Valuation of biodiversity and associated ecosystem services

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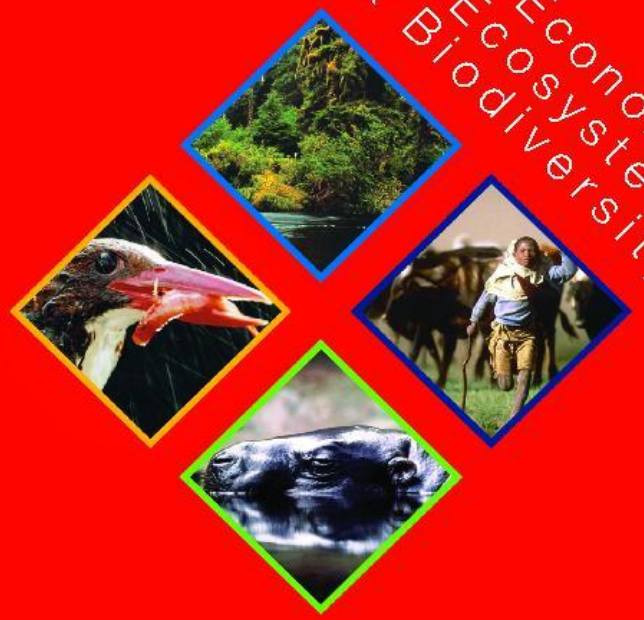
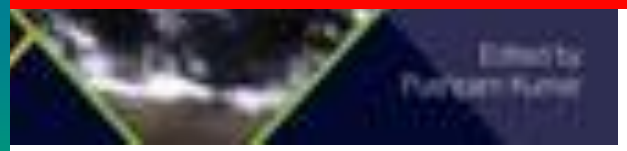
AN EXPLORATION OF TOOLS AND METHODOLOGIES FOR VALUATION OF BIODIVERSITY AND BIODIVERSITY RESOURCES AND FUNCTIONS

The Economics of Ecosystems & Biodiversity



TEEB FOR LOCAL AND REGIONAL POLICY MAKERS



Options for the Application of

TOOLS FOR VALUATION OF BIODIVERSITY

and Biodiversity Resources and Functions

Biodiversity and its resources and functions generate substantial ecosystem services many of which are not traded on markets and whose value is therefore not reflected in market prices. Consequently, private and public decision-making and the allocation of funds will be distorted if the repercussions of activities on biodiversity resources and functions, and the associated ecosystem services, are not adequately taken into account. This distortion is an important underlying cause of biodiversity decline. Undertaking valuation of biodiversity resources and functions and the associated non-marketed ecosystem services has the potential of improving private and public decision-making, thereby contributing to the target of the Convention to significantly reduce by 2010 the current rate of biodiversity loss.

TOTAL ECONOMIC VALUE (TEV) Most public and private resource management and investment decisions are strongly influenced by considerations of the monetary costs and benefits of alternative policy choices. Undertaking valuation should seek to address the relevant components of the Total Economic Value of non-marketed ecosystem services, bearing in mind that the concept of Total Economic Value includes both the direct and indirect use value as well as non-use value of ecosystem services and hence goes beyond the immediate benefits of commercial exploitations of biodiversity resources. Decisions can be improved if they are informed by the economic value of alternative management options and involve mechanisms that bring to bear non-economic considerations as well.

The options of valuation tools provided in the accompanying table should not be taken as a closed set of tools, considering the evolutionary character of this field.

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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→ now: focus on economic values

What are economic values?
Some important observations…

Economic value ≠ commercial value

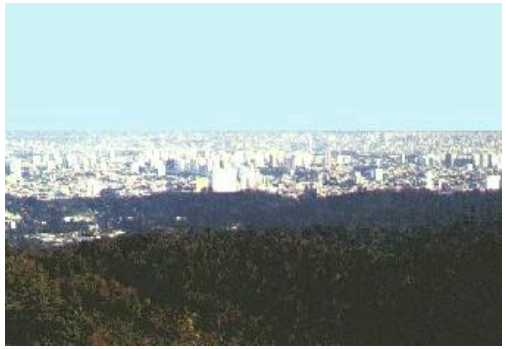
- individuals may assign value for different reasons or motives, and not only for the immediate benefits of commercial exploitations of resources
- what matters is that they are willing to give up (some amount of) something of value to them (e.g., money) in exchange for biodiversity/ecosystem services:
- "willingness-to-pay"

Valuation ≠ 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 <u>different</u> services and benefits

→require different approaches/tools to valuation

Why undertaking (economic) valuation?

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).

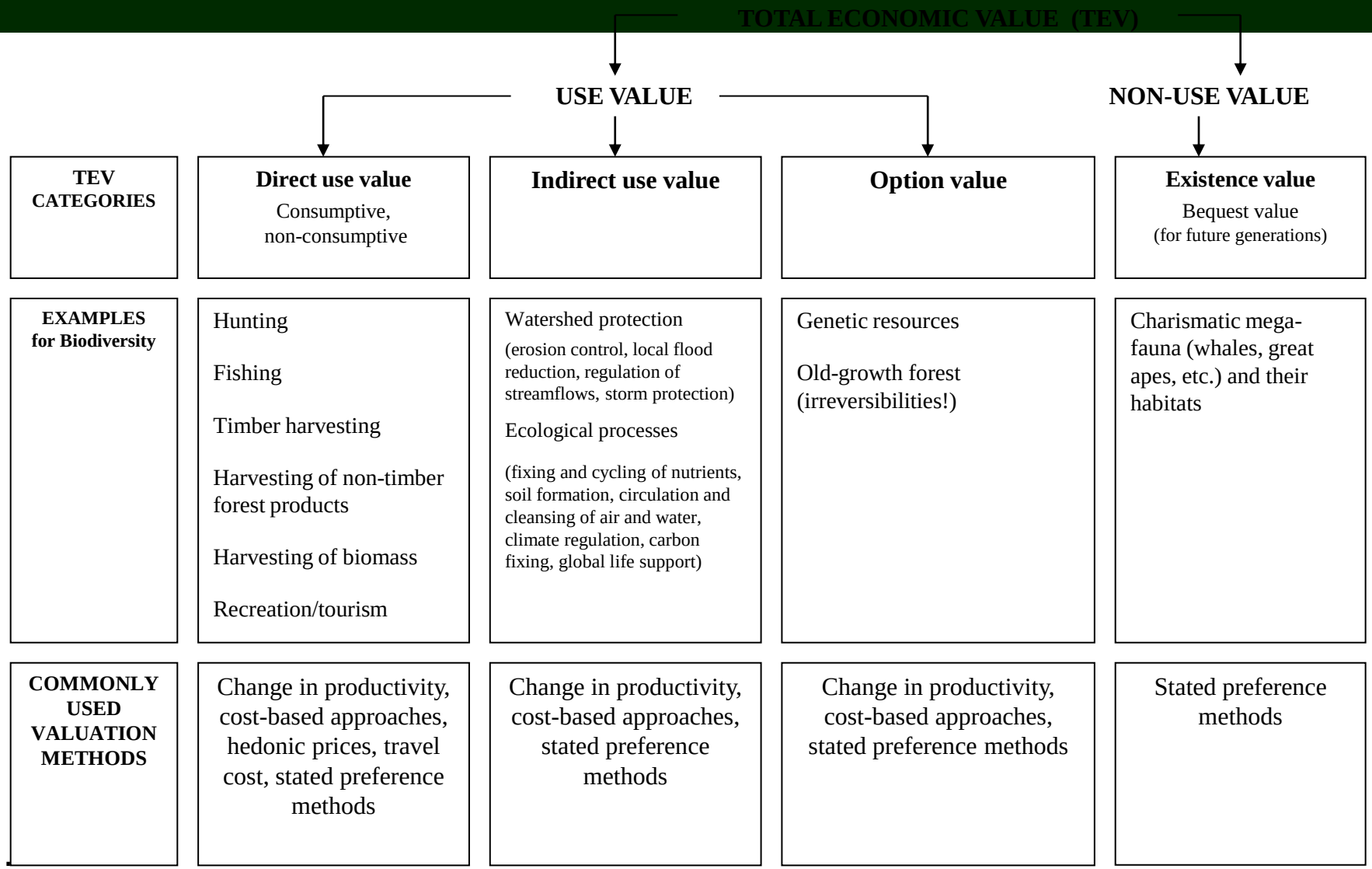
Still others can be measured and monetized…

…their value can be demonstrated by applying economic valuation tools**.**

How to decide?

Stakeholder involvement critical!

Total Economic Value (TEV)



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

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

.

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**
  - Very relevant in development cooperation context
- **Many methods also require much prior economic understanding and technical expertise**
  - Very relevant in development cooperation context
- **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)

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?

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 implemented by countries (e.g., water), including countries in the region
- Strengthen ecosystem (service) components in existing sectoral accounts?
- Global Partnership on Wealth Accounting and the Valuation of Ecosystem Services (WAVES)

Examples/experiences

South Africa: The Fynbos Biome

TS 28, case VI

Madagascar: Mantadia National Park

TS 28, case VIII

Tanzania: Valuing the Eastern Arc Mountains

http://valuingthearc.org

http://www.naturalcapitalproject.org/tanzania.html

(….)

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.

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

- Integration into national guidelines for application of appraisal tools (CBA, CEA, SEA);
- 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.;
- Establish or strengthen cooperation with statistics offices; explore opportunities to strengthen ecosystem components in sectoral green accounts (water, forests, land);
- Build capacity;

Questions

- ✓ 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?

Exercise

Please develop a possible template for a national target implementing Aichi target 2

What could be the milestones in implementing this target?