Introduction to Forest Economic Valuation
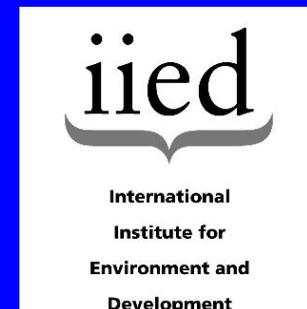
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Outline

- **The problem – why valuation is needed**
- **Forest values and who they accrue to**
- **Valuing resource management scenarios**
- **Valuation methods**
- **Examples of valuation**

The problem

- **Land use decisions do not take account of all forest values**
  - **Not all values are reflected in market prices**
- **Benefits of natural resources often do not accrue to local communities**
  - **Affects incentives for sustainable management**
- **Conservation and management interventions may conflict with immediate local livelihood needs**
  - **Restriction of access to natural resources**
  - **Restrictions on grazing**

Why natural resource values are often hidden

- **Externalities – uncompensated impacts**
- **Public goods – non-rival and non-excludable**
- **Lack of information eg on subsistence use**
- **Distortions in prices eg subsidies to agriculture**
- **Lack of clear land and resource property rights**

What is economic valuation?

- **Expression of the cost and benefits flows associated with marketed and non-marketed goods and services of natural resources in monetary terms so that they can be added up and compared**

Types of value

- **Direct use value**
  - Consumptive – wood products, non-wood products –fruits, honey,resins, medicines
  - Non-consumptive – education, recreational and cultural uses
- **Indirect use value**
  - Watershed protection, nutrient cycling, carbon storage, micro-climatic regulation
- **Option value** (future direct/ indirect uses)
- **Non-use values** (existence values)
  - Culture, heritage, intrinsic worth, biodiversity

Total economic value =

Direct use values +

Indirect use values +

Non-use values

Who benefits from natural resource values?

- **Direct use values are more likely to be of concern to local communities (but benefits of timber harvesting often accrue to others)**

- **Indirect use values tend to benefit those further away eg downstream**

- **Non-use values tend to benefit the global community – biodiversity**

How can economic valuation help?

- **Assesses whether a management intervention is worthwhile**

- **Identifies the winners and losers from current resource use and management**

- **Identifies the potential winners and losers from a management intervention**

- **Identifies trade-offs and win-win solutions**

- **Identifies potential sources of financing for conservation**

Cork Oak Forests:
What do we want to value?

- **Not the whole ecosystem**
- **But the costs and benefits of a change to sustainable management**
  - **For local communities**
  - **For other stakeholders eg:**
    - **Government, people downstream, global community**
- **Over time**
  - **Harvesting rates reduced to ensure sustainability**

Valuation Methods

- **Market price valuation**
  - **Including subsistence use**
- **Surrogate markets**
  - **Travel cost, hedonic pricing, substitute goods**
- **Production function**
  - **Biophysical relationships between forest ecosystem services and market activities**
- **Stated preference**
  - **Contingent valuation and choice experiments**
- **Cost-based approaches**
  - **Replacement cost, defensive expenditure**

Market price valuation NTFPs

Based on returns to harvesting or stumpage value

$$v = (p-c)q$$

v is value of an NTFP to a collector

p is average price in relevant market

c is costs of collection, processing, transport

q is quantity sold eg: per year

Key factors

Quantity	How much is used/sold
	Sustainable harvesting rate
Price	Seasonal variation
	Quality
	Local, national or export market
	Scale – Impact of increased supply
	Certification premium
Cost	Collection – distance and density
	Transport to market - distance
	Wage rates
	Opportunity cost of own labour

Dealing with time

Sustainable management may mean lower harvesting but continuing for more years

How to compare resource use scenarios when they involve different harvesting rates and hence net benefits over time?

Economic valuation assumes that benefits in the future are less valuable than those occurring in the present
- **time preference**
- **opportunity cost of capital**

Discounting

Application of a discount factor to enable comparison of different profiles of costs and benefits

Net present value $= \sum (b_t - c_t)/(1+r)^t$

What discount rate?

What time horizon?

Case study – Mishana, Peru

- **Peters, C., Gentry, A.H. and R.O. Mendelsohn (1989) Valuation of an Amazonian rainforest, *Nature*, vol 339**
  - Collection time: interviews and direct observation
- **Comparison of returns from land uses in one hectare of Amazon forest**
  - Sustainable NTFP and timber harvesting
  - Clearcut followed by plantations
  - Clearcut followed by cattle ranching
- **Conclusion: Sustainable NTFP and timber gives highest value**

Estimating NTFP returns (1)

- **Quantities**
  - **Inventory: fruit trees and palms in 1 ha**
  - **Annual production rates per tree from:**
    - **Counting and weighing fruits (4 species)**
    - **Interviews with collectors (7 species)**
    - **Published yield estimates (latex)**
  - **Carrying capacity: 25% left for regeneration**
- **Prices**
  - **Monthly surveys of local market**
  - **Official figures (Rubber)**

Estimating NTFP returns (2)

- **Costs**
  - **Labour cost: minimum wage rate**
  - **Transport: 30% of market value based on previous studies**
- **Discount rate**
  - **5% (no rationale given)**
- **Time horizon**
  - **Perpetuity**

Financial returns

Land use options	Net present value (US$/ha)
Sustainable NTFP	6330
Sustainable timber	490
Total	**6,820**
Clearcut timber plus forest plantation	**4,185**
Clearcut timber plus cattle ranching	**3,960**

Critique of Mishana study

Strengths	Weaknesses
Compares land uses	Unrealistic land use options: exclude shifting agriculture
Sustainable harvesting rate not actual rates	Assumes 1ha is representative
Includes costs	Takes no account of impact of increased supply on price
Multiple year focus	Less relevant when tenure uncertain

Case study: Mantadia National Park, Madagascar

- *Kramer, R. Sharma, N and M. Munasinghe 1995 Valuing Tropical Forests. Environment Paper No. 13, World Bank*

- Estimates costs and benefits for different groups of the creation of a National Park

Who are the losers?

- **Local communities: US$566,000**
  - Forgone benefits from timber, NTFPs and shifting agriculture
  - 20 year time horizon
  - 10% discount rate

Who are the winners?

- **Downstream farmers: US$71,000**
  - Production function approach to assess benefits of reduced deforestation on flooding and on rice production

- **International tourists: US$2.53 mn**
  - CVM survey of 100 visitors to a nearby Reserve: willingness to pay more to include a visit to the new park

The problem

Switching to sustainable management raises returns for some stakeholders and reduces them for others

The opportunity

Those who benefit can pay the land/resource managers to change to sustainable practices