The Economics of Ecosystems & Biodiversity

The TEEB approach to the loss of biodiversity and ecosystem services

Genesis and making of the TEEB studies, methodology, and main results

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Institute for European Environmental Policy (IEEP)

CAPACITY-BUILDING WORKSHOP FOR NORTH AFRICA AND THE MIDDLE EAST ON THE ECONOMICS OF ECOSYSTEMS AND BIODIVERSITY (TEEB)

Beirut, 21–23 February 2012

Presentation overview

- TEEB origins & the biodiversity challenges
- Conceptual basis of TEEB
- Valuation & the evidence base
- Policy tools to respond to the challenge
- Summary
- Annex 1: CBD Strategic Plan 2011-2020 targets
- Annex 2: Questionnaire: **Reviewing the incorporation of biodiversity and ecosystem services into NBSAPs**

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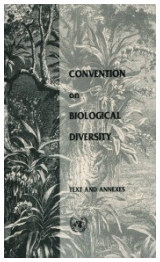
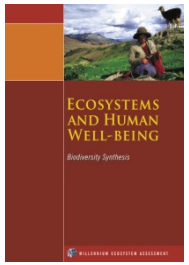
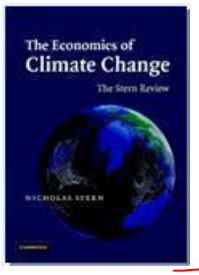
The Economics of Ecosystems & Biodiversity

TEEB's Genesis, Aims and progress





Ecol./Env. Economics literature



G8+5 Potsdam

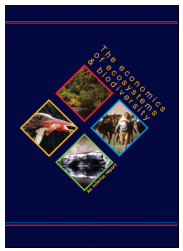
"Potsdam Initiative – Biological Diversity 2010"

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

Importance of recognising, demonstrating & responding to values of nature

Engagement: ~500 authors, reviewers & cases from across the globe

Interim Report



CBD COP 9 Bonn 2008

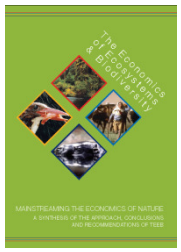
Climate Issues Update

Input to UNFCCC 2009

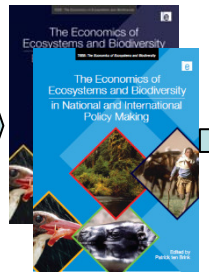
TEEB End User Reports Brussels 2009, London 2010

India, Brazil, Belgium, Japan & South Africa Sept. 2010

TEEB Synthesis



TEEB Books



BD COP 10 Nagoya, Oct 2010

CBD COP11 Delhi

National TEEBs
Netherlands
Nordics
Norway
Brazil
India
...

Sectoral TEEB work
Water
Ag

Rio+20 Brazil

TEEB Architecture (Phase 1 and 2)

Coordination group: Initiators / sponsors
Vision + demand driven: growing country engagement

Advisory Board

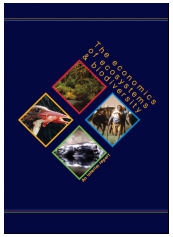
UNEP United Nations Environment Programme · UKaid from the Department for International Development · Sida · Federal Ministry for the Environment, Nature Conservation and Nuclear Safety · Rijksoverheid · Schweizerische Eidgenossenschaft Confédération suisse Confederazione Svizzera Confederaziun svizra · defra Department for Environment Food and Rural Affairs · Ministry of Foreign Affairs · Ministry of the Environment

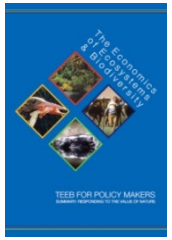
Study Leader
(Pavan Sukhdev)

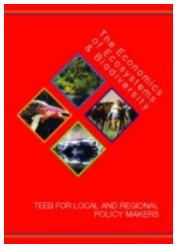
Scientific coordination
(H. Wittmer, UFZ)
Other coordination: UNEP

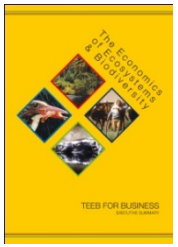
TEEB Coordinators
P. Kumar, P. ten Brink, H. Wittmer, H. Gundimeda & J. Bishop & G. Langdale
Core teams: across wide range of organisations / expertise areas
Authors & Contributors: open architecture, invaluable contributions
Reviewers: important process re QA, engagement, buy-in

Deliverables
End-user focus

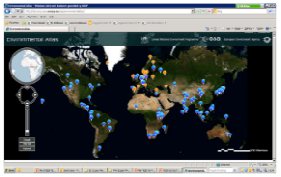








TEEB4me



Comm's & Outreach

Open Architecture, (aim for) global representation/relevance & contributions.
Dynamic process: country engagement. Over 500 contributors, all continents

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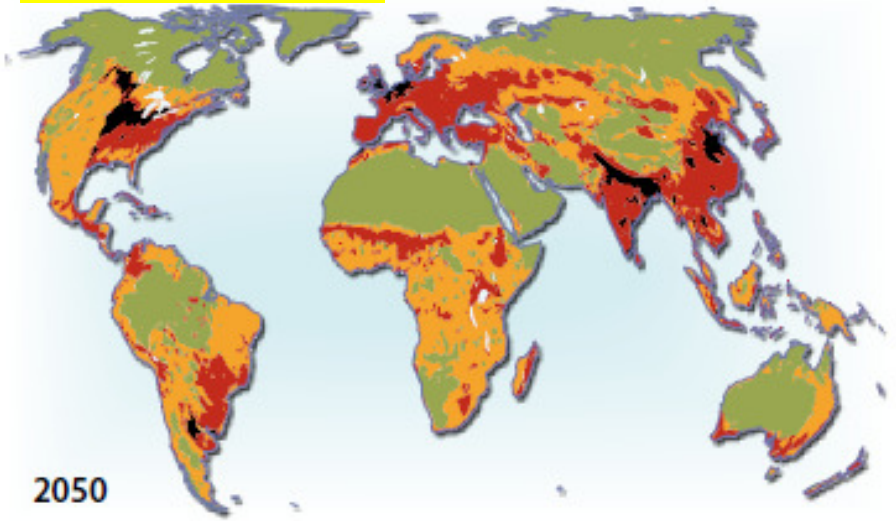
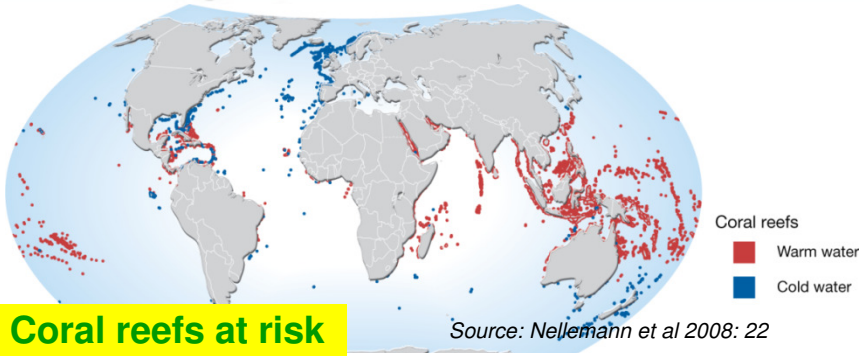
"I believe that the great part of miseries of mankind are brought upon them by false estimates they have made of the value of things."

Benjamin Franklin, 1706-1790

Biodiversity (loss)

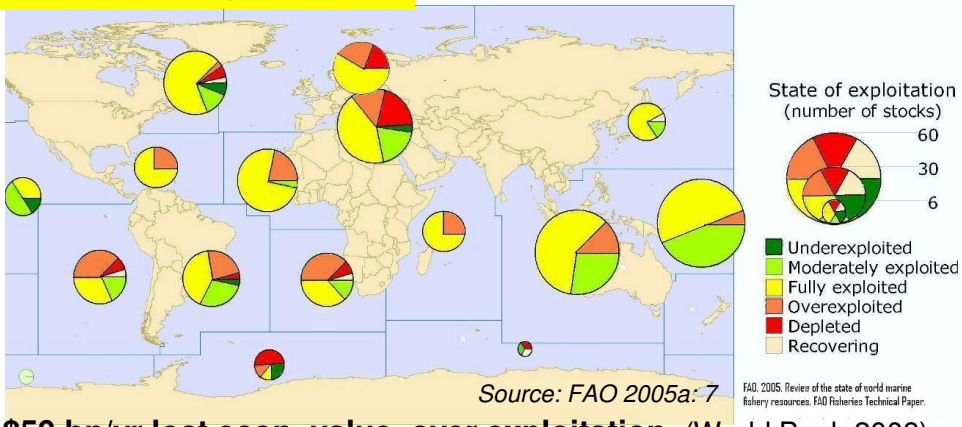




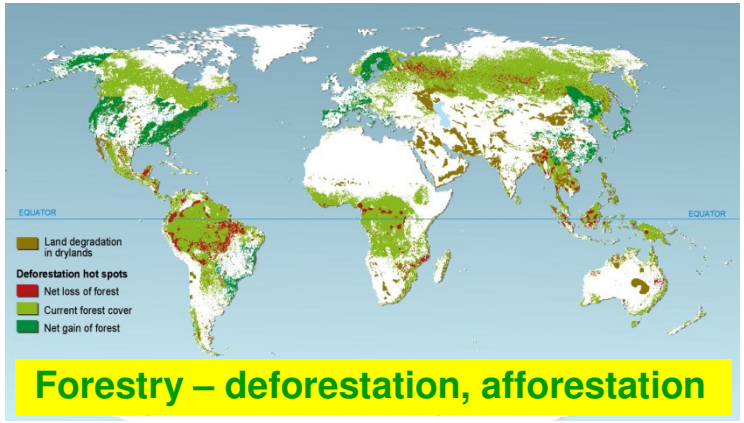
Source: Nellemann et al 2008: 22

Coral reefs at risk

Fisheries exploitation



$50 bn/yr lost econ. value, over exploitation (World Bank 2008)



Forestry – deforestation, afforestation

"There is a renaissance underway, in which people are waking up to the tremendous values of natural capital and devising ingenious ways of incorporating these values into major resource decisions." Gretchen Daily, Stanford University

Critical issues

The value of biodiversity and ecosystem services are not fully reflected in the markets, in price signals, and policies

- **Decision making** (at company, policy & citizen level) **still too often fails to take into account the local to global benefits, contributing to a loss of biodiversity and ecosystem services.**

- **Assessing ecosystem service benefits (and links to biodiversity and ecosystem functions) and identifying who benefits from what natural capital is critical for policy focus, interest and instrument choice, design and implementation.**

- **There is a growing recognition of the need to improve and invest political capital in natural capital accounts and integrated environmental and economic accounts. This is a seen as a 'slow fuse' investment, but one that can lead to a paradigm shift in governance.**

- **There is a need to improve the economic signals to help take the values of nature into account – in positive incentives and in reforming incentives harmful to the environment – as well as regulatory and governance solutions. This requires action at all governance levels + mainstreaming nature's values.**

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CBD COP 10 Nagoya: Strategic Plan 2011-20

5 strategic goals & 20 headline targets *....extracts...*

Strategic goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society

Target 1:... people aware of the values of biodiversity .....

Target 2: .... biodiversity values have been integrated ....into strategies... planning ... national accounting.... reporting systems.

Target 3:...addressing harmful incentives and promoting positive incentive measures..

Strategic goal D: Enhance the benefits to all from biodiversity and ecosystem services

Target 14: ... ecosystems that provide essential services.... restored and safeguarded

Target 15: ... contribution of biodiversity to carbon stocks has been enhanced...

Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization;

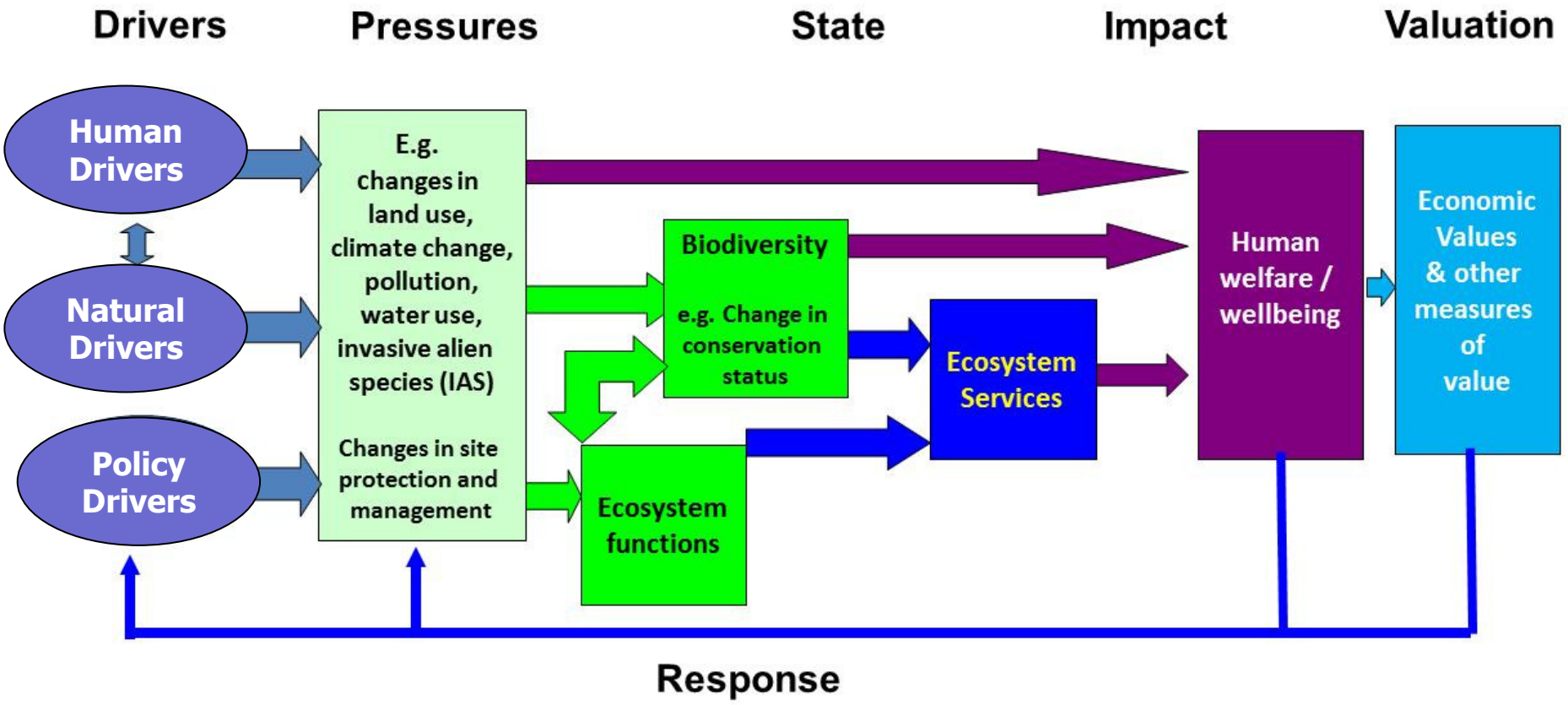
Evidence on values of biodiversity can also support many other targets

e.g. On sustainable fisheries, agriculture, forestry, sustainable use ...

The Foundation of TEEB

Conceptual Basis

From (policy) drivers to impacts to values



Source: Adapted from Braat and ten Brink et al (2008)

Understanding data & interactions helps policy decisions.

Ecosystem services

Provisioning services

Food, fibre and fuel;

Water provision

Genetic resources

Regulating Services

Climate /climate change regulation
Water and waste purification; Air purification; Erosion control Pollination
Biological control

Cultural Services

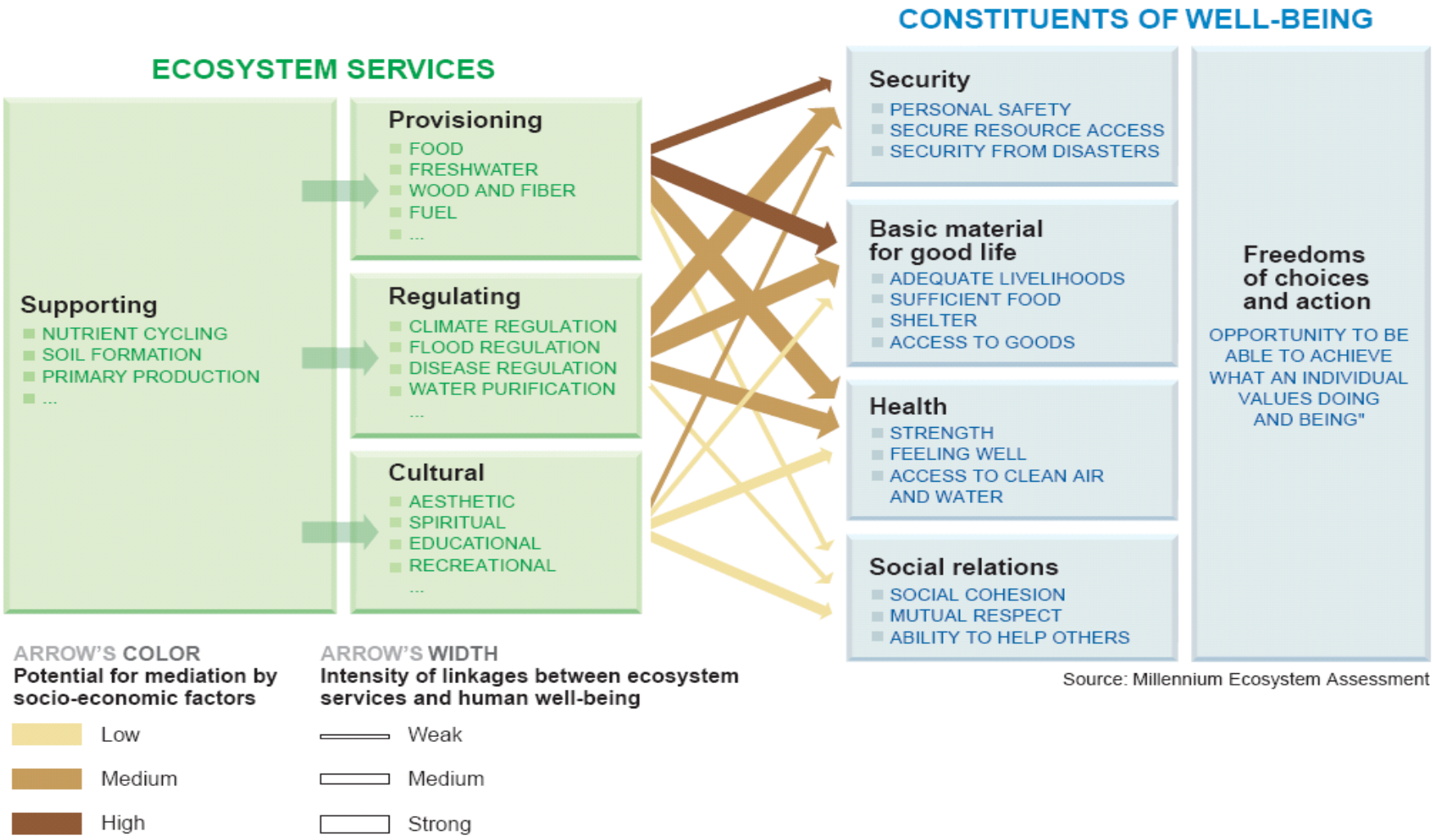
Aesthetics, Landscape value, recreation and touris
Cultural values and inspirational services

Supporting Services: Soil formation & fertility, photosynthesis, nutrient cycle, pollination

Some are private goods (eg food provisioning), **others public goods that can become (part) private** (eg tourism, pollination), **others are pure public goods** (eg health, identify)

Values include market values, existing or potential (e.g. pending market creation);
Some values are real as avoided costs or eventually as replacement costs.
Others not in market transactions or GDP, but are very real for citizens, community & society.

Ecosystem Services (MA framework): support wellbeing in many ways



Source: Millennium Ecosystem Assessment

Source: MEA

Biodiversity (genes, species, ecosystems) & its value is about

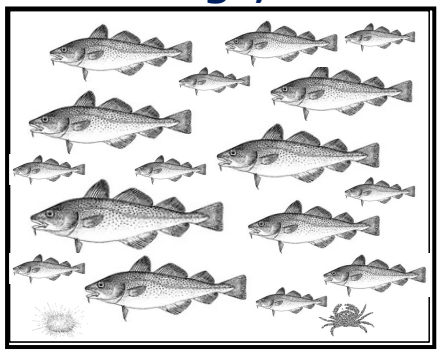
Diversity/variety – e.g. pharmaceuticals, food security, biomimicry;

E.g. genetic resources:

> than

Quantity – e.g. timber, carbon storage, fish stock, flood control, water retention

E.g. for fish production:



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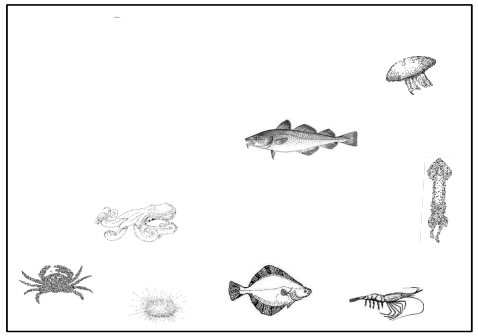

Quality – e.g landscape & tourism, ecosystems & water filtration, resilience

(to climate change, IAS)

Building on Balmford and Rodriguez et al (2009) Scoping the Science

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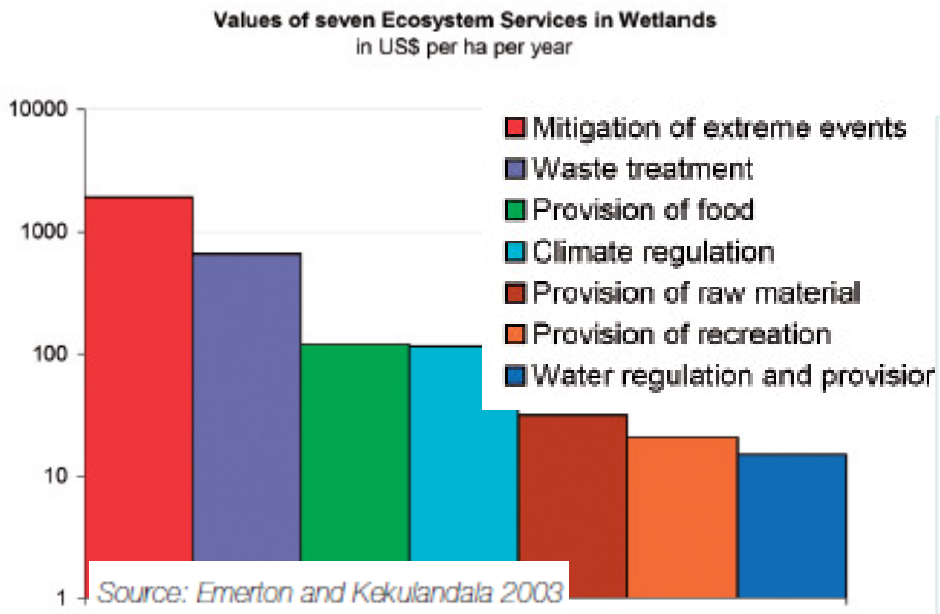
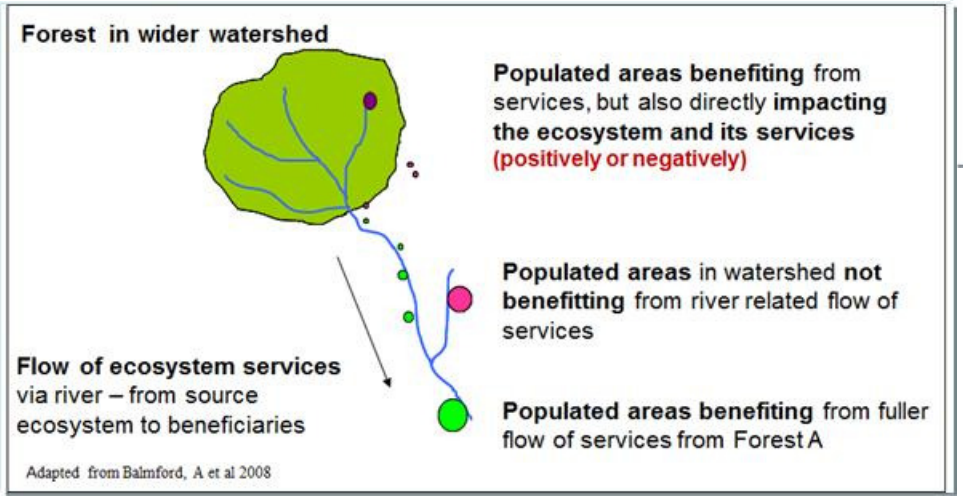
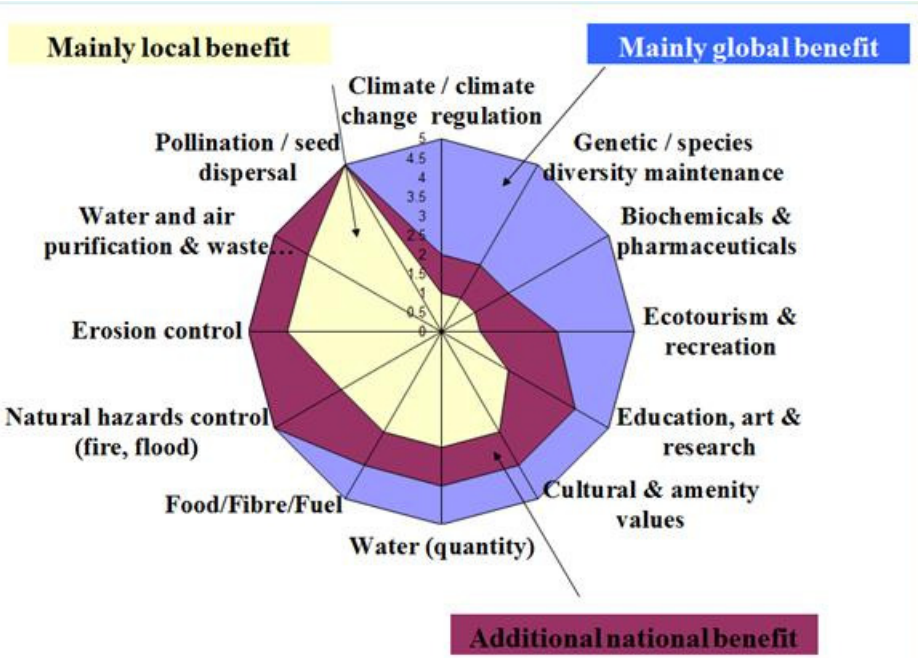
Many ecosystem services from the same piece of land





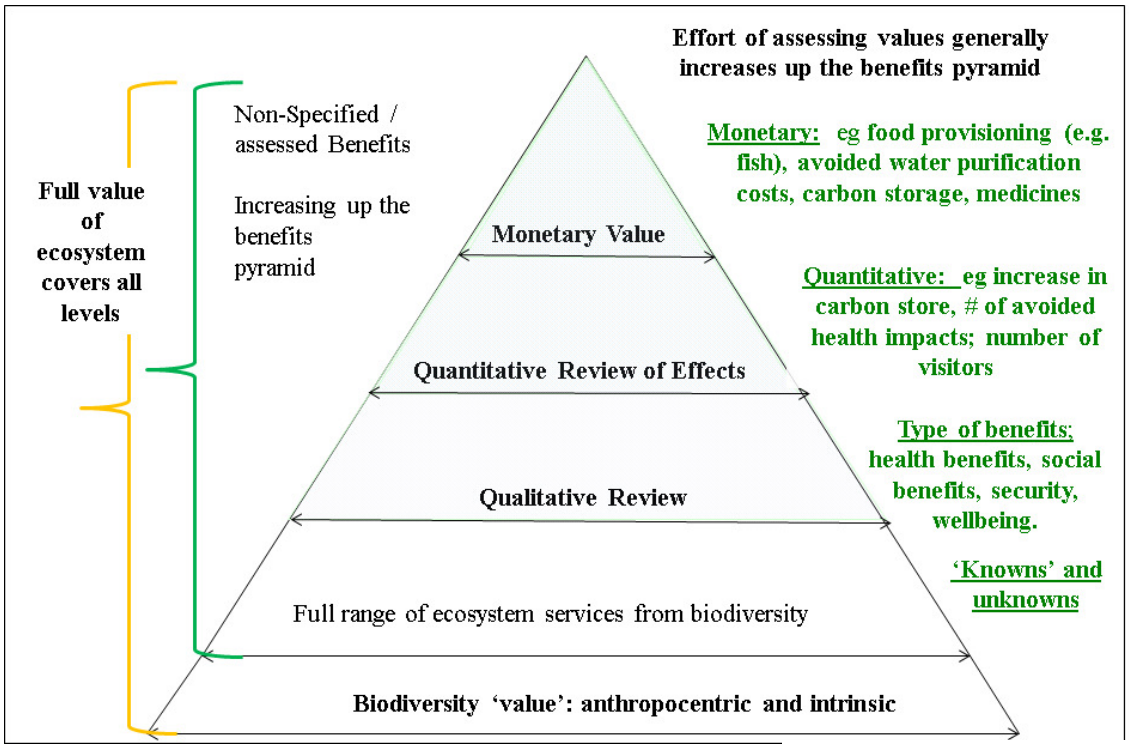
Benefits local to global



Benefits are spatially dependent

Key to understand the interactions - it is the link of ecological systems with economic and social systems that defines the value

Biodiversity 'values': What can you know; wish to know



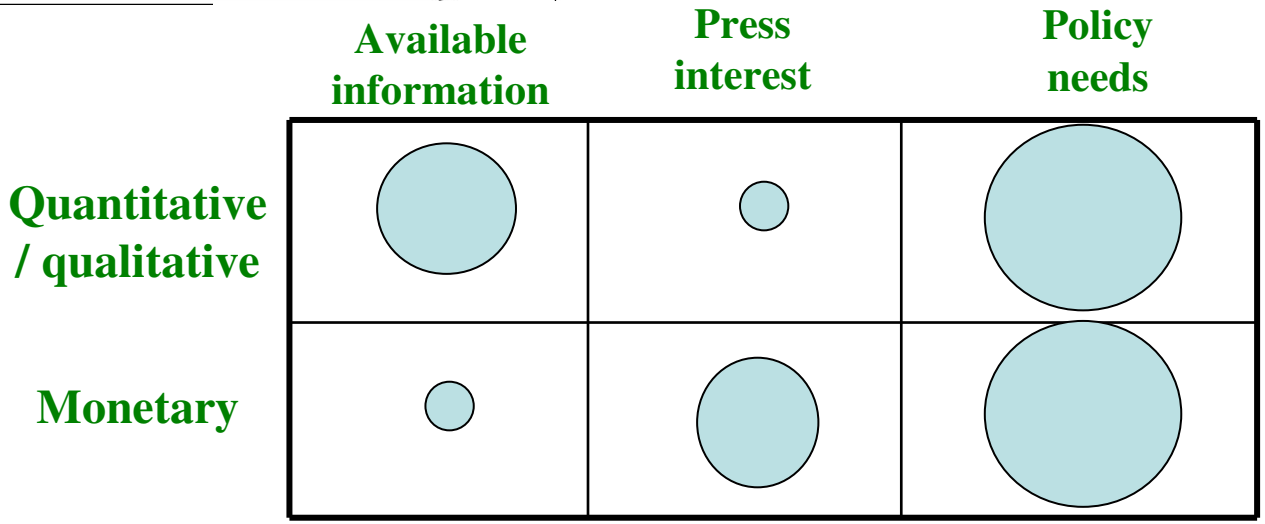
The Benefits Pyramid

To get the full picture one needs mix of monetary, quantitative, spatial, and qualitative information / understanding

Valuation tends to build on physical assessment

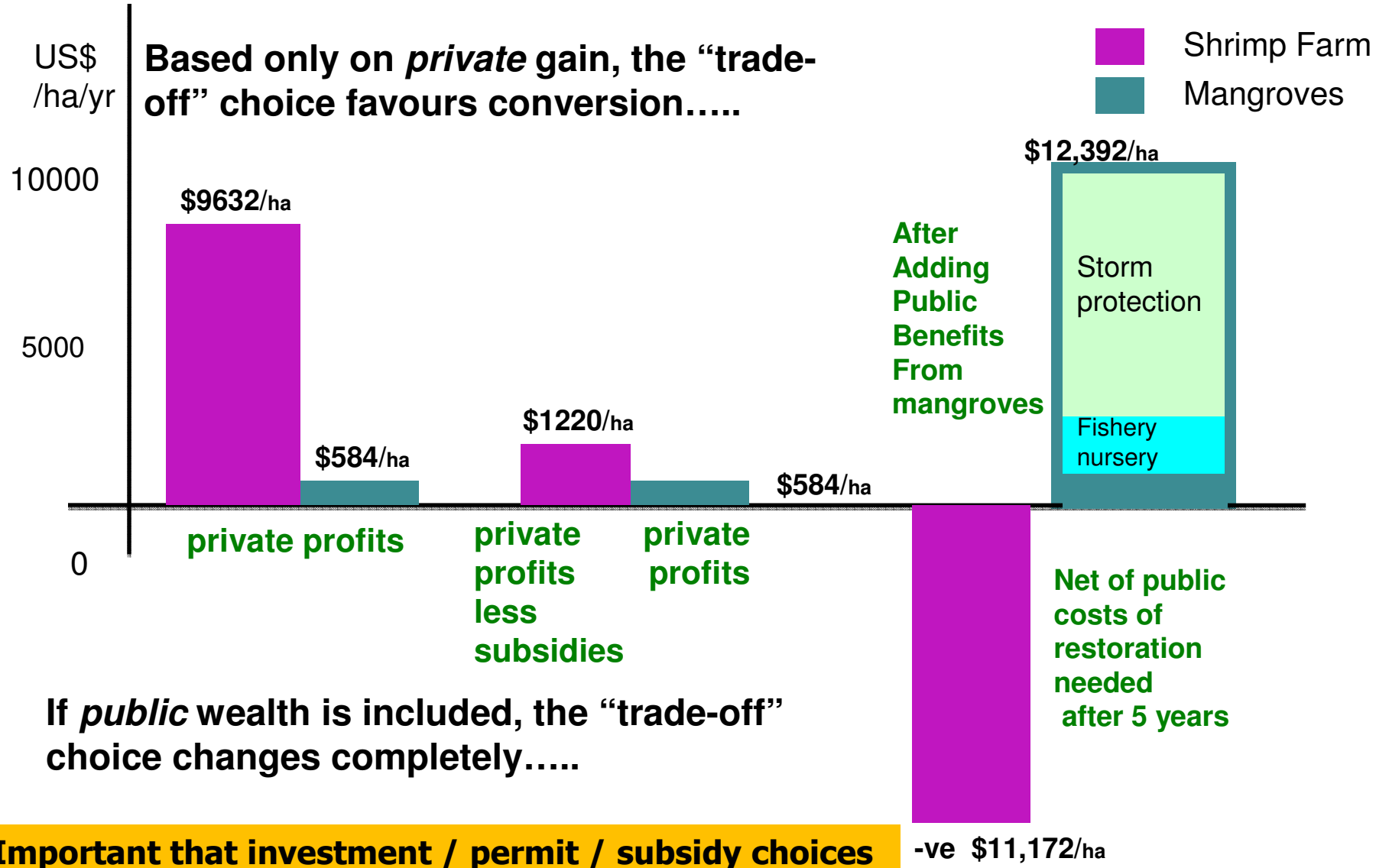
Range of tools at each level

The Evidence Base and Demand

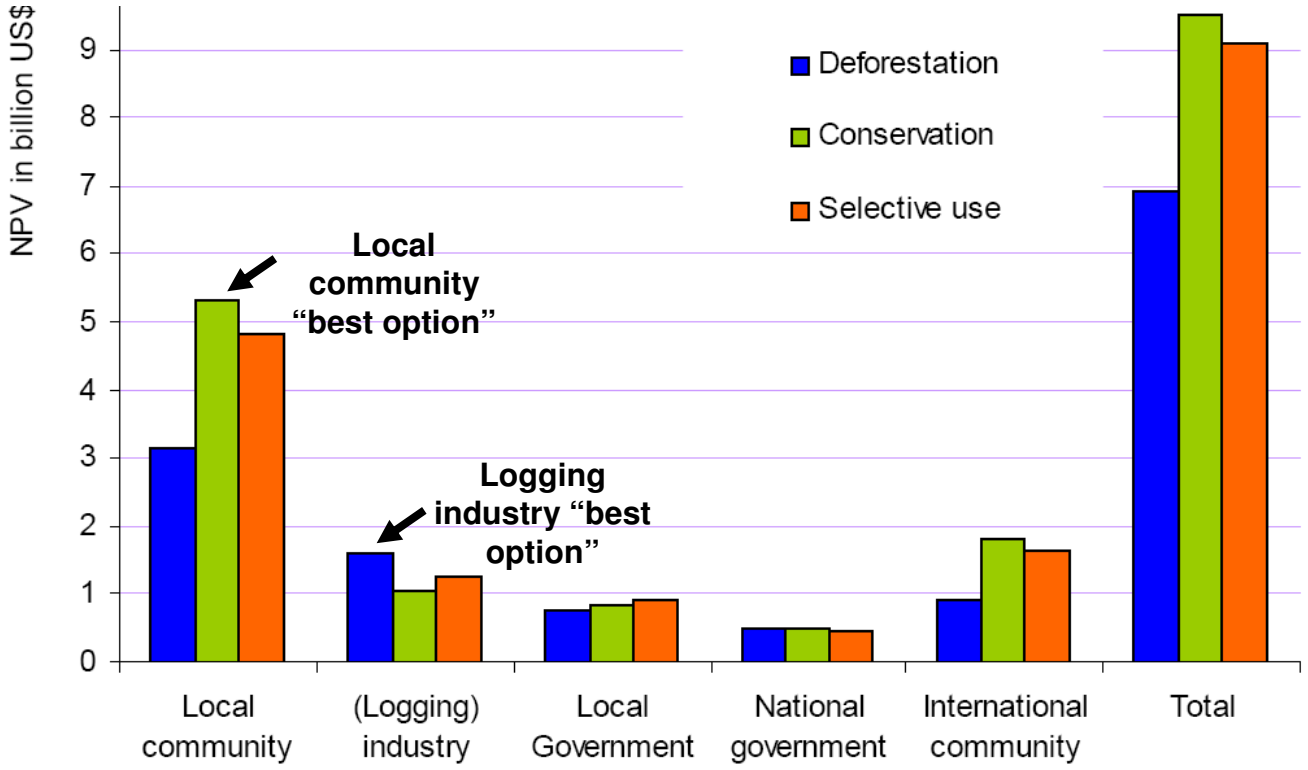


Taking account of public goods

…can change what is the "right" decision on land/resource use



Leuser National Park on Sumatra, Indonesia
Distribution of ecosystem benefits



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 Dividents? ASEAN Biodiversity Vol 2. Nr. 2, 17-24.

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%.

What is "best" depends on who you are: understanding who wins & who stands to lose in decisions is paramount.

Leuser National Park on Sumatra, Indonesia (cont.)

Range of ecosystem benefits and time profile

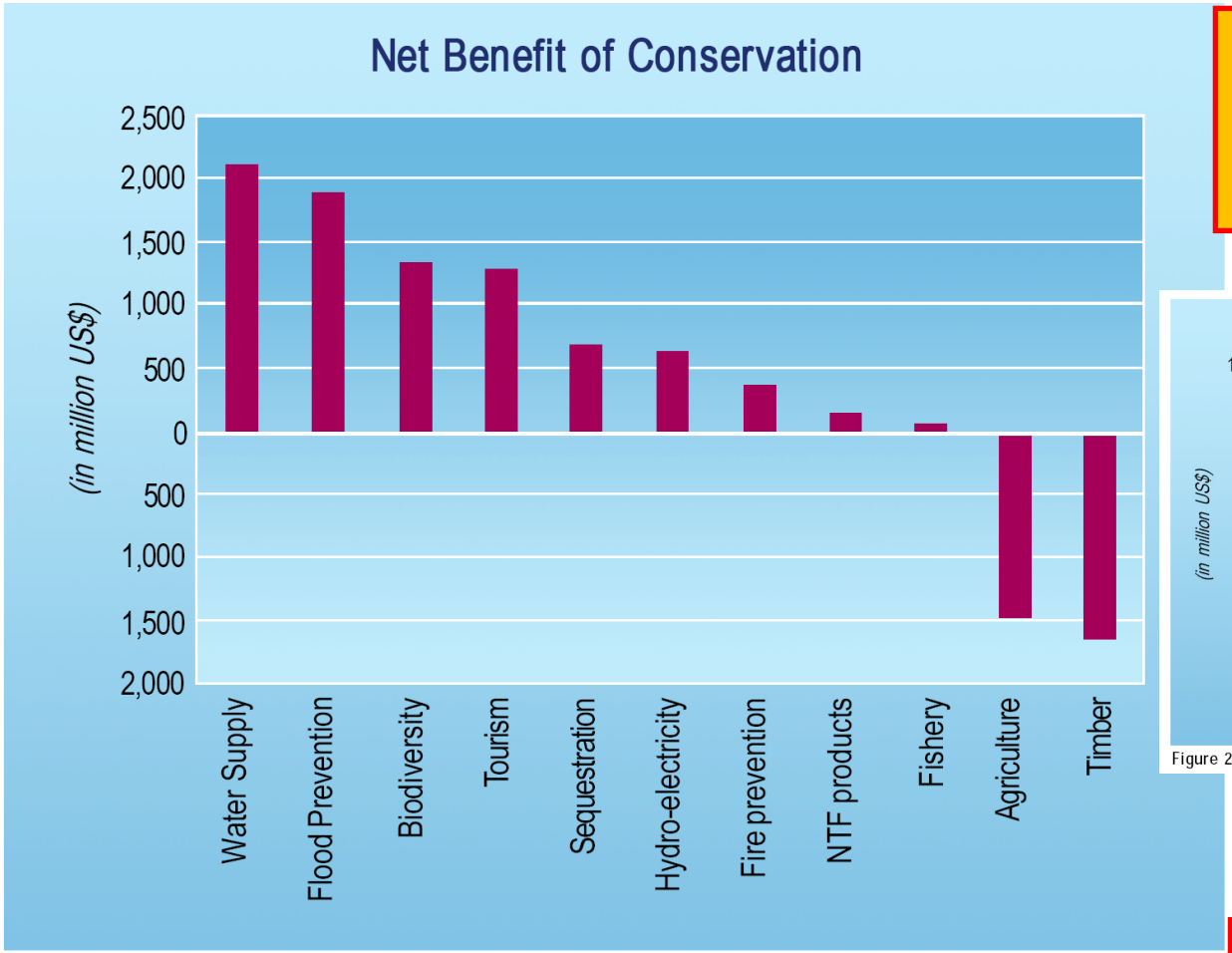


Figure 3. Net Benefits over time of Leuser National Park for the two scenarios distributed over the various categories.

There can be trade-offs across Ecosystem services

The benefits and who wins and loses will be time sensitive

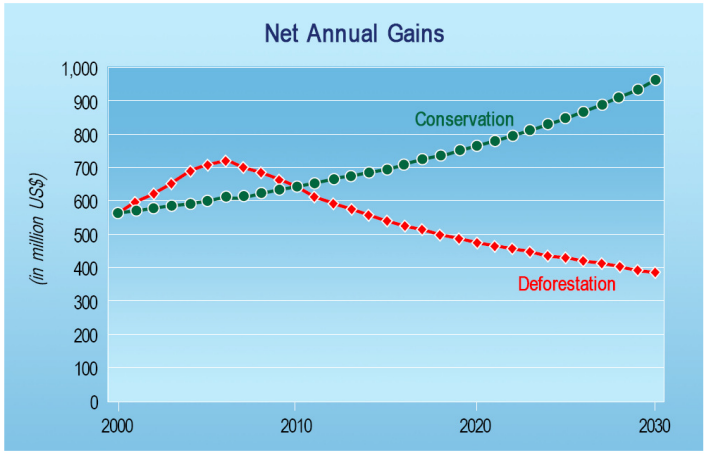


Figure 2. Net gains over time of Leuser National Park for the two scenarios.

Scenarios 2000 to 2030, discount rate 0% (Beukering et al. 2002)

Transition planning important

Fit for purpose: what level of precision is needed?

Policy Making – **if benefits an order of magnitude > costs** (or vice versa)**, then clear signal for need for policy action (or not). Precision less critical in Impact Assessment (IA) - robust order of magnitude can suffice.**

Instrument Design – eg PES, REDD+, ETS – greater precision needed to get the design right (e.g. what level of payments, defining additionality & conditionality) + **confidence in instrument**

In project and permit assessment – as precise an answer is needed where possible, but whole picture also needed

In compliance checking (e.g. performance under PES/REDD) – as precise an answer as possible is needed. Verifiability.

Fit for purpose:

Policy needs & context defines the level of robustness and precision needed

Good governance only requires answers fit for purpose – proportionality principle

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TEEB and the evidence base on the values of nature

& the response to the values of nature

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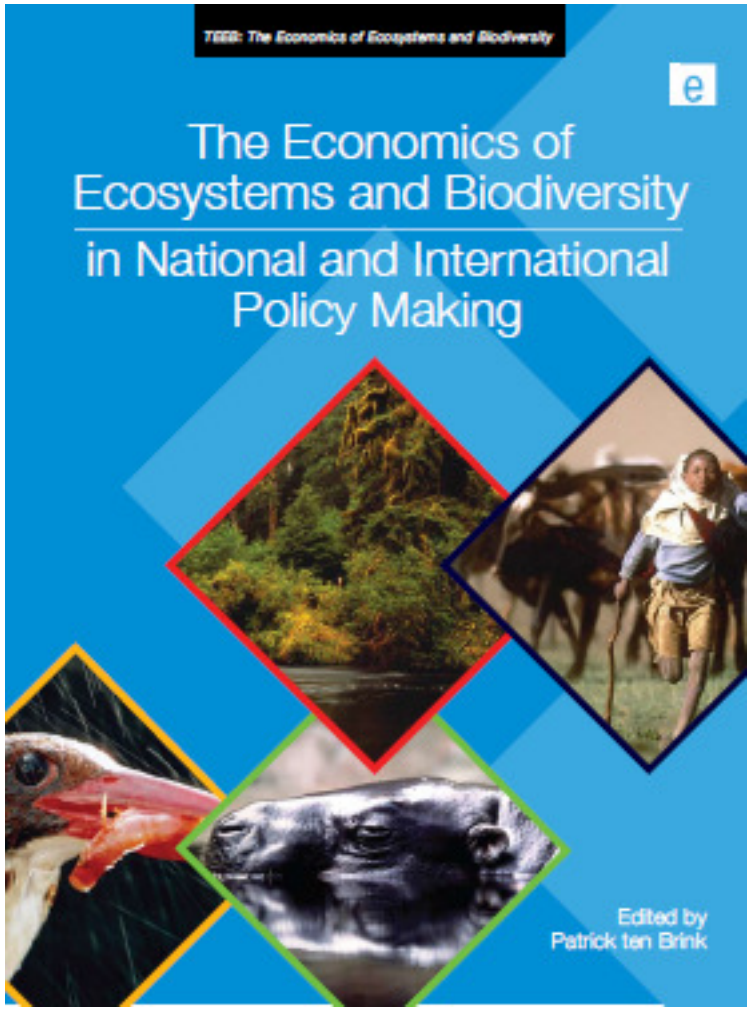
TEEB for Policy Makers



http://www.teebweb.org/

The Global Biodiversity Crisis

- Nature's assets & biodiversity loss
- Economic values and loss
- Social dimension

Measuring what we manage

- Indicators
- Accounts (SEEA/Waves)
- Valuation
- Assessment

Available Solutions

- **PES (e.g. water), PES: REDD+**
- **Markets, GPP**
- **Subsidy reform**
- **Legislation, liability, taxes & charges**
- **Protected Areas**
- **Investment in natural capital** (restoration et al)

Transforming our approach to natural capital

Evidence base - Assessing values and actions

Assessing the value of working with natural capital has helped determine where ecosystems can provide goods and services at lower cost than by man-made technological alternatives and where they can lead to significant savings

- **USA-NY**: Catskills-Delaware watershed for NY: PES/working with nature saves money (~5US$bn)
- **New Zealand**: Te Papanui Park - water supply to hydropower, Dunedin city, farmers (~$136m)
- **Mexico**: PSAH to forest owners: aquifer recharge, water quality, deforestation, poverty (~US$303m)
- **France & Belgium:** Priv. Sector: Vittel (Mineral water) PES & Rochefort (Beer) PES for water quality
- **Venezuela:** PA helps avoid potential replacement costs of hydro dams (~US$90-$134m over 30yr)
- **Vietnam** restoring/investing in Mangroves - cheaper than dyke maintenance (~US$: 1m to 7m/yr)
- **South Africa:** WfW public PES to address IAS, avoids costs and provides jobs (~20,000; 52%♀)
- **Germany :** peatland restoration: avoidance cost of CO2 ~ 8 to 12 €/t CO_2 (0-4 alt. land use)

Critical to assess where working with nature saves money for public (city, region, national), private sector, communities and citizens & who can make it happen

Sources: various. Mainly in TEEB for National and International Policy Makers, TEEB for local and regional policy and TEEB cases

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Beneficiaries:

Public sector (e.g. water: nat. & municipalities) & **Public goods** (e.g. forests, biodiversity, climate),

Private sector (e.g. water, beer, energy, agriculture),

Citizens (e.g. water quantity, quality, price, security) and

Communities (e.g. payments, livelihoods/jobs, ecological assets & "GDP of the poor")

Decisions: conservation / restoration investment, PES / public programmes, spatial planning and protected areas, certification / labelling of products and production processes

Policy synergies: **Water – availability/quantity, quality,**

Climate - mitigation (green carbon) and (ecosystem based) adaptation to CC

Job creation and livelihoods

Security - natural hazards (e.g. flooding)**, water, energy**

Finances - public sector budget savings (Nat. gov't, public services, municipalities)

Industrial policy – energy, water, forestry, agriculture...

Consumer affordability

Poverty, community and culture

Development cooperation **and in each case : biodiversity.**

For Politicians / Decision makers - many policy synergies

Natures benefits : for free until they are gone

Over 75 % of the world's crop plants rely on pollination by animals

The annual economic value of insect-pollinated crops in the EU is about EUR 15 billion

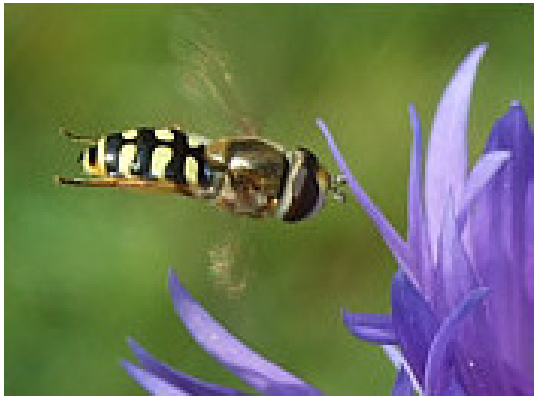
30 % of fruits, 7 % of vegetables and 48 % of nuts produced in the EU depend on pollinators

The value of a forest through its provision of natural pollinators: e.g. Costa Rica ~ at US$ 395 per ha/yr or 7% of farm Income (Ricketts et al. 2004).

UKNEA: economic value of biotic pollination as a contribution to crop market value in 2007 at EUR 629 million, 2011)

Loss of pollinators (domesticated & wild) reduces crop yield through reduced and unreliable pollination

Domesticated pollinator (honey bee)



Wild pollinator (hover fly)

Building on presentation by Dr Anne Franklin (2010), various references in "EU 2010 Biodiversity Baseline" (EEA, 2010) + UK NEA, 2011, Ricketts et al, 2004)

Carbon Storage : Climate mitigation values

Estimated value of carbon storage in 2010 and 2020 in ENPI South countries (high and low estimate): ***an illustration of the carbon value of forests***

	CO_2 stored in forest stock (living carbon) mtC02	Value of carbon storage 2010 € million (stock value)		Value of carbon storage in 2020 *with trend in forest cover and forest carbon from 1990 to 2010 continued to 2020 and with 2020 carbon prices* € million (stock value)	
	2010	Low @17.2 €/tCO2	High @ 32 €/tCO2	Low @ 39 €/tCO2	High @56 €/tCO2
Algeria	257	4,422	8,228	9,886	14,196
Egypt	25	437	813	1,051	1,509
Israel	18	301	560	696	999
Jordan	9	148	276	336	483
Lebanon	7	112	209	256	368
Morocco	809	13,915	25,888	31,606	45,383
OPT	1	18	33	40	57
Syria	43	743	1,383	1,690	2,427
Tunisia	33	571	1,062	1,370	1,967
ENPI South	1,202	20,668	38,451	46,931	67,389

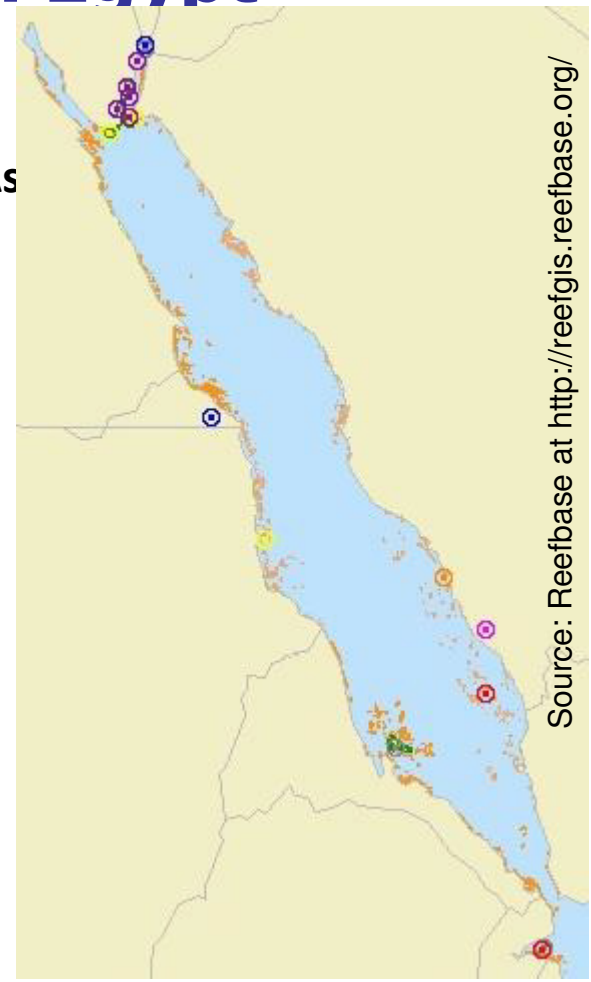
Source: ten Brink et al (2011),own calculations based on FAO (2011) data

ten Brink et al (2011) ***Analysis for European Neighbourhood Policy (ENP) Countries and the Russian Federation on Social and Economic Benefits of Enhanced Environmental Protection. Regional Report: ENPI South.*** **Available on** http://www.environment-benefits.eu/

http://www.enpi-info.eu/eastportal/news/latest/27505/EU-neighbours-could-save-up-to-150,000-lives-by-adopting-EU-environment-legislation

Examples of Value: Coral Reefs in Egypt

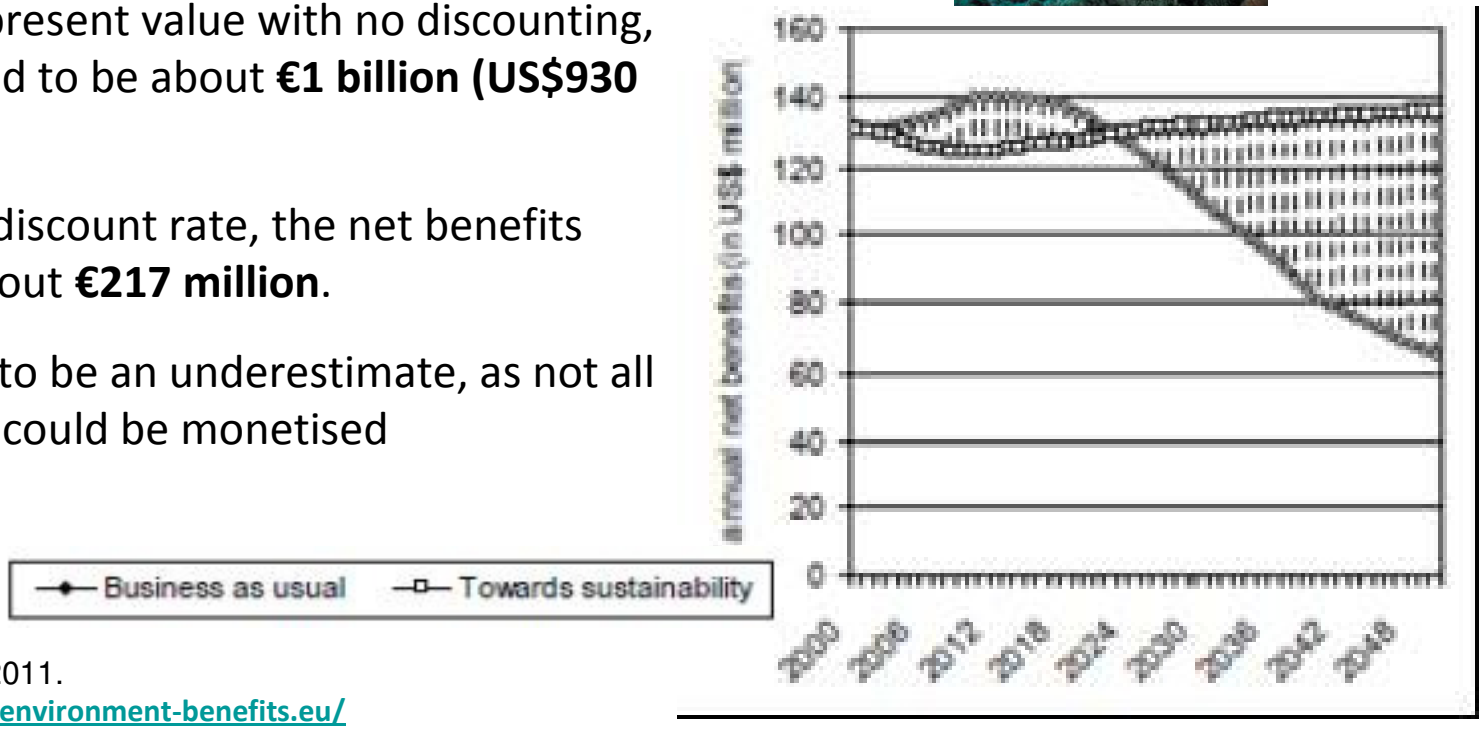
- In Egypt est. over **4,000 km2** of coral reefs (Cesar, 2003).
- Coral reefs biologically diverse ecosystems; **~>50% MPAs**
- Critical **habitat** for many marine species
- **ESS:** shoreline protection, generation of coral sand, nitrogen fixation, cultural services:
- **> 2 million tourists** visit the Egyptian Red Sea,
- **~ 30+ %** of them are **direct users of reefs** (Cesar, 2003).
- **Income** generated ~ **80 million LE** (EEA, 2009), ~ €10m/km2
- Range of **threats** - a global loss of over 10 % of these valuable ecosystems + 15 % lost due to warming of the surface ocean (EEAA, 2010b).



Bassi, S. and Nada, E. 2011. *Analysis for European Neighbourhood Policy (ENP) Countries and the Russian Federation on social and economic benefits of enhanced environmental protection - Arab Republic of Egypt Country Report.* **Available on** http://www.environment-benefits.eu/

Coral Reefs in Egypt (cont.)

- Cesar (2003) estimated the **monetary benefits related to tourism revenues, fishery, research, bio prospecting and biodiversity**, by comparing a **sustainable management scenario** in 2050 with **BaU (continued risks)**.
- The net benefit of sustainable management, using a net present value with no discounting, are estimated to be about **€1 billion (US$930 million)** .
- Using a **5 %** discount rate, the net benefits would be about **€217 million**.
- This is likely to be an underestimate, as not all the benefits could be monetised



Bassi, S. and Nada, E. 2011.
Available on http://www.environment-benefits.eu/

Decision making taking account of values

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Valuation of ESS from Kampala wetlands, Uganda

Services provided by the Nakivubo swamp include natural water purification and treatment & supporting small-scale income activities of poorer communities

Problem recognition: Plans to **drain** the **Nakivubo Swamp** (>40sqkm) for **agriculture** → **Waste water treatment capacity** of the swamp was assessed (Emerton 2004)

Assessment: Maintaining the wetlands: ~235.000$ p.a.
Running a **sewage treatment facility** of equivalent capacity: ~2Mio. US$ p.a.

Policy Solution: draining plans abandoned & Nakivubo Swamps designated as PA

Sources: TEEBCases for TEEB for local and regional policy

Recognising and demonstrating the values again critical for decision making. ⇨ **Capacity support .**

Establishment of a MPA: Tubbataha Reefs, Philippines

UNESCO World Heritage site, contains 396 species of corals & has higher species diversity per square meter than the Great Barrier Reef

Problem Recognition - 1998 Bleaching & losses

>>Stakeholders meeting

Policy Solution

"No-take" areas agreed, & later, the President passed the Tubbataha Reefs Natural Park Act in 2010 (10 mile buffer zone around the no-take marine reserve) thus increasing Park by 200%

Impacts of policy

- **Increase coral cover – 40% 1999-2003, 50% 2004**
- **Fish biomass in nearby reefs doubled since 2000 and perceived fish catches increased 1999 – 2004 from 10 to 15-20 kg/day**
- **Survey found a significant increase in living standards from 2000 to 2004**

Sources: Tongson 2007, Samonte-Tan et al. 2008, Dygico 2006; in TEEBCases for TEEB for local and regional Policy

Sourou River Valley, Burkina Faso

- **Traditional development strategies focused on converting wetlands for agriculture**

BUT: wetlands provide multiple ecosystem services contributing to the livelihood of about 60,000 people, worth some 15 Mio. € (Somda et al. 2010)

→ Agriculture is only one service among many others

Study helped Stakeholder and decision makers realise:

- **Importance of intact wetlands and their multiple ES for local economy**
- **Economic valuation of ES is an important tool for guiding wetland management and development strategies**

Local stakeholders call for including ES in local development plan
Cross-sectoral partnerships for integrated wetland management

Photo: abcBurkina (http://www.abcburkina.net/ancien/photos/riz_foto/sourou_750.jpg)

Ecosystem Service	%	Million EURO
Timber (fuelwood and construction)	37	5.6
Non-timber forest products	21	3.2
Pastures	18	2.7
Fishery	10	1.5
Transportation on water	10	1.5
Agricultural production	3	0.5
Tourism	1	0.2
Total	100	15.0

Source: Somda et al. 2010 Valeur économique de la vallée du Sourou: Une évaluation préliminaire. IUCN West Africa. URL:http://cmsdata.iucn.org/downloads/brochure_sourou_corrige_09_08_2010.pdf

Source: Somda et al. 2010

Sources: TEEBCases for TEEB for local and regional policy

Instruments taking account of values

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Payments for Ecosystem Services (PES):
One tool to make economics part of the solution

Instrument growing in applications

- **300 PES programmes globally, range of ecosystem services** (Blackman & Woodward, 2010)
- **Global value ~ USD 8.2 billion** (Ecosystem Marketplace, 2008; see also OECD 2010)
- **Increasing by 10-20% per year** (Karousakis, 2010)

Big and small

- e.g. **496 ha being protected in an upper watershed in northern Ecuador**
- e.g. **4.9 million ha sloped land being reforested by paying landowners China.**

Public (municipal, reg., nat.) **& private** eg Vittel (Fr), Rochefort (B), Bionade (D) for quality water

Local (e.g. New York, Quito), **Regional** (e.g. Niedersachsen), **national** (e.g Costa Rica, Mexico and Ecuador **and international** (e.g. REDD+, ABS)

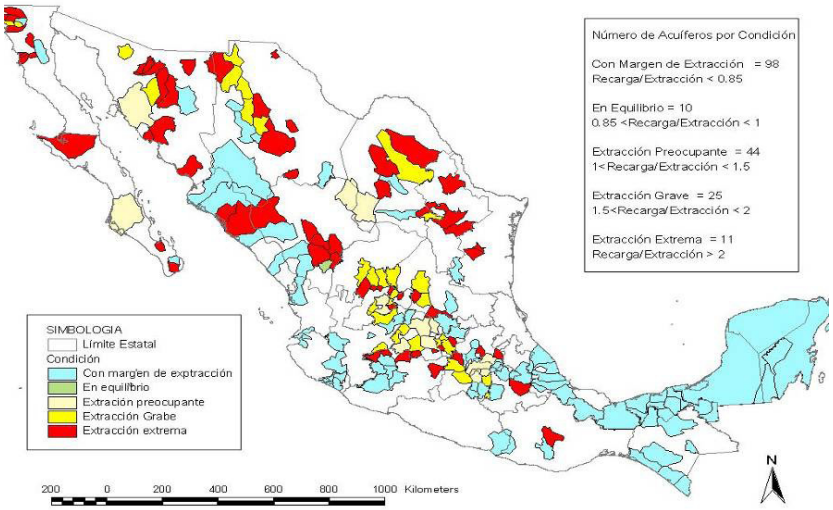
Target a range of objectives: water, deforestation, carbon storage, IAS, poverty…

See also Chapter 5 TEEB for Policy Makers

'Men do not value a good deed unless it brings a reward' Ovid, B.C. 43 – 18 A.D.

Hydrological services: Aquifer recharge; Improved surface water quality, reduce frequency & damage from flooding`

Solution: Mexico PSAH: PES to forest owners to preserve forest: manage & not convert forest

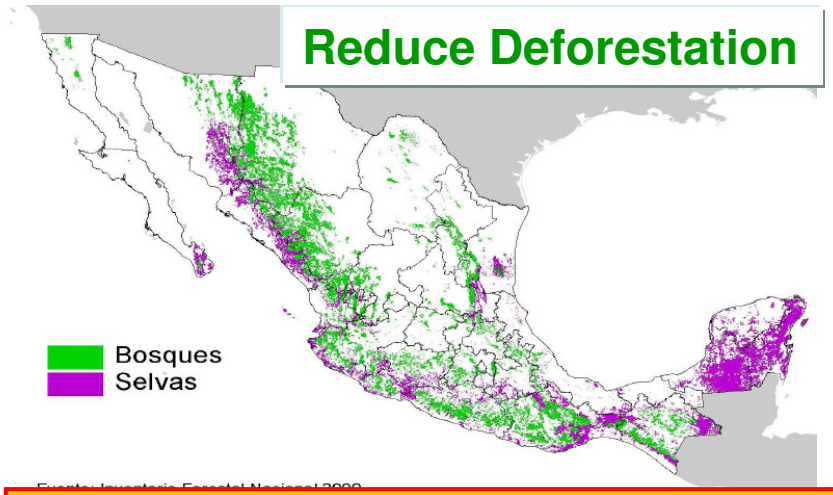


Result

Deforestation rate fell from 1.6 % to 0.6 %.

18.3 thousand hectares of avoided deforestation

Avoided GHG emissions ~ 3.2 million tCO2e



Investment in good spatially relevant data critical to develop an evidence base for policy instruments

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Subsidies:
Over $1trillion/year: a mix of "the good, the bad & the ugly"

Sector	Region
Agriculture	OECD: US$261 billion/year (2006–2008) (OECD, 2009)
Biofuels	US, EU and Canada: US$11 billion in 2006 (GSI, 2007; OECD, 2008b)
Energy	World: US$557 billion/year in 2008 (IEA, 2010)
Fisheries	World: US$15–US$35 billion/year (UNEP, 2008a)
Transport	World: US$238–US$306 billion/year, of which EHS are estimated at US$173–US$233 billion/year (Kjellingbro and Skotte, 2005)
Water	World: US$67 billion/year, of which EHS are estimated at US$50 billion/year (Myers and Kent, 1998)

(TEEB 2011 Chapter 6: Lehman & ten Brink et al 2011)

Opportunities: win-wins, reduce lock-in, progress towards a green economy; free up money to help with MEAs. EU should lead by example: EU Resource efficiency road map asks for an inventory 2012, road map/action plan 2013/4, full EHS reform 2020

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The Economics of Ecosystems & Biodiversity

Investment in ecological infrastructure

Ecological infrastructure is 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**
- **PAs & connectivity to facilitate resilience of ecosystems and species**

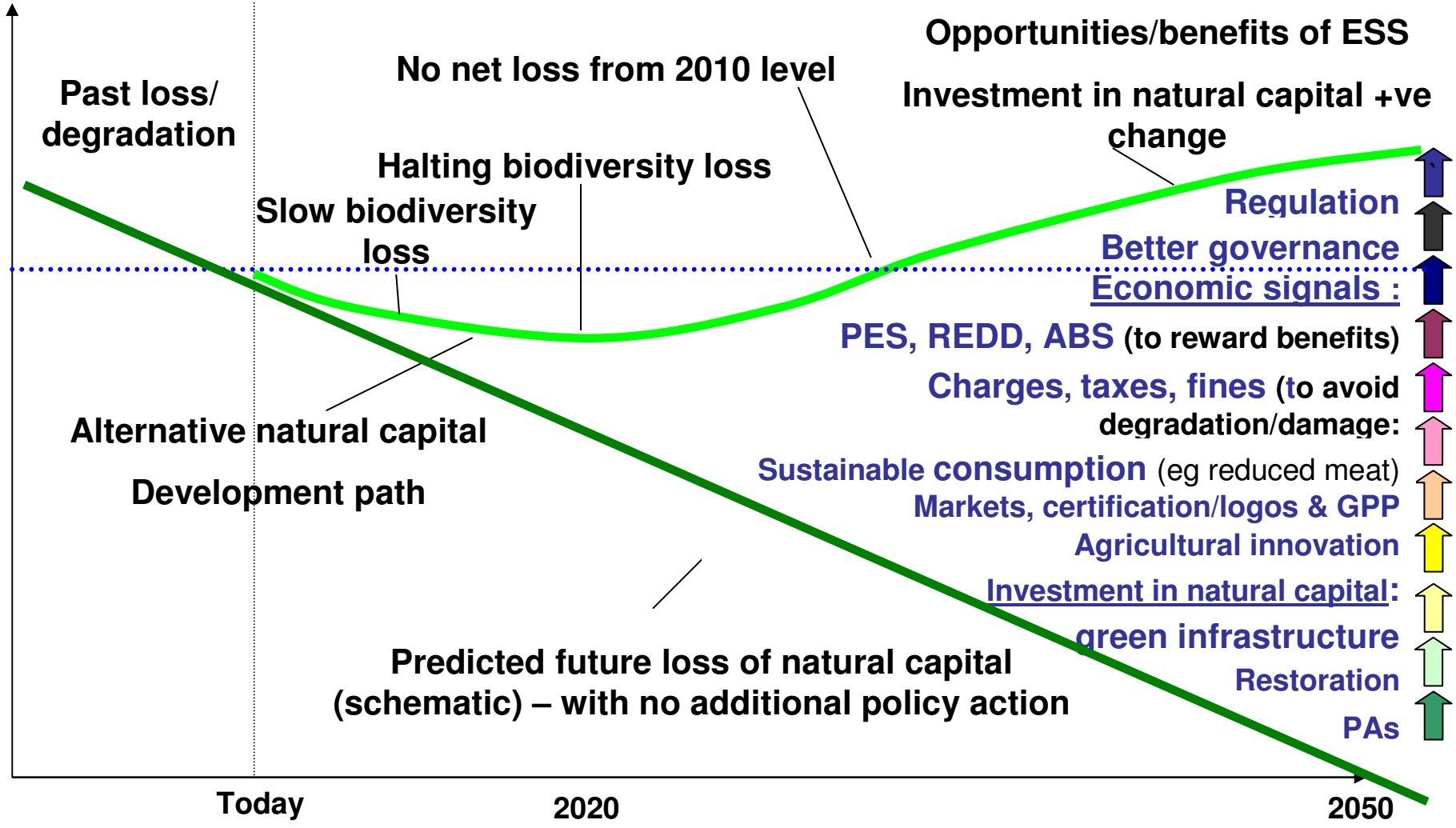
Can help adapt to climate change at lower cost than man-made technological solutions – critical to understand where and support it (eg restoration, protection & management, financing).

Adaptation to climate change will receive hundreds of US$ billions in coming years/decades.

Critically important that this be cost-effective.

Support for identifying where natural capital solutions are appropriate & invest.

Eroding natural capital base & tools for an alternative development path, towards a green economy



Need multi-level governance & engagement (government, business, communities, citizens) & integration – all essential for a transition to a green economy. Mainstream the values of nature.

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CBD COP 10, Aichi Accord/ Strategic Plan 2011-2020: Major Commitments.

The NBSAPs (National Biodiversity Strategies and Action Plans) are a key tool.

But links to other strategies and plans critical for NBSAPs success (and vice versa)

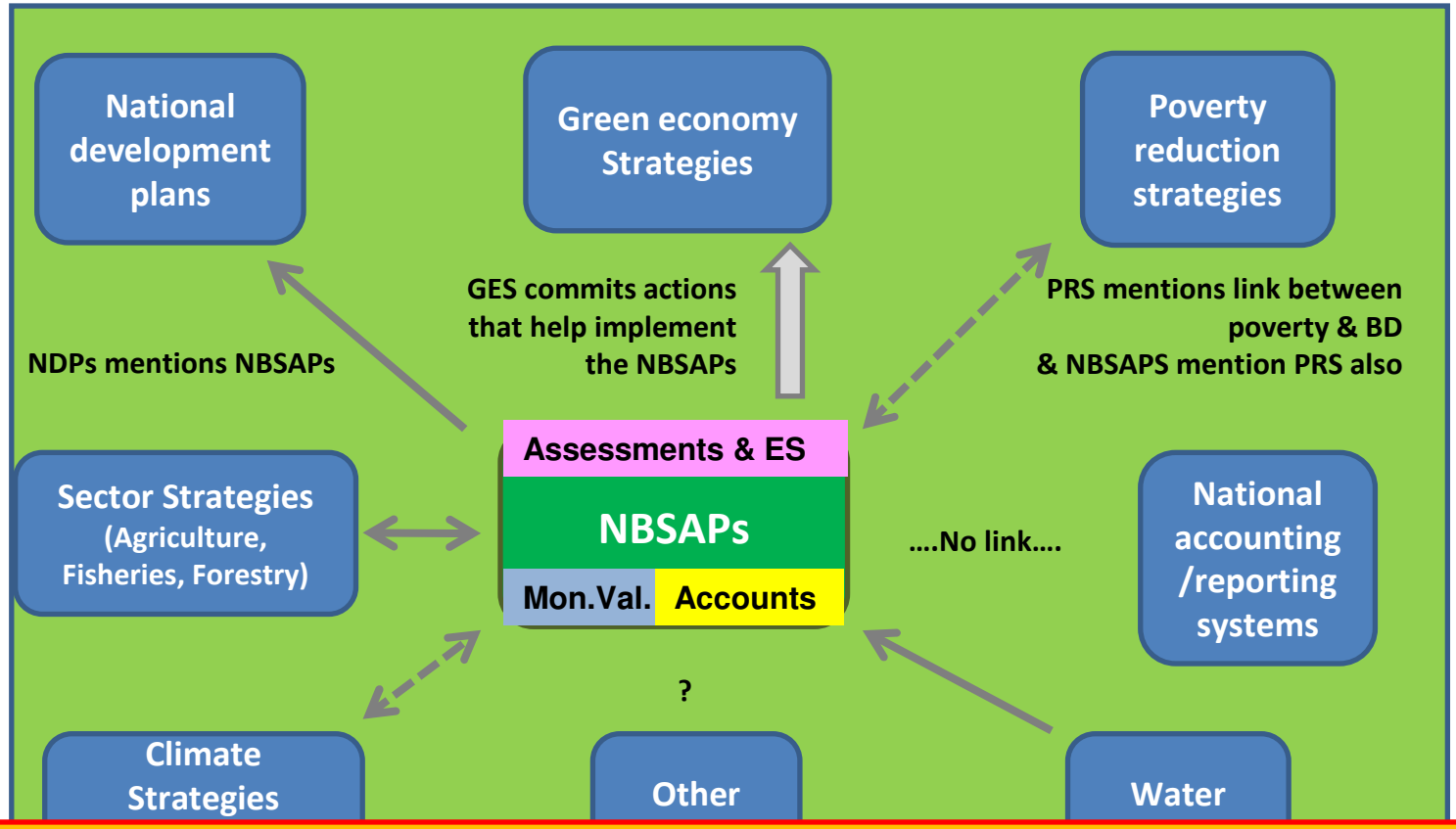
Key: Governance

Implicit integration/reference, one way: →

Implicit integration/reference, both ways ↔

Explicit integration/reference, one way: ⇒

Explicit integration/reference, both ways: ⇔



Good governance / efficiency via joined up thinking and planning;

mainstreaming the values of nature a useful tool to identify common agendas and policy synergies

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The Economics of Ecosystems & Biodiversity

Questions to You (Defra Review / Questionnaire)

1. NBSAP Status and Links to other Strategies and Plans
2. Incorporating Biodiversity and Ecosystem Services in NBSAPs
    1. What ecosystem assessment & (economic & social) valuation processes in your country?
    2. Reference to ecosystem services in NBSAPs?
    3. To what extent do NBSAPs reflect the value of biodiversity and ecosystem services?
    4. What values are picked up (e.g. of provisioning, regulating and cultural services)?
    5. Do NBSAPs commit to physical natural capital accounts?
    6. Do NBSAPs commit to economic environmental accounts?
    7. What do you see the right role for monetary valuation? What of other tools?
    8. What do you see as the role of Monetary valuation in mainstreaming biodiversity?
3. Constraints and Needs for International Assistance (see TEEB Phase 3 survey (Chloe Hill)

Please let us know of interesting practice in your countries on assessments, use of ES, valuing nature & monetary valuation, accounting & integration into NBSAPs & wider decision making

See web page for link to online questionnaire (via anna.chenery@unep-wcmc.org) and paper copies

We'll share the results on practice with all who wish it.

TEEB Summary

- **Making Natures Values Visible:** improved evidence base for improved governance, awareness for action – government (all levels), business, people
- **Measuring better to manage better:** from indicators to accounts, valuation & certification
- **Changing the incentives:** payments, taxes, charges, subsidy reform, markets
- **Protected areas:** biodiversity riches that can also offer value for money, recreation and cultural identity, tourism.
- **Ecological infrastructure and benefits:** climate change (mitigation/adaptation), air pollution & health et al
- **Natural capital and poverty reduction:** investment for synergies –livelihoods, food, water, fuel.
- **Mainstream the economics of nature:** across sectors, across policies, seek synergies across disciplines.

…is this enough to work out what to do?

…always better to look at the whole board
And engage the full set of players

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The Economics of Ecosystems & Biodiversity

Thank you

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

See also www.teeb4me.com

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IEEP is an independent, not-for-profit institute dedicated to the analysis, understanding and promotion of policies for a sustainable environment. www.ieep.eu

See also IEEP's award winning *Manual of European Environmental Policy*

http://www.ieep.eu/the-manual/introduction/ http://www.europeanenvironmentalpolicy.eu/

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Rijksoverheid

NORWEGIAN MINISTRY OF FOREIGN AFFAIRS

defra
Department for Environment Food and Rural Affairs

UKaid
from the Department for International Development

UNEP

Ministry of the Environment

Sida
SWEDISH INTERNATIONAL DEVELOPMENT COOPERATION AGENCY

The CBD Strategic Plan for the period 2011-2020 *"Aïchi Protocol"*

Strategic goal A: **Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society**

Strategic goal B: **Reduce the direct pressures on biodiversity and promote sustainable use**

Strategic goal C: **To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity**

Strategic goal D: **Enhance the benefits to all from biodiversity and ecosystem services**

Strategic goal E: **Enhance implementation through participatory planning, knowledge management and capacity building**

CBD (2010); see also ten Brink, P., Eijs, A., Lehmann, M., Mazza, L., Ruhweza, A., and Shine, C., (2011). Transforming our approach to natural capital: the way forward. In The Economics of Ecosystems and Biodiversity in National and International Policy Making. Edited by Patrick ten Brink. Earthscan, London and Washington

Strategic goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society

Target 1: **By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.**

Target 2: **By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.**

Target 3: **By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio-economic conditions.**

Target 4: **By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.**

CBD (2010)

Strategic goal B: Reduce the direct pressures on biodiversity and promote sustainable use

Target 5: **By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.**

Target 6: **By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.**

Target 7: **By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.**

CBD (2010)

Strategic goal B: .cont.

Target 8: **By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.**

Target 9: **By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.**

Target 10: **By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.**

CBD (2010)

Strategic goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity

Target 11: **By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascapes.**

Target 12: **By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.**

Target 13: **By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.**

CBD (2010)

Strategic goal D: Enhance the benefits to all from biodiversity and ecosystem services

Target 14: **By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.**

Target 15: **By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.**

Target 16: **By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.**

CBD (2010)

Strategic goal E: Enhance implementation through participatory planning, knowledge management & capacity building

Target 17: **By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.**

Target 18: **By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.**

Target 19: **By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.**

Target 20: **By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan 2011-2020 from all sources and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization should increase substantially from the current levels. This target will be subject to changes contingent to resources needs assessments to be developed and reported by Parties.**

CBD (2010)

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Annex – Questionnaire

Reviewing the incorporation of biodiversity and ecosystem services into NBSAPs

UNEP-WCMC & IEEP on behalf of Defra, UK;

a contribution to TEEB Phase 3

Reviewing the incorporation of biodiversity and ecosystem services

Introduction

Thank you for contributing to this survey, which is being conducted by UNEP-WCMC and IEEP for a project to examine the lessons learnt from incorporating the values of biodiversity and ecosystems into the development of National Biodiversity and Action Plans (NBSAPs). It has been commissioned by the UK Department of Environment Food and Rural Affairs (Defra), in co-ordination with the Secretariat of the Convention on Biological Diversity (CBD).

The survey is being conducted to collect insights on different country practice and also assist in the identification of a selection of case study countries for further follow-up to explore interesting approaches. The summary survey results will contribute to a report on good practice and lessons learnt on integrating biodiversity and ecosystem service valuation into NBSAPs and hence support the implementation of Target 1 and 2 of the Strategic Plan for Biodiversity 2011-2012. This report will be available to all survey respondents.

Please Note: The questions in this survey are aimed at production of updated and revised NBSAPs which align with the Strategic Plan for Biodiversity 2011-2020 and the associated Aichi Biodiversity Targets.

Reviewing the incorporation of biodiversity and ecosystem services

Section 1: NBSAP Status and links to other strategies and plans

National Biodiversity Strategies and Actions Plans (NBSAPs) are the principal instruments for implementing the CBD at the national level. At CBD COP 9 (Decision IX/8) and CBD COP 10 (Decision X/2) Parties adopted guidance for the revision of their NBSAPs and agreed to revise their NBSAPs in line with the Strategic Plan for Biodiversity 2011-2020, respectively.

This section of the survey briefly examines the current status of NBSAP revision and links to other policies and strategies which may support biodiversity mainstreaming.

For further information visit the NBSAPs pages of the CBD website.

1.1 What is the status of NBSAP updating in your country?

- ◯ Completed
- ◯ Some elements and parts completed
- ◯ NBSAP updating plans generated, but work has not yet commenced on NBSAP updating
- ◯ No work conducted so far
- ◯ Don't know

1.2 How is work on NBSAP updating in your country organized?

- ◯ One ministry/agency has responsibility for completing the entire NBSAP, in isolation from other agencies and sectors
- ◯ One agency has responsibility for completing the entire NBSAP, consultations are untaken with other agencies and sectors
- ◯ Different agencies are responsible for completing different sections of the NBSAP
- ◯ Don't know
- ◯ Other (please specify)

1.3 What format does/will your revised NBSAP take?

- ◯ A single document
- ◯ Several 'stand alone' elements which relate to different aspects of the NBSAP, e.g. separate strategy, action plan, implemention plan, finance plan etc.
- ◯ Several 'stand alone' elements for different sectors and /or cross-sectoral policies and programs
- ◯ Other (please specify)

Reviewing the incorporation of biodiversity and ecosystem services

1.4 Please provide other relevant information on NBSAP updating organization:

1.5 Does/will your countries' NBSAP link to any of the following (tick all that apply):

- ☐ Development Plans
- ☐ Poverty Reduction Strategies/Plans
- ☐ Green Economy Strategies/Plans
- ☐ Forestry Strategies/Plans
- ☐ Fisheries Strategies/Plans
- ☐ Agriculture Strategies/Plans
- ☐ Climate Change Strategies/Plans
- ☐ Budgets
- ☐ Legislation
- ☐ Other (please specify)

1.6 Do these links focus on biodiversity and ecosystem service valuation?

- ◯ Yes
- ◯ No

If 'Yes', please give a brief summary below

Reviewing the incorporation of biodiversity and ecosystem services

Section 2: Incorporating Biodiversity and Ecosystem Service values into NBS...

Biodiversity and ecosystem service values may be incorporated into revised NBSAPs for a number of reasons, including:

- To highlight the contribution of biodiversity and ecosystem services

- To align NBSAPs with the Strategic Plan for Biodiversity, particularly Strategic Goal A and underlying Aichi Biodiversity Targets 1 and 2.

- As a tool for mainstreaming biodiversity across sectors, policies and programmes.

The importance and value of biodiversity and ecosystem services can be presented by both non-monetary (qualitative, quantitative and spatial) and monetary terms. In general to have a full appreciation of the value of nature requires a mix of measures.

This section of the survey examines the approached used for incorporating biodiversity and ecosystem service values into NBSAPs

For supporting information on biodiversity and ecosystem service assessment and evaluation click here.

2.1 Are you aware if any of the following assessment or valuation approaches are used for policy support in your country?

	Always used	Frequently used	Rarely used	Never used	Do not know
Ecosystem assessments	◯	◯	◯	◯	◯
Economic valuation	◯	◯	◯	◯	◯
Social valuation	◯	◯	◯	◯	◯

Definitions

Ecosystem assessments are to be understood as the gathering of physical and spatial information relating to the quality and health of ecosystems, using biodiversity and ecosystem service indicators. An analysis of the interactions of ecosystems with economic and social systems may be part of it.

Economic valuation refers to the assignment of money values to non-marketed assets, goods and services, where the money values have a particular and precise meaning.

Social valuation is to be understood as the attempt to understand the interaction between ecosystems and e.g. people's livelihoods, health, quality of life, etc. There are many techniques for this 'valuation' and 'monetary valuation' is just one way to express the results.

Reviewing the incorporation of biodiversity and ecosystem services

2.2 To what extent does/will your NBSAP make reference to ecosystem services (ES)?

- ◯ No mention
- ◯ Recognition of ecosystem services
- ◯ Recognition of ES and commitment to develop ES indicators
- ◯ Recognition of ES and commitment to do **ecosystem assessments** including mapping
- ◯ Don't Know

Which ecosystem services are recognized?

2.3 To what extent does/will your NBSAP reflect the value of biodiversity and ecosystem services?

- ◯ No current mention
- ◯ Recognition of value but no commitment to do valuation
- ◯ Recognition of values and commitments to do valuation/assess values
- ◯ Recognition of values plus commitment to take the values into account in decision making.
- ◯ Don't Know

Reviewing the incorporation of biodiversity and ecosystem services

Section 2: Incorporating Biodiversity and Ecosystem Service values into NBS...

2.4 This recognition of biodiversity and ecosystem services value covers (tick all that apply):

- [ ] The direct value to the economy - i.e. focused on 'provisioning services' such as timber, food, materials
- [ ] Other values to the economy from 'regulating services' - such as water regulation/purification, erosion control, pollination, disease regulation, climate mitigation.
- [ ] 'Cultural and social values' with potential economic benefits -e.g. landscape and amenity values, ecotourism and recreation
- [ ] Wider 'Cultural and social values' with no direct impact on the economy – e.g. related to wellbeing, identity, cultural, aesthetic and spiritual values.
- [ ] Intrinsic value – biodiversity for its own sake
- [ ] Other

Please provide further details

2.5 To what extent does/will your NBSAP incorporate commitments to / announce measures in the area of complementing national economic accounts with natural capital / environmental accounts – i.e. *physical accounts in physical units?*

See 'Background' for further information.

- ◯ Doesn't
- ◯ Acknowledges need
- ◯ Commits to doing
- ◯ Announces measures and makes link to clear targets (e.g. timeline)
- ◯ Don't know

Reviewing the incorporation of biodiversity and ecosystem services

2.6 To what extent does/will your NBSAP incorporate commitments to / announce measures in the area of integrated economic and environmental accounting (as per UN SEEA and WAVES) – i.e. *monetary accounts in monetary units?*

See 'Background' for further information.

- ◯ Doesn't
- ◯ Acknowledges need
- ◯ Commits to doing
- ◯ Announces measures and makes link to clear targets (e.g. timeline)
- ◯ Don't know

2.7 Understanding the value of nature can be achieved with or without the use of economics as sometimes an ecological, qualitative, quantitative and spatial understanding can be enough. What do you see as the right role of economic valuation? What other tools are valuable?

2.8 What do you think of monetary valuation as a tool for mainstreaming biodiversity into policy-making and society?

- ◯ Can and should play a primary role
- ◯ Can play a primary role
- ◯ Is one tool of many, but has a place in a toolkit
- ◯ Should be used in specific cases only
- ◯ Should not be used
- ◯ Don't know

Please feel free to explain your choice; we'd welcome your insights

Reviewing the incorporation of biodiversity and ecosystem services

Section 3: Constraints and needs for International assistance

3.1 What are the main constraints/envisioned constraints for incorporation of biodiversity and ecosystem service valuation in NBSAPs?

Please rank constraints by significance, 1 being the most significant constraint, 8 being the least

	1	2	3	4	5	6	7	8	9
Lack of political support for the assessment and integration of the value of nature given its intrinsic value	◯	◯	◯	◯	◯	◯	◯	◯	◯
No ministry/agency has responsibility for incorporating biodiversity and ecosystem service valuation into NBSAPs.	◯	◯	◯	◯	◯	◯	◯	◯	◯
Lack of collaboration between ministries/agencies for incorporating biodiversity and ecosystem service valuation into NBSAPs.	◯	◯	◯	◯	◯	◯	◯	◯	◯
Little work completed or available on biodiversity and ecosystem valuation for use in NBSAP updating	◯	◯	◯	◯	◯	◯	◯	◯	◯
General lack of technical and institutional capacity for incorporating biodiversity and ecosystem service valuation into policy processes more broadly	◯	◯	◯	◯	◯	◯	◯	◯	◯
Lack of technical and institutional capacity for incorporating biodiversity and ecosystem valuation into NBSAPs	◯	◯	◯	◯	◯	◯	◯	◯	◯
Lack of guidance materials on incorporating biodiversity and ecosystem valuation in NBSAPs	◯	◯	◯	◯	◯	◯	◯	◯	◯
Finance issues	◯	◯	◯	◯	◯	◯	◯	◯	◯
Other	◯	◯	◯	◯	◯	◯	◯	◯	◯

If other (please specify)

3.2 Please provide more information on constraints encountered/envisioned:

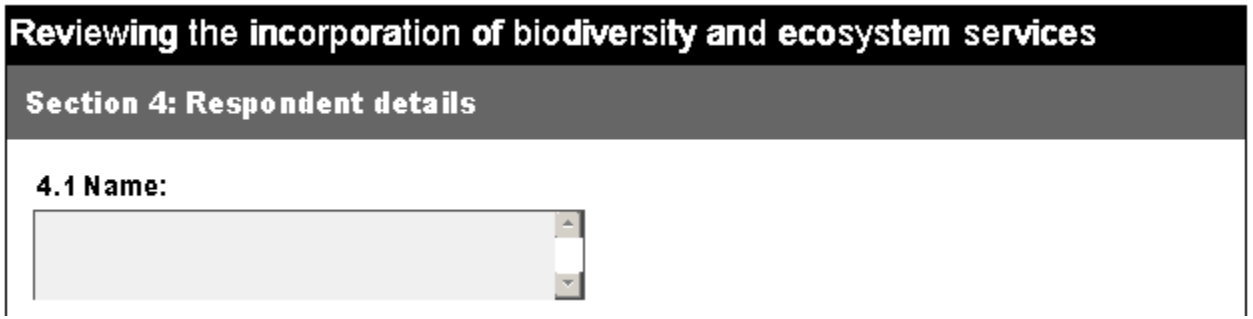
Reviewing the incorporation of biodiversity and ecosystem services

3.3 In addition to in increased funding, what are the most important ways international assistance can support the incorporation of biodiversity and ecosystem service valuation into NBSAPS:

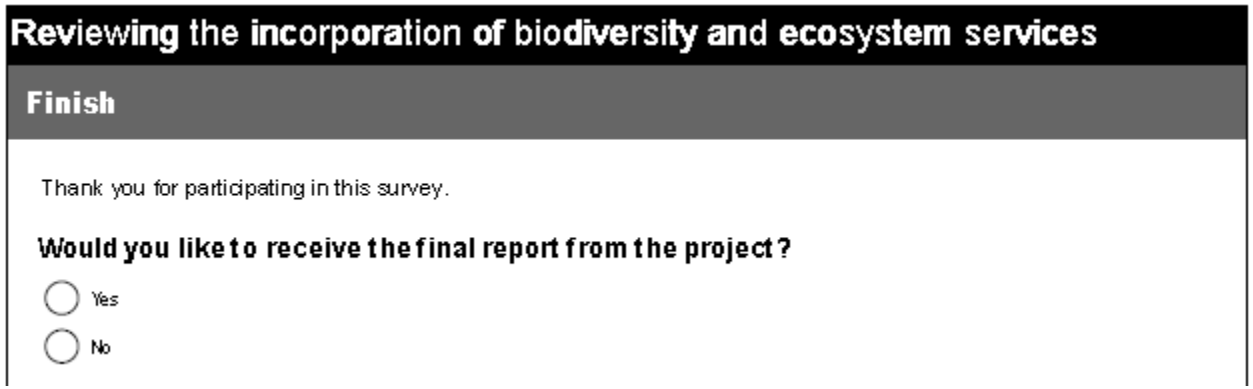
Please rank constraints by significance, 1 being the most significant constraint, 8 being the least

	1	2	3	4	5	6	7	8	9
Specific guidance materials on incorporating biodiversity and ecosystem services valuation into NBSAPs	◯	◯	◯	◯	◯	◯	◯	◯	◯
Lessons learnt and national examples of good practice for incorporating biodiversity and ecosystem services into NBSAPs	◯	◯	◯	◯	◯	◯	◯	◯	◯
In country capacity building workshops	◯	◯	◯	◯	◯	◯	◯	◯	◯
Regional capacity-building and exchange workshops	◯	◯	◯	◯	◯	◯	◯	◯	◯
Policy support tools	◯	◯	◯	◯	◯	◯	◯	◯	◯
Online help desks	◯	◯	◯	◯	◯	◯	◯	◯	◯
Advisory services	◯	◯	◯	◯	◯	◯	◯	◯	◯
Technical support from The Economics of Ecosystems and Biodiversity (TEEB) Network	◯	◯	◯	◯	◯	◯	◯	◯	◯
Other (optional)	◯	◯	◯	◯	◯	◯	◯	◯	◯

If Other (please specify)



etc



The questionnaire can be emailed to you (contact anna.chenery@unep-wcmc.org) and also available in paper copy

Annex – additional cases

Working for Water (WfW): SA
The Manalana wetland (near Bushbuckridge, Mpumalanga)
Restoration within wider PES scheme

- **Severely degraded by erosion that threatened to consume the entire system**
- **WfW public works programme intervened in 2006 to reduce the erosion and improve the wetland's ability to continue providing its beneficial services**

Results

- **The value of livelihood benefits from degraded wetland was just 34 % of what could be achieved after investment in ecosystem rehabilitation;**
- **Rehabilitated wetland now contributes provisioning services at a net return of 297 EUR/household/year;**
- **Livelihood benefits ~ 182,000 EUR by the rehabilitated wetland; x2 costs**
- **The Manalana wetland acts as a safety net for households.**

Sources: Pollard et al. 2008; **Wunder et al 2008a; http://www.dwaf.gov.za/wfw/**

Sources: TEEBCases for TEEB for local and regional policy

Recognising and demonstrating the values and potential for increased value critically important.