

The Economics of Ecosystems & Biodiversity



The Economics of ecosystems and biodiversity -

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**Sub-regional workshop for East, South and Southeast Asia on Updating
NBSAPs**

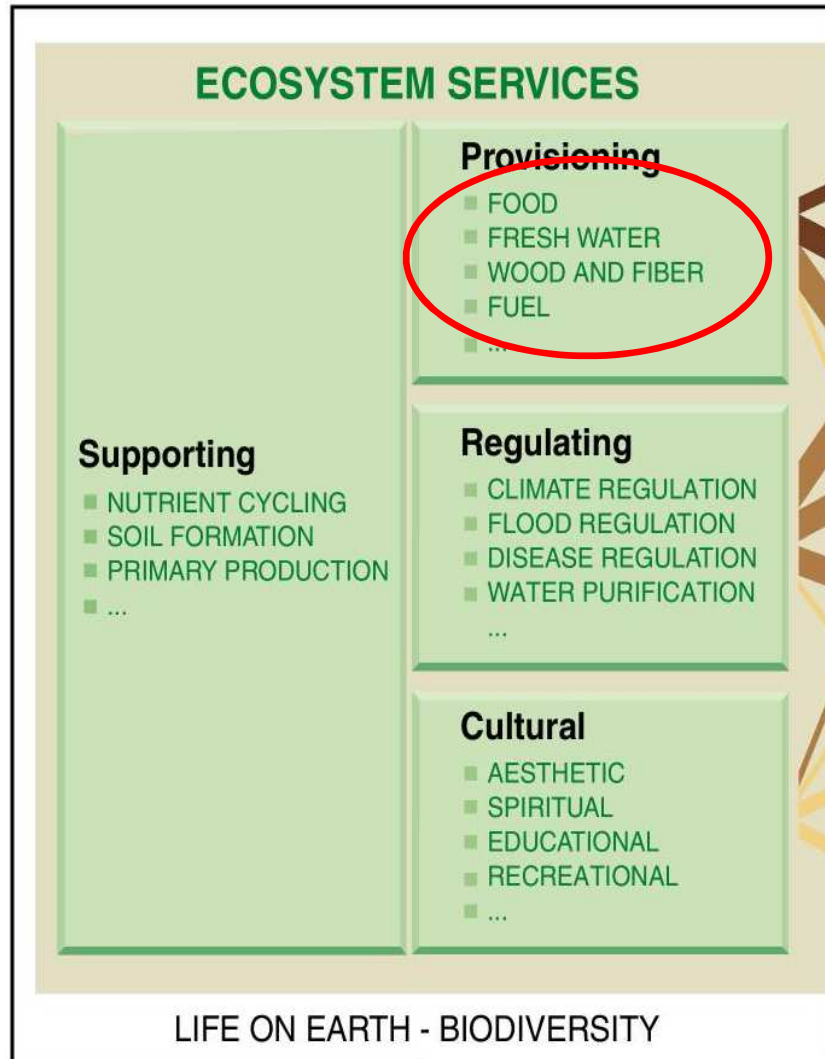
Xi'an, China, 15-16 May 2011



Rijksoverheid



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CONSTITUENTS OF WELL-BEING



Source: Millennium Ecosystem Assessment

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The situation:

Nature provides bundles of different benefits.

This natural capital is neglected ...

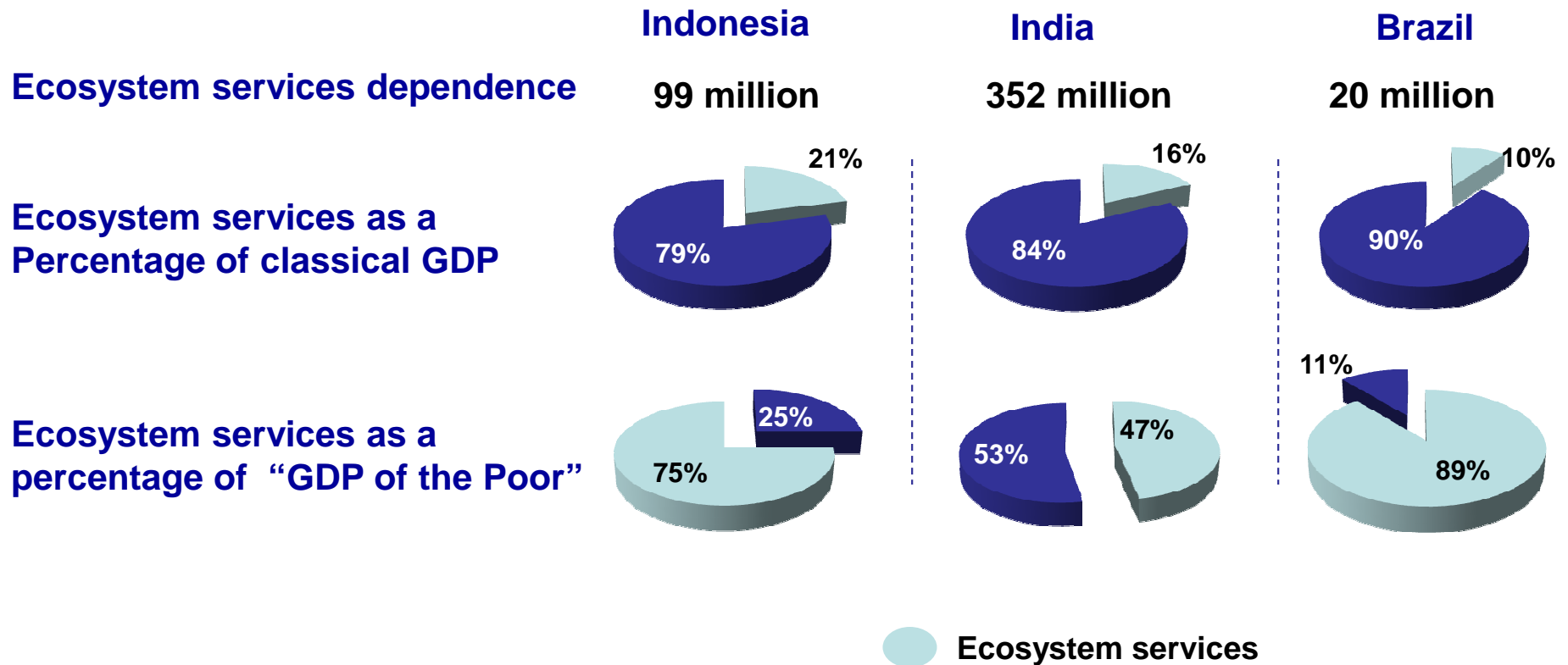


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... as a condition for local well-being:

“GDP of the Poor” is the most seriously hit by ecosystem losses



Source: Gundimeda and Sukhdev, TEEB for National Policy

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... as an asset for local development:

Enhancing nature's benefits through a focus on ecosystem services: silvo-pastoral management in Colombia.



(picture: CIPAV)

The problem

Pasture degradation resulting in income loss, further expansion of pasture area.

Focus on Ecosystem services

How to tackle poor pasture practices and with it soil erosion, increase of water runoff and biodiversity loss?

Policy response

Silvo-pastoral management on 3.500ha: planting improved grasses, fodder shrubs and trees. GEF-funded payment for biodiversity and carbon fixation (PES) to cover initial investment costs.

Results:

1. Enhanced local benefits: nutrient recycling, fruit, fodder, timber, water flow regulation, protection against landslides. (Farmers income increased up to US\$1157/ha)
2. After the project, farmers still keep the silvopastoral systems without the PES, due to its multiple benefits.

Source:
TEEBcase Silvopastoral Project



The situation:

We cannot risk taking nature for granted

- **poor use leads to development opportunities lost**
 - Wetland protection in Hail Hoar wetland increased income by over 80% and local consumption of products went up by 45% in Bangladesh
 - Kala Oya water tank system, Sri Lanka (tank benefits 3000 US\$/ha/yr and rice < 200 US \$)
- **overuse leads to vicious circle of (poverty–degradation)**
- **collapse can cause tremendous irreversible damage**





Why are benefits not explicitly recognized?

- Development strategies focus on economic growth
- Services that nature provides are often not visible
- Competing demands on nature.
- Time lags.
- Poor understanding of natural cause and effect.
- Public versus private benefits.
- Fragmented decision making



TEEB's Goals

1. Demonstrate the **value to the economy, to society/individuals and wider environment** – what we have & what we risk losing.
2. Underline the **urgency of action, benefits of action** (opportunities)
3. Show how we (can) **take into account the value of ecosystems and biodiversity in our decisions and choices,**
4. **Identify / support solutions**
 - **New instruments,**
 - **Support wider use of good existing tools (eg in other countries),**
 - **Help make existing tools realise their potential;**
 - **Help provide information to reform “bad ones”**
5. Address the needs of **policy-makers, local administrators, business and citizens (the “end-users”)**

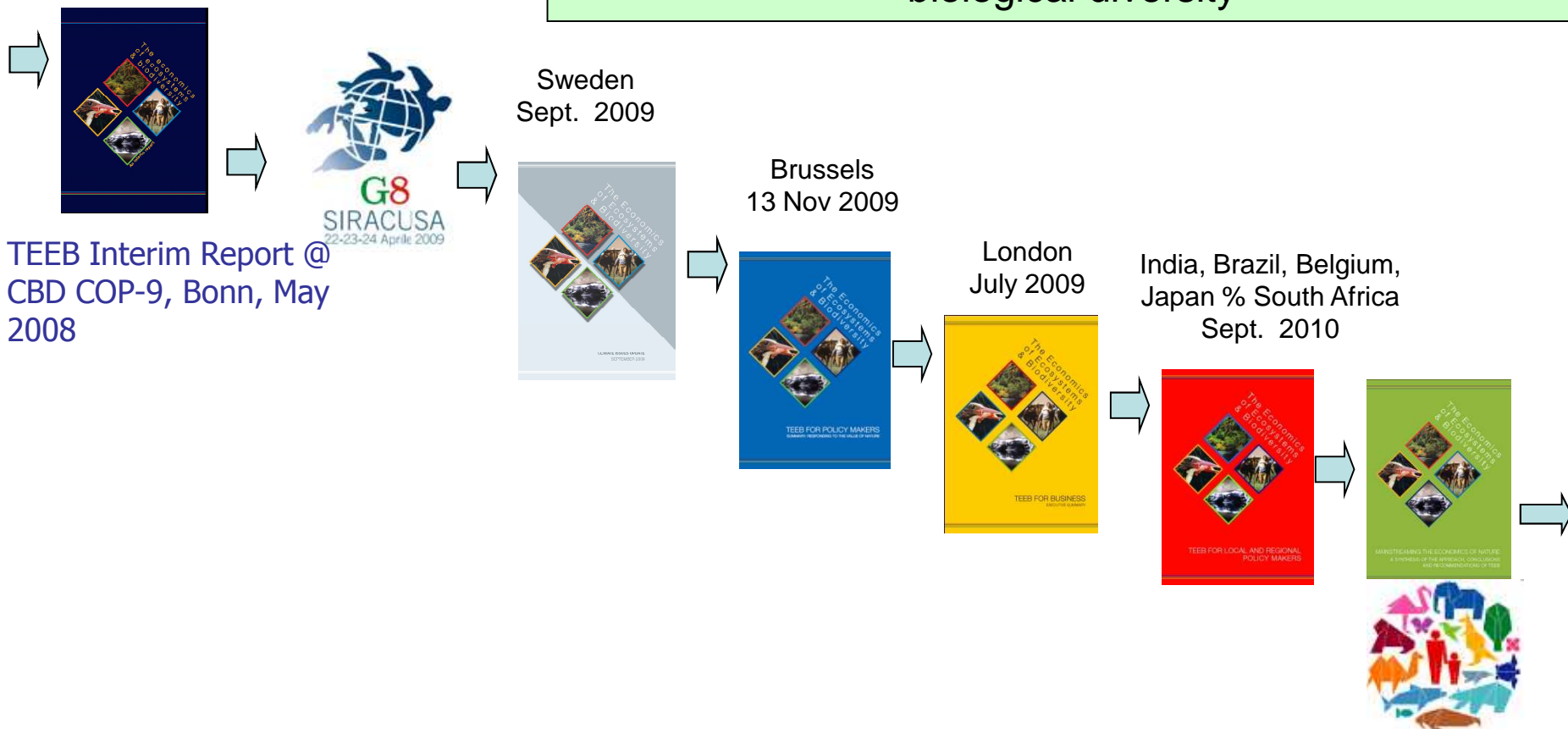
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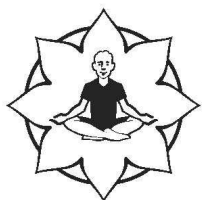


TEEB's Genesis and progress

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

“Potsdam Initiative – Biological Diversity 2010”
1) The economic significance of the global loss of biological diversity





TEEB's approach to "valuation"



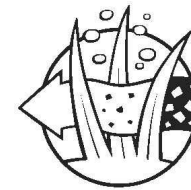
1. Recognizing value: a feature of all human societies and communities



2. Demonstrating value: in economic terms, to support decision making

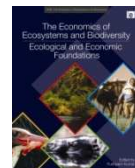
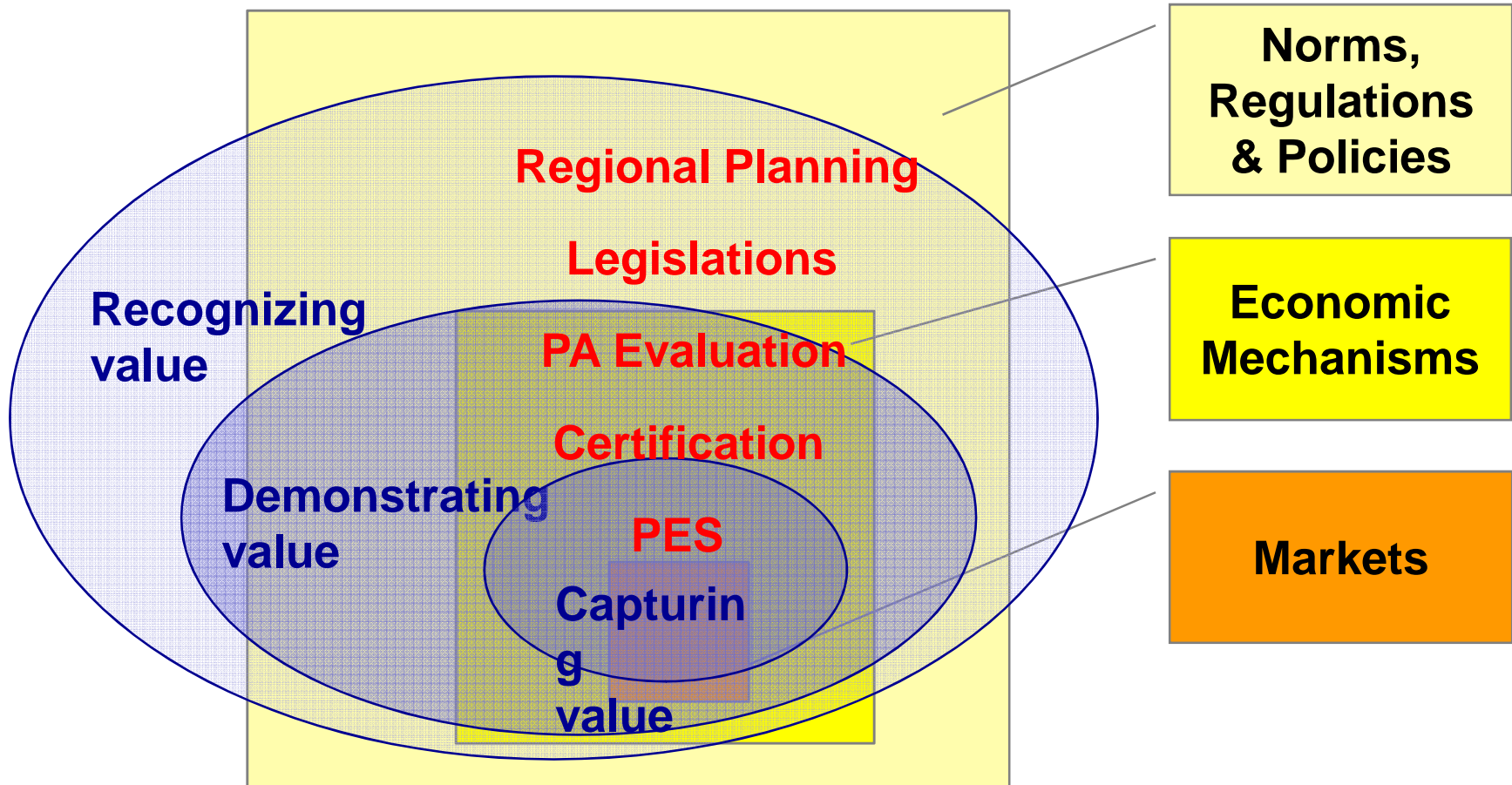


3. Capturing value: introduce mechanisms that incorporate the values of ecosystems into decision making





Applying TEEB's Approach ...



Ch.5



Ch.4



Ch.3



Ch.3

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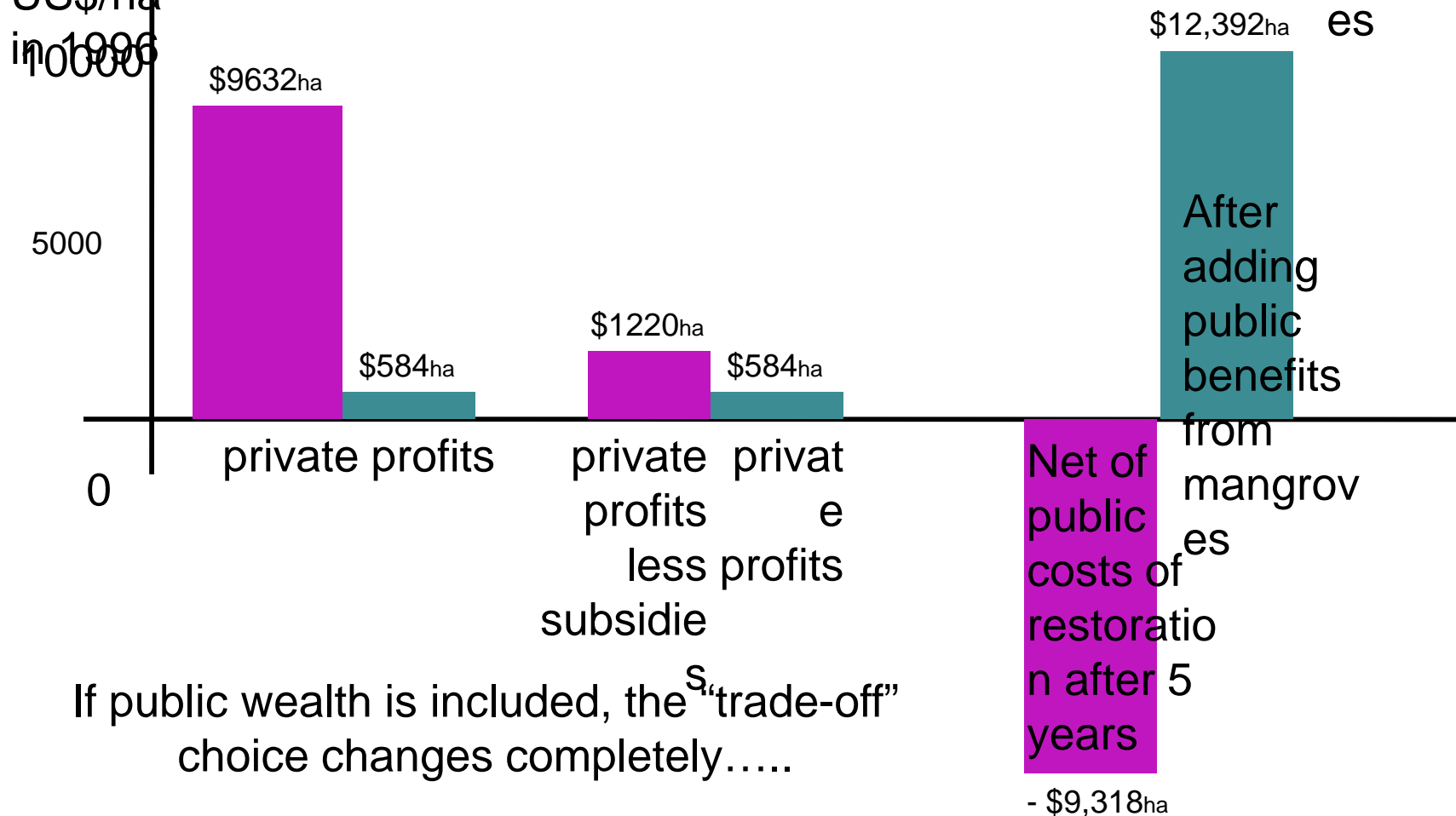
Private Profits, Public Losses...

NPV over 9 yrs
(10% discount
rate)

US\$/ha
in 1996

Most "trade-offs" go only as far as
measuring private profits.....

Shrimp Farm
Mangroves

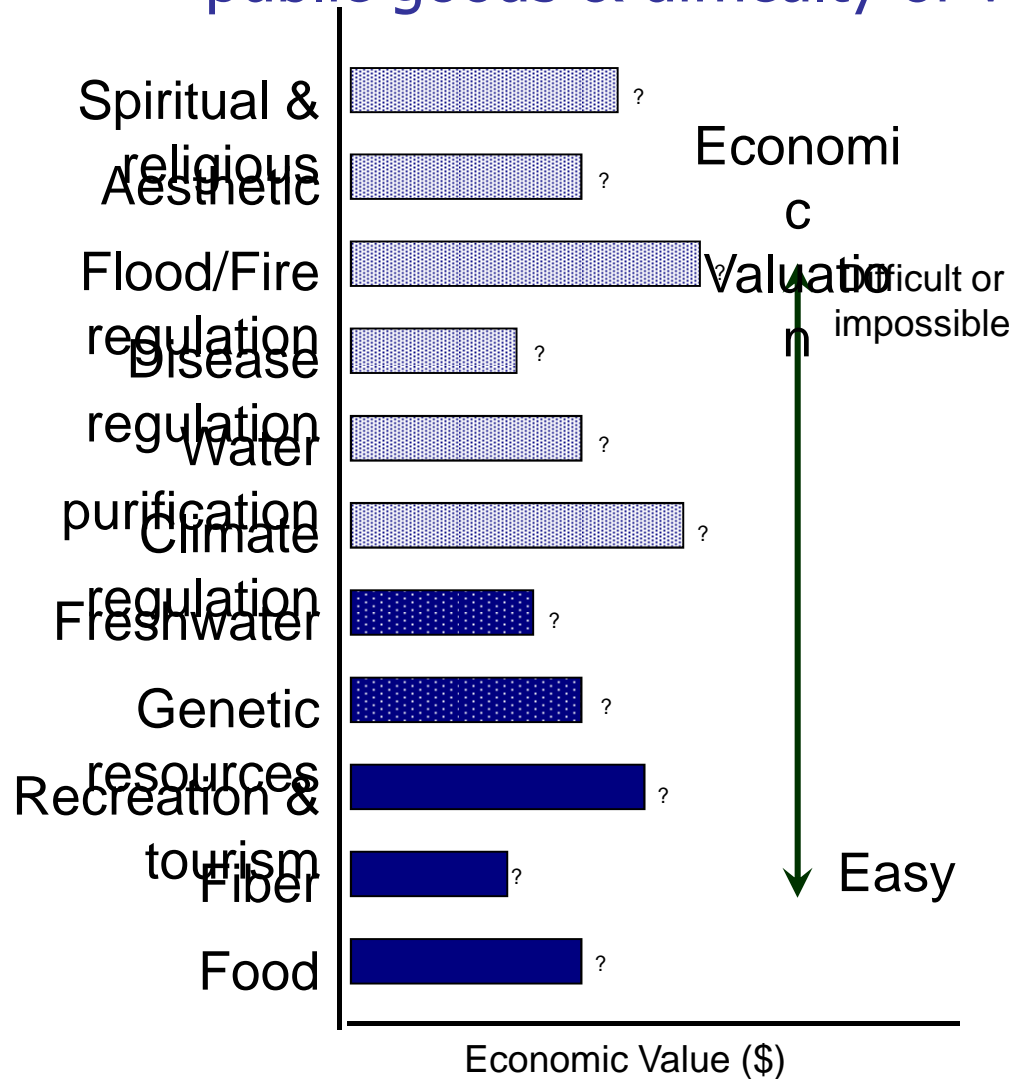


If public wealth is included, the "trade-off"
choice changes completely.....

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Ecosystem services public goods & difficulty of valuation

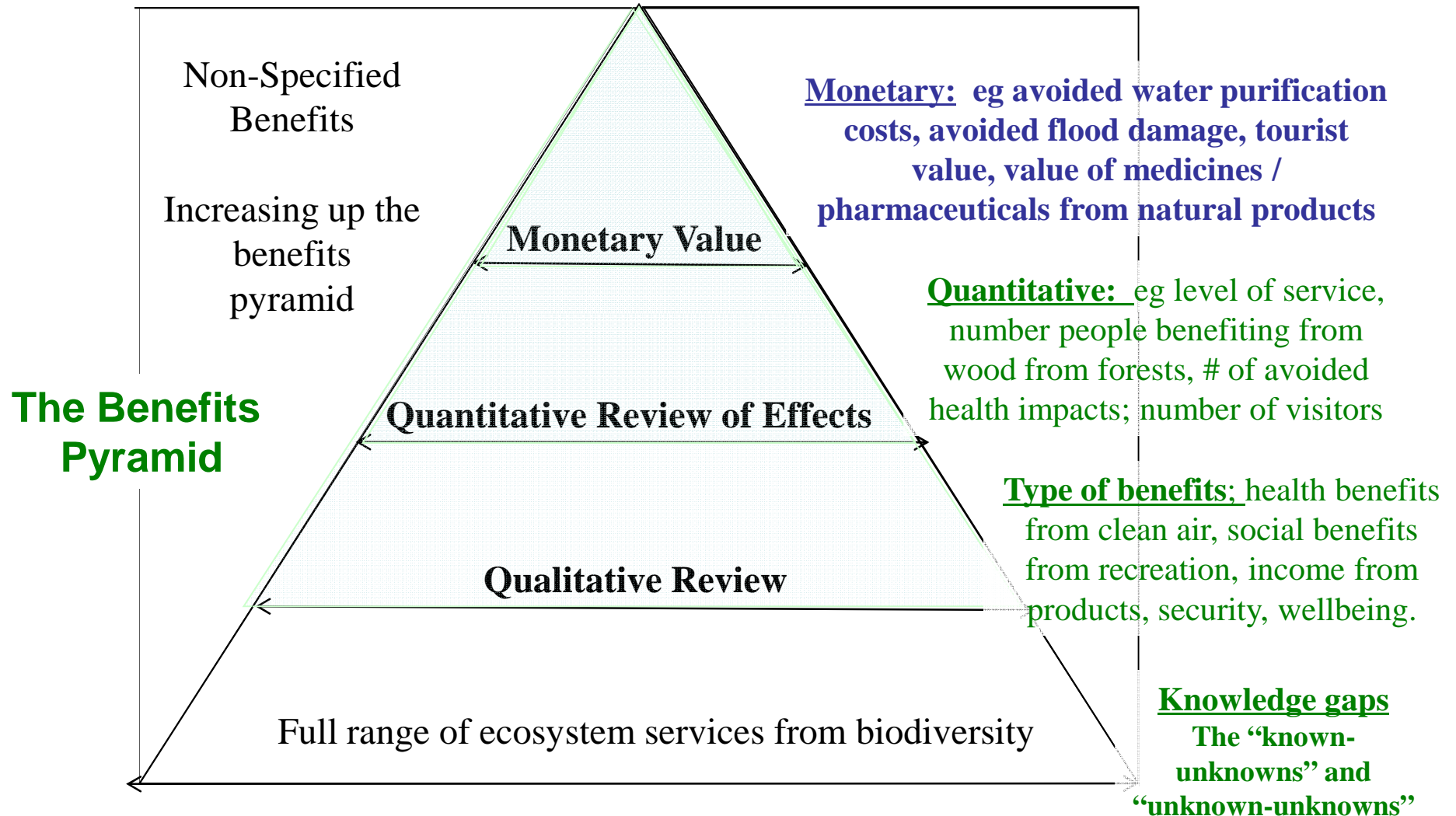


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Measuring Benefits of Ecosystem services

Answers are needed at all levels



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Different frameworks that can be used

- 1. Purely monetary values: Total Economic Value.
- 2. Non-monetary values: Key Biodiversity Areas; Critical Natural Capital.
- 3. Combination of monetary and non-monetary values: Millennium Ecosystem Assessment; Sustainable Livelihoods Approach.



Various decision making tools

- Monetary valuation
- Cost-Benefit Analysis
- Multi-criteria analysis
- Participatory Rural Appraisals

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Leuser National Park on Sumatra, Indonesia Distribution of ecosystem benefits

What is “best” depends on who you are – understanding who wins and who stands to lose in decisions is paramount.

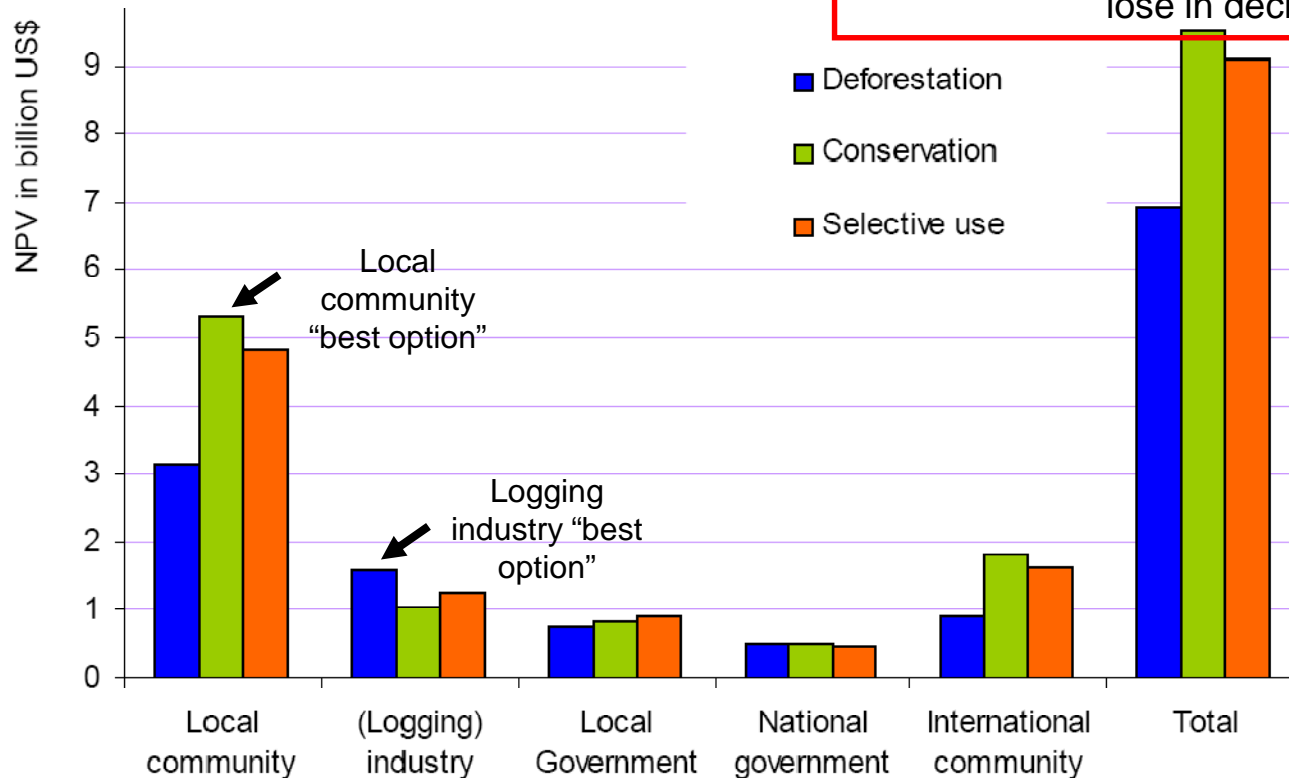


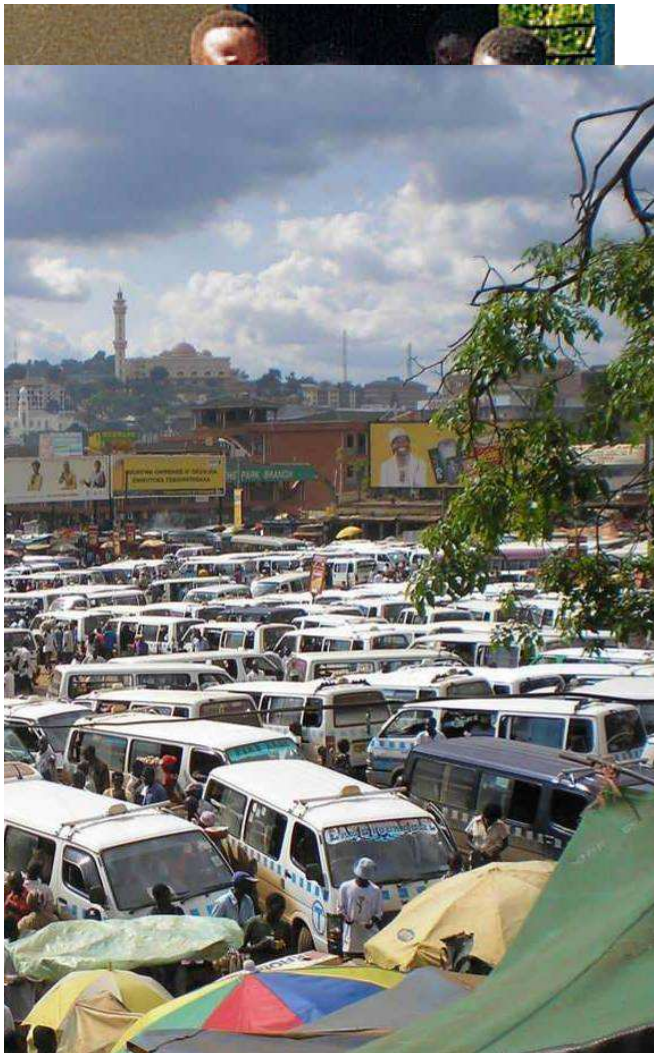
Figure 1: Benefit distribution among stakeholder under different land use scenarios in the Leuser Ecosystem (25,000 sq km), Indonesia, in Net Present Value (NPV) in billion US\$ over 30 years, at a discount rate of 4%.

Sources: van Beukering, P.J.H., H.S.J. Cesar, M.A. Janssen (2003). *Economic valuation of the Leuser National Park on Sumatra, Indonesia*. *Ecological Economics* 44, pp 43-62. and van Beukering, P.J.H., H.S.J. Cesar, M.A. Janssen (2002). *Economic valuation of the Leuser Ecosystem in Sumatra*. In: *Conservation Dividends? ASEAN Biodiversity Vol 2. Nr. 2. 17-24*.

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The opportunity: Maintaining, restoring or enhancing nature's benefits



- **it can help save municipal costs**
 - Quito's drinking water comes cheaper from 2 national parks
 - Kampala's wetlands effectively treat sewage (\$1M vs \$1.75M replacement)
- **it can protect against natural hazards**
 - mangroves protect against typhoons in northern Vietnam (\$1.1 million investment in mangroves saved US \$7.3m in dyke maintenance)
- **it can boost the local economy**
 - it pays to protect sharks in the Maldives (3300\$ tourism vs \$32 for a single catch)
- **it can help tackle poverty**
 - woodland restoration secures essential services to agropastoralists in Tanzania (5 lakh ha restored across 825 villages)

Source: all examples are TEEBcases (teeb.org)



Examples : 'Satoyama' Landscapes

75 - 100% reduction in pesticides, traditional winter flooding rice farming adopted, & White Stork rice & other certified products sold at a "premium"

Konotori no Mai / Flying Oriental White Stork

PES

2003 - 2007: farmers paid 40,000 JYen per 1,000m² of rice paddies .Currently granted 7,000 JYen per 1,000m² by Toyo-oka City

CERTIFICATION

Rice sold at 23 % higher rate for reduced pesticide use, and 54 % more for organic farming



- ❑ White Stork habitat increased from 0.7 ha in 2003 to 212.3 ha
- ❑ Extinct in 1971, now has over 40 breeding pairs
- ❑ 1 billion JPY annually in tourism, & municipal income raised by 1.4 %

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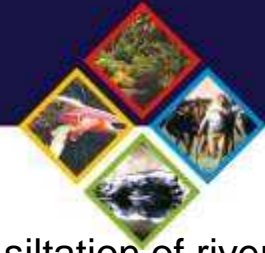


Biorights Program, East Kolkatta – program of SAFE

- *East Kolkata Wetlands* a threatened Ramsar site in Eastern India,
- Considered as sewage dumping ground with no awareness about importance to local stakeholders
- Biorights compensating poor people dependent on natural areas for cash generating activities.
- Funded by DFID (UK), Self help groups formed for protection
- Case of PPP model supported by NABARD, TATA-AIG, PWC



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Sukhomajiri, India

- Rainfed farming, no source of irrigation, increased soil erosion uphill leading to siltation of river Sukhna
- check dam construction and watershed management
- Participatory approach adopted, watersharing and re-arrangements with local communities
- Forests regenerated, incomes improved (first village income received), water quality downstream improved





Financing biodiversity conservation through sale of high value forest products

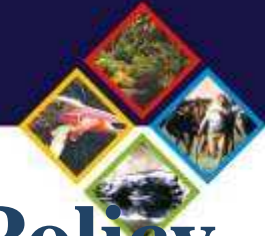
- Humla region in Northwest Nepal
- A complex ecosystem and a highly contested area of natural products.
- Land was awarded to the local community to produce high value essential oils and sales are negotiated by organisations in the partnership, thus disincentivising the use of low value raw produce such as fuel wood.
- The essential component of this is community members working together with the enterprise organizations to learn skills, help develop plans and take up formal tenure.



Innovative financing to save Elephants in Srilanka

- elephants consume 150kg of food every day: crop raiding is a serious problem in densely inhabited areas – defences cause injuries, etc..
- a survey of impacts on 480 local households and of their willingness to accept compensation.
- a second survey among Colombo city residents: their willingness to pay for the conservation of elephants exceeds the funding needed for compensating rural elephant damage.
- in 2007, Ceylinco Insurance presented a new scheme, partly CSR and partly profit driven: Ceylinco proposed small charge addition to the premium payments of life/vehicle policy holders. This feeds a trust for compensations payments.





Important: How to apply them in Policy areas or public management tasks?

4. Environmental Management Systems: EMAS, ISO, Ecobudget
5. NRM: forestry, fisheries, agriculture, water management, disaster mitigation, tourism
6. Spatial planning instruments and EIA
7. Protected Area Management
8. Market-based instruments for conservation
9. Competitions, certification and labelling



Public Management systems and urban management

- ISO 14000 series
- ecoBUDGET
- EMAS.
-



Environmental tools

- Indicators
- Green public procurement
- Local Biodiversity Strategy and Action Plans
- Planning
- Strategic environmental assessments and
- Environmental impact assessments and so on.
- These tools have specific purposes and can be coordinated through an environmental management system.



Conservation of ecosystems through environmental management systems

Example: EcoBUDGET in Tubigon - Philippines

- **The problem:** (i) increasing threats to the municipality's fish and water resources, (ii) little knowledge about impact of existing environmental initiatives.
- **The instrument:** ecoBUDGET, an environmental mgmt system: the common budgeting & accounting system is used as a frame for setting up an environmental budget, in which key natural resources are selected, targets set and measured on a recurrent basis, instead of money.
- **The required input:** broad consultations; 9 municipal staff from different departments work on annual Master Budget; ratified by the city council.
- **The impact:** Subsequently, environmental efforts were coordinated and geared to meet targets of the Master Budget, with stronger cross sector involvement. Annual budget cycle ensures continuous follow-up. Strong public awareness.



Blue Flag Certification for coastal areas: an economic argument in South Africa

- The Blue Flag certification scheme is targeted at local authorities, the public and the tourism industry in coastal areas.
- Awarded annually to beaches and marinas that meet certain environmental, amenity and safety criteria and assures recreational users of a quality visit to the beach.
- economic benefits increased from tourist visits
- In the holiday town of Margate along the Kongweni Estuary, the loss of Blue Flag status is estimated at a potential economic loss of between US\$ 2.7 million and US\$ 3.4 million per annum (Nahman and Rigby 2008, transformed to 2007 US\$).
- Decreased consumer confidence in Durban due to lost status status in 2008

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Measuring What we Manage: Towards Proper Stewardship of Our Natural Capital

- A. Do we have a measurement problem?**
- B. The way we currently measure biodiversity and ecosystem services**
- C. Better macro economic and societal indicators**
- D. GDP of the Poor**
- E. More Comprehensive National Income Accounting**



Range of opportunities to take natural capital into account

- **Biodiversity indicators: needs for measurement/monitoring, modeling & policy**
- **Ecosystem services indicators important for instrument design (PES, F&E, etc.)**
- **Ecological footprints valuable for policy targets and communication**
- **Critical importance of ecosystem services to the poor – refocus poverty reduction**
- **National policy makers with more comprehensive national income accounts**



Incentive Schemes: Rewarding the (unrecognised) value of ecosystems and biodiversity

- ❑ **Payments for Environmental Services (PES)** – potential to build on experiences of water purification, carbon storage et al. Economics underlines the potential. Need for upfront ecosystem service assessments, conditionality, participation, monitoring & governance.
- ❑ **PES-REDD** – potentially high value new instrument offering synergies between biodiversity and climate change
- ❑ **Access and Benefits Sharing (ABS)** – negotiations
- ❑ **Other compensation measures (tax breaks, transfers) and direct payments to secure benefits**
- ❑ **Markets (organic, biotrade, natural cosmetics, FSC, MSC etc)** – being “mainstreamed”. Need for support for certification of producers in 3rd countries.
- ❑ **Green public procurement** – making use of market demand (PP 14% of EU GDP). A tool that can help green the product cycle – leading counties to show the way.

TEEB: Understanding and responding to the values of nature

- Under-valuing biodiversity and the ecosystem services it supports has contributed to the loss of natural capital
- Historically, many values have been invisible
- Increasingly values are understood and available
- Increasing use in policy assessment and policy choices.
- Real world effects – on policies, instruments, investments, results.

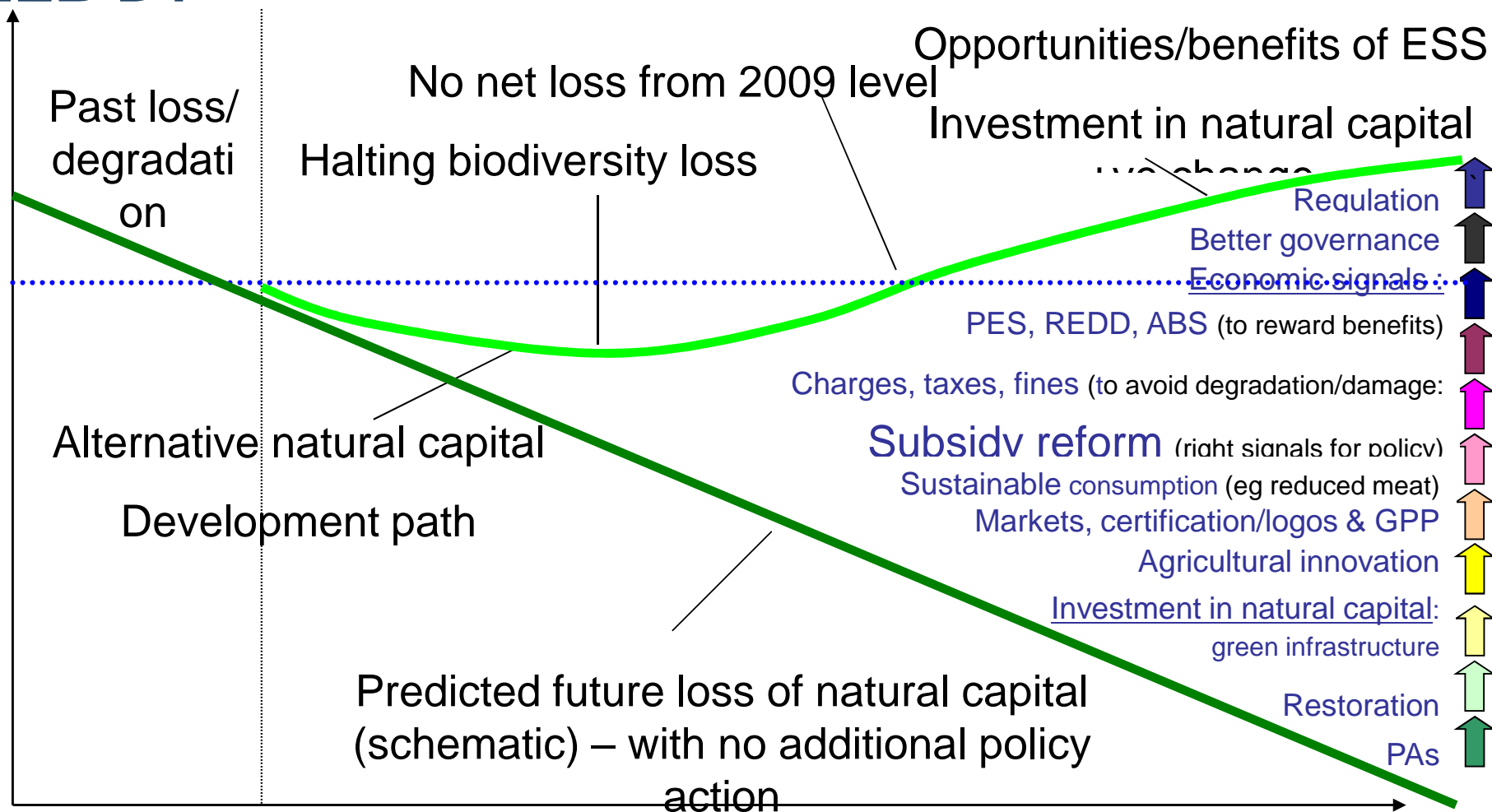
More steps are needed to appreciate and respond to the value of nature

The whole picture of benefits and costs need to be appreciated – the here and now, the over there and over time, the private and public



...is this enough to work out what to do? ...always better to look at the whole board

tools for an alternative development path and need for innovative financing – Recommendations from TEEB D1



Need a portfolio of instruments, need BD action + integration, need engagement by all stakeholders; need good governance, “joined-up-thinking”



The Report: How to adopt this focus?



First answers to practical questions.
For example:

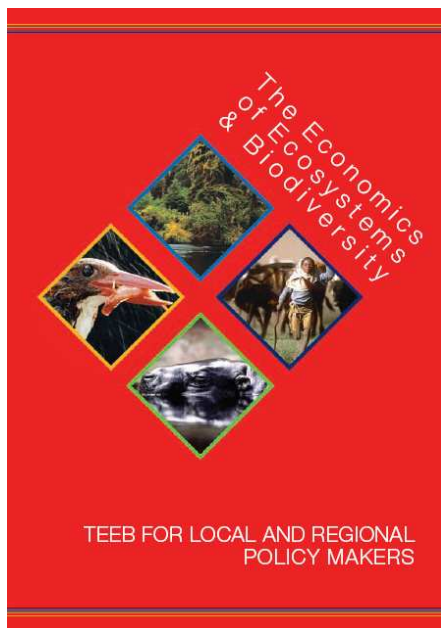
- What do I need to **clarify** before commissioning an ecosystem services assessment?
 - What do I need it for?
 - What do I already know?
 - What are my constraints?
- How can I **make the most** of ecosystem service assessments?
 - Adapt to function, e.g. decision support, advocacy, awareness, fundraising, PES...
 - be transparent about assumptions



The approach:

Six steps for effectively appraising ecosystem services

This approach is not a fixed recipe. It is intended to guide policy makers in designing their own processes:



1. Specify and agree the policy issue 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.



Applying the approach: Spatial planning in Sumatra

Step 1: Agree on the issue: Following a new spatial planning law (2007) the Indonesian Government designs spatial plans at district levels. An NGO forum supports Riau districts in preparing spatial plans

Step 2: Identify relevant ES: In Riau, lowland forests are affected by intense logging and forest conversion to plantations, affecting biodiversity, water regulation, and causing erosion Photo: Ahmad Zamroni/AFP/Getty Images

Step 3: needs and assessment tools

for planning with ecosystem services, their occurrence and their spatial connections need to be known. Assessment with InVEST – a tool for mapping and analysing services.



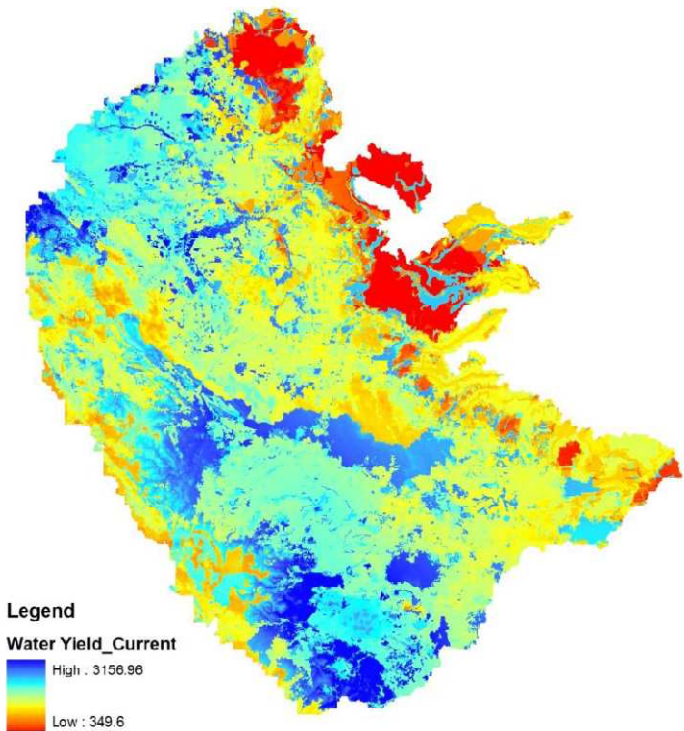


Applying the approach: Spatial planning in Sumatra

Step 4: Conduct the assessment: Based on data from the districts, InVEST modelled services under two scenarios: 'Sumatra Ecosystem Vision' (island wide strategy) and BAU

Step 5: Appraise policy options: specific recommendations were made based on the maps: where to restore habitats, where to allocate forest concessions, for which areas to apply for forest carbon PES, ..

Step 6: Focus on global and local ecosystem benefits. Social impact assessment of policy responses: tbc



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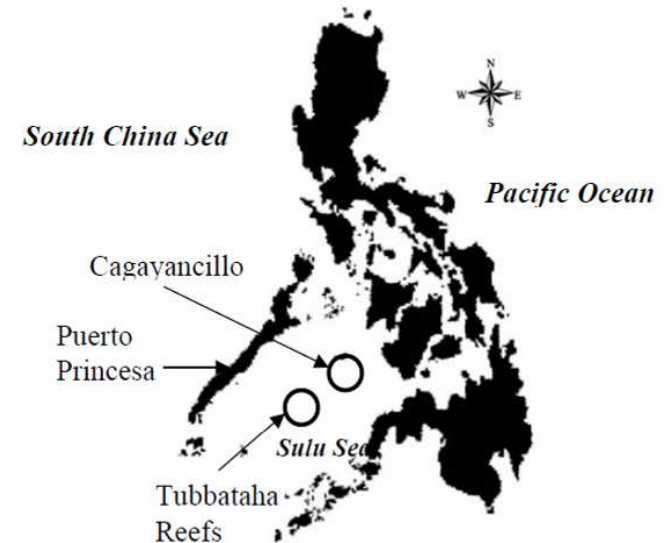
Establishment of a MPA: Tubbataha Reefs, Philippines

2) Specify which ecosystem service are relevant

- Habitat for a multitude of species
- Provides Sulu Sea with fish and invertebrate larvae (Alcala 1993)
- Cultural ecosystem services: appealing destination for divers

1) Specify and agree on the problem

- Implementation of the MPA in 1988 via a presidential proclamation imposed no-take policy
- Stakeholders' interests follow the typical conservation-development divide – implementation and enforcement difficult



Source: Tongson E. (WWF 2007)

5) Identify and appraise policy options

- Commitment of stakeholders to no-take policy (Workshop 1999)
 - User fee System based on WTP survey
 - Sharing scheme regulating distribution of fees



Establishment of a MPA: Tubbataha Reefs, Philippines

3) Define information needs and select methods

- Empirical evidence on the benefits of the MPA (Monitoring of biophysical, socio-economic and governance indicators)
- Value of MPA (Willingness-to-pay survey among divers)

4) Assess expected changes in availability and distribution of ecosystem services (Ex post in this particular case)

- Higher fish biomass compared to other offshore reefs
- Fish biomass in nearby reefs doubled since 2000 and perceived fish catches increased between 1999 – 2004 from 10 to 15-20 kg/day
- Coral cover stabilized at 40% from 1999-2003 before reaching 50% in 2004

6) Assess the distributional impacts of policy response

- Monitored socio-economic indicators point out an increase in living standard from 2000 to 2004 in Cagayancillo (lot and house ownership, quality of construction materials and household utilities, electricity access, toilet ownership)



TEEB For Local and Regional Policy

An economic perspective on Biodiversity and ESS at local policy level can be supportive in several ways:

- it makes a strong case for conservation
- It emphasizes the need for mainstreaming environmental concerns in all public management
- it shows the urgency required for action
- it shows the social impacts of policies
- It supports fundraising efforts
- it provides decision support among management options



The Lessons

There is room to manoeuvre – recognising ecosystem services is the first step to make your natural work for local development and human well-being

Adapt appraisal design to your needs – in order to get useful results you need to understand and decide what is being measured or valued and how

Find the right place for your results in decision making – if economics is weaponry, then paying attention to rights, knowledge and participation help you take care against backfiring

Build on the full range of values – cashing in on single services provides incentives for degrading the entire system we depend on.

It is better to err on the side of caution – ecology is complex and our understanding limited – but future damage costs are too high to risk doubting

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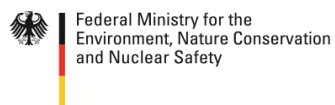


Thank you

TEEB Reports available on <http://www.teebweb.org/>

See also www.teeb4me.com

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