

# Valuation of biodiversity and associated ecosystem services

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CBD

<http://vimeo.com/16961590>



## 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))*

# 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
- Where there are tradeoffs/exchanges to be made, valuation can provide information based on “willingness-to-pay” and/or “willingness to accept”

### Valuation $\neq$ monetization (nor ‘commodification’)

- other ‘payment vehicles’ possible
- (combination with) qualitative or semi-qualitative methods

# Environment IS a development problem: E-GDP of the poor

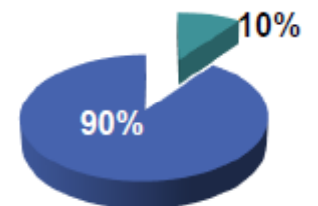
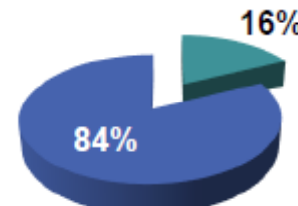
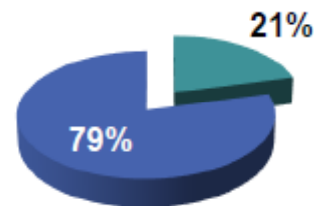
**Ecosystem services  
dependency**

**Indonesia**  
99 million

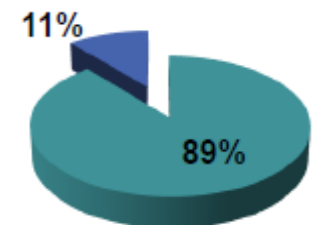
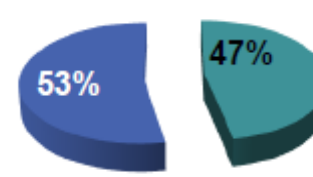
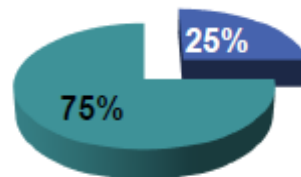
**India**  
352 million


**Brazil**  
20 million

**Ecosystem services as  
percent of classical GDP**

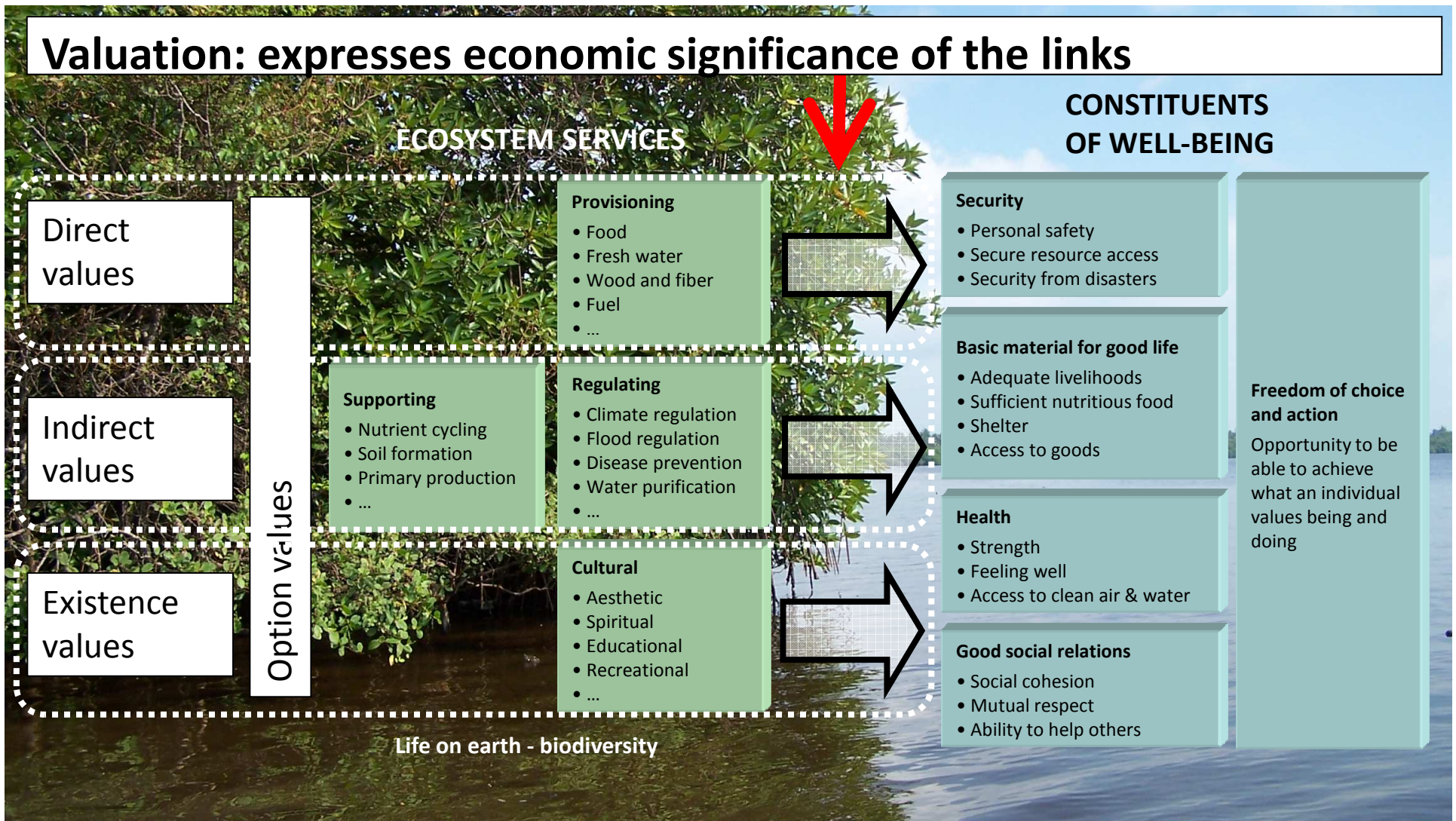


**Ecosystem services as  
percent of “GDP of the  
Poor”**



 **Ecosystem services**

# Valuing ecosystems





# The Easterlin paradox

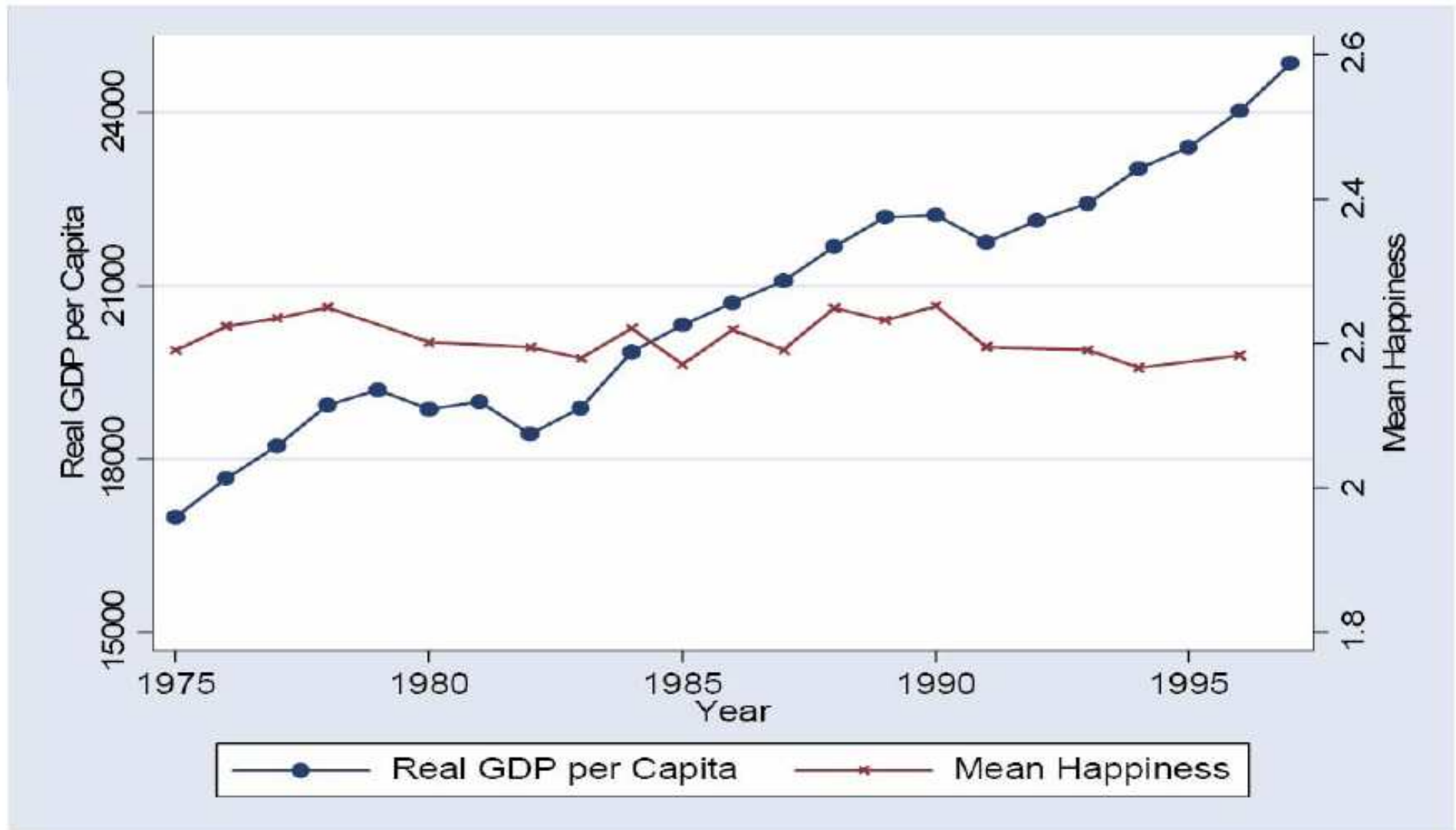


Figure 6 Happiness and average annual income<sup>15</sup>

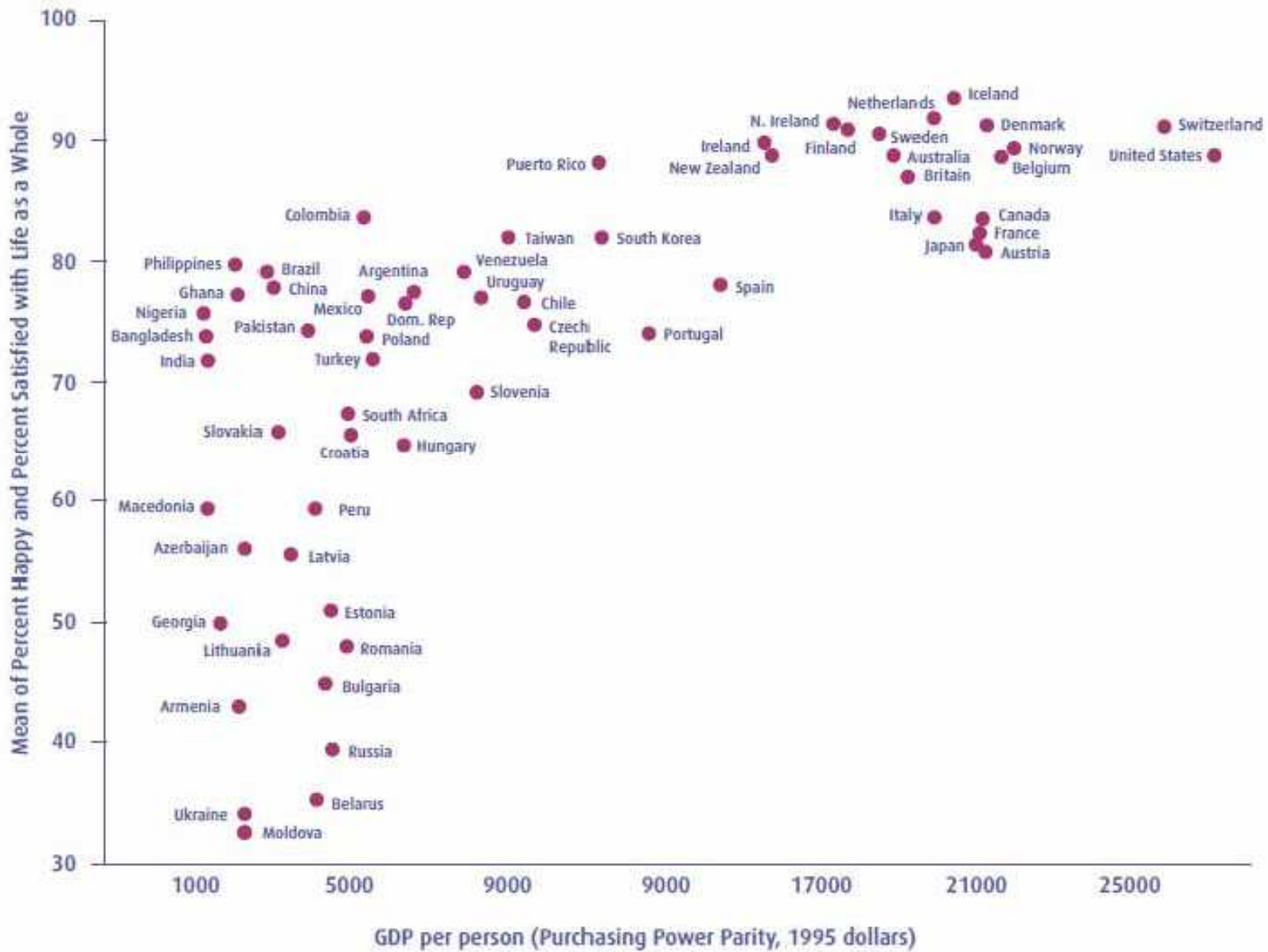
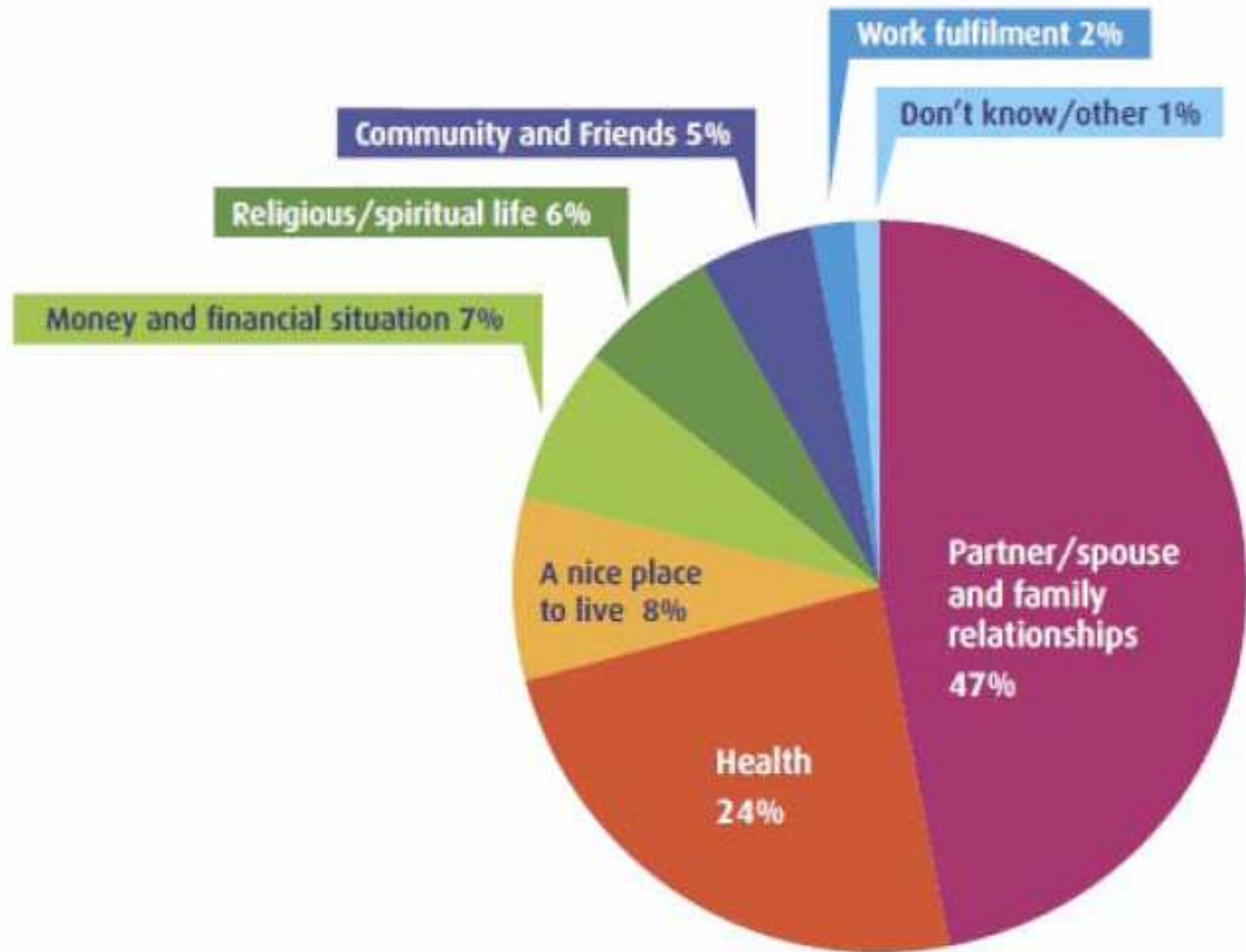


Figure 5 Factors influencing subjective wellbeing (happiness)<sup>7</sup>





# Why undertaking (economic) valuation?

## The basic narrative

Some valuable ecosystem services are traded and valued in markets...

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

...but many others are not:

Public goods: nobody can be excluded from their use

Externalities: Boundaries of analysis.

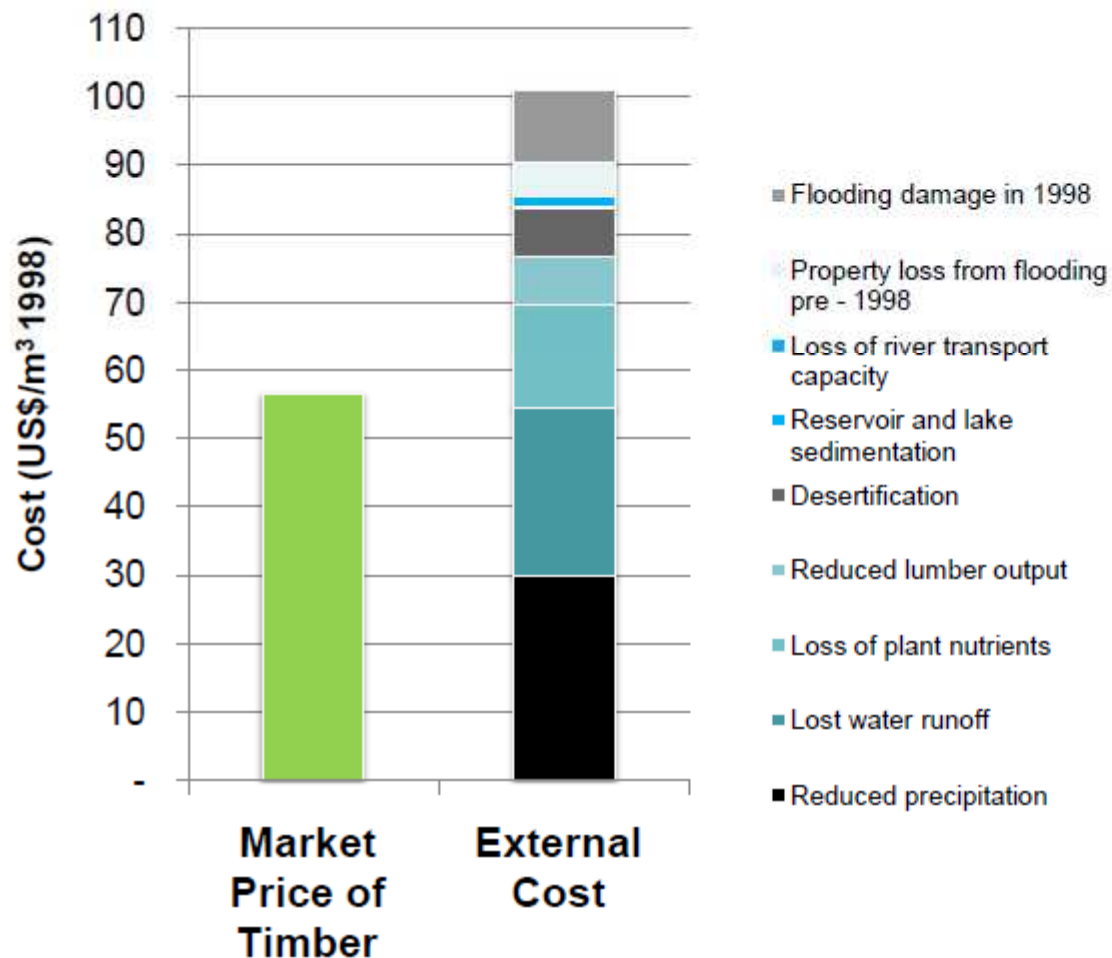
Weak price signals/ incentives for individual conservation/sustainable use efforts

*‘Measure better in order to manage better’  
‘(Economic) valuation shall elicit “hidden”  
biodiversity values for better decision-making.’*

# The Economics of Ecosystems & Biodiversity



## Business impacts at sector & country-level



- US\$12.2 billion estimated ecological cost of deforestation in China (1950-88)
- 60% of this cost is attributed to logging
- 64% of logging was for construction and materials sectors
- External costs = 178% of the market price of timber (1998)

Source: TEEB for Business, 2010 (Annex 2.1).

# 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

Situation specific: You must know what you want to do with the information in order to decide whether to use valuation:

- Absolute Total Economic Valuation (TEV) for awareness raising and accounting
- Relative TEV for policy and decision making.

# Applications

## Awareness raising

Stand alone valuation exercise, for instance of one or a few ecosystem services which are key in the specific national context (Aichi Target 1)

## Project analysis

Project appraisal: integration into economic decision-making tools

- Cost-benefit analysis (CBA)

- Cost-effectiveness analysis

Correcting prices (e.g. entry fees for national parks) (Aichi Target 3)

## Programme/policy level

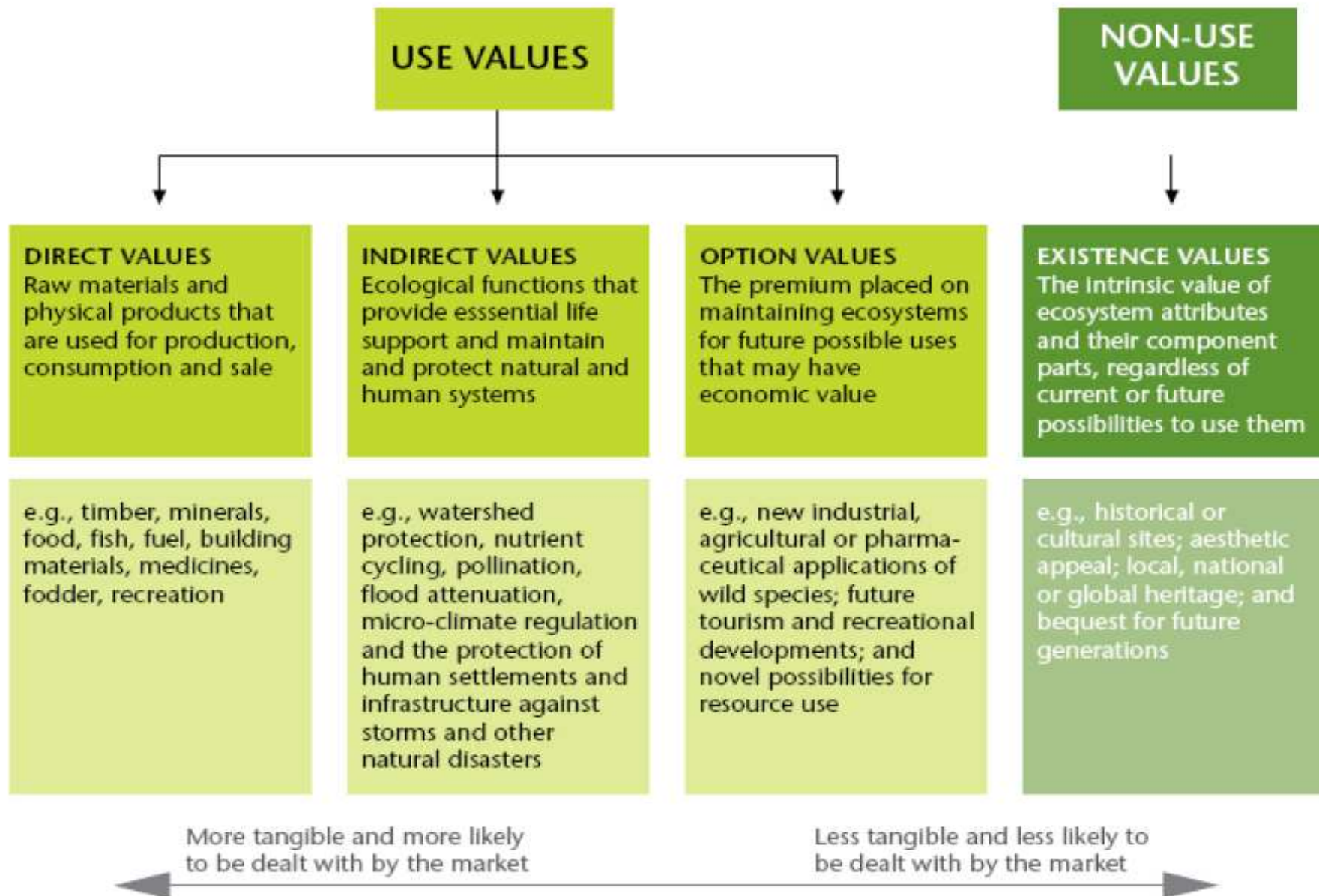
Integration into/interaction with other assessment tools (SEA)

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

Integration into national accounting (SEEA) (Aichi Target 2)

**What are your country's national objectives and priorities?**

# Total economic value (TEV)





# 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

# 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

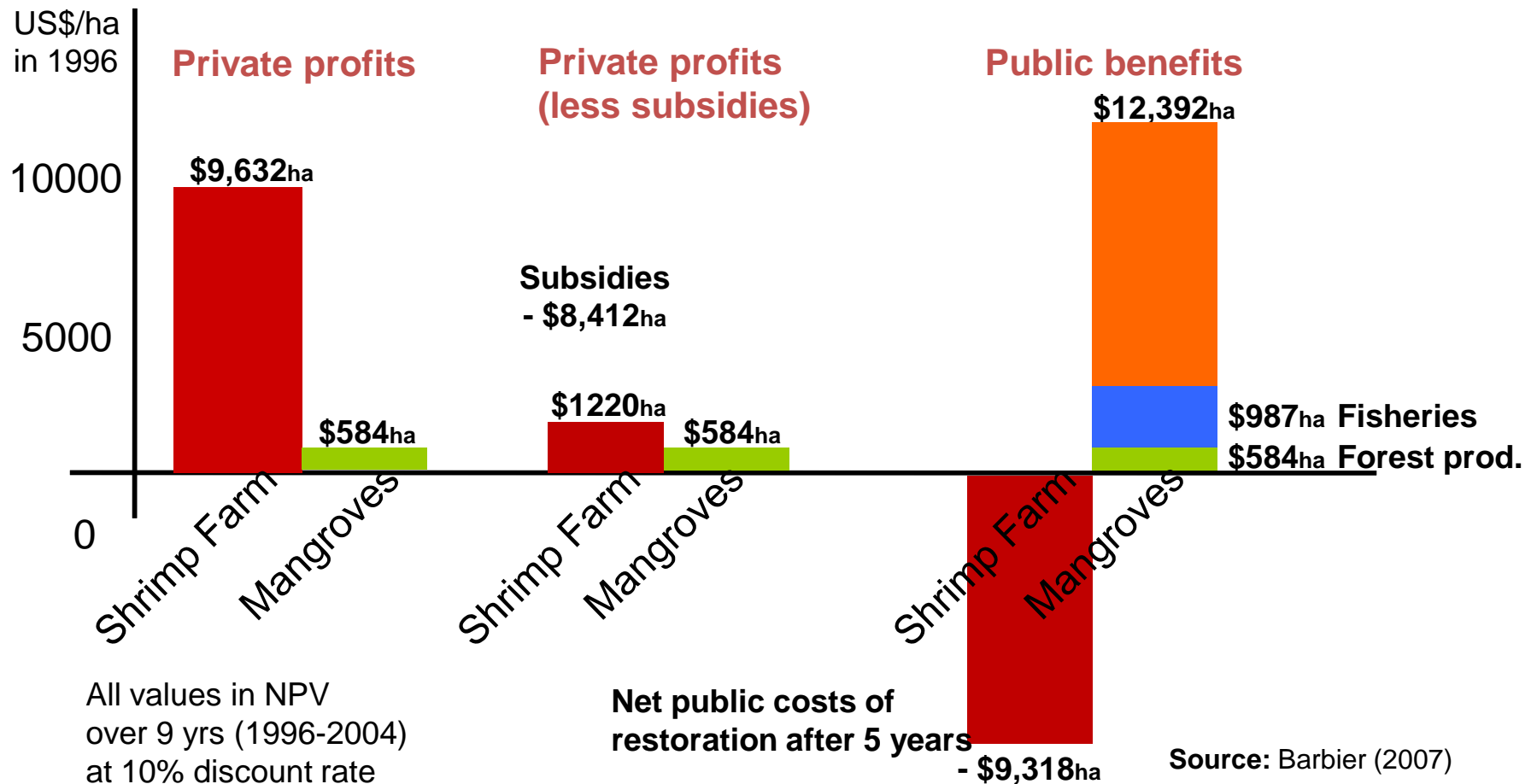
<b>NET PRESENT VALUE OF MANGROVE FOREST BENEFITS*</b>	
<b>BENEFIT</b>	<b>Value (US\$) per ha</b>
<b>DIRECT USE VALUE:</b>	
Net income from timber and non-timber products	87.84
<b>INDIRECT USE VALUE:</b>	
Offshore fishery linkages	20.82–68.90
Coastline protection	3,678.96
<b>TOTAL DIRECT AND INDIRECT USE VALUE</b>	<b>3,787.62–3,835.70</b>
<b>DIRECT USE VALUE ONLY:</b>	
Net present value (10% discount rate)	822.59
Net present value (12% discount rate)	734.83
Net present value (15% discount rate)	632.27
<b>DIRECT AND INDIRECT USE VALUES:</b>	
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.

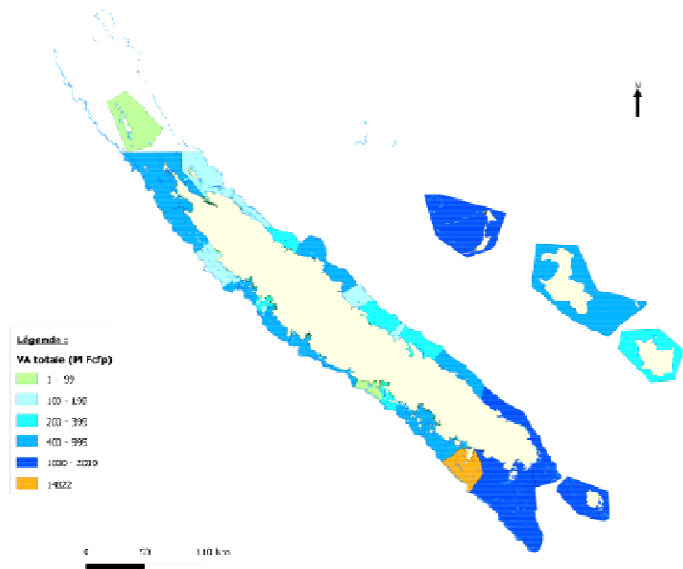
Source: CBD TS 28, p.46, Sathratai and Barbier 2001.

# Example: Mangrove forests in Southern Thailand

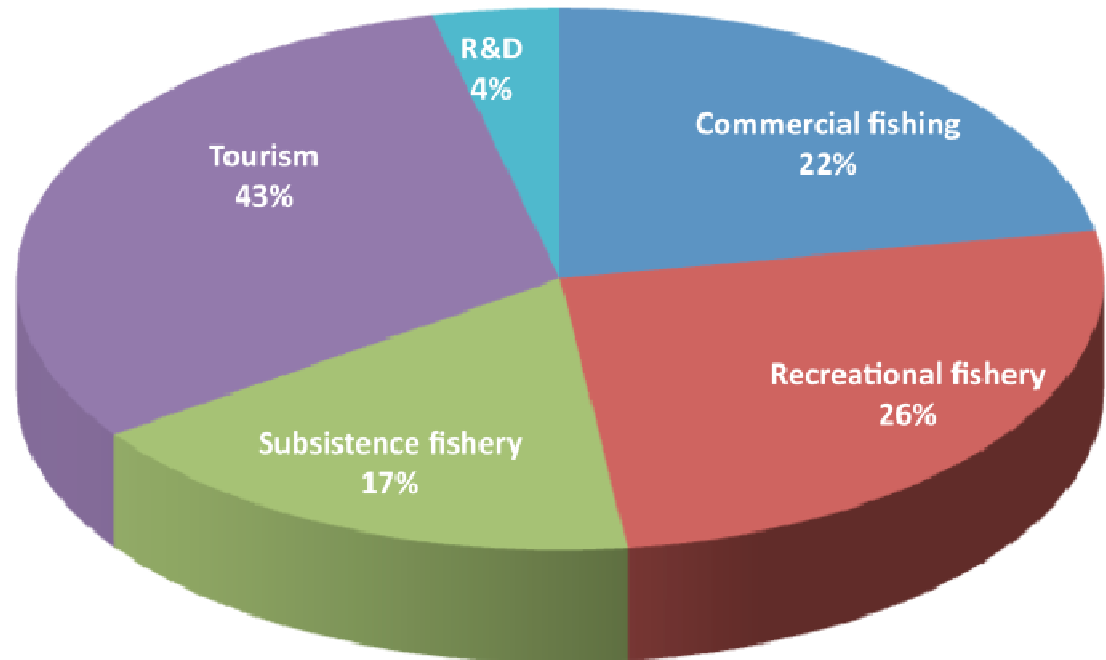
## Shrimp farms vs mangroves



# Using valuation to identify the distribution of benefits (New Caledonia: 190-320 M€/y)



Financial value of coral reef ecosystem services - Use values  
2008 : 9,000- 12,000 MFcp (78-103 M€, 100-137 M usd)





# 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
  - Cost vs accuracy
  - Total vs relative; Accounting vs policy; Awareness vs Development
- Analyses require technical expertise
- Economic values and valuation provide some of the information needed to make better decisions
  - Needs to be put into context and to be part of a broader deliberative and participatory process in order to be useful.

Apply a cost-benefit criterion to the valuation itself.