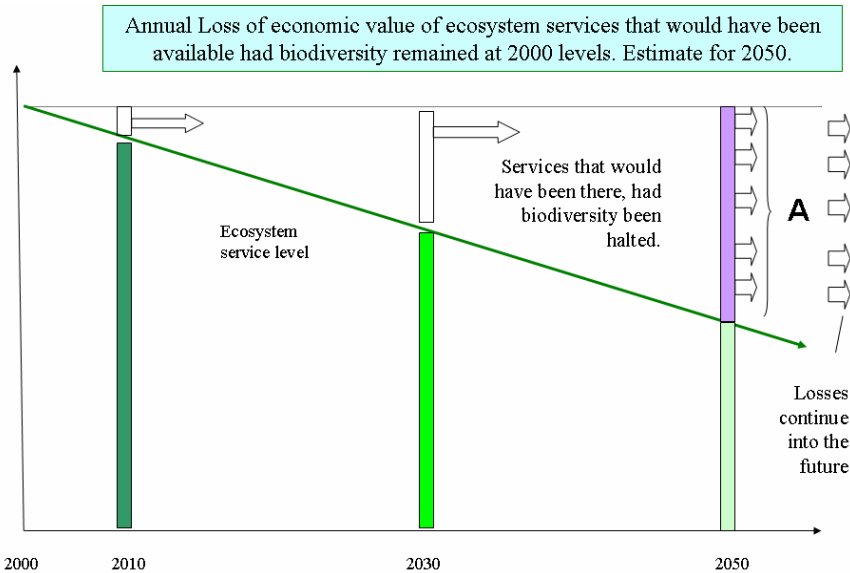


Ethics of  
Discounting



# Losses in 'Present Value' terms... (COPI study, May 2008, TEEB)

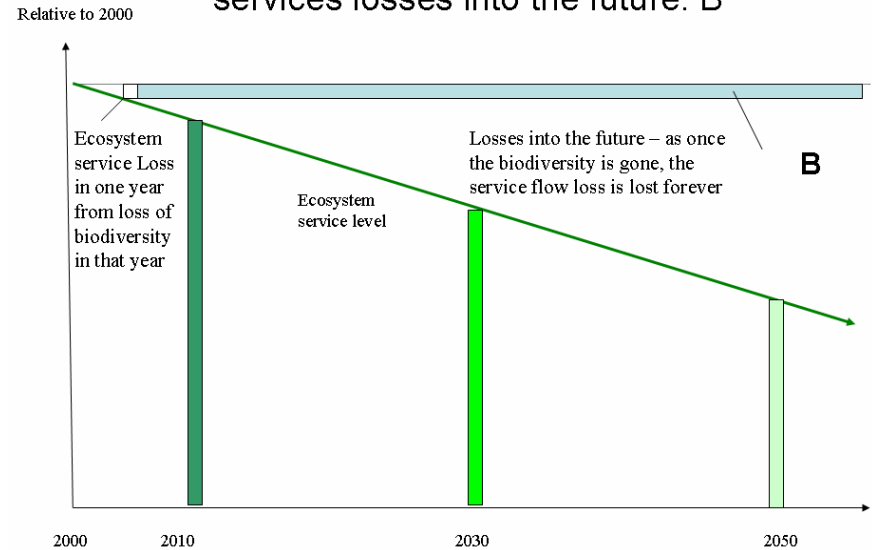
## A : 50-year impact of inaction or 'business as usual'



Welfare losses equivalent to 7 % of GDP, horizon 2050

## B : Natural Capital Loss every year

Valuation and Ecosystem service losses  
A year's biodiversity loss leads to ecosystem services losses into the future: B



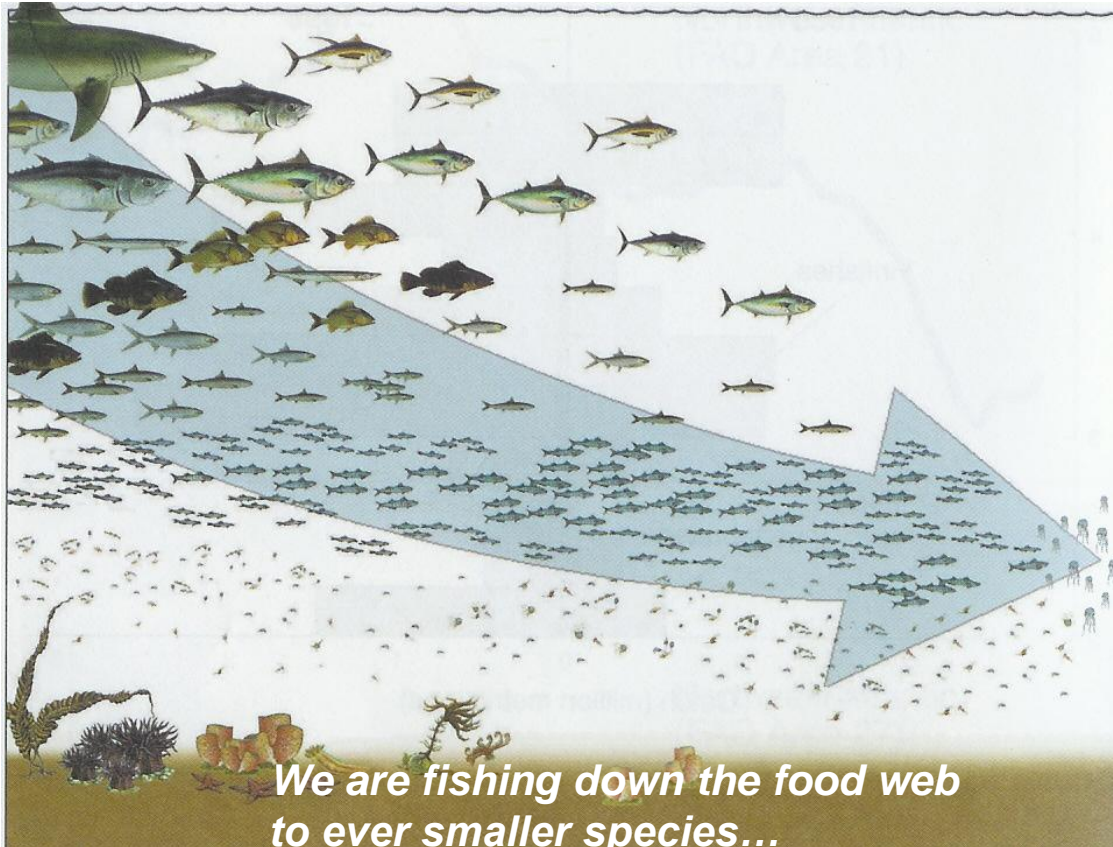
Natural Capital Lost : Annually  
EUR  $1.35 \times 10^{12}$  to  $3.10 \times 10^{12}$

(@ 4%  
Discount Rate)

(@ 1%  
Discount Rate)



# Global Loss of Fisheries... ...Human Welfare Impact



- Perverse Subsidies are a key driver of the loss of fisheries**
- Half of wild marine fisheries are fully exploited, with a further quarter already over-exploited**
- at risk : \$ 80-100 billion income from the sector***
- at risk : est. 27 million jobs***
- but most important of all.....***

***at risk : Health ... over a billion rely on fish as their main or sole source of animal protein, especially in developing countries.***



## Losses of Ecosystem Services seriously jeopardize Poverty Alleviation

*TEEB “Interim Report” spelt out the direct links between Biodiversity loss & Ecosystem degradation and the risks of failure on ALL EIGHT Millennium Development Goals*

<b>Ecosystem Service</b>	<b>Related MDG</b>	<b>Links with Target</b>	<b>Risks and Conflicts</b>	<b>Evaluation</b>

*This is not just about MDG 7 (Environment) !*



## Haiti Example : Ecosystem Losses and Links to MDG's 1, 4, 5, 8...

- Haiti was once fully forested; less than 3% cover remains today.
- Poorest country in the Western Hemisphere ; 65% of its people must survive on less than \$1 a day.
- From 1950-1990, the amount of *arable land* almost halved due to soil erosion.
  - Deforestation has diminished evaporation back to the atmosphere over Haiti; total rainfall in many locations has declined by as much as 40%, reducing stream flow and irrigation capacity.
  - Avezac Irrigation System only supports half of the 9,500 acres it was initially designed to cover.
- When it rains, hillsides no longer efficiently retain or filter water - even moderate rains cause devastating floods.
- Ground and stream waters are laden with sediment and pollution, which has degraded estuarine and coastal ecosystems.
- about 90% of Haitian children are chronically infected with intestinal parasites that they acquire from the water they drink.

MDG 1: Eradicate extreme poverty and hunger

MDG 5: Improve maternal health

MDG 4: Reduce child mortality



## “GDP of the Poor” is most seriously impacted by ecosystem losses...

- “India” Example (from GIST’s Green Accounting for Indian States Project)
- 540 Million people engaged in farming, animal husbandry, informal forestry, fisheries....
  
- ESS add “only 7.3%” to classical GDP

*or*

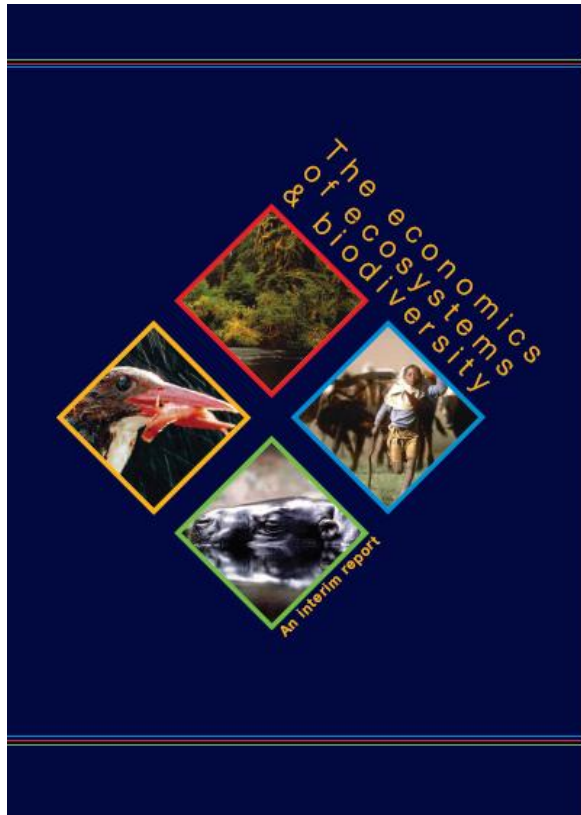
- ESS add 57 % to “GDP of the Poor”
  
- Replacement of those ESS is beyond the capacity of the poor : they would need to spend twice their incomes !





# TEEB – Interim Report COP-9, Bonn, May 2008

## *Key Messages from the Interim Report.....*



Economic Size &  
Welfare Impact of  
Losses



Strong Links with  
Poverty / MDG's /  
“GDP of the Poor”



Discount Rates are  
an *ethical* choice



# TEEB – Final Report Sep 2009, June 2010



Science & Economics  
Foundations, Policy  
Costs, & Costs of Inaction



Policy Evaluation  
for Policy-Makers



Decision Support  
for Administrators



Business Risks  
& Opportunities



Consumer  
Ownership



## **Valuation Framework ... more work on**

- Ecosystem dynamics
- Thresholds
- Resilience
- Urban biodiversity
- Agricultural biodiversity
- Discount rates as ethical choices

## **Methodology Compendium..... more work on**

- more ecological services / regulating services of forests (e.g. flood prevention, soil erosion prevention)
- some option values, (e.g. bio-prospecting)
- WTP survey instrument design
- thresholds, ecosystems close to thresholds, and how to factor this into valuation
- benefits of oceanic and coral reef biodiversity
- pollution / health benefits (of urban biodiversity)
- pollination / other benefits (of rural biodiversity)



# Coral Reef Biodiversity : Bio-prospecting values ?

## *Alzheimer's Disease*

*The substance this worm, *Paranemertes peregrina*, uses to paralyze its prey can also serve as a treatment of Alzheimer's disease* © Harbor Branch Oceanographic Institution at Florida Atlantic University



## *Cancer*

*This coral produces an anti-cancer drug currently under preclinical investigation* © Harbor Branch Oceanographic Institution at Florida Atlantic University



**Source** : Manfred Walser / Christian Neumann, June 2008, "The Value of our Oceans", WWF Germany



# Oceanic Capture of CO<sub>2</sub> : Carbon Storage values ?

## ***Phytoplankton – Primary production***

- Plants, including the phytoplankton of the sea, convert CO<sub>2</sub> to organic matter in a process called primary production. Ocean phytoplankton is responsible for about half the global biospheric net primary production.<sup>3</sup> All standing stock biomass of the world's oceans are temporary carbon sinks, which means they can temporarily remove carbon from the atmosphere. Part of this biomass is consumed by larger organisms, part is remineralised by microorganisms, while the remainder sinks down to the deep sea sediments and is stored there.

## ***Biogenic calcification***

- The second mechanism is biogenic calcification. The formation of heavy calcareous skeletons is a widespread phenomenon in various groups of marine planktonic organisms. Their production and – because they are weightier than water – their subsequent sinking generates a continuous rain of calcium carbonate (one component of which is CO<sub>2</sub>) to the deep ocean and sediments. Recent models assume a rate of 0.121 Gt per year for the deep sea carbonate sink. A similarly high rate is predicted for CO<sub>2</sub> sequestration in shallow waters, mainly in the form of carbonate reefs and banks.<sup>4</sup>

**Source** : Manfred Walser / Christian Neumann, June 2008, “The Value of our Oceans”, WWF Germany



# New Markets created to reward biodiversity & ecosystem conservation...

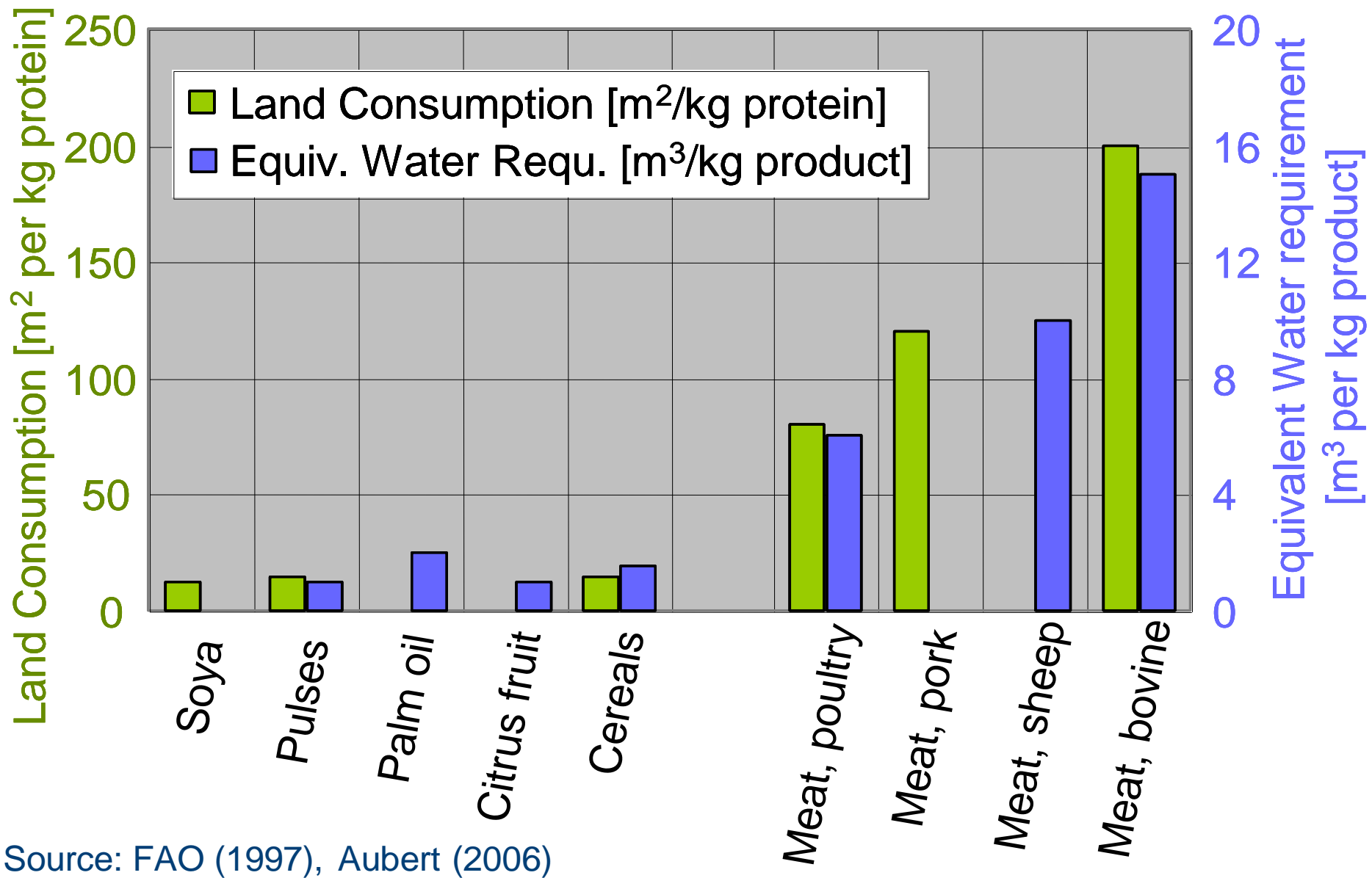
.... but to be really successful, these markets need appropriate institutional infrastructure, incentives, financing and governance: in short, investment

**Wetland Banking** : USA - companies or individuals buy environmental credits from Wetland Mitigation Banks to pay for degradation of wetland ecosystems due to agriculture or development. Over 400 banks established, majority by private entities. Market over \$ 3 billion, last year it transacted \$ 750 million

**Endangered Species Credits** : USA - A biodiversity cap-and-trade system for 'endangered species credits', which can be used to offset a company's negative impacts on threatened species and habitats.

**Bio-Banking** : NSW, Australia, 2006, to create incentives for protecting private land with high ecological value. Developers buy "biodiversity credits" to offset negative impacts on biodiversity. These credits can be created by enhancing or permanently protecting land.

Business themes : how can businesses disclose their 'Biodiveristy' externalities ? mitigate or offset them ? profit from evolving biodiversity markets and a 'green economy' ?



Consumer Theme : Ecological Footprints - Land and Water use by various foods



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# Thank You !