

Economic value of ecosystem services

**EUROPARC Nordic-Baltic Section Seminar
Kristianstad, May 5 2011**

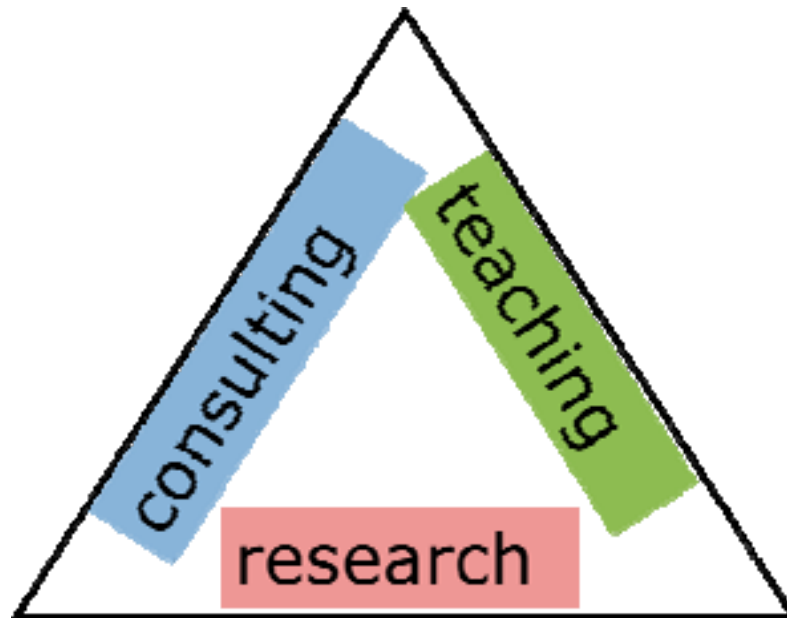
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About Enveco

- **Private enterprise – limited company**
 - **Enveco Miljöekonomi AB**
- **Founded in 2004, owned by the two founders**
- **Staff: From 2 to 6 persons**
 - **4 environmental economists, 1 MSc in environmental science, 1 MSc in biology**

Three mutually supporting parts of Enveco's work

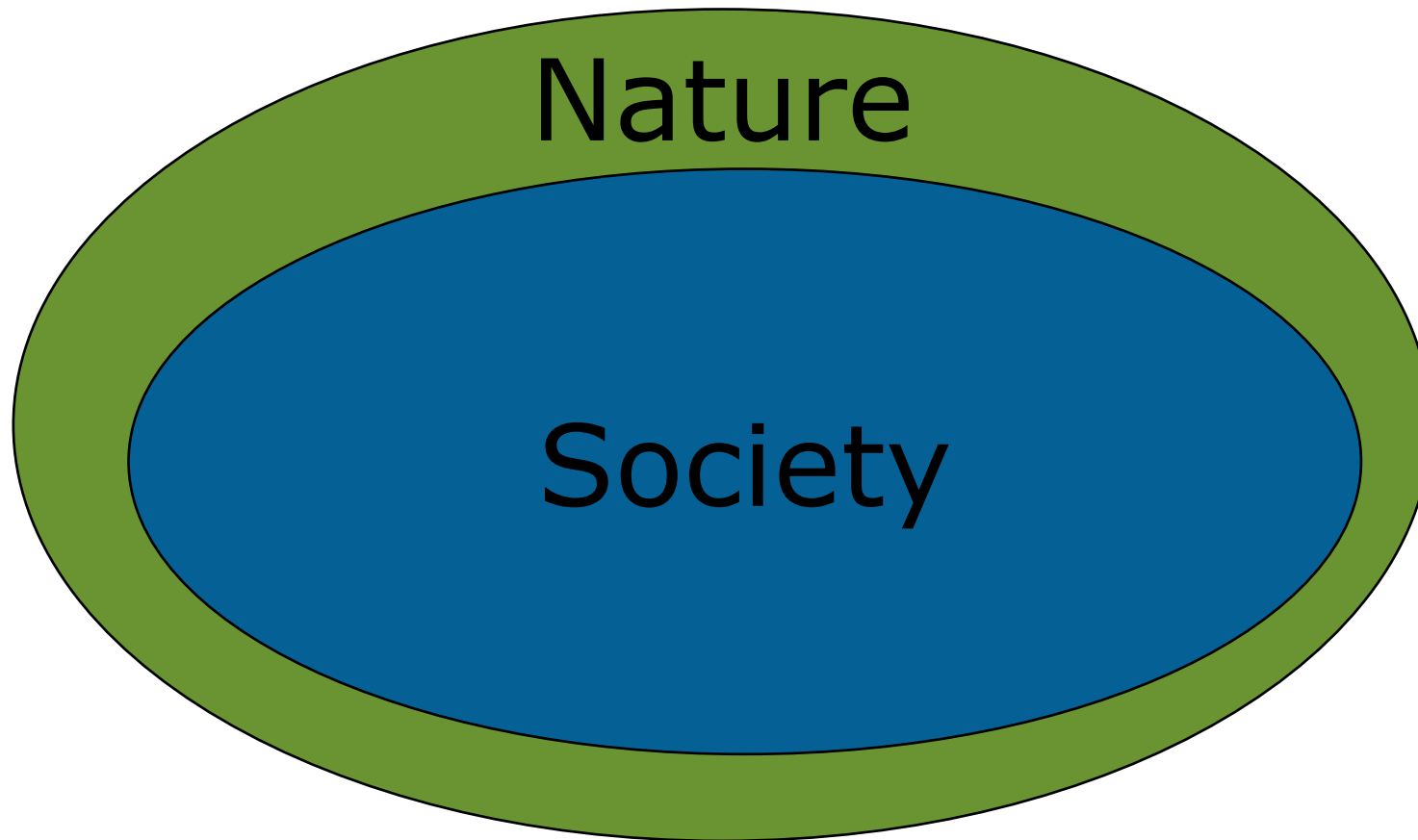


Particular expertise in:

- Economic valuation of the environment
- Socio-economic impact analysis
- Social aspects of sustainability
- Education in environmental economics and ecological economics
- Marine and coastal areas



Problem: more and more people must share the same cake → lack of ecosystem services!



Markets and economic values



Markets provide opportunities for trade-offs between different scarce resources. Such trade-offs reveal economic values.



- Nonrival
- Non-excludable



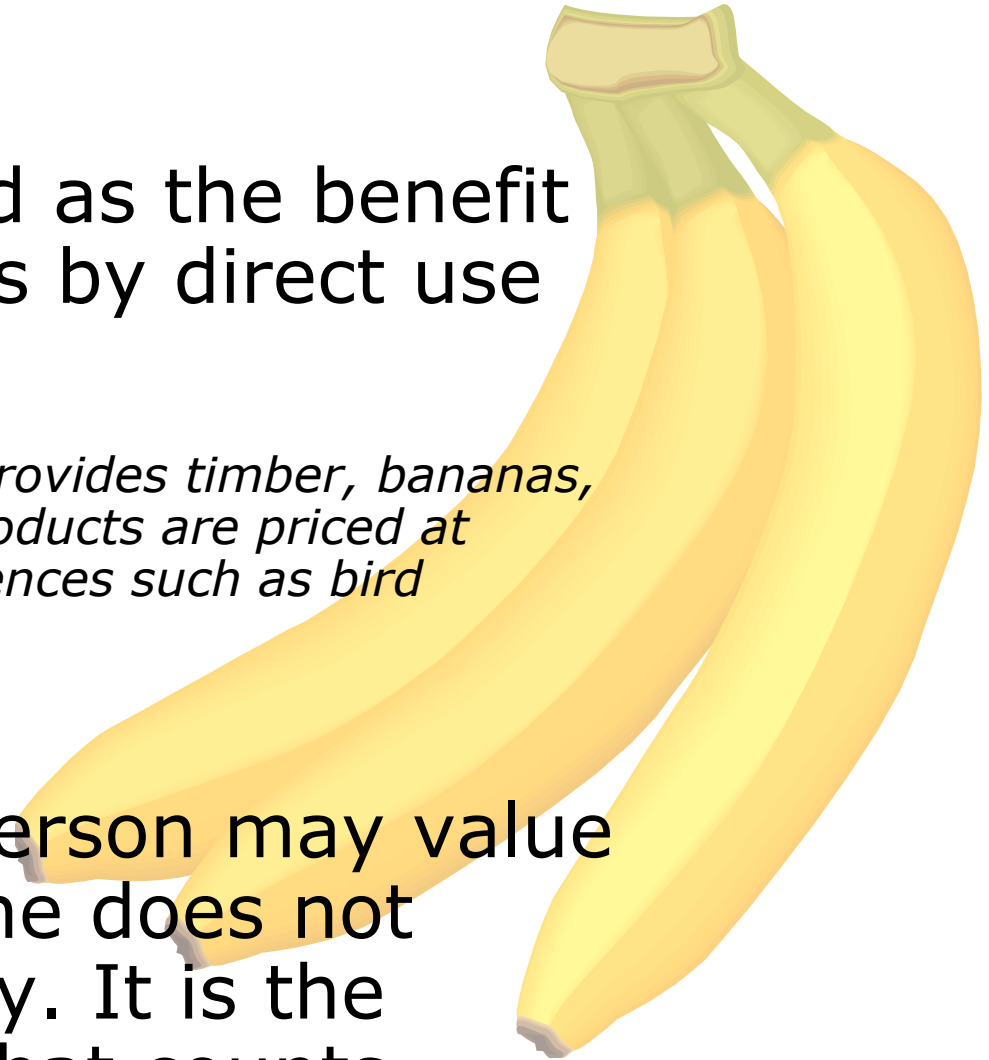


Use values

Use values: Defined as the benefit a person experiences by direct use of a resource.

Examples: (1) The rain forest provides timber, bananas, coffee, medicines etc. These products are priced at markets. (2) Recreation experiences such as bird watching and fishing.

Option values: A person may value a resource even if she does not intend to use it today. It is the possibility to use it that counts.



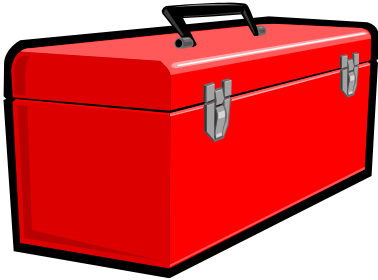
Non-use values

A person may be willing to pay for the conservation of a resource even if she does not intend to use it directly. She is willing to pay so that other people will have the opportunity to enjoy the resource today or in the future.



Examples: Pay for the protection of threatened species, pay for improved water quality.

Tool box



Two main approaches:

A. Use existing links between environmental quality and market goods (indirect methods or “revealed preferences**”)**

B. Create a hypothetical market (direct methods or “stated preferences**”)**

Valuation methods

Approach A. *Use the relation between ecosystem services and market goods, e.g.:*

- The production function method
- The travel cost method
- The property value method (hedonic price)
- The defensive expenditure method

Approach B. *Use scenarios and ask people directly, e.g.:*

- The contingent valuation method
- Choice experiments

Other methods. *Weaker relationship to economic theory, e.g.:*

- The replacement cost method
- The human capital method
- Costs of realizing political decisions (political WTP)

Pros and cons

Approach A:

- + Based on real market behaviour
- Gives only information on users' economic valuation

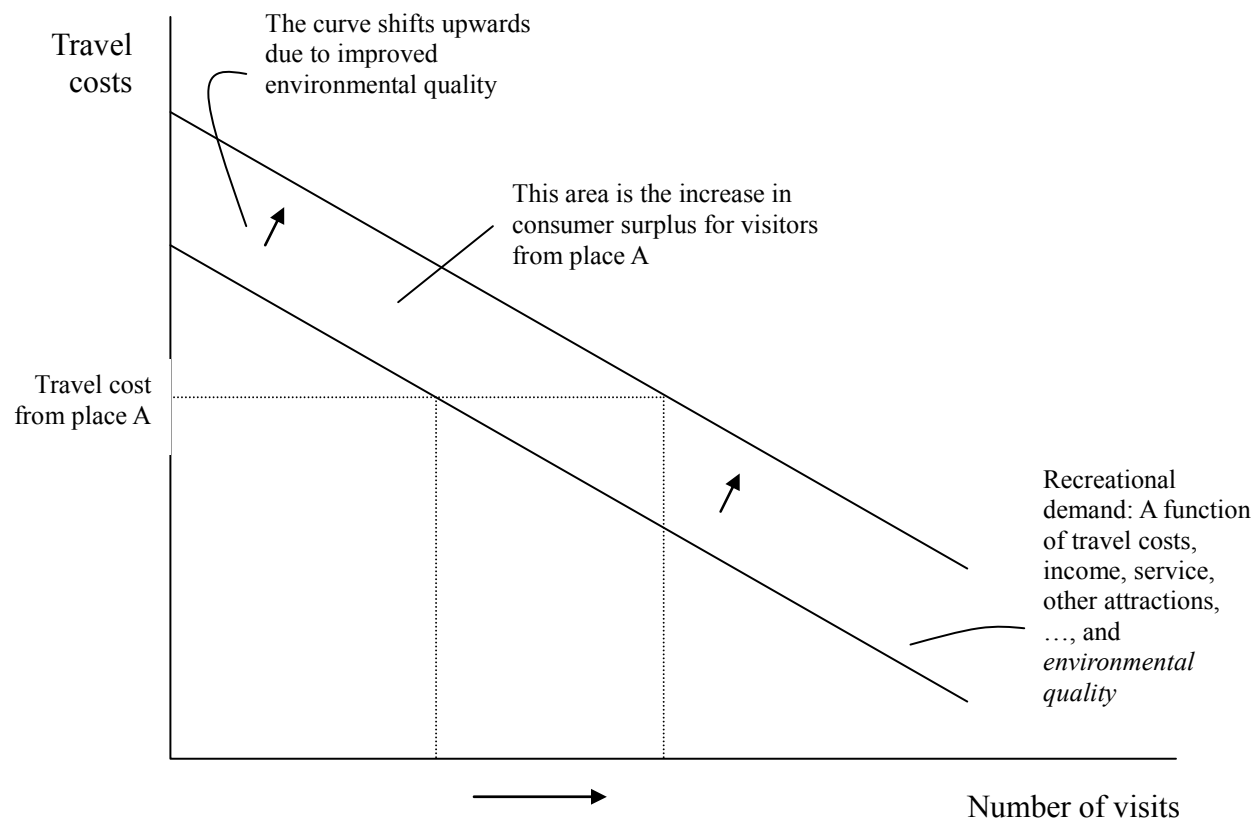
Approach B:

- + Can also give information on non-users' values
- Based on hypothetical market behaviour (but how big is the potential bias?)

The travel cost method

Basic idea: People make economic sacrifices in order to visit recreational sites. The **recreational** value of a site may thus be obtained by estimating the demand for travels to the site.

The zonal travel cost method

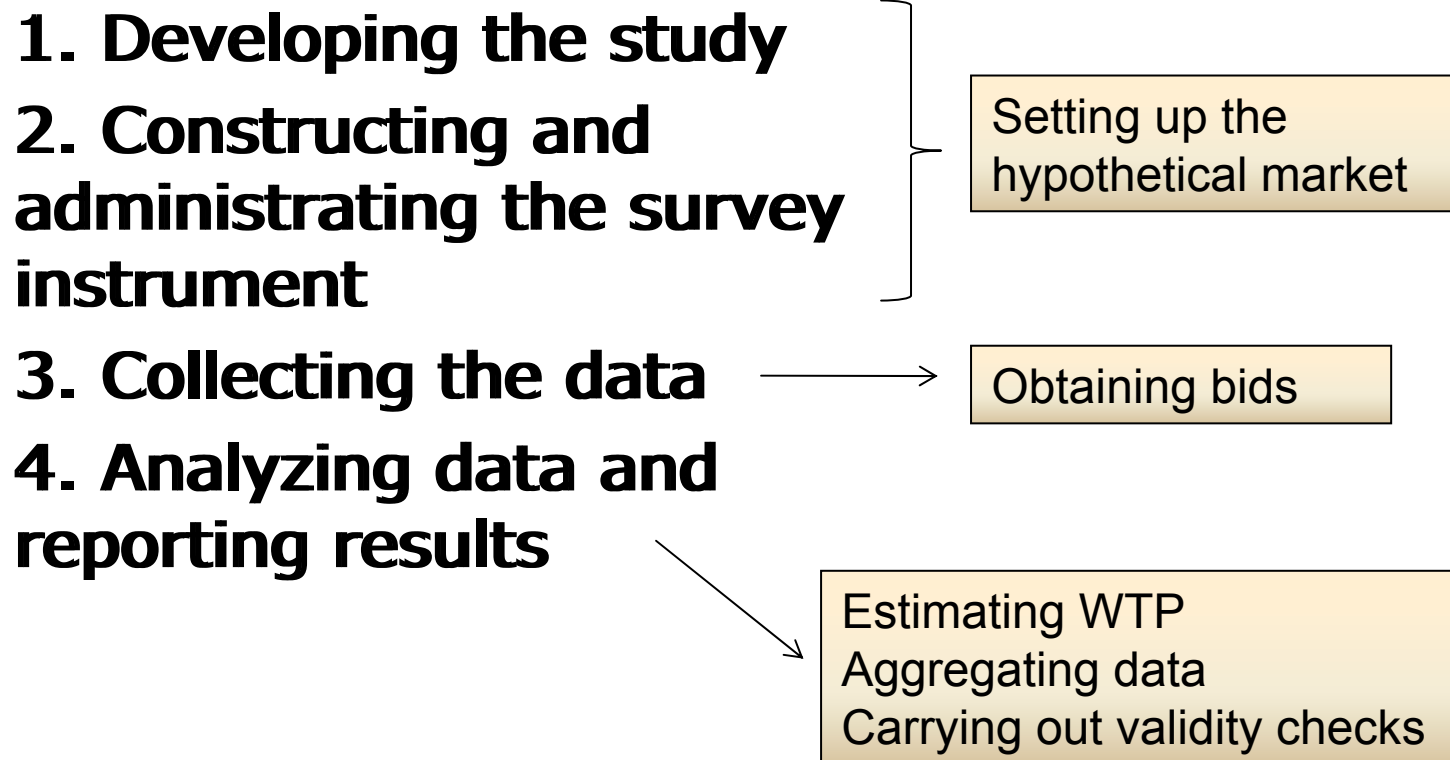


The contingent valuation method

Basic idea: A change in the supply of a non-market good is described to a (usually random) sample of individuals by using conventional survey instruments.

- Questions are posed about trade-offs, from which it is possible to infer individuals' **WTP** (willingness to pay) for a realization of the change.

Phases of a contingent valuation study



Two Swedish examples





Economic value of improved water quality in the Stockholm archipelago

Scharin & Söderqvist (2000), Soutulakorva (2005)

- **Too large input of nutrients (N & P) causes eutrophication.**
 - The Baltic Sea (slow water exchange, built-in natural barriers) is particularly sensitive to eutrophication.
- **Reduction of nutrient loads involves high costs.**
- **The value of improved water quality accrues, to a large extent, through recreational use.**
 - **Therefore, TC-method useful!**

Economic valuation

A policy experiment

- **Economically value improved water quality, measured as + 1 m secchi depth (see one's feet when bathing...).**
- Two mail questionnaire surveys on travel behaviour, carried out in the fall of 1998 and 1999, respectively.
 - Questions about respondents travel behaviour, purpose of travel, travel costs, travel time, income, the importance of clean and clear water...
- The respondents' demand for travels to different sites in the archipelago was estimated by the use of the travel cost method.
 - Among other factors, demand for travel depended on water quality (sight depth).
- The aggregated WTP of the counties Stockholm and Uppsala: **MSEK 85-273/year.**

And the costs...?

- Scharin (2005) estimated the total cost of achieving +1 m secchi depth to **MSEK 57/year** (Scharin, 2005).

➔ net benefit to society:
MSEK 28-216/year



Economic valuation of the cultural environment – results from valuation studies in Småland”

Soutukorva & Söderqvist (2010)

- In 2009, Enveco carried out two valuation studies for the Swedish National Heritage Board (RAA).
- Valuation of two cultural reserves in the county of Småland.
 - One planned - Högarps by (CVM)
 - One already existing - Åsens by (zonal TCM)

WTP question

10. Hur mycket skulle du maximalt vara beredd att betala för att Högarby skulle bli ett kulturresevat? Kryssa antingen för en av rutorna med förtryckta beloppeller skriv en egen summa på översta raden. Betalningen ska ske varje månad under åren-2010-2029.

Innan du svarar, tänk på att din privata budget ska hålla, det vill säga att du får avstå från något annat för att kunna betala det här.

Egen summa: _____ kr per månad

<input type="checkbox"/> 1-9 kr/mån	<input type="checkbox"/> 200-299 kr/mån
<input type="checkbox"/> 10-19 kr/mån	<input type="checkbox"/> 300-399 kr/mån
<input type="checkbox"/> 20-29 kr/mån	<input type="checkbox"/> 400-499 kr/mån
<input type="checkbox"/> 30-49 kr/mån	<input type="checkbox"/> 500-749 kr/mån
<input type="checkbox"/> 50-74 kr/mån	<input type="checkbox"/> 750-999 kr/mån
<input type="checkbox"/> 75-99 kr/mån	<input type="checkbox"/> 1000-1499 kr/mån
<input type="checkbox"/> 100-149 kr/mån	<input type="checkbox"/> 1500-1999 kr/mån
<input type="checkbox"/> 150-199 kr/mån	<input type="checkbox"/> 2000-2999 kr/mån

MAX WTP/month for
20 years

11. Varför kan du tänka dig att betala för att Högarby skulle bli ett kulturresevat?

Svar: _____

WTP result

"At most, how much would you be willing to pay for Högarps by to become a cultural reserve?"

WTP for respondents:

- The mean WTP for respondents: **SEK 43/month.**

- Survey population as a whole (~ 28 000 people) **MSEK 2/year.**

Valuation study databases

- **Thousands of applications on various environmental issues.**
- **Examples of existing databases:**
 - Environmental Valuation Reference Inventory (EVRI), www.evri.ca
 - Nordic Environmental Valuation Database (NEVD),
www.norden.org/pub/sk/showpub.asp?pubnr=2007:518
 - ValueBase^{SWÆ},
<http://www.naturvardsverket.se/sv/Lagar-och-andra-styrmedel/Miljoekonomi/Miljovardering/>
- **Databases – simplify benefit transfer?**

Benefit transfer

- **Policy makers are demanding economic values ... but they are expensive to produce (?)**

What is BT?

Study Site (s)



An (expensive) CV survey estimated gain in consumer surplus of SEK 100 per household per year for an additional 3 m³ of instream flow.

Policy Site (p)



Government is considering a policy to increase flow by 3 m³ at a nearby river ...

Thank you Scott Cole for giving us permission to use this picture!

What is BT?

Study Site (s)



An (expensive) CV survey estimated gain in consumer surplus of SEK 100 per household per year for an additional 3 m³ of instream flow.

Policy Site (p)



Can undertake an (expensive) CV survey ... or ... can “transfer” value from the (similar) study (?)

Thank you Scott Cole for giving us permission to use this picture!

1) To show the importance of something



2) As part of a cost-benefit analysis

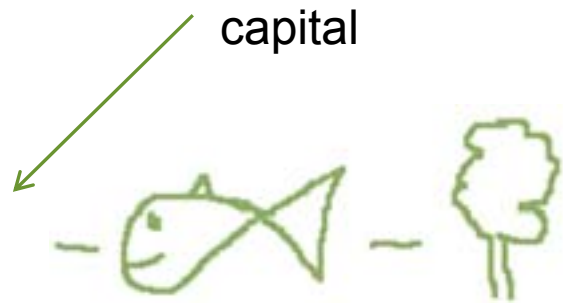
Table 5.1 Total costs and benefits of achieving the BSAP target regarding eutrophication in the entire Baltic Sea region (millions of Euros per year).	
Costs of proactive actions:	Million €
Total minimum cost of achieving the BSAP targets for emission reductions (Swedish EPA 2009a).	2 560
Total cost of achieving the BSAP targets for emission reductions (HELCOM & NEFCO 2007).	3 000
Benefit gained from reaching targets:	
Total benefits of avoiding the effects of eutrophication estimated on the basis of the willingness of people to pay (Swedish EPA 2009a).	4 830
Total benefits of improved water quality based on meta-analysis (Huhtala et al. 2009).	2 564

Source: HELCOM Initial Holistic Assessment (2010)

3) Green national accounts, adjusting GDP

$$NDP = C + Inv + X - M - D$$

Depreciation of capital



5) Illustrative

\$5,000,000,000,000: The cost each year of vanishing rainforest

British researchers set out the economic impact of species destruction - and their findings are changing world's approach to global warming

By Matt Chorley, Political Correspondent


Sunday, 3 October 2010

British scientific experts have made a major breakthrough in the fight to save the natural world from destruction, leading to an international effort to safeguard a global system worth at least \$5 trillion a year to mankind.

Groundbreaking new research by a former banker, Pavan Sukhdev, to place a price tag on the worldwide network of environmental assets has triggered an international race to halt the destruction of rainforests, wetlands and coral reefs.

With experts warning that the battle to stem the loss of biodiversity is two decades behind the climate change agenda, the United Nations, the World Bank and ministers from almost every government insist no country can afford to believe it will be unaffected by the alarm rate at which species

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80 per cent of the world's remaining terrestrial biodiversity live in forests

MORE PICTURES

Source: The independent

Ecosystem services represent enormous economic values

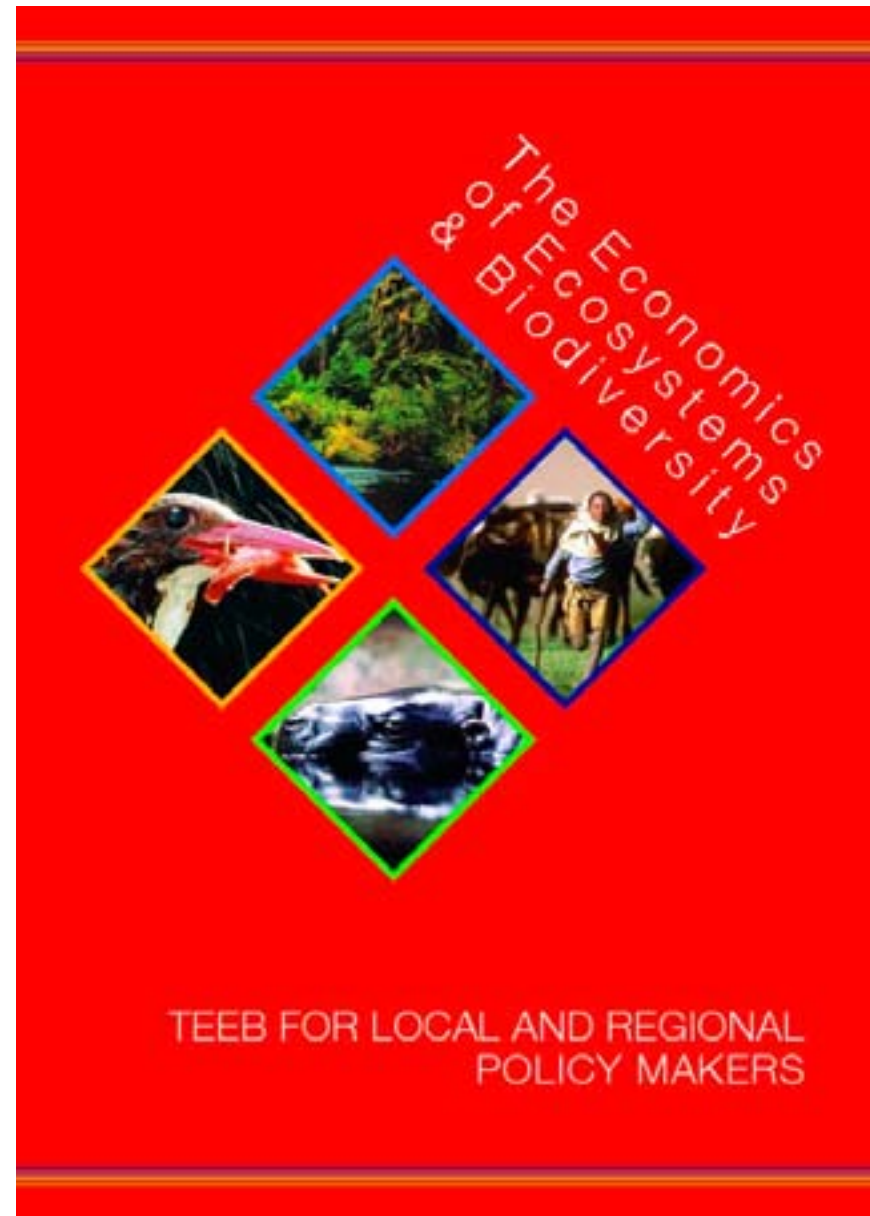
See TEEB for many international examples!

E.g. the economic value of the pollination services of insects 2005 = 153 billion euro
(Gallai et al. 2009)



Stepwise approach to include ecosystem services in local/regional policy

1. Specify and agree on the policy issue with stakeholders
2. Identify which services are most relevant
3. Define information needs and select appropriate methods
- 4. Have ecosystem services assessed**
5. Identify and appraise policy options
6. Assess distributional impacts



More examples...

