

Valuation of biodiversity and associated ecosystem services

Markus Lehmann, CBD Secretariat
Andrew Seidl, IUCN

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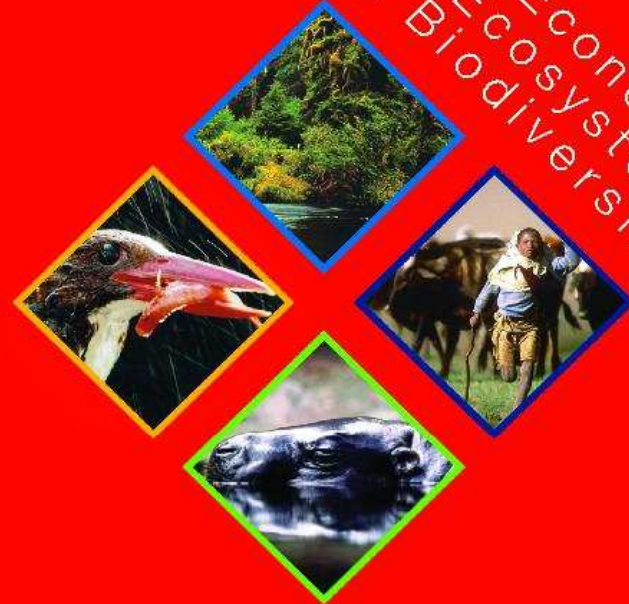


28

AN EXPLORATION OF TOOLS AND
METHODOLOGIES FOR VALUATION OF
BIODIVERSITY AND BIODIVERSITY
RESOURCES AND FUNCTIONS



The Economics & of Ecosystems of Biodiversity



TEEB FOR LOCAL AND REGIONAL
POLICY MAKERS

Aichi target 2 of the Strategic Plan

“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.”

Different types of biodiversity values...

“...the intrinsic value, ecological, genetic, social, economic, scientific, educational, cultural, recreational and aesthetic values of biological diversity and its components;” (decision X/3, paragraph 9 (b) (ii))

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Different types of biodiversity values...

*“...the intrinsic value, ecological, genetic, social, **economic**, scientific, educational, cultural, recreational and aesthetic values of biological diversity and its components;” (decision X/3, paragraph 9 (b) (ii))*

→ now: focus on economic values

What are economic values?

Some important observations...

Economic value \neq commercial value

individuals may assign value for different reasons or motives, and not only for the immediate benefits of commercial exploitations of resources

what matters is that they are willing to give up (some amount of) something of value to them (e.g., money) in exchange for biodiversity/ecosystem services:

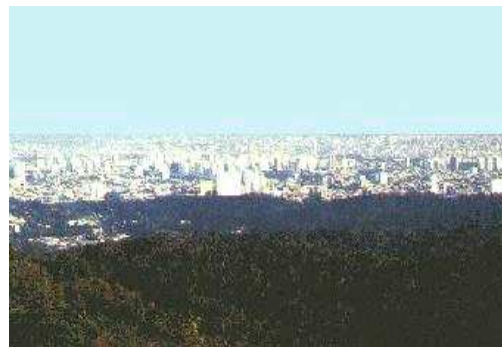
“willingness-to-pay”

Valuation \neq monetization

other ‘payment vessels’ possible

(combination with) qualitative or semi-qualitative methods

What is this?



A water purification plant

***A flood control
mechanism***

A paradise for flyfishing

A food production factory

An aesthetic pleasure

A god

A sports facility

A pollinator

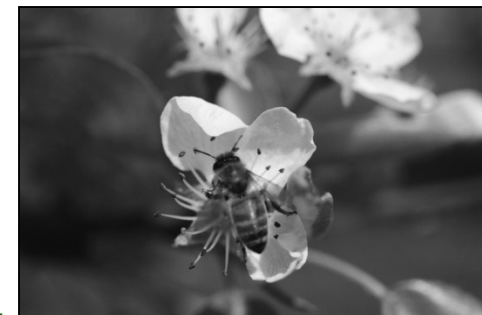
A scientific breakthrough

An air conditioner

One ecosystem

***→ many different services
and benefits***

***→ require different approaches/tools
to valuation***



Why undertaking (economic) valuation?

The basic narrative

Some ecosystem services are traded and valued on markets...

e.g., many (but not all) provisioning services

...but many others are not:

Because they bear characteristics of public goods: nobody can be excluded from their use, and markets cannot form

No price signal that indicates scarcity of biodiversity

Hence no or weak incentives for individual conservation/sustainable use efforts

But: valuation does not necessarily imply correcting prices!

...and sometimes markets are small and escape formal statistics

(Economic) valuation shall elicit “hidden” biodiversity values for better decision-making

Limits to (economic) valuation...

The **advantage** of economic valuation is that it puts biodiversity values 'on an equal footing' with other economic benefits and costs, BUT:

Some values cannot be measured...

(e.g., intrinsic, religious values)

...but need to be **recognized** nevertheless.

Others can be measured but are difficult to monetize...

...their values need to be **demonstrated** (by other tools).

Still others can be measured and monetized...

...their value can be **captured** by applying economic valuation tools.

How to decide?

Stakeholder involvement critical!

Valuing biodiversity, ecosystems, or ecosystem services?

Valuing ecosystem services is easier than valuing biodiversity

Role of biodiversity in ecosystem functions, and role of ecosystem functions in providing ecosystem services

Valuing individual ecosystem services is easier than valuing whole ecosystems

- Stock vs flow
- Achieving comprehensiveness while avoiding double-counting
- Net present value and the role of discount rates

Total Economic Value (TEV)

TOTAL ECONOMIC VALUE (TEV)

USE VALUE

NON-USE VALUE

TEV CATEGORIES	Direct use value Consumptive, non-consumptive	Indirect use value	Option value	Existence value Bequest value (for future generations)
EXAMPLES for Biodiversity	Hunting Fishing Timber harvesting Harvesting of non-timber forest products Harvesting of biomass Recreation/tourism	Watershed protection (erosion control, local flood reduction, regulation of streamflows, storm protection) Ecological processes (fixing and cycling of nutrients, soil formation, circulation and cleansing of air and water, climate regulation, carbon fixing, global life support)	Genetic resources Old-growth forest (irreversibilities!)	Charismatic mega-fauna (whales, great apes, etc.) and their habitats
COMMONLY USED VALUATION METHODS	Change in productivity, cost-based approaches, hedonic prices, travel cost, stated preference methods	Change in productivity, cost-based approaches, stated preference methods	Change in productivity, cost-based approaches, stated preference methods	Stated preference methods

Tools

1. **Revealed-preference methods**

individuals reveal their willingness-to-pay in actual behavior (e.g., in “surrogate” markets)

2. **Stated-preference methods**

individuals state their willingness-to-pay in hypothetical behavior, by responding to questionnaires

3. **Benefit (functions) transfer**

transfer results of one or several studies to a comparable site

Tools

General assessment

- **Valuation tools can generally provide useful and reliable information when applied carefully and according to best practice**
- **Choice of tools is situation-dependent (which types of values are deemed to be relevant?)**
- **Tools can be combined among each other**
 - Capturing different types of value
 - Sensitivity analysis
- **Tools can be combined with deliberative/ participatory approaches**
 - Sensitivity analysis
 - Distributional impacts
 - Non-economic considerations, sensitivities

Tools

General assessment (cont.)

- The application of many methods is costly and time consuming, and require much data
- Many methods also require much prior economic understanding and technical expertise
- Tradeoff between cost and reliability
- Revealed preference methods inherently more reliable, but:
- Tradeoff between reliability and applicability (capturing non-use values!)
- Benefits transfer for rapid assessments ('quick&dirty')

Apply a cost-benefit criterion to the valuation itself, including to the choice of the valuation tool(s)

Example: Mangrove forests in Southern Thailand

- Study covers some (direct and indirect) use value of mangrove forests
- Direct use values: fish/seafood, honey, timber (boat repairs)
- Indirect use values: fish breeding ground (for offshore fisheries); coastal protection; [carbon storage – not considered in trade-off analysis]
- Change-in-productivity approach; replacement cost
- Policy question: mangrove conservation or conversion to shrimp farms?
- Source: Sathratai and Barbier 2001 and updates, TEEB

Example: Mangrove forests in Southern Thailand

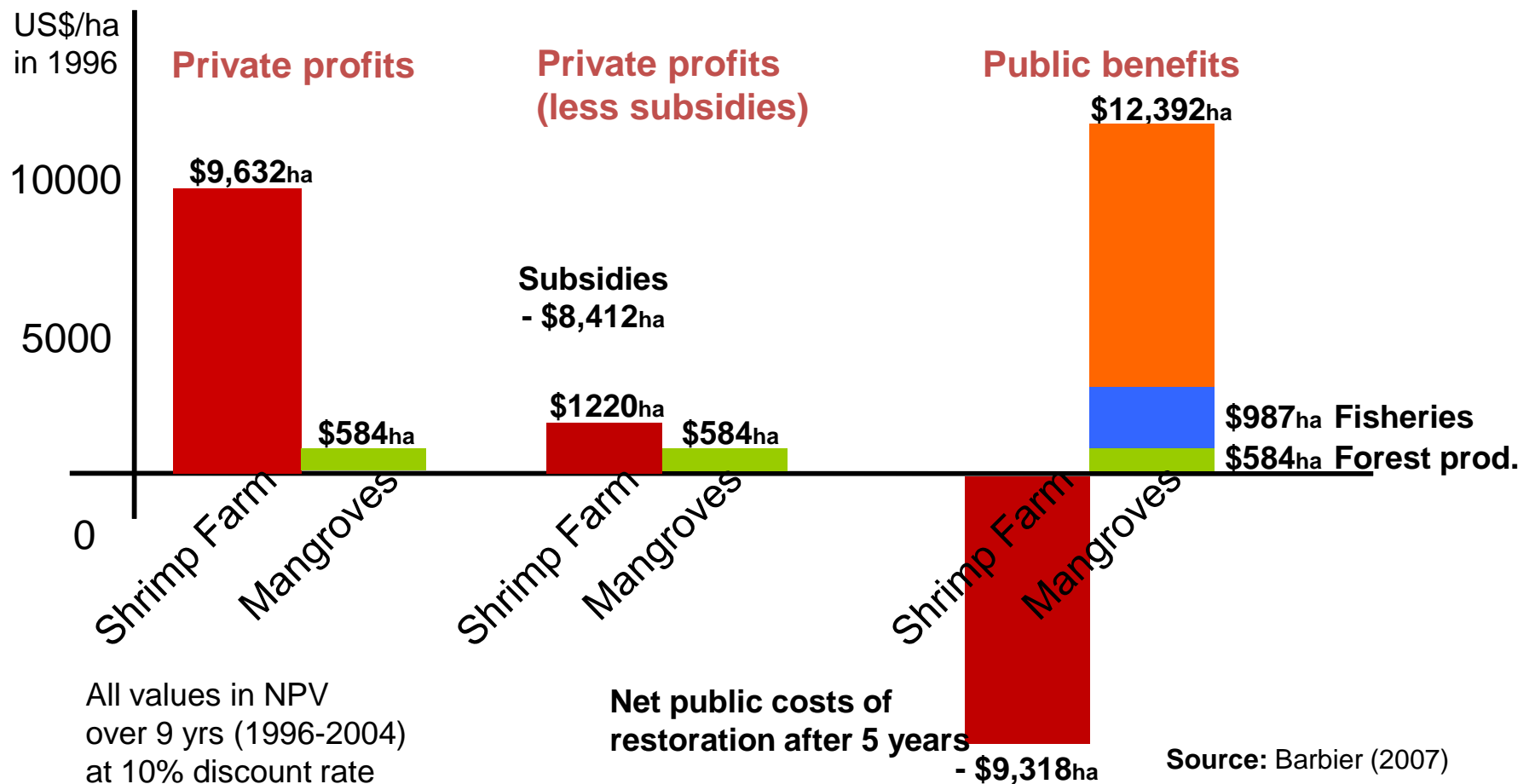
NET PRESENT VALUE OF MANGROVE FOREST BENEFITS*	
BENEFIT	Value (US\$) per ha
DIRECT USE VALUE:	
Net income from timber and non-timber products	87.84
INDIRECT USE VALUE:	
Offshore fishery linkages	20.82–68.90
Coastline protection	3,678.96
TOTAL DIRECT AND INDIRECT USE VALUE	3,787.62–3,835.70
DIRECT USE VALUE ONLY:	
Net present value (10% discount rate)	822.59
Net present value (12% discount rate)	734.83
Net present value (15% discount rate)	632.27
DIRECT AND INDIRECT USE VALUES:	
Net present value (10% discount rate)	35,470.72–35,920.98
Net present value (12% discount rate)	31,686.34–32,088.57
Net present value (15% discount rate)	27,264.13–27,610.22

* All net present value calculations are based on a 20-year time line.

Source: CBD TS 28, p.46, Sathratai and Barbier 2001.

Example: Mangrove forests in Southern Thailand

Shrimp farms vs mangroves



Valuation and national accounting

- UN SEEA (system of integrated economic and environmental accounts)
- Latest version 2003, currently under review
- Strengthening ecosystem components one goal of the review
- Environmental accounts are satellite accounts and mainly bio-physical
- Some sectoral accounts are operational and being already implemented by countries (e.g., water)
- Strengthen ecosystem (service) components in existing sectoral accounts?
- Global Partnership on Wealth Accounting and the Valuation of Ecosystem Services (WAVES)

Applications

Awareness raising

Stand alone valuation exercise, for instance of one or a few ecosystem services which are key in the specific national context

See also Aichi target 1!

Project level

Project appraisal: integration into economic decision-making tools

- Cost-benefit analysis (CBA)

- Cost-effectiveness analysis

- Correcting prices (e.g. entry fees for national parks)

Programme/policy level

- Integration into/interaction with other assessment tools (SEA)

- Development of (sector) strategies and planning processes, land use planning

- Integration into national accounting (SEEA)

What are your country's national objectives and priorities?

Achievements in the region

Some valuation studies already undertaken...

- Mangrove conservation in Southern Thailand
- Forest ecosystem services in Sekong Province, Lao PDR
- Forest ecosystem services in Malaysia
- Changbaishan Mountain Biosphere Reserve, China

(see CBD TS 28)

- (...)
- At regional level: Coastal ecosystem services of the South China Sea (unepscs.org)
- Ongoing: InVEST project on mapping ecosystem services in the Upper Yangtze River Basin

Initiatives for environmental accounting

- China, India, Philippines,...
- India and Philippines are among the first round of participating pilot countries in the WAVES partnership

Achievements in the region

NBSAPs and National Reports

Frequent references to valuation/integration of biodiversity values made in existing NBSAPs

- Few concrete activities identified
- No timelines

Achievement: integrating valuation into EIA

“In 2008, the Department of Environment (DOE) introduced Guidelines on Economic Valuation of The Environmental Impacts for Environmental Impact Assessments (EIA) Projects. This guideline constitutes a component of the requirements to prepare detailed EIA. It provides advice and instructions to assist project initiators, as well as a checklist for officers at DOE. It will also ensure the importance of biodiversity and its components are identified, quantified and where possible monetised in relation to the preparation of Environmental Impact Assessments.”

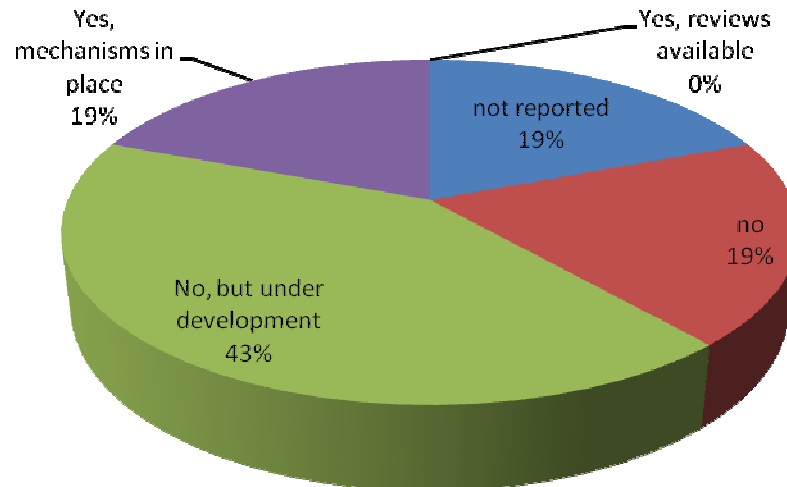
Malaysia, 4th National Report, April 2009

Achievements in the region

3rd National Reports

East, South, South-East Asia (20 out of 25 countries)

84. ♦ Has your country developed the mechanisms or approaches to ensure adequate incorporation of both market and non-market values of biological diversity into relevant plans, policies and programmes and other relevant areas? (decisions III/18 and IV/10)	
a) No	5
b) No, but relevant mechanisms are under development	11
c) Yes, mechanisms are in place (please provide details below)	5
d) Yes, review of impact of mechanisms available (please provide details below)	0



Valuation: a flexible approach

Picking the low-hanging fruit in valuation...

Many valuation tools are costly and time-consuming to apply, and require considerable technical expertise and capacity...

- Apply a cost-benefit-criterion to the valuation exercise itself
 - ✓ Aim to capture the most important ecosystem services/elements of TEV in a specific context – do not seek comprehensiveness at all cost
 - ✓ Use simpler tools whenever appropriate
 - ✓ Consider using qualitative/semi-quantitative representations; do not monetize at all cost

Valuation: a flexible approach

A simple step-wise approach...

1. Define the **decision-making problem** at hand
 - This may involve the definition of (stylized) scenarios for the different options
2. Identify the **most important ecosystem services** (or components of TEV) in the specific context
 - in many situations, these will be a few key direct and indirect use values
 - Stakeholder involvement will be critical (example: identification of the role of NTFR for local well-being!)
 - aim for option and existence value only when there is a clear indication that these values are of particular significance in the specific context (because those are particularly difficult to evaluate)

Valuation: a flexible approach

A simple step-wise approach... (cont)

3. Considering using the following (comparatively simple) tools:

- Existing market data: for many direct use values (e.g.: local market prices for many NTFR; tourism revenues;...)
- Cost-based approaches: e.g. replacement cost associated with the loss of indirect use values
- Travel cost approach for tourism/site-seeing
- Benefits transfer: for rapid assessments, and with due caution
- Change-in-productivity method: for important indirect use values when good scientific data is available

Valuation: a flexible approach

A simple step-wise approach... (cont)

4. Use indicators for human well-being which are meaningful and practicable in the present context

- In some cases, using highly aggregated monetary figures will actually obfuscate the contribution of ecosystem services to local well-being

For instance, the monetary figures for NTFR are often low in absolute terms and need to be complemented by indicators of their relative importance for human well-being

- Being spatially explicit will often be helpful (see Tanzania example)

Examples for possible indicators:

- Percentage share of NTFR in monetary/non-monetary income
- Dietary contribution of food NTFR
- Annual revenue from tourism sector, number of type of jobs created
- Etc.

Questions for discussion

- ✓ What are the most important areas of applying (economic) valuation in your country (e.g., awareness-raising, application within CBA/CEA, SEA, land use planning, green accounting)?
- ✓ What are the most important ecosystem services in your countries where you believe valuation would be useful?
- ✓ Have valuation studies already been undertaken in your countries? Is there a need to update or broaden them?
- ✓ Is valuation been used systematically to inform policy-making? If not, in which areas does it need strengthening (see above), and what are the gaps?

Towards implementing Aichi target 2

- Need for pragmatic approaches
- Need for capacity building
- ✓ Define the national target in accordance with national priorities
 - Agree on role and extent of economic valuation (see 'flexible approach')
- ✓ Options for implementing activities
 - Showcase critical values (e.g. on key ecosystems) (see also goal 1) at national or sub-national level;
 - Prepare 'national TEEB' and feed results into revisions of PRSPs etc.;
 - Integration into national guidelines for application of appraisal tools (CBA, CEA, EIA, SEA, spatial planning);
 - Establish or strengthen cooperation with statistics offices; explore opportunities to strengthen ecosystem components in sectoral green accounts (water, forests, land);
 - Integrate valuation results;
 - Build capacity.

Exercise

Per table:

Please develop an ambitious while realistic 'mock' national target which 'translates' Aichi target 2 into a revised NBSAP, and identify associated activities and timelines.

For your support, please see the identified options and guiding questions on page two of the short guide to Aichi target two.

Please elect a rapporteur and take notes of your work!