

# Valuation of biodiversity and associated ecosystem services

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# 28

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



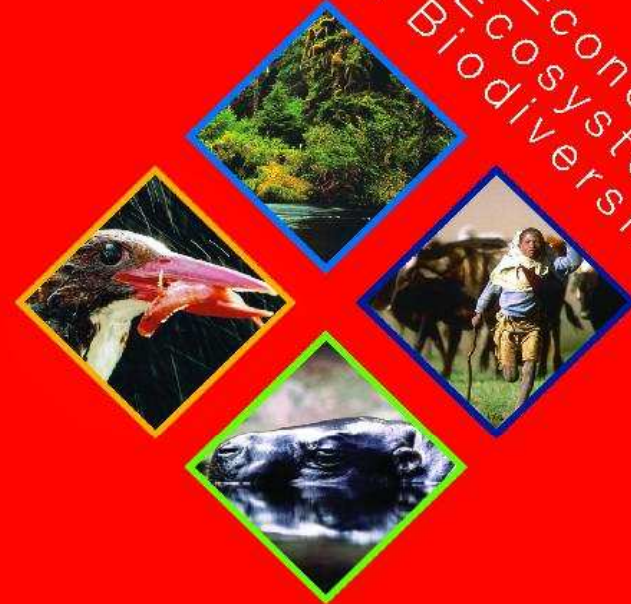
## Options for the Application of TOOLS FOR VALUATION OF BIODIVERSITY and Biodiversity Resources and Functions

**B**iodiversity 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.

The Economics  
& of Ecosystems  
& 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.”*

**There are different types of biodiversity values...**

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

# 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***

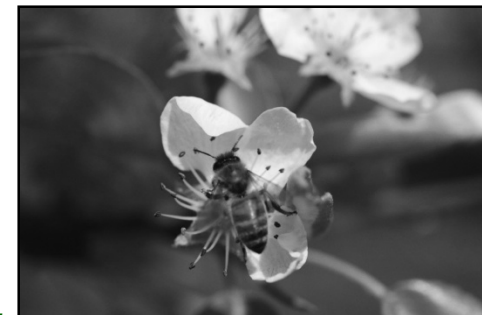
***A scientific breakthrough***

***An air conditioner***

***One ecosystem***

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

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



# Why undertake (economic) valuation?

Some ecosystem services are not valued (priced) and traded on markets...

e.g., some, but not all, **provisioning** services (crops, timber, some pollination)

...but many other ecosystem services are presently not traded or not:

- because they are public goods, where nobody can be excluded from their use and markets cannot form easily;
- no price signal that indicates scarcity of biodiversity;
- hence no, or only weak, incentives for individual conservation/sustainable use efforts.

***(Economic) valuation corrects an externality by revealing “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 remember:

**Whilst some biodiversity/ecosystem services can be measured and monetized...**

i.e...their value can be demonstrated by applying economic valuation tools;

**others can be measured but are difficult to monetize...**

i.e...their values need to be demonstrated (by other methods)

**And finally, some values cannot be measured...**

(e.g., intrinsic, religious values)

...but need to be **recognized** as important.

# 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)
<b>EXAMPLES for Biodiversity</b>  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
<b>COMMONLY USED VALUATION METHODS</b>	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

# Ecosystem Services (MEA)

## **Provisioning services**

- food (including seafood and game), crops, wild foods, and spices
- water
- minerals (including diatomite)
- pharmaceuticals, biochemicals, and industrial products
- energy (hydropower, biomass fuels)

## **Regulating services**

- carbon sequestration and climate regulation
- waste decomposition and detoxification
- purification of water and air
- crop pollination
- pest and disease control

## **Supporting services**

- nutrient dispersal and cycling
- seed dispersal
- primary production

## **Cultural services**

- cultural, intellectual and spiritual inspiration
- recreational experiences (including ecotourism)
- scientific discovery



# 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 “total ecosystem value”, but there still challenges:

- Stock vs. flow;
- Achieving completeness while avoiding double-counting;
- Net Present Value (NPV) and the role of discount rates.

# Applications of valuation

## Awareness raising

- Stand alone valuation exercise, for instance of ecosystem services which are key in the specific national context (hydrological services)
- See also Aichi target 1

## Project appraisal level

- Integration of into decision-making tools (EIA)
  - Cost-benefit analysis (CBA)
  - Cost-effectiveness analysis (CEA)
  - Correcting prices (e.g. entry fees for national parks)

## Programme/policy level

- Integration into/interaction with other assessment tools (SEA)
- Development of (sectoral) strategies and planning processes, land use planning
- Integration into national accounting (SEEA)

# 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)

# Valuation: a flexible approach

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 (water treatment plant – Catskills);
- 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.

# Towards implementing Aichi target 2

- ✓ 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) 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;

## Moving toward a national target 2

1. In what ways, and in which sectors (e.g., awareness-raising, application within CBA/CEA, SEA/EIA, land use planning, green accounting) do you think that (economic) valuation could be introduced in your country?
  2. What are the most important ecosystem services in your countries where valuation could be useful?
  3. Have valuation studies already been undertaken in your countries? Can you give specific examples?
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1. Is valuation being used systematically to inform policy-making? If not, in which areas does it need strengthening and what are the gaps?