Overview of economic valuation:
value classification and valuation method

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Characteristics of coastal habitats

- Bio, chem, physical interactions
- Social, cultural, institutional interactions

Four ecological functions: regulation, habitat, production, information

Human connection to habitats (ecosystem services: ES)

- Goods (inputs & output)
- Services

Economic values of natural resources & environment

- Direct use value
- Indirect use value
- Non-use value

Total Economic Value

Component of “Total Economic Value”

Total Economic Value

Use Value
- Direct Use Value
- Indirect Use Value
- Option Value
- Quasi-option Value

Non-use Value
- Bequest Value
- Existence Value

Note: this classification of value is used in UNEP/GEF/SCS guideline
Component of “Total Economic Value”

- **Total Economic Value**
  - **Use Value**
    - Direct Use Value
    - Indirect Use Value
    - Option Value
  - **Non-use Value**
    - Bequest Value
    - Existence Value

*Note:* this classification of value is found in many text books.
Conservation value is the same as existence value or non-use value or sometimes “passive use value”.

Total Economic Value (TEV)

- Use Value
  - DIRECT USE VALUE
    - (consumptive, and non-consumptive)
  - INDIRECT USE VALUE
  - OPTION VALUE
    - (incl. bequest value & quasi-option value)
  - Non-use Value
    - EXISTENCE VALUE

Examples of associated values:

**DIRECT USE VALUE**
- Provisioning function
  - Water
  - Food
  - Cultural & amenity (information function)
  - Recreation
  - Spiritual use

**INDIRECT USE VALUE**
- Regulating function
  - Climate regul.
  - Flood prev.
  - Soil retention
  - Air & Water purification
  - Nursery

**OPTION VALUE**
- Estimated potential future benefits of ALL goods and services
  - (including Supporting function)

**EXISTENCE VALUE**
- Supporting function
  - i.e. the intrinsic value placed on natural habitats and wildlife
Total Economic Value

Total economic value (TEV) is the sum of the use value (UV), option value (OV), and non-use value (NUV).

\[ \text{TEV} = \text{UV} + \text{OV} + \text{NUV} \]

**Use value**

\[ \text{UV} = \text{direct use value} + \text{indirect use value} \]

**Non-use value**

\[ \text{NUV} = \text{(bequest value)} + \text{existence value} \]
## Simple description of total economic value

<table>
<thead>
<tr>
<th>Type of values</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct use value</td>
<td>Goods/services that can be consumed directly</td>
<td>Food, medicinal plants, fuel wood, ecotourism</td>
</tr>
<tr>
<td>Indirect use value</td>
<td>Functional benefits</td>
<td>G &amp;S derived from regulation function, i.e., flood control, storm protection</td>
</tr>
<tr>
<td>Option value</td>
<td>Future direct and indirect use values.</td>
<td>Pharmaceutical products, biodiversity, conserved habitats.</td>
</tr>
<tr>
<td>Bequest value</td>
<td>Value of leaving use and non-use values for next generation</td>
<td>Habitats, irreversible changes.</td>
</tr>
<tr>
<td>Existence value</td>
<td>Value from knowledge of continued existence, e.g., based on aesthetic, cultural, &amp; moral aspects</td>
<td>Habitats, endangered species.</td>
</tr>
</tbody>
</table>
### Economic Value of Mangrove Forests

<table>
<thead>
<tr>
<th>Direct Use Value</th>
<th>Indirect Use Value</th>
<th>Option Value</th>
<th>Non-use Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timber, firewood, woodchips, charcoal</td>
<td>Shoreline / riverbanks stabilisation</td>
<td>Future use as per (1) and (2)</td>
<td>Cultural and aesthetic</td>
</tr>
<tr>
<td>Fisheries</td>
<td>Groundwater recharge and discharge</td>
<td></td>
<td>Spiritual and religious</td>
</tr>
<tr>
<td>Forest resources: food, medicine, construction materials, tools, dyes, Wildlife</td>
<td>Flood and flow control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agricultural resources</td>
<td>Human waste and pollutants storage and recycling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water supply</td>
<td>Biodiversity maintenance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water transport</td>
<td>Migration habitat provision</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Genetic resources</td>
<td>Nursery and breeding grounds for fish</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tourism and recreation</td>
<td>Nutrient retention</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human habitat, Educational, historic and scientific Information</td>
<td>Coral reef maintenance and protection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information</td>
<td>Saline water intrusion Prevention</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 1: Total Economic Value of Wetlands

**DIRECT VALUES**
Production and consumption goods such as:
- Water
- Fish
- Firewood
- Building poles
- Thatch
- Wild foods
- Medicines
- Crops
- Pasture
- Transport
- Recreation,
... *etc* ...

**INDIRECT VALUES**
Ecosystem functions and services such as:
- Water quality and flow
- Water storage and recharge
- Nutrient cycling
- Flood attenuation
- Micro-climate,
... *etc* ...

**OPTION VALUES**
Premium placed on possible future uses or applications, such as:
- Agricultural
- Industrial
- Leisure
- Pharmaceutical
- Water use,
... *etc* ...

**NON-USE VALUES**
Intrinsic significance of resources and ecosystems in terms of:
- Cultural value
- Aesthetic value
- Heritage value
- Bequest value,
... *etc* ...

From Emerton 1999
Valuation Method
(theoretical approach – typically taught in economic class)

Methods based on economic approaches of BENEFIT MEASUREMENT (measuring change in human welfare or “UTILITY”)

1. Reveal preference approach (SP)
   =>> observation of people acting in the market

2. Stated preference approach (RP)
   =>> people’s responses to hypothetical questions on their WTP/WTA for a change in goods & services of ecosystem

(Mitchell & Carson, 1989)

Other methods are considered non-econ. approaches
***Valuation Method***
(practical approach- different from economic class)

Methods based on types of data availability

1. Valuation using conventional market price
   1.1 direct market based value (actual value)
   1.2 indirect market based value (value of other goods with related type of services)

2. Valuation using surrogate market
   2.1 travel cost
   2.2 hedonic price
Valuation Method
(practical approach- differs from economic class)

Cont.

3. Valuation using hypothetical/simulated market
   \[=>\text{survey of “willingness to pay/willingness to accept” value}\]
   \[3.1 \text{ contingent valuation}\]
   \[3.2 \text{ attribute-based or choice modeling}\]

4. Valuation using other techniques, i.e.,
   \[4.1 \text{ benefit transfer}\]
   \[4.2 \text{ participatory economic valuation}\]
***Market prices***

Direct market based value

=》》 Market prices can be used to value products with established markets.

=》》 Typically, local market prices (on-site sale value) can be a good approximation of environmental values, where such prices are available.

=》》 This approach is the most obvious means of establishing a value for extractive uses of an environmental good.

*Example*……..
***Prices of related goods and services***

Indirect market based value

=>> G &S that have no immediate market values

=>> Products that are home-consuming and have never reached market (Cost of substitutes)

    *firewood => kerosene price*

=>> Services derived from regulating function (Substitute cost/replacement cost/preventive expenditure)

    *shoreline protection of mangroves => man-made sea defence*
***Prices of related goods and services***

Cont.

=>> Change in environment services derived from provisioning function cause a change in production of human activities (Change in productivity)

(loss of mangroves => change in captured fisheries)

=>> To use this approach we need to identify the “LINK” between G&S derived from ecosystem and “marketed goods” to be considered.

Other examples…….
Surrogate Market

Travel cost method (TCM)

=>> We estimate the “demand curve” for an environmental resource

*Note:* a very cruder version of travel cost method can be based on average travel cost to get to an ecotourism area, accommodation, entrance fees and other charges.

Hedonic price (HPM)

=>> We estimating the influence of environmental attributes on *property value*, usually houses.
Hypothetical Market
(survey based)

Contingent valuation method (CVM)

=>> We construct a hypothetical market in which users are asked to express their willingness to pay (WTP) for the benefits or willingness to accept (WTA) compensation for losing them.

Choice modeling (CM)

=>> We construct/design the choice set that involves with the price attribute along with different resource attributes/change in G&S then ask people to rank/rate/choose alternatives rather than explicitly express a WTP or WTA.
***Other techniques***

Benefit transfer (BT)
=>> We take the results of one or more primary (original research) studies that estimate values for similar projects and impacts then modify and transfer the values to the project being evaluated

Participatory economic valuation (PEV)
=>> We allow people to define the values of resources within the context of their own
=>> The method is used when other standard methods are not applicable and when cash prices have little relevance as an indicator of values.
Classification of Economic Values

Use Values

Direct Use Values

Outputs
- fish
- fuelwood
- recreation
- transport
- meat, etc.

Indirect Use Values (Functional Values)

Benefits
- flood control
- storm protection
- nutrient/sediment trapping
- habitat/nursey
- erosion control, etc.

Market analysis;
TCM; SMV; CVM
Hedonic prices;
“Public prices”;
[IOC], [IS];
[Replacement costs]

Option, Quasi-option Values

ICM
CVI
CVM

Nonuse Values

Existence, Bequest Values

CVM

Notes:
ICM = individual choice models
CVI = conditional value of information models
CVM = contingent valuation method (including contingent behaviour/ranking methods)
TCM = travel cost method
SMV = surrogate market valuation (household production function models)
IOC = indirect opportunity cost approach
IS = indirect substitute approach
[ ] = valuation methodology to be used with care

Source: Based on Barbier (1994).

Fig. 1. Valuing wetland benefits.
Remarks:

1. All the market value approaches give you only “the use value” of the environment. Non-use value is not included.

2. With limited time and budget, start with a simple approach.

3. Always take into consideration of your research objectives and theoretical validity in selecting the valuation approach.

4. If time and budget allowed, proceed with >1 methods for value assessment, ie., preventive expenditure vs. CVM, replacement cost vs. change in productivity.

5. Method such as cost of illness, replacement cost, etc. do not use economic approach (we don’t measure change of people’s benefits).