

Session 2

Valuation of Environmental Resources

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Why Do We Want Valuation in NRM projects??

- To do a fuller accounting of benefits and costs
- To explicitly include environmental goods and services that are often ignored
- To improve the chance of projects passing an IRR test
- To overcome shortages in existing markets

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Externalities and Valuation – key ingredients in environmental economics

- The two major causes of poor environmental / NRM analysis are **externalities** and **valuation**
- **Externalities** – a disconnect between cause and effect, either over space or over time
- **Valuation** – lack of market prices to signal scarcity or value

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Externalities (both environmental or economic)

- An externality occurs when the action of one person affects the well-being of another person and that second person is not part of the decision-making process
- Externalities can be addressed (internalized) by various means:
 - Eliminating the problem
 - Making compensation to the person affected
 - Consultation with and receiving approval from the person affected

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Both Externalities and Valuation Affect Decision Making

(an example from a Mangrove forest)

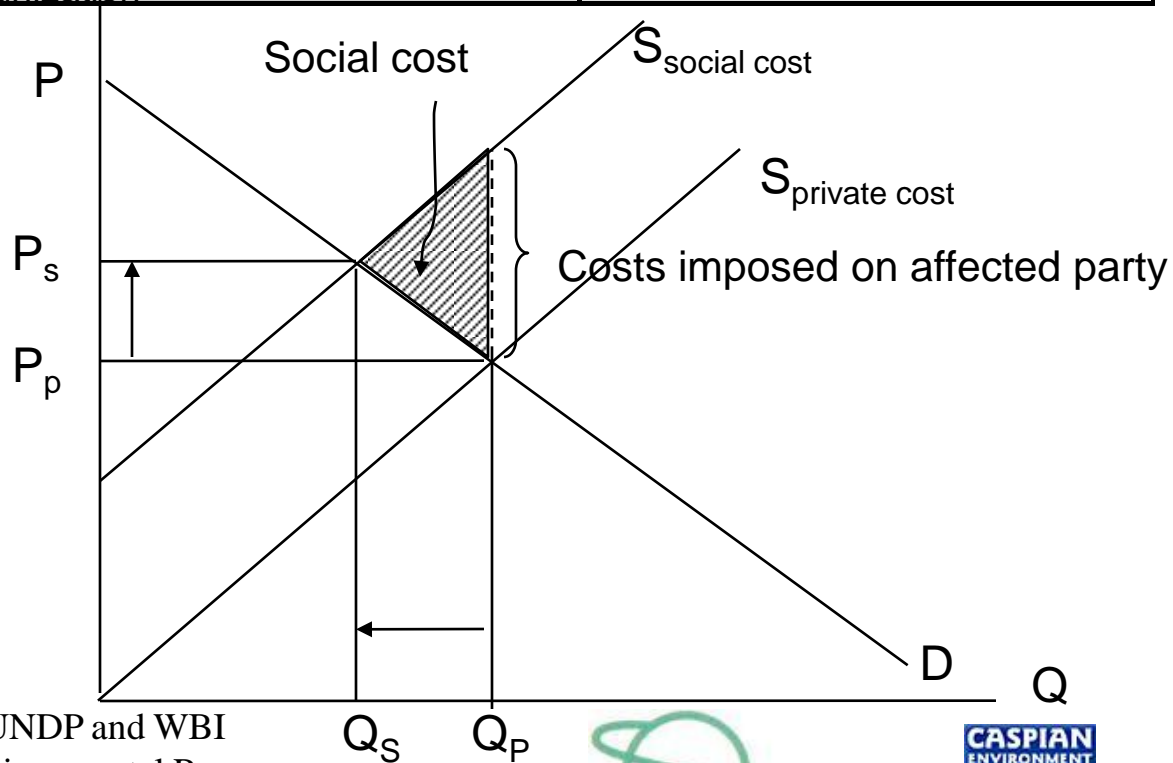
		Location of Goods and Services	
		On-Site	Off-site
Valuation of Goods and Services	Marketed	<p>1</p> <p>Usually included in an economic analysis (e.g., poles, charcoal, woodchips, mangrove crabs)</p>	<p>2</p> <p>May be included (e.g., fish or shellfish caught in adjacent waters)</p>
	Non-marketed	<p>3</p> <p>Seldom included (e.g., medicinal uses of mangrove, domestic fuelwood, food in times of famine, nursery area for juvenile fish, feeding ground for estuarine fish and shrimp, viewing and studying wildlife)</p>	<p>4</p> <p>Usually ignored (e.g., nutrient flows to estuaries, buffer to storm damage)</p>

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Externalities can lead to MARKET FAILURES

- Externalities can be positive or negative, and can result from consumption or production. Examples include:

Source	Positive	Negative
Production	Private garden provides scenic view to nature lovers	Air Pollution from factories-health impacts
Consumption	Listening to nice sounds/music; Immunization	cigarette smoking



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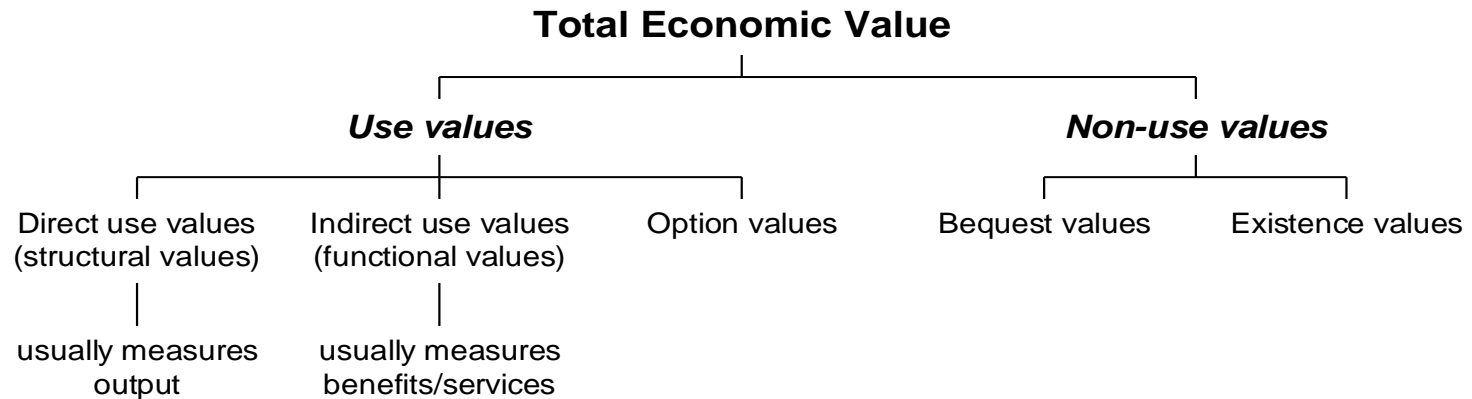
The Total Economic Value (TEV) Approach

- Includes both Use Values and Non-Use Values
- Use values include direct use, indirect use, and option values
- Non-use values include bequest values and existence values
- The TEV is the sum of all of these values

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The TEV Valuation Matrix



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Total Economic Values: use values

- **direct use values**

- **directly consumable output**

- *food*
 - *biomass*
 - *recreation*
 - *health*

- **indirect use values**

- **functional benefits**

- *ecological functions*
 - *flood control*
 - *storm protection*

- **option values**

- **future direct and indirect values**

- *biodiversity*
 - *conserved habitats*

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Total Economic Values: non-use values

- *bequest values*

- *values of leaving use and non-use to future generation*

- *habitats*
 - *irreversible changes*

- *existence values*

- *values from knowledge of continued existence*

- *habitats*
 - *endangered species*

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Choosing the best form of project/ policy analysis : BCA or CEA??

- **B/CA** or benefit –cost analysis – is preferred since it includes monetary estimates of benefits and costs over time
- **CEA** – or cost-effectiveness analysis – is useful when it is impossible to estimate benefits of a project (project costs are almost always known) and so we seek the least cost way to reach a stated goal or objective

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Why BCA is usually preferred (and NPV is best)

- BCA gives a **quantitative measure** of the generation of net social benefits (what we are most concerned about as societies)
- BCA can take **several forms** – NPV (net present value), BC Ratio (benefit cost ratio) or IRR (internal rate of return)
- All three **use the same data as inputs** but vary in how they use the discount rate
- NPV is usually the **best measure** – WHY???

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How to Determine Economic Values (prices): Approaches to **Economic Valuation of Environmental Impacts**

- **Changes in Production**
 - Crops, fisheries, water
 - Health
 - Opportunity cost
- **Survey Techniques**
 - CVM (Contingent Valuation Method)
- **Surrogate Markets**
 - Travel Cost
- **Hedonic Approaches**
 - Property value
 - Land values
 - Wage differential

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Valuation techniques: Change in production

- A basic “price x quantity” approach that is very useful in many NRM projects
- Changes in production may have been ignored because they occurred “off-site” (externalities) or because of pricing problems (valuation)
- Easy to sell to decision makers

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Valuation techniques: Hedonic price methods

- Value environmental amenities (and disamenities) by changes in property values or location-specific prices
- Applied to housing, hotels, land and other site-specific valuation issues
- A very strong revealed preference approach
- Willingness to pay limited by ability to pay

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Valuation techniques: Contingent valuation method (CVM)

- **CVM** as a second-best approach that relies on surveys and questions on willingness-to-pay (**WTP**) or willingness-accept-compensation (**WTAC**)
- When should you use WTP and when WTAC??? – in theory and in practice??
- Especially useful when the market does not exist (e.g. a yet to be established protected area) or for bequest and existence values

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Valuation techniques: Contingent valuation method (CVM) –contd.

- Extensively used for ecosystem damage assessment
- Sometimes applied by the use of **Benefit Transfer** techniques – apply value from study A to location B for a similar resource
- Good point about CVM – you always get an answer!
- Bad point about CVM – you always get an answer!!

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Surrogate valuation techniques: the Travel Cost Method

- A “revealed preference” approach based on observation or survey data on actual travel patterns
- Solid theoretical and practical foundations and applications
- A good technique for many recreational/ cultural amenities
- The travel cost itself is not the value – but is used to derive a demand curve to then estimate values

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Selected Case Studies — illustrating various valuation approaches

- National Parks in Georgia
- Lake Sevan in Armenia
- Marine Park management in Cancun, Mexico

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WTP for a National Park in Georgia — case study #1

- Estimating the WTP for new and existing national parks in Georgia
- Uses CVM to estimate WTP
- Surveys Georgians within the country, and foreigners living in Georgia, Armenia, and Azerbaijan
- Derives estimates for both daily and annual passes for Georgians

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Measuring WTP for Restoration of Lake Sevan, Armenia — case study #2

- Designed to supplement a change in productivity analysis of an investment operation by including use and non-use values
- Includes Armenians in Armenia and also those Armenians who live abroad (a larger number)
- Tests two payment vehicles — a one-time payment and monthly payments for 3 years
- Applies Benefit Transfer to estimate expatriate WTP (based on relative income levels and other factors)

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Paying for Management of a Marine Park in Cancun, Mexico – case study #3

- A “paper park” in need of financial support
- Large visitor numbers and large revenues associated with park use (snorkeling tours), but no entrance fees collected
- Challenge : how to tap visitor WTP (and ability to pay), and retain revenues locally to help pay management costs
- Used creative financing, working with stakeholders, new legal measures, and revenue sharing

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Conclusions

- A wide variety of valuation techniques exist that can be used to value environmental resources
- Literature expanding rapidly in both developed and developing countries
- Increased acceptance of the techniques and the results by government decision makers
- Cannot value all NRM project components –e.g. what is biodiversity worth????

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Conclusions (cont'd)

- Some short cuts are possible (e.g. quick and dirty approaches; benefit transfer) but have to be used with caution
- Valuation can be built into project design and does not have to be terribly expensive
- See your friendly local World Bank/ UNDP environmental economist for assistance!!!

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