



Institute for European  
Environmental Policy

## Scenarios and models for exploring future trends biodiversity and ecosystem services changes

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[www.ieep.eu](http://www.ieep.eu)



- **TEEB**
- **TEEB Phase 1: Approach/modelling used**
- **TEEB Phase 2: Modelling & Scenario needs**

# Objectives



Potsdam 2007: meeting of the environment ministers of the G8 countries and the five major newly industrialising countries

## “Potsdam Initiative – Biological Diversity 2010”

### **1) The economic significance of the global loss of biological diversity**

*In a global study we will initiate the process of analysing*

*the global economic **benefit of biological diversity,***

*the **costs of the loss of biodiversity** and*

***the failure to take protective measures versus the costs of effective conservation.***

# TEEB's Goals

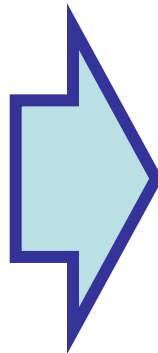
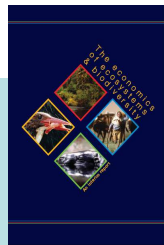


- **Assess and communicate the urgency of action to address ecosystems and biodiversity loss** – by presenting the economic, societal and human value of the benefits of ecosystems and biodiversity, and the scale of the benefits lost,
- Show how we (can) **take into account the value of ecosystems and biodiversity in our decisions and choices**,
- Address the **needs of policy-makers, local administrators, business and citizens** (the “end-users”) – interests, opportunities, & responsibilities.



## Phase 1 (2007-2008):

- **Preliminary scoping work,**
- **Some first analysis,**
- Clarification as to how to address the wider goals,
- Preliminary identification of experts and organisations to contribute



## Phase 2 (2008-2010):

- **Additional analysis within wider Valuation framework**
- **Broaden the scope of studies (methods; ecosystem services (ESS) and biomes)**
- Focus on End-user products
- Stronger Involvement from different experts & organisations

# COPI: The study that provided key numbers to TEEB Phase 1



TEEB Phase 1 report includes some high level aggregate “value of loss of biodiversity” values.

These came from the COPI Study.

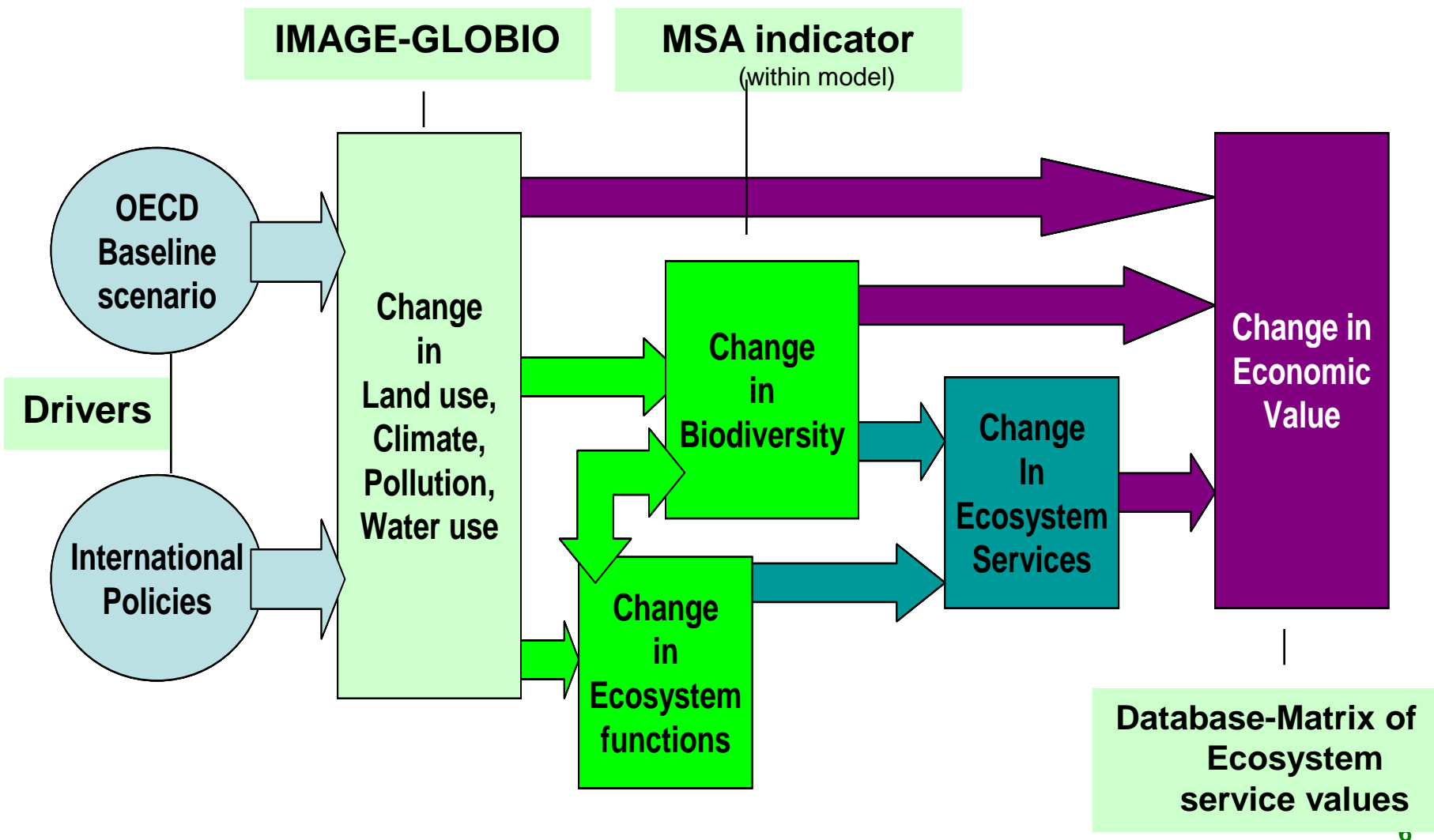
A quick introduction to the approach, numbers and limitations

## The Cost of Policy Inaction: *Not Halting Biodiversity Loss*

L. Braat & P. ten Brink (eds.) with J. Bakkes, K. Bolt, I. Braeuer, B. ten Brink, A. Chiabai, H. Ding, H. Gerdes, M. Jeuken, M. Kettunen, U. Kirchholtes, C. Klok, A. Markandya, P. Nunes, M. van Oorschot, N. Peralta-Bezerra, M. Rayment, C. Travisi, M. Walpole.  
Wageningen / Brussels, May 2008



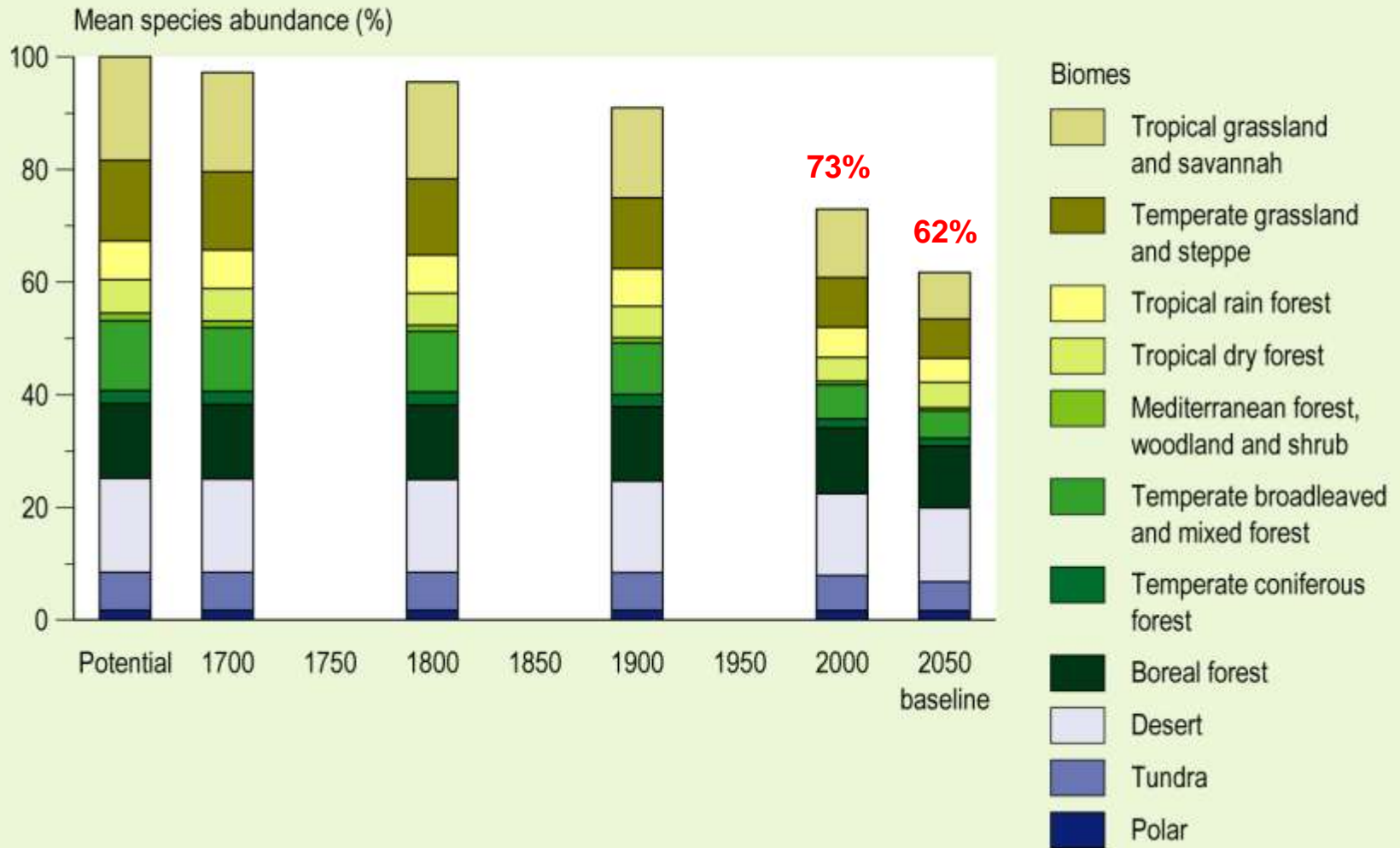
# Mapping changes : from Biodiversity & Ecosystems to Economic Values



# Biodiversity loss - 1700 to 2050



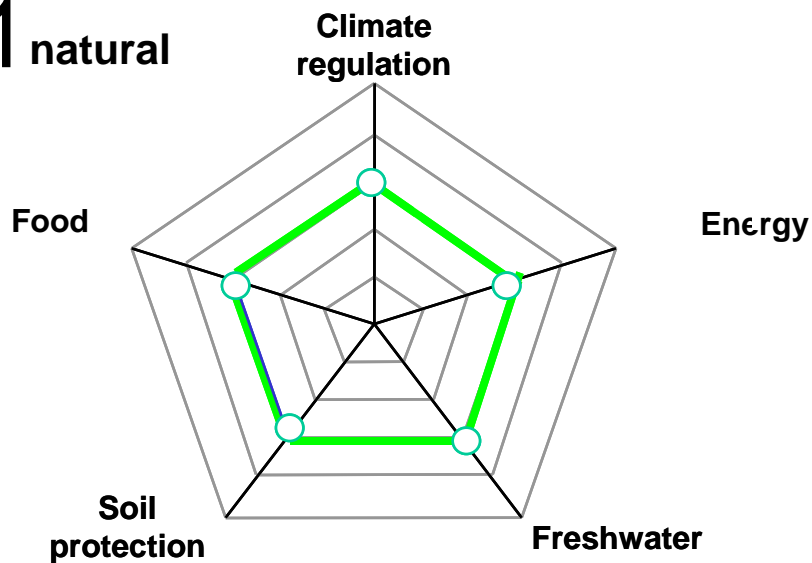
## Historic and future development of global biodiversity



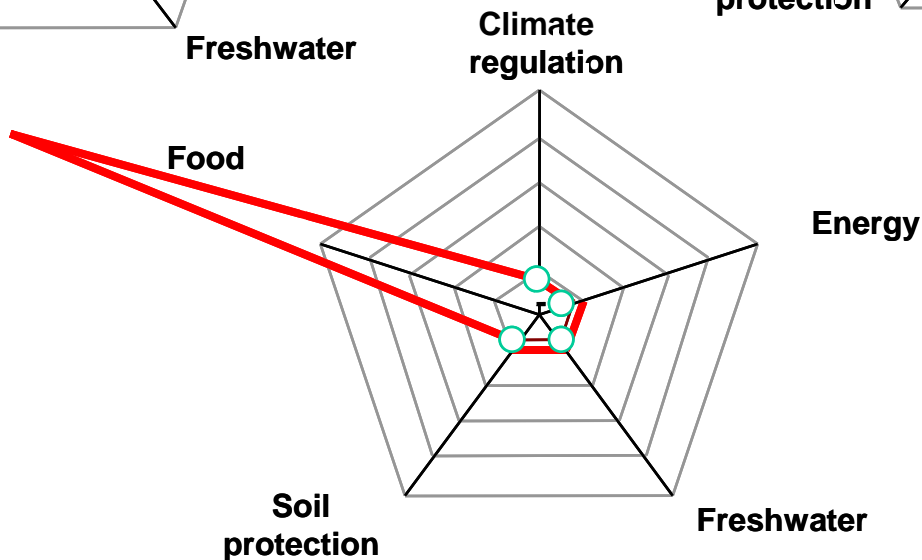
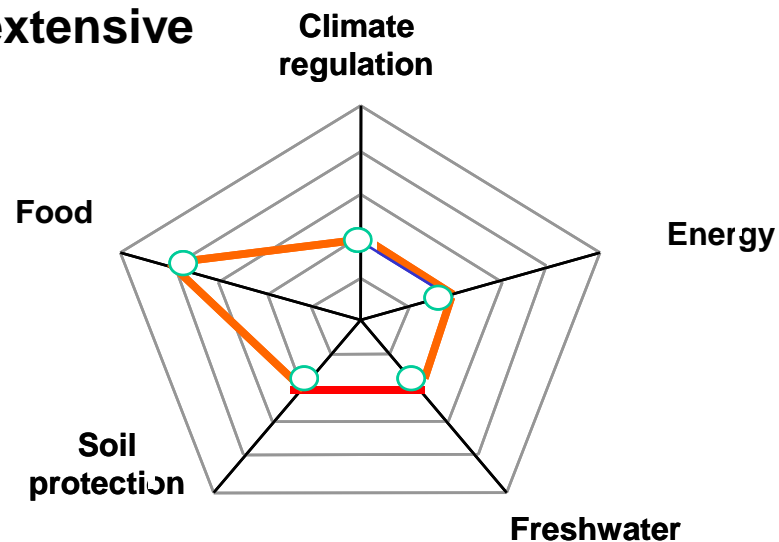
# Land-uses and trade offs for ecosystem services



**1 natural**



**2 extensive**



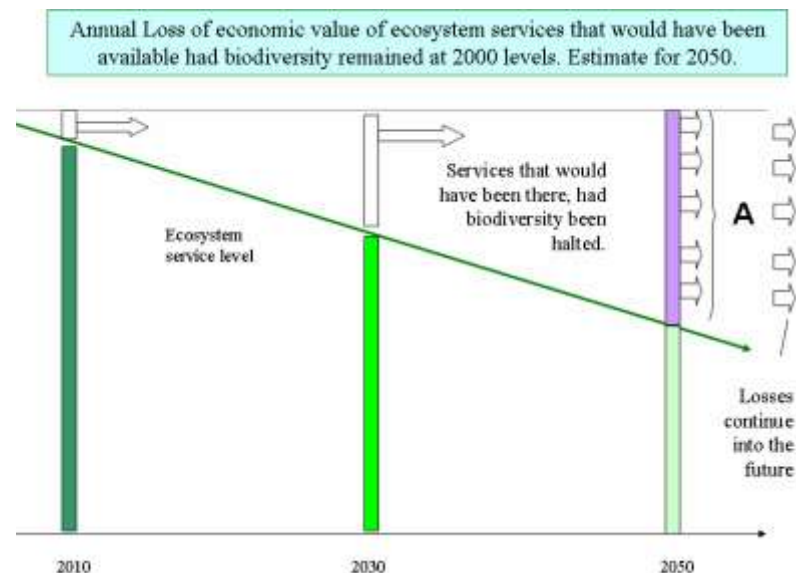
**3 intensive**



## The cost of **not** protecting nature – COPI Study

- **2000 to 2010** : welfare losses from loss of ecosystem services from loss of nature estimated to amount to around **50 billion Euros extra loss per year, every year**.
- By **2010** the welfare losses amount to **545 billion EUR in 2010**.
- The value of the amount lost every year rises as population and economies grow
- The loss of welfare in 2050 from the **cumulative loss** of ecosystem services between now and then amounts to **14 trillion (10<sup>12</sup>) Euros** under the *fuller estimation* scenario
- This is equivalent in scale to **7% of projected global GDP for 2050** – across land-based biomes

• Source: P ten Brink in L. Braat & P. ten Brink (eds.) 2008 COPI Study



# TEEB Phase 1 numbers in context



**Key Numbers in TEEB based on the COPI Study + cases. COPI, however,**

- **Was only land-based; it did not include marine, wetlands, coral reefs etc** (though some working insights were included)
- **It only covered some of the ecosystem services**
- **It build on land use change and quality change, with the latter linked to MSA indicator (existing in the model)** (note the choice was dictated by the existence of the model and should not be taken as a COPI team or TEEB team preference for MSA over other indicators. The team are aware of the limitations of MSA.)
- **It only looked at costs of inaction versus a reference point (2000) and not wrt to a baseline.**
- **It did not look at range of future scenarios and do scenario analysis or major sensitivities**
- **It assume a linear relation of ecosystem services with biodiversity**
- **It did not take into account feedback loops (Eg loss of services, lead to loss of economic growth)**
- **It did not look at the costs of action.**

**In short, it provided a first estimate of the cost of policy inaction, that covers only part of the picture. While fine for the interim report, the phase 2 of the TEEB will need to “go up a level”.**



Science & Economics  
Foundations, Policy  
Costs & Costs of Inaction

D0



Policy opportunities for  
National & International  
Policy-Makers

D1



Decision Support  
for Local Administrators

D2



Business Risks  
& Opportunities

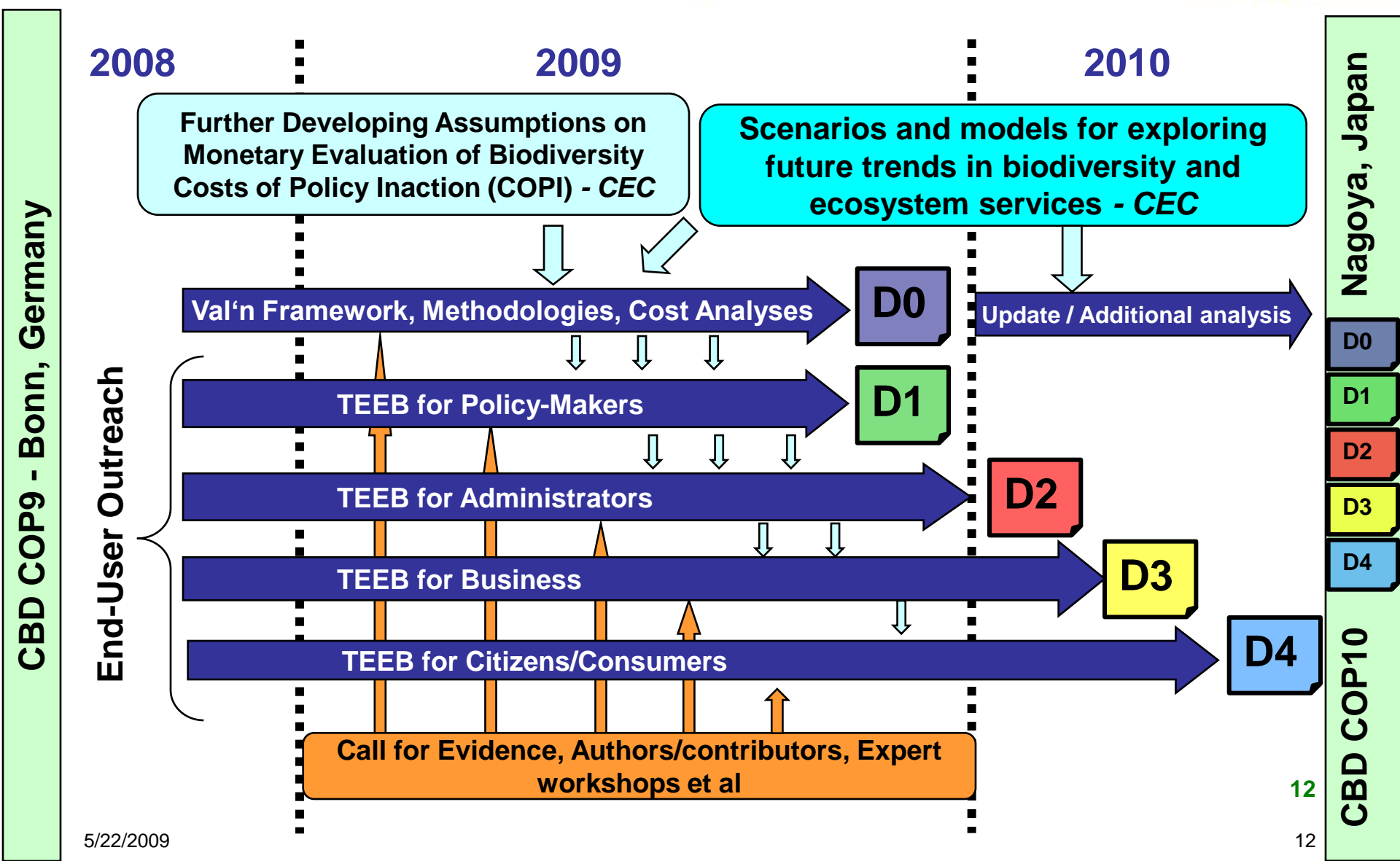
D3



Citizen / Consumer  
Ownership

D4

# Timeline of TEEB Phase 2 and links to: COPI and Scenarios & Models projects





- **Further analysis for September 2009**
  - **Aggregate values:** What existing results can we use from modelling and scenarios work that already exists. + tbc: some very limited COPI updates (eg scenarios runs)
  - **Synthesis range of values: “Matrix”** of ecosystem service values for different regions, economic prosperity and population intensity
  - **Case examples**
- **Analysis to October 2010 (Nagoya)**
  - Launch model/scenarios runs that help develop a fuller picture: different ecosystems/biomes; range of scenario runs, ideally more robust re ecosystem indicators, etc
- **Analysis to 2015 (MDGs)**
- **Analysis in the long term**

# Today: Scenarios and models for exploring future trends of biodiversity and ecosystem services changes



- What models are out there that might be useful for TEEB / what questions do they (help) answer?
- What type of answers can they give (physical/monetary)?
- What can they cover?
- What are their strengths and weaknesses (wrt TEEB “needs”)?
- What would be needed to run them (data, time, costs)?
- What complementary models/analysis needed to get global aggregate values?
- Which should we recommend be used by / for TEEB?
- Can we develop a mini-ToR to recommend – eg what, when, what for, and how much?



## Scenarios and Models Recommendations



European  
Commission



- TEEB: Pavan Sukhdev (Study leader)
- Pushpam Kumar (TEEB Economics and Science Foundation D0)



## Afternoon Session

### How to use the quantitative tools for policy developments within TEEB

#### Expert Presentations

**Rob Alkemade** Netherlands Environmental Assessment Agency (PBL)

**Heather Tallis** Stanford University

**Villy Christensen** University of British Columbia

**Henrique Miguel Pereira** Lisbon University

**Joachim Spangenberg** Sustainable Europe Research Institute (SERI)

Discussions

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Commission



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# Questions for discussions



- **What do you think can and should be done - modelling and scenarios for TEEB?**
- **What models? What improvement to existing models?**
- **What scenarios/sensitivities (covering what issues?)**
- **What biomes/ecosystems/geographic scales?**
- **What is feasible in the timescale?**
- **What costs/input would be required?**
- **Ideal vision vs Pragmatic reality – what can be done for Nagoya and what to 2015 (MDGs) and what beyond?**



# Institute for European Environmental Policy

**Thank you**

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