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The Economics of Ecosystems & Biodiversity

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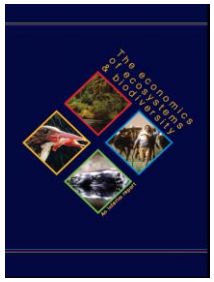
UNEP
Federal Ministry for the Environment, Nature Conservation and Nuclear Safety
defra
UKaid from the Department for International Development
NORWEGIAN MINISTRY OF FOREIGN AFFAIRS
Rijksoverheid
Sida

TEEB's genesis …

G8 2007
Environment Ministers Meeting
Potsdam, 15-17 March 2007

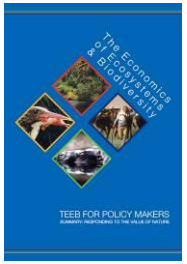
"**Potsdam Initiative – Biological Diversity 2010**"

……the economic significance of the global loss of biological diversity….



TEEB Interim Report
CBD COP-9, Bonn, May 2008

TEEB Climate Issues Update
Strömstad September 2009.



TEEB for Policy Makers
Brussels 13 Nov. 2009

What is TEEB?

- **D0** — Science & Economics Foundations, Policy Costs, & Costs of Inaction
- **D1** — Policy Evaluation for National Policy-Makers
- **D2** — Evaluation & Decision Support for Administrators
- **D3** — Business Risks & Opportunities
- **D4** — Citizen & Consumer Ownership (“teeb4me”)

TEEB's mission is to make Nature economically visible

TEEB Advisory Board


Achim Steiner


Joan-Martinez Alier


Edward Barbier


Jacqueline McGlade


Giles Atkinson


Lord Stern


Jochen Flasbarth


Julia Marton-Lefevre


Peter H. May


Karl-Goran Maler


Herman Mulder

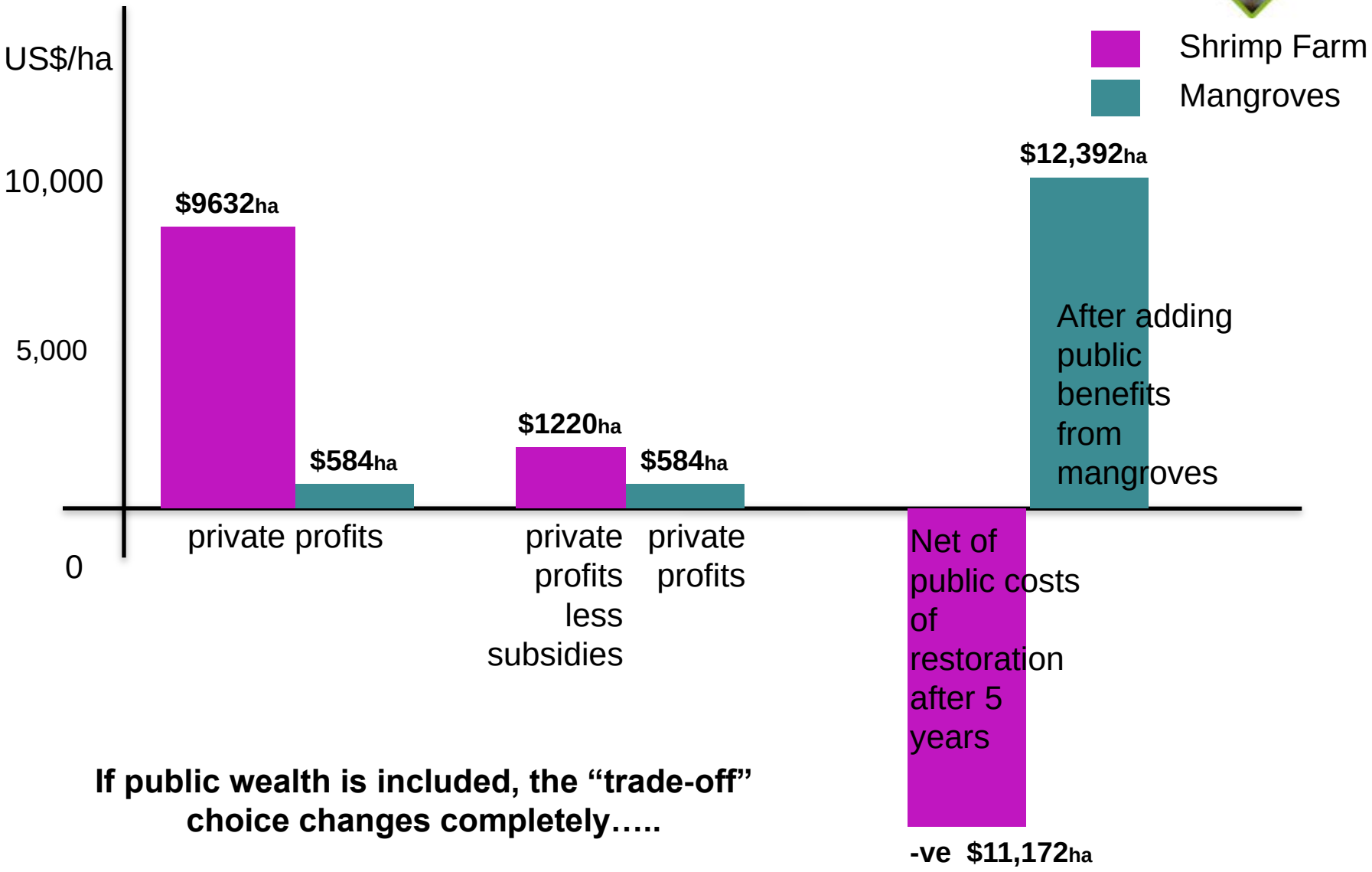

Walter Reid


Ahmed Djoghlaf


Yolanda Kakabadse


Ladislav Miko

"Private Profits, Public Losses"



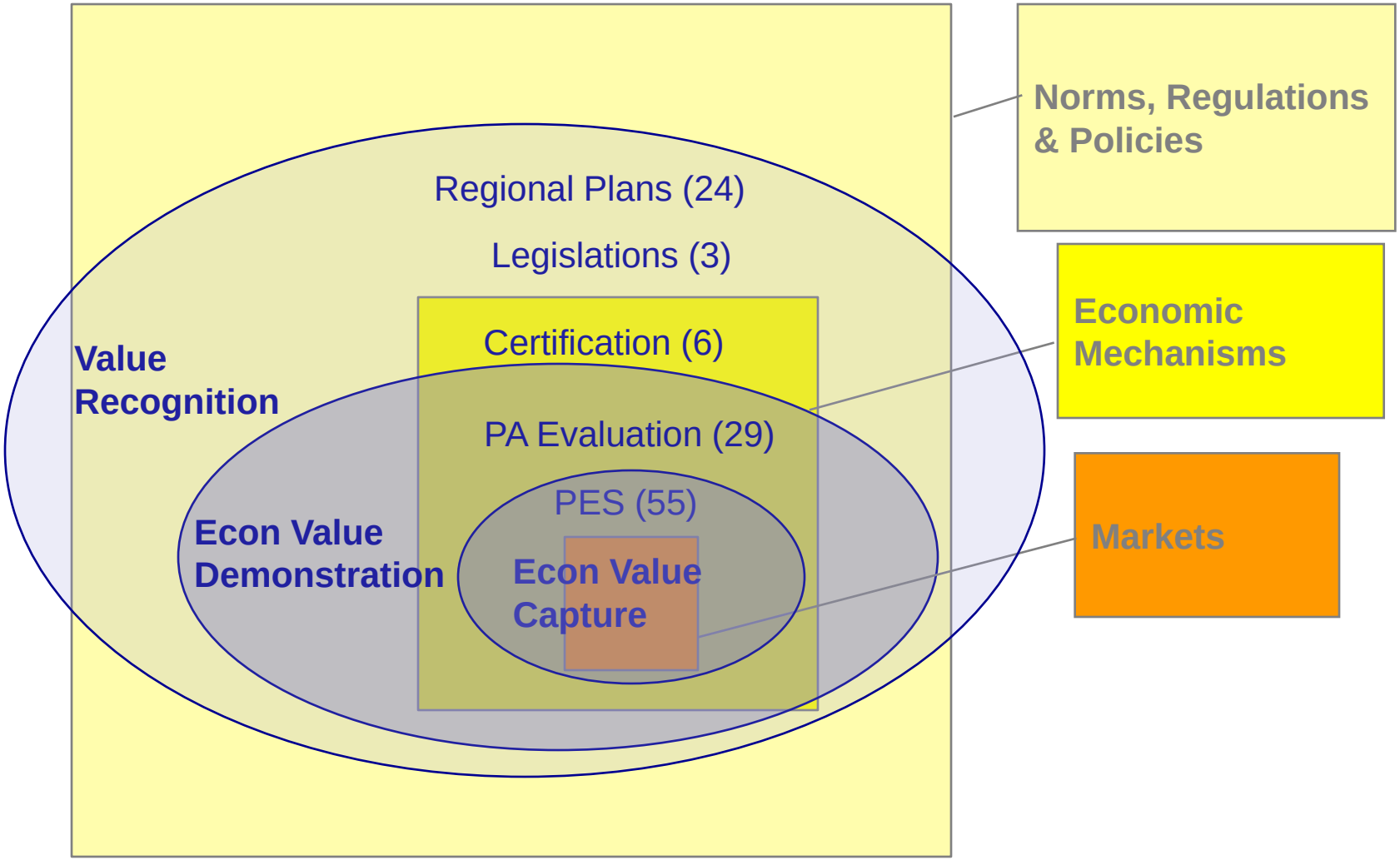
If public wealth is included, the "trade-off" choice changes completely…..

Source: Barbier 2007

Why is it TEEB important?

- Ecosystem Services form 45%-90% of the "GDP of the Poor" in rural and forested lands,
- But we are losing land ecosystem services valued at $2tr-$4.5tr in terms of human welfare benefits
- Phase 1 sized the Problem, Phase 2 describes Solutions
- Effective, Equitable and Economically justifiable solutions EXIST - we describe 120 examples !

Valuations, Operating Spaces, Responses…



Opportunities for mainstreaming

- Cancun UNFCCC COP
  - Climate change mitigation policy needs to reflect wider costs and benefits for biodiversity (Coral reef emergency / REDD).
  - Climate change adaptation finance needs to consider the compelling economics of using ecosystem restoration.
- Rio+20
  - Formally recognise the links between biodiversity, climate change, development, water and food security

Recommendation : Invest in ecological infrastructure

- Tropical forests store a fourth of all terrestrial carbon
  - 547 gigatonnes (Gt) out 2,052 Gt (Trumper et al. 2009)
- Tropical forest capture
  - up to 4.8 Gt CO_2 annually (Lewis & White 2009) (total emissions p.a. ~32Gt)
- Stopping deforestation holds an excellent cost-benefit ratio
  - Halving deforestation generates net benefits of about $ 3.7 trillion (NPV) including only the avoided damage costs of climate change (Eliasch Review 2008)

Recomm : Recognise the value of protected areas

• Global spending on PAs p.a.:	~ $6.5-10 billion
• Need for PAs (15% land, 30% sea) p.a.:	~ $45 billion
• Need for Natura2000 p.a.:	~ $6.5 billion
• Benefits from effective PAs p.a.:	~$4-5 trillion
• International NGO funding: p.a.	~ >$1 billion
• International gov funding (30-50% to PAs):	~$4-5 billion p.a.
• Market-based income to PAs	~ $1-2 billion p.a
• Percentage of total ODA:	~ 2.8%

(TEEB D1 ch8)

Investment in ecological infrastructure

Ecological infrastructure key for adaptation to climate change

- **Afforestation: carbon store+ reduced risk of soil erosion & landslides**
- **Wetlands and forests and reduced risk of flooding impacts**
- **Mangroves and coastal erosion and natural hazards**
- **Restore Forests, lakes and wetlands to address water scarcity**
- **Coral reefs as fish nurseries for fisheries productivity / food security**
- **PAs & connectivity to facilitate resilience of ecosystems and species**

From local to national to EU efforts

Global responsibility / contribution

Investments in Ecological Infrastructure for Climate adaptation

- **restoration can be cost effective way of providing a service：**

planting mangroves along coastline in Vietnam cost $1.1 million but saved $ 7.3 million annually in dyke maintenance (GRID-Arendal 2002; Reid and Huq 2005)

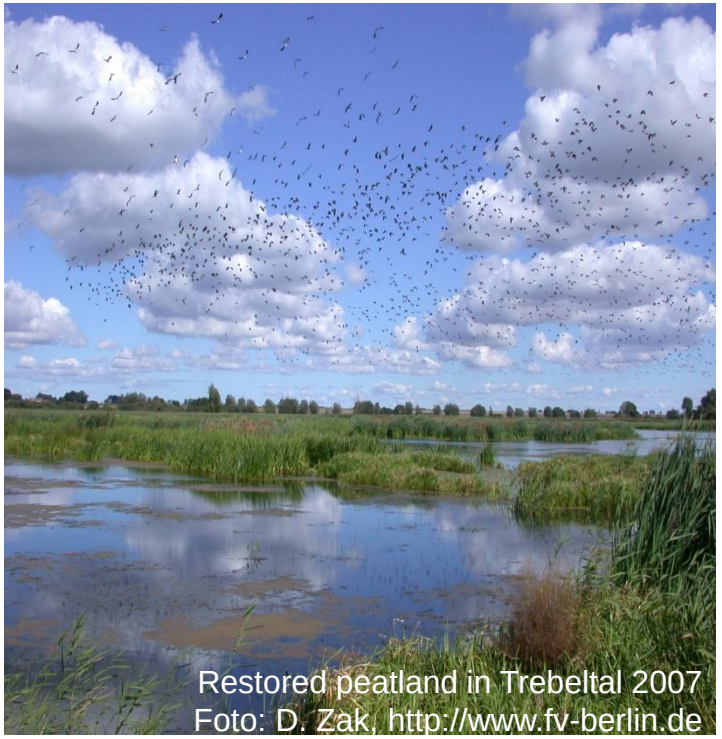
Example : Nature-based climate change mitigation, Germany

- drainage of 930,000 ha peatlands in Germany for agriculture cause emissions of 20 Mio. t of CO_2-eq. per year
- total damage of these emissions amounts to 1.4 billion €
- **peatland restoration**: low cost and biodiversity friendly mitigation option

Mecklenburg-Vorpommern:

- pilot project between 2000-2008
- restoration of 30,000 ha (10%)
- emission savings of up to 300,000 t CO2-eq.
- **avoidance cost of 8 to 12 € / t CO_2**
- **if alternative land use options are realized (extensive grazing, reed production or alder forest) costs decrease to 0 to 4 € / t CO_2**
- where Maize can be grown restoration can not compete

Source: Federal Environmental Agency 2007; MLUV MV 2009; Schäfer 2009



Restored peatland in Trebeltal 2007
Foto: D. Zak, http://www.fv-berlin.de

Natural resource management & spatial planning

- **Flooding of River Elbe, Germany (2002),** Damage over EUR 2 billion
- Assessment that flood damage (+ cost of dams) by far exceed costs of upstream flooding arrangements with land holders

→ **The value of upstream ecosystems in regulating floods was re-discovered**

→ **Local authorities start changing spatial planning & seeking arrangements upstream (but still have a lot to do)**

River Elbe flooding, Germany

Step 1: Specify and agree on the problem

- August 2002 heavy floods of the river Elbe, direct economic damage of over 9 billion €
- occasion to revise system of flood protection towards integrated flood risk management

© DPA

Step 2: Which ecosystem service are relevant

- flood protection
- habitat for a multitude of species
- nutrient retention

Step 3: Define information needs and select methods

- CBA of different alternatives (relocate dykes, establish polder)
- replacement costs for assessment of the nutrient and pollutant filters
- contingent valuation for the willingness to pay for flood control

Step 4: Conduct the assessment

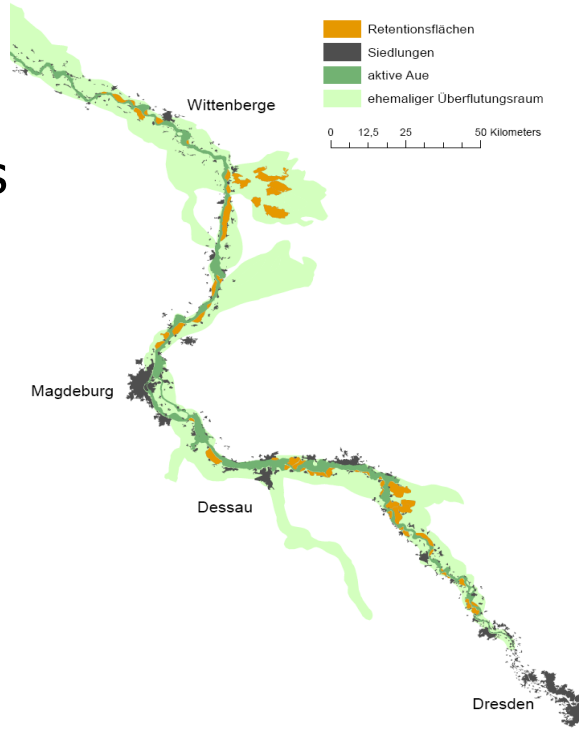
- relocation of the dykes creates a new flood retention area of just 35,000 ha of land
- establish polder includes the creation of a surface of 3,248 ha
- combination of both measures with dike relocations (3402 ha) and steered polders (4143 ha)

Step 5: Identify and appraise policy options

- all options have a positive benefit-cost-ratio if environmental benefits are included:
- BCR: - relocation of the dykes = 3.1
  - establish polders = 9.9
  - combination = 4.6

Step 6: Assess the distributional impacts of policy response

- Maps are being made that indicate economic losses and social impacts



Sources: Grossmann, M., Hartje, V., Meyerhoff, J. (2010) Ökonomische Bewertung naturverträglicher Hochwasservorsorge an der Elbe. Naturschutz und Biologische Vielfalt 89, Bundesamt für Naturschutz: Bonn.

Opportunity ahead: Research needs for Germany (and Europe)

- Give yourself an overview: What is the natural capital in Germany?

>> A TEEB for Germany and a national ecosystem assessment will help to show the way

- More than 1000 studies on valuation of ecosystem services across the world – but only few from central Europe

>> More studies and better methods needed

- Major instruments have been developed (e.g., habitat banking, ecological fiscal transfer)

>> develop them further and implement them

TEEB and economic development

- From Interim Report (2008), & Report for local and regional policy makers (2010) : biodiversity is acutely important for the worst off in society
  - Ecosystems contribution to the "GDP" of the poor - subsistence farmers, pastoralists, forest-dwellers…
  - Links to the MDGs : 1, 3, 4, 5 and 7.

Ecosystem Services and Poverty

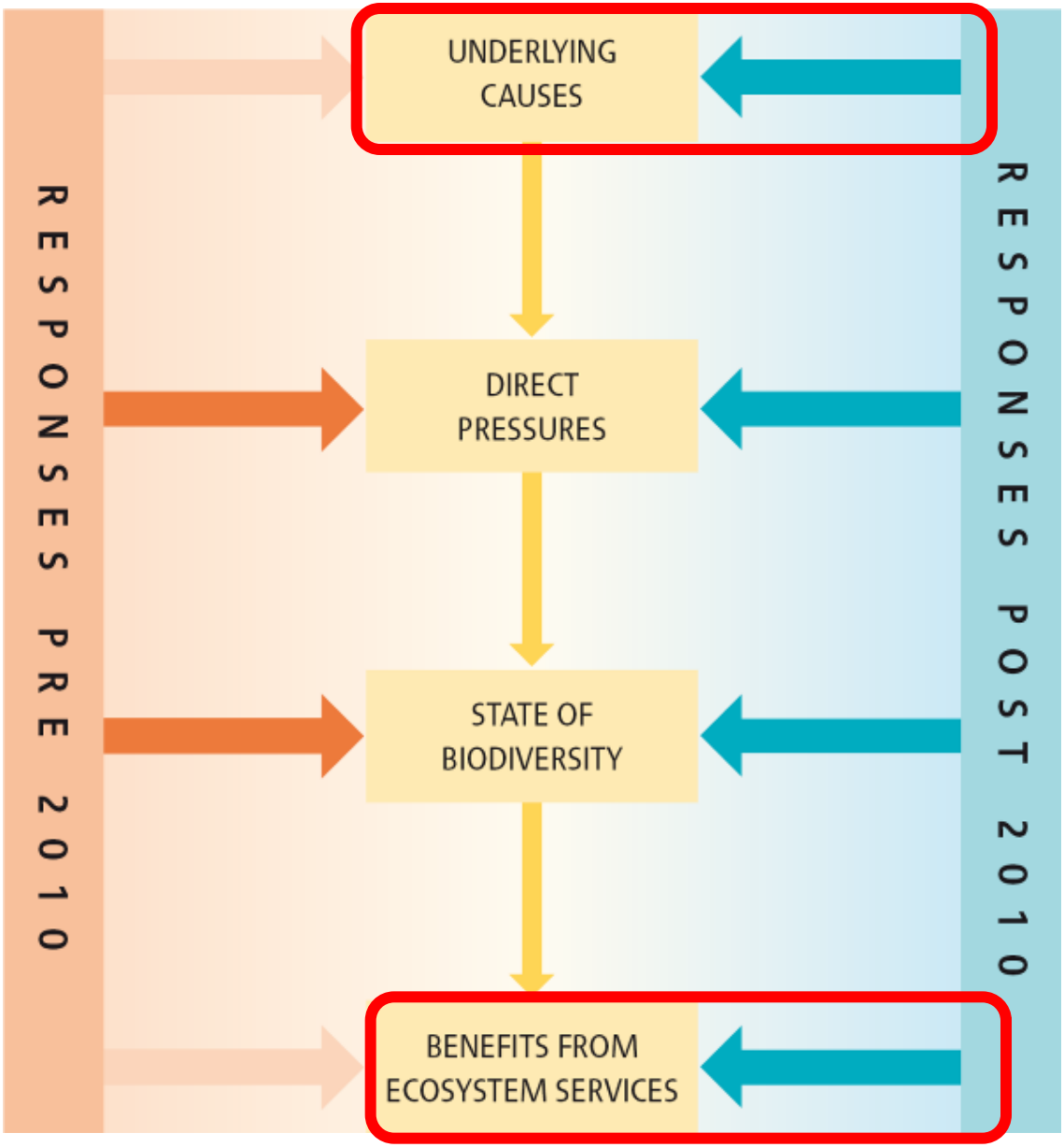
	Indonesia	India	Brazil
Ecosystem services dependency	99 million	352 million	20 million
Ecosystem services as a % of classical GDP	21% / 79%	16% / 84%	10% / 90%
Ecosystem services as a % of "GDP of the Poor"	25% / 75%	47% / 53%	11% / 89%

Ecosystem services

"GDP of the Poor" is most seriously impacted by ecosystem losses

Source: Gundimeda and Sukhdev, D1 TEEB

The Economics of Ecosystems & Biodiversity



Opportunity ahead: The need for a more ambitous CBD strategy and implementation

- foster mainstreaming in all policy areas
- address indirect drivers
- Develop and use innovative financial mechanisms
- ABS regime with fair rules

TEEB in CBD COP-10…

- ✓ **CBD Strategic Plan : 14 (e) and (f)**

  (UNEP/CBD/WG-RI/3/L.9)
- ✓ **SBSTTA 14 - XIV/4.. (… protected areas…) (c) 8.**
- ✓ **SBSTTA 14 - XIV/6… (.. Article 10 … (sustainable use of biodiversity…) 1.)**
- ✓ **SBSTTA 14 - XIV/15 (…. Incentive measures …)**

  (Article 11…(# 2, 4, 8 and 11))

TEEB After Nagoya ?
Four Assets Maintain & Develop….

TEEB Reports

need updating every 2-3 yrs

TEEB Approach

needs stewardship

TEEB Community

needs to stay alive

TEEB Brand

needs to be maintained

Post TEEB reports, Post Nagoya : Stakeholder demands….

End-Users	Demand Indications
Developing Countries…	ESS valuations, local capacity-building, & implementation support
EC, Brazil, India, Japan, Germany ….	Collaboration &TEEB Reps for National/ Regional TEEB studies
WB, ADB, UNEP, OECD, others …	SEEA "first-mover nations" (5-6 each developed and developing) for Ecosystem Accounting
ICAEW, IASB, GRI, WBCSD, Corporations….	Sector Impact Estimates (over 500 calculations TEEB D3 "China/Cons/Forests" model…) & Sector TEEB (eg : Agriculture ; Finance ; etc)
Citizens, NGOs…	TEEB Outreach, esp. through social media, traditional media, advertising sector, cpartners, CSR, NGOs …

- Shift from demand for *research* to demand for *advice* on implementation of 'TEEB' approach

"Demand for isolated theory is getting weaker, for applied economics is getting stronger…"

(John Gowdy, President, ISEE - at Bremen)

- Capacity Building for Developing Countries
- "Country" and "Regional" TEEB - for Policy- makers
- Green Accounting Project – WB and Others
- Estimating Business Sector Externalities
- Stewardship & Quality Assurance - TEEB Approach
- Prioritizing Ecology & Valuation Knowledge Gaps
- Communicating the Issue to Society at Large

Challenge : ECUADOR'S Conservation Proposal (Yasuni Preserved, ITT Oil stays in ground) ?

Yasuni National Park – "the most biodiverse wilderness on Earth"

Thank You !

www.teebweb.org

www.teeb4me.com

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