Training Workshop on Payments for Ecosystem Services (PES) and Reducing Emissions from Deforestation and Degradation (REDD+)

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Potential 'value' of ecosystem services vis-à-vis cost of project implementation, buyers, current 'pricing' and realistic potential revenues

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What is the value of ecosystem services?

- The value of ecosystem services is hard to determine and can not be permanently fixed----ecosystems are dynamic and therefore, their services change overtime (-,+, 0), depending on extent and type of human interactions within those ecosystems.
- Considering the generational value of ecosystem services, makes 'pricing' even more difficult.
- In some cultures, ecosystem services are priceless– they mean everything that make up their whole being—their past, present and future----ancestors, religions, cultures and traditions, etc.
- Market approach determines ecosystem service prices by how much the buyer is willing to pay for the service and how much the seller is willing to receive---this 'willingness' can be regulated or negotiated.

Value of ecosystem services and policies

However:

- Markets fail to capture most ecosystem service values
- Many ecosystem services are either undervalued, or have no value, in current decision making frameworks
- Policies tend to take more account of shorter term and more localized private gains of benefits (such as increased agricultural productivity from wetland drainage) than longer term and more distant loss of public benefits (such as increased risk of flooding and decreased water quality).

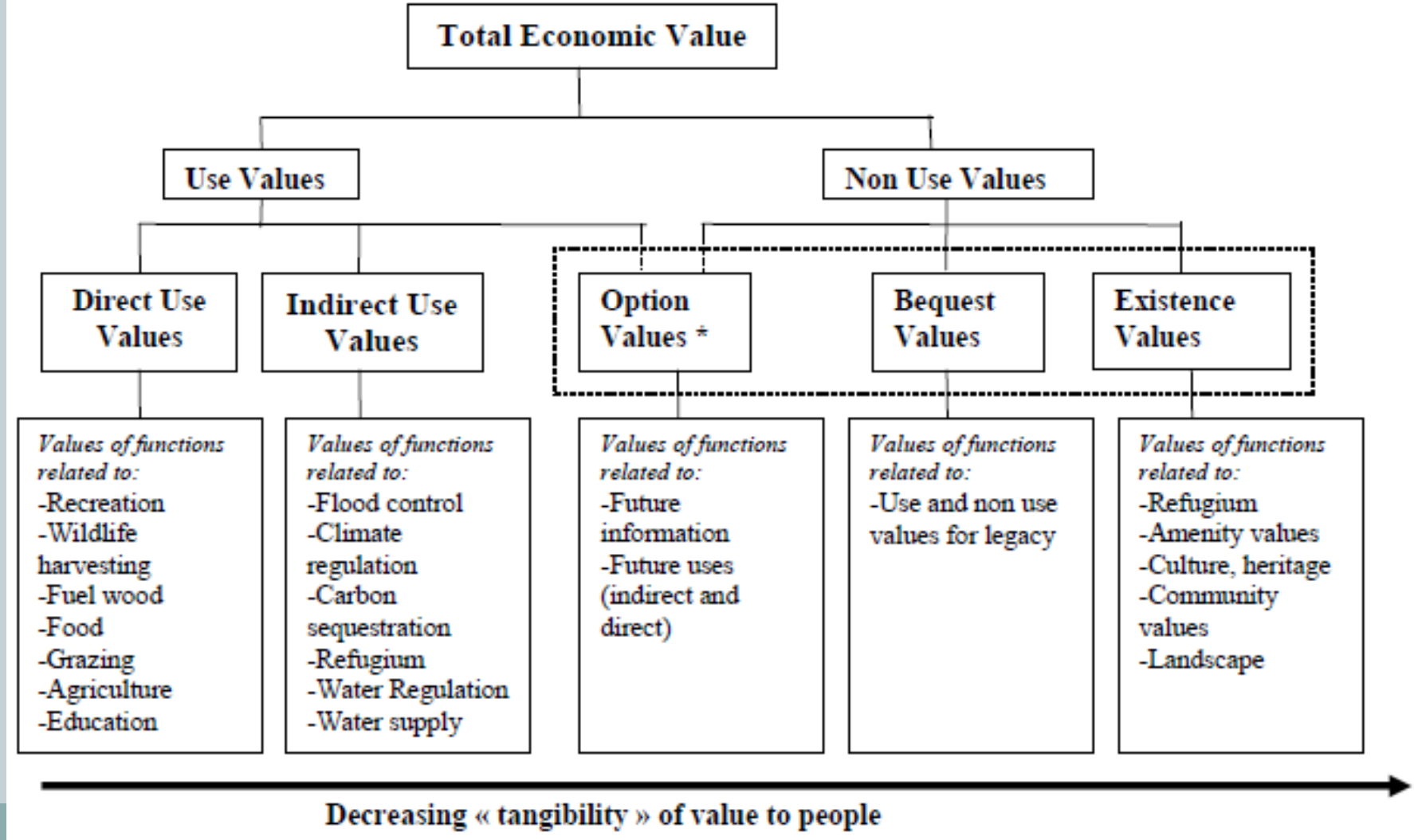
→ Declining capacity of ecosystems to sustain ecosystem services and increasing risks to future human wellbeing

Why are estimates of ecosystem benefits needed?

- To justify and decide how to allocate public spending on conservation, preservation, or restoration initiatives and prioritize
- To compare the benefits of different projects or programs
- To identify the costs and benefits for different stakeholders from how an ecosystem is managed
- To consider the public's values, and encourage public participation and support for environmental initiatives.
- To justify the need for financial resources to sustain, restore or enhance ecosystem services.

→ Better understanding and quantitative measurement of biodiversity and ecosystem values to support integrated policy assessments are a core part of the long-term solution.

Total Economic Value of Ecosystem services



Valuation methods

- Direct market valuation methods
  - Market Price Method
  - Productivity Method
  - Damage Cost Avoided, Replacement Cost, and Substitute Cost Methods
- Revealed preference approaches (based on observed behaviour)
  - Hedonic Pricing Method
  - Travel Cost Method
- Stated preference approaches (people's WTP for ES in hypothetical markets)
  - Contingent Valuation Method
  - Contingent Choice Method
  - Group valuation
- Benefit transfer method

Costs in project implementation/setting up P/RES schemes

Transaction costs

- Information acquisition /research costs- search and information gathering costs related to knowing what goods or services are being demanded, and at what price they can potentially be delivered.
- Negotiation and decision costs related to crafting acceptable agreement between parties.
- Monitoring and enforcement costs to ensure that parties comply the contracts.

Payment costs

- The actual payment/price of the ecosystem service

Management costs

- If the scheme is mediated by a broker, management cost is usually required---—this may include costs of monitoring, capacity building, communication between sellers and buyers, etc.

Who should bear the costs of gathering essential information?

Information acquisition and analysis can be costly. In developing countries, this may be too high to be internalized in 'buyer-financed schemes.

Information costs can be lowered by collaborating with

- ✓ Government-funded national and international scientific institutions
- ✓ Public-utility companies
- ✓ University faculty and student research
- ✓ External donors (especially during start-up phase)

How can research costs be minimized?

Research costs may be reduced through diverse institutional arrangements that make information acquisition easier.

Arrangements include centralizing operations, forming partnerships and networks, using intermediaries and brokers, learning-by doing, and formation and use of social capital.

In some areas, PWS schemes have been initiated with minimum information to begin with, and using them responsibly, or by just using 'rule of thumb on research needs' and applying the precautionary principle, and learning by doing.

Simple rules of thumb on research needs based on objective

Objective: Maintaining ecosystem in its current state

- ✓ If the solution is maintaining water quality or quantity by conserving threatened vegetation, it is possible to simply start setting up the mechanism based on precautionary principle and leave more detailed research later.

Objective: Restoring ecosystem to improve water quality

- ✓ Then research is needed to demonstrate biogeochemical linkages, develop economic cost functions and evaluate how much restoration is cost-effective, to establish if a PES scheme is feasible.
- ✓ If research funding is unavailable, the wisest initial course of action is undertake inexpensive no-regret actions such as keeping cows away from compacting springs and riverbanks.

Do transaction costs reduce over time?

Time and size are two things that can lower transaction costs overtime.

- ✓ Once experience and confidence are gained, the time spent by P/RES manager can significantly reduce.
- ✓ Once processes are improved.
- ✓ A large scale project can reasonably pay for more elaborate fixed transaction cost elements, such as a precise monitoring system, and less on trust-intensive client verification.

Who are buying ES ?

1. Public utility companies (water companies, HEP)
2. Private companies (resource-dependent ventures, like agri-industries, pharmaceuticals, food industries)
3. International community (e.g., for carbon, biodiversity)
4. General public (tourists, water consumers through water companies, etc.)
5. NGOs, donors are de facto buyers of ES through development interventions
6. National/local governments through regulatory measures and development interventions can be considered de facto buyers of ES.

A case study of Tapantí National Park, Costa Rica

Valuation of tropical forest services and mechanisms to finance their conservation and sustainable use

Source: Bernard, F., de Groot, R.S., Campos, J.J., Valuation of tropical forest services and mechanisms to finance their conservation and sustainable use: A case study of Tapantí National Park, Costa Rica, Forest Policy and Economics (2009)

Study area and problem statement

Tapanti-Macizo de la Muerte National Park

- 58,323ha, current budget: US$245,550 per year
- Lack of funds to finance conservation and for effective management of Tapanti NP and its surrounding buffer zone
- No recognition of the economic value of ecosystem services provided by Tapanti NP
- Risk of future deterioration of the ecosystems in Tapanti NP and at its buffer zone reducing the benefits available to future generations.

Purpose of the study

- **Research objective:**

  To explore the possibility of developing financing mechanisms based on the ecosystem services provided by Tapanti NP, to improve conservation and sustainable management of the park and of its buffer zone in the short, medium and long term.

- **Selected ecosystem services**

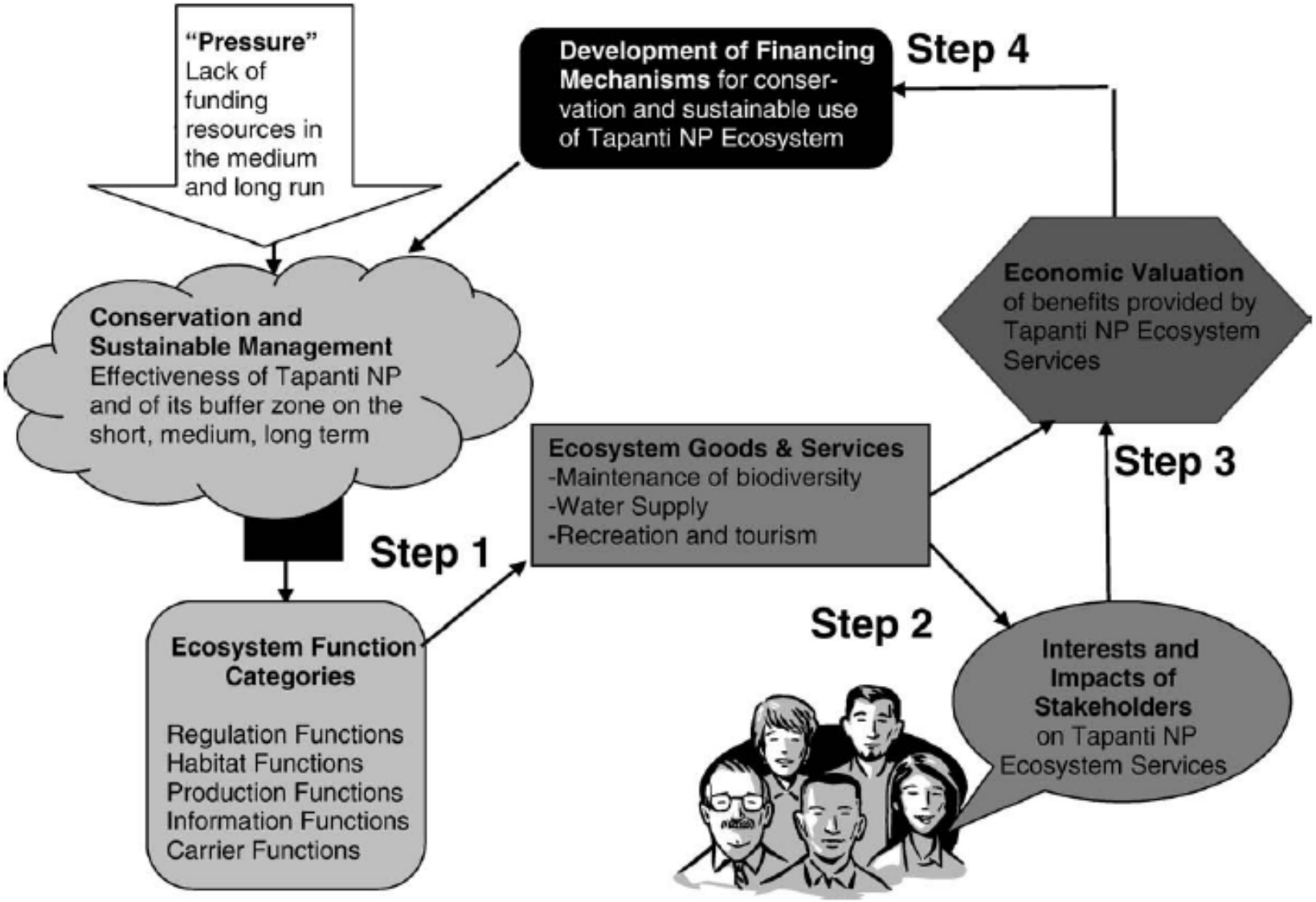
✓ Maintenance of Biodiversity

✓ Water supply

✓ Recreation and tourism

Legend

Step 1	**Function Analysis:** Linking ecosystem processes and components with functions & services
Step 2	**Stakeholder Analysis:** Linking stakeholders and ecosystem services
Step 3	**Function Valuation:** Linking services to economic and/or financial benefits of stakeholders
Step 4	**Market Analysis:** Linking financial benefits to practical financing mechanisms



Stakeholder interests, conflicts and synergies over the use of selected ES at Tapanti NP

	Type of stakeholder groups based on interactions with the park	Organisations and short explanation
1	Stakeholders who benefit from the park-services and have a positive influence	–Park managers –INBIO (Inst. of biodiversity) –Tourists –Tourism businesses
2	Stakeholders who benefit from the park services and have a neutral influence on the park	–AyA (Inst. of aquaducts & sewers)/ Cartago Plant (drinking water company) –ICE (Inst. of electricity in Costa Rica) (hydroelectricity company) –Consumers from the cities of San Jose, Cartago, Paraiso (directly benefiting from the water supply service of Tapanti NP)
3	Stakeholders who benefit from the park services and have a negative influence on the park	– Some tourists (who negatively affect nature and/or damage the park infrastructure)
4	Stakeholders who do not benefit from the park services and have a positive influence on the park	–MINAE (Ministry of Environment)/ACLAP –NGO's (eg Association de volunteers of San José University) –Baxter Industry
5	Stakeholders who do not benefit from the park services and have a neutral influence on the park	–Some local inhabitants –Some tourism businesses in the Macizo Sector
6	Stakeholders who do not benefit from the park services and have a negative influence on the park	–Some farms (use and spread of some pesticides and chemical products)
7	Stakeholders who are negatively affected by the park and have a negative influence on the park	–Some local inhabitants (who have no viable economic alternatives leading to illegal extraction, etc)

- The main beneficiaries are the electricity company, the drinking water companies, tourists and tourism businesses.
- More beneficiaries of ES at the regional and national level than at the local level.
- Importance of considering stakeholders that do not benefit or have a negative impact on ES for the future effectiveness of financing mechanisms

Monetary value of ecosystem services

Ecosystem services	Method of Valuation	Economic value (US$ per year)	Total (US$ per year)
Water Supply	Avoided Cost Method for Drinking water supply	199,570	**1,845,713**
	Avoided Cost Method for Hydroelectricity generation	1,646,143	
Recreation and tourism	Market based Method (visitor fees)	32,500	**657,500**
	Factor Income Method (Tourism Businesses)	625,000	
Biodiversity Conservation	Market based Method for Foundation support	10,000	**>10,000**

Financing mechanisms

Ecosystem services	Beneficiaries	Economic Benefits	Potential Payments to be made	Mechanism
Water Supply	Drinking water Plants	199,500	175,000	Public Good Service Payment (Water Tax)
	Hydroelectricity plants	1,646,143	n/a	Mechanism in development (Law) since 2002
Recreation & Tourism	Tourism businesses	625,000	45,700-128,000	Donations with voluntary contractual arrangement
	Tourists	0	85,500-101,000	User fees (development of new services) →development of concession and involvement of local people as either owners of the concession or co-concessionaires Individual donations, adoption programme and friend schemes. → Support of local association
Maintenance of biodiversity	Industrial Companies	0	30,000	Donations with voluntary contractual arrangement.
	Research Institute of Biodiversity	Not yet (0)	3750	User Fees for research activities and share of benefits for discoveries and commercialisation
TOTAL		2,470,713	339,450 – 437,750	-

Conclusion and recommendations

- Estimates of the financial benefits from the 3 services: US$2.5 million/year, i.e. US$43/ha annually
- The main beneficiary is the hydroelectric company, receiving almost 65% of total financial benefits from the 3 services at the park included in this study.
- WTP by interviewed stakeholders was at least 339,000 US$/year (14% of total value), which would be just sufficient to cover the funds needed for sustainable park management (current budget (US$245,000) and additional US$100,000 required by the park to improve management)
- These potential payments do not yet include the hydroelectricity company, which is one of the major beneficiaries. Their contribution, through a water-tax, could generate considerable additional income for the park.

Some considerations to keep in mind

- Developing and implementing financing mechanisms may lead to high transactions costs that should be identified before-hand and should be minimized to ensure the effectiveness of the financial mechanism.
- Merely increasing financing resources of Tapanti NP will not ensure effective conservation and management of the park unless local communities participate in the conservation of ecosystem services provided by the park, and share in their benefits.
- The success of implementation and financing mechanisms will require continuous monitoring, enforcing and assessment so that the payments contribute to both long-term sustainable forest management and improved livelihoods of local communities.

References

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