



Module 11

Valuing ecosystem services



Decision making always involves choosing among competing priorities

Valuation, sometimes economically, provides a metric for valuation

This Module discusses valuation and prepares people to look more objectively at the local catchment this afternoon

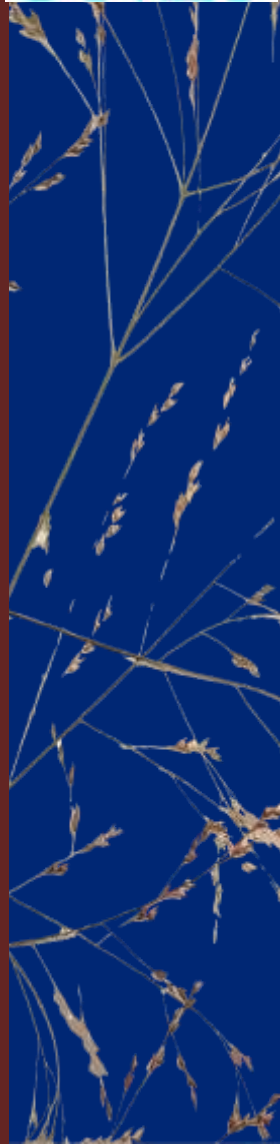




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Valuation

- To make better decisions about use and management of ecosystem services, we must assess importance to human society
- Value of ecosystems is viewed differently among disciplines, cultures and philosophies
- Valuation is “the process of expressing a value for a good or service in terms of something that can be counted, often money, but also through methods and measures from other disciplines”
(Millennium Ecosystem Assessment 2003)



Value

- **Exchange value:** price of a good or service in the market
- **Utility:** Use-value of a good or service; may differ from market price (e.g., the market price of water is low, but its use-value high; the reverse is true for diamonds)
- **Importance:** Appreciation or emotional value we attach to a good or service (e.g., emotional value of viewing wildlife or scenery)





Scientific disciplines involved in ecosystem valuation

- **Economics is concerned with measuring exchange value or price to maintain a system or its attributes**
- **Ecology measures importance of attributes or functions of a system to maintain ecosystem resilience and health**
- **Sociology & psychology measure importance of attributes to maintain moral value of ecosystem**



Importance of ecosystem valuation

- Stakeholders use (and misuse) ecosystem services
- Conflicting interests and over-exploitation occur at expense of others
- Structural shortcomings lead to incomplete cost-benefit analyses of interventions
- Sustainable, multi-functional ecosystem use is ecologically sound and economically better
- Better communication of values, costs and benefits is crucial





Reasons for under valuation

- **Market failure/Public Goods:** Ecological services often viewed as public goods (i.e., services like water-purification viewed as “free” and not counted in the market)
- **Market failure/Externalities:** Markets do not reflect full social costs or benefits of a change in availability of a good or service
- **Perverse incentives:** Policies may provide incentives for economic activity that works against wise-use of ecosystems, leading to degradation and destruction rather than sustainable management





Reasons for under valuation

- **Unequal distribution of costs and benefits:** Stakeholders who benefit from ecosystem service or its overuse may not be the same as those who bear the cost of degradation
- **Unclear ownership:** Ownership can be difficult to establish. Ecosystems may not have clear boundaries; ecosystem boundaries rarely correspond with administrative boundaries
- **Centralized decision-making:** Higher-level decision makers often fail to recognize importance of local ecosystems services
- **Net present value:** People may consider the value they are getting from ecosystems today without a vision for the future





Undertaking Valuation

- **Assessment of total economic value (TEV):** Total contribution of ecosystems to local or national economy and human well-being should be communicated to stakeholders, creating conditions for policy to stimulate conservation and sustainable use
- **Trade-off analysis:** Evaluating costs and benefits of development options to make informed decisions about possibilities for sustainable, multi-functional use of ecosystem services
- **Impact assessment:** Analysis of effects of proposed action on desired services. There may be good reasons for converting ecosystems. However, often loss of services is caused by accidents and unintended side-effects





How are valuation studies used?

- **Demonstrate contribution of ecosystems to local, national and global economy**
- **Convince decision-makers that benefits of conservation and sustainable use usually outweigh costs**
- **Identify users and beneficiaries of ecosystem services to attract investments and secure sustainable financial streams**
- **Increase awareness about benefits of ecosystems to human well-being; ensure ecosystems are taken into account in economic welfare indicators**
- **Improve local institutions that manage resources, identify better markets and resource management options for ecosystems and their products, and investigate people's livelihood strategies**





A framework for ecosystem valuation

**Step 1: Analysis of policy processes and management objectives
(why undertake the valuation)**

**Step 2: Stakeholder analysis and involvement
(who should do the valuation, and for whom?)**

**Step 3: Function analysis, identification & quantification of services
(what should be valued?)**

**Step 4: Valuation of services
(how to undertake the valuation?)**

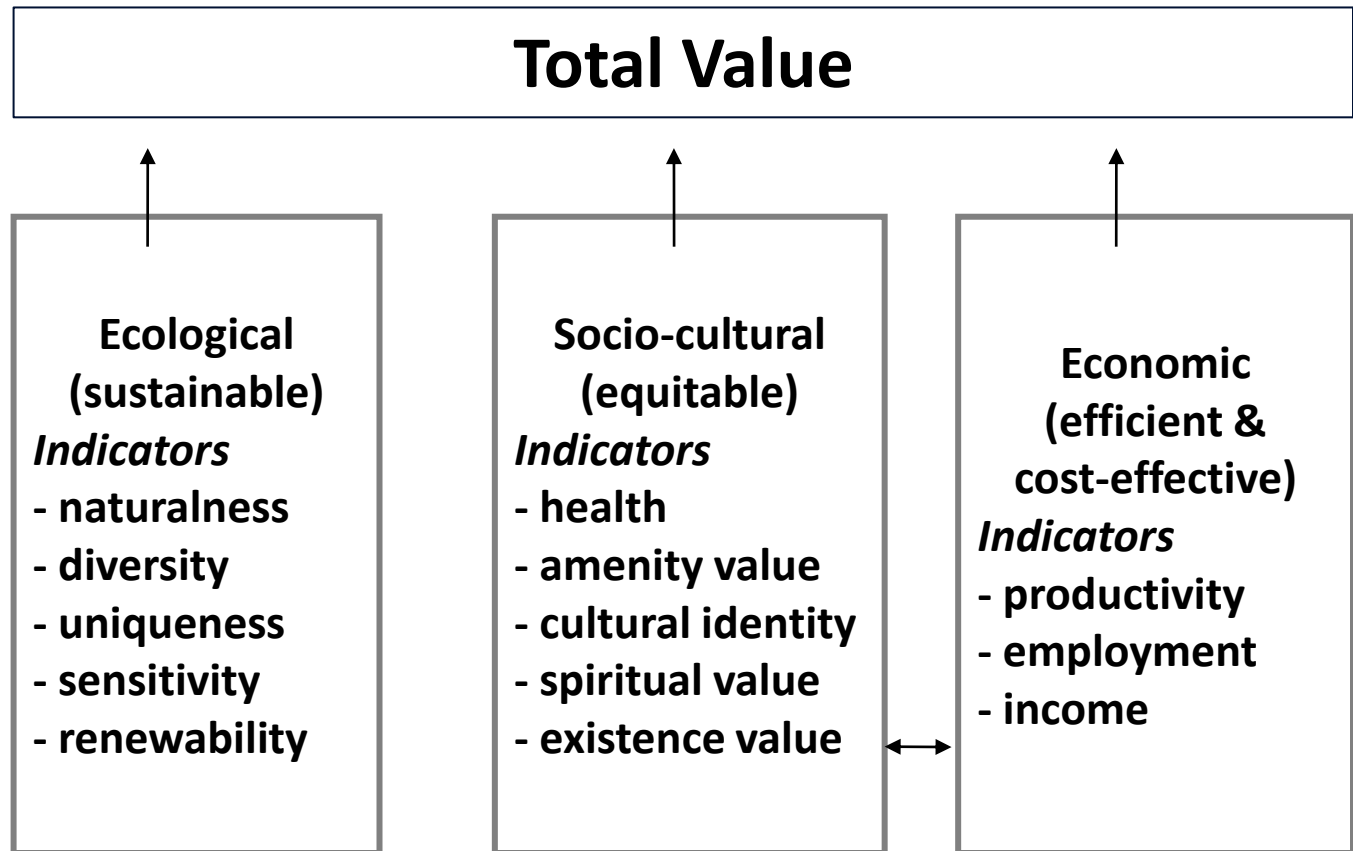
**Step 5: Communicating ecosystem values
(to whom to provide assessment results)**

***Results must be accessible to stakeholders and decision-makers**





Total Economic Value Components



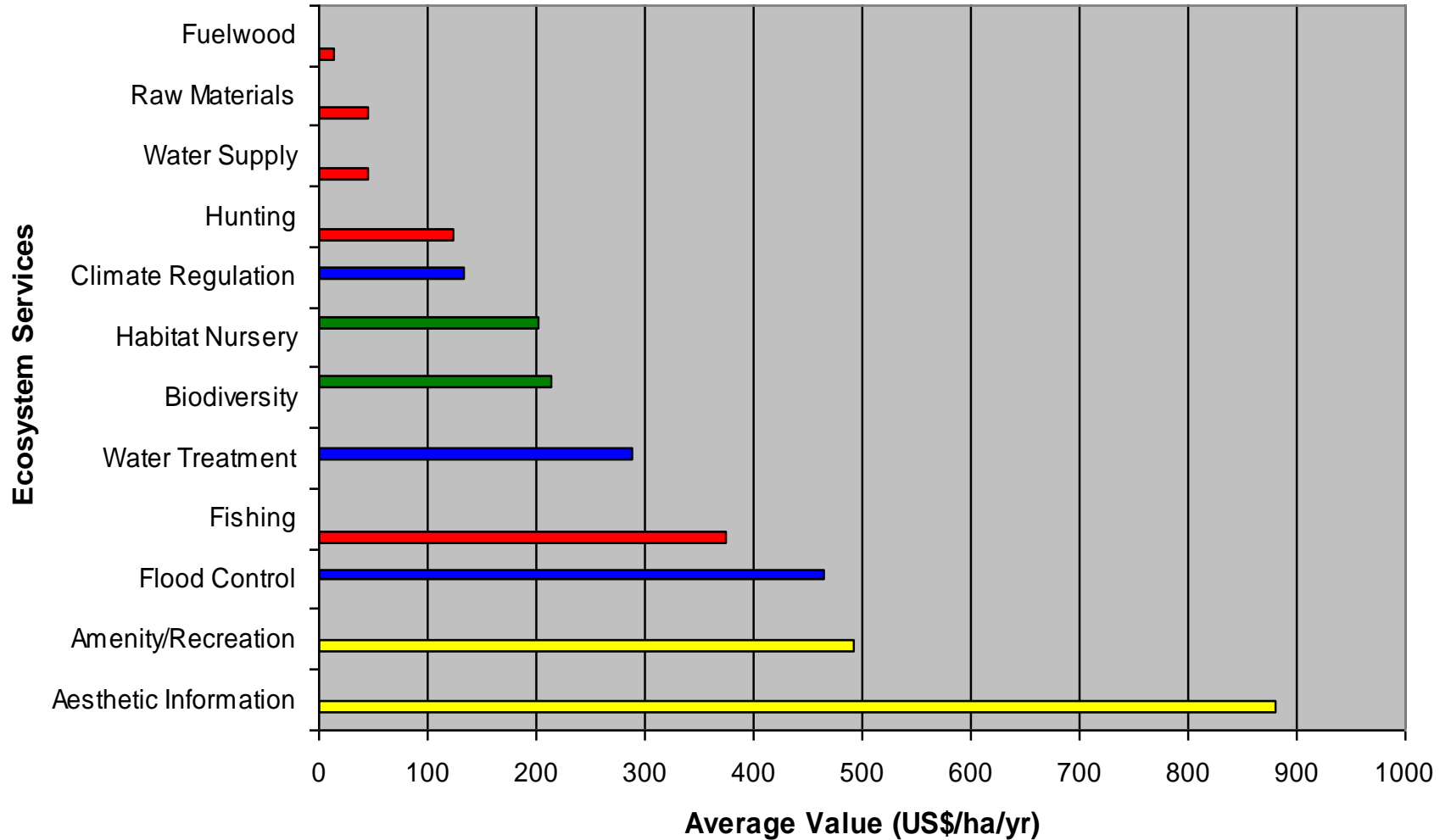


Application of TEV

- Wetlands provide beneficial services, averaging over \$4,000 per acre (US) in 2000 dollars
- Overall, total for services assessed is \$3,274 per ha per year; yet this is an underestimate
- Actual values for specific wetlands can be much higher
- Costanza *et al.* (1997) obtained higher estimates for services; flood control (\$4,539 /ha/year), water treatment (\$4,177 /ha/year), and water supply (\$3,800 /ha/year)



Total Economic Value (TEV)* of the main ecosystem services provided by wetlands (US\$/ha/yr)



■ Provisioning Services ■ Cultural & Aesthetic Services ■ Regulation Services ■ Supporting Services

Average Global Value of Annual Ecosystem Services

Ecosystem	Typical cost of restoration	Estimated annual benefits from restoration	Net present value of benefits over 40 years	Internal rate of return	Benefit/cost ratio
	US\$/ha	US\$/ha	US\$/ha	%	
Marshlands	33,000	14,200	171,300	12%	5.4
Lakes and Rivers	4,000	3,800	69,700	27%	15.5
Coastal	232,700	73,900	935,400	11%	4.4



TEV Caveats

- **Actual values often differ from perceived values; high values arise from less visible activities**
- **Ecosystems usually managed for provisioning services**
- **Goods relate to fuelwood, raw materials, and products of hunting and fishing; services without tangible goods not included**
- **Better ways of including less visible benefits are needed**
- **Many values are mutually supporting**





Preparing to return to the workshop catchment

- In groups, identify ecosystem services you would incorporate in a TEV for your catchment (20 min)





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Economics is a sometimes familiar, sometimes difficult field for our participants. How comfortable will you and your participants be with economic tools? Will you stick with qualitative metrics?

Can you see challenges leading this?

