



SUSTAINABLE USE OF FOREST ECOSYSTEM SERVICES

MARKET-BASED APPROACH

Learning Outcomes

At the end of the presentation, participants should be able to:

- Describe the concept of each market-based technique
- Explain various techniques used in economic valuation of forest ecosystem services using market-based

Market-based Approach

Classification based on IIED (International Institute for Environment and Development, 1994)

Price-based

- Market-prices
- Efficiency or shadow price

Cost-based

- Indirect opportunity cost
- Restoration cost
- Replacement cost
- Relocation cost
- Preventive/Defensive Expenditure
- Damage Costs Avoided

Market-based Approach

Classification based on Australia (1995)

- Change-in-productivity technique
- Change-in-income technique
- The replacement-cost technique
- The preventive-expenditure technique
- The relocation-cost technique

Principles of Market-based Approach

- Use market price to value forest resources
- Use market prices with and without alterations.
- If market exists: use *market price*
- If market is distorted (due to market failure, externalities, etc.) *shadow prices* have to be estimated and calculated.
- Value a benefit as *an increase in revenue or as a decrease in monetary outlay*
- Value a cost as *an increase in monetary outlay or as reduction in revenue*

Market-based Approach

Some techniques

- Production function (changes in production or change in producer surplus)
- Market prices
- Replacement Cost Technique
- Preventive expenditure
- Human capital (change in income technique)
- Relocation cost technique

Production Function

- Production activities → affect the environment
- Production values can be estimated using a straightforward conventional cost-benefit analysis.
- Costs and benefits are identified using with and without project prospective.
- Examples
 - losses resulting from environmental problem
 - decreased agricultural profitability from contamination
 - decreased industrial production due to noise pollution related absentesim

Market Prices

- Prices are derived within the marketplace
- Prices act as a signal of the opportunity cost of scarce resources
- Willingness-to-pay - indicate the financial account or value of the environment.
- Examples
 - benefits due to increase in production
 - increased in timber revenue
 - increased in agricultural production

Replacement cost technique

- The cost of replacement is used as a proxy for the environmental damage
- Where production is restored after an environmental impact, there is no change to the producer surplus but the cost of the substitute is the cost of the change
- Examples
 - impacts of development project
 - Costs of species conservation after it is lost as a result of logging activities
 - costs of road works after erosion causes roads to be washed away
 - costs of establishing a new park when another is destroyed by road construction

Preventive expenditure

- Expenditures that the society is willing to incur to prevent environmental damage
- The amount spent on preventive/mitigation measures is a proxy for the value for the environment
- Examples
 - costs of filtering water after logging a catchment area
 - costs of noise insulation in a house next to a highway
 - costs of construction of river bank due to soil erosion as result of development upstream

Human Capital

- The value of human output lost due to ill health or premature death as a result of environmental damage
- Examples
 - expenditure on health treatment due to pollution
 - value to human life in terms of forgone income

Relocation Cost (1)

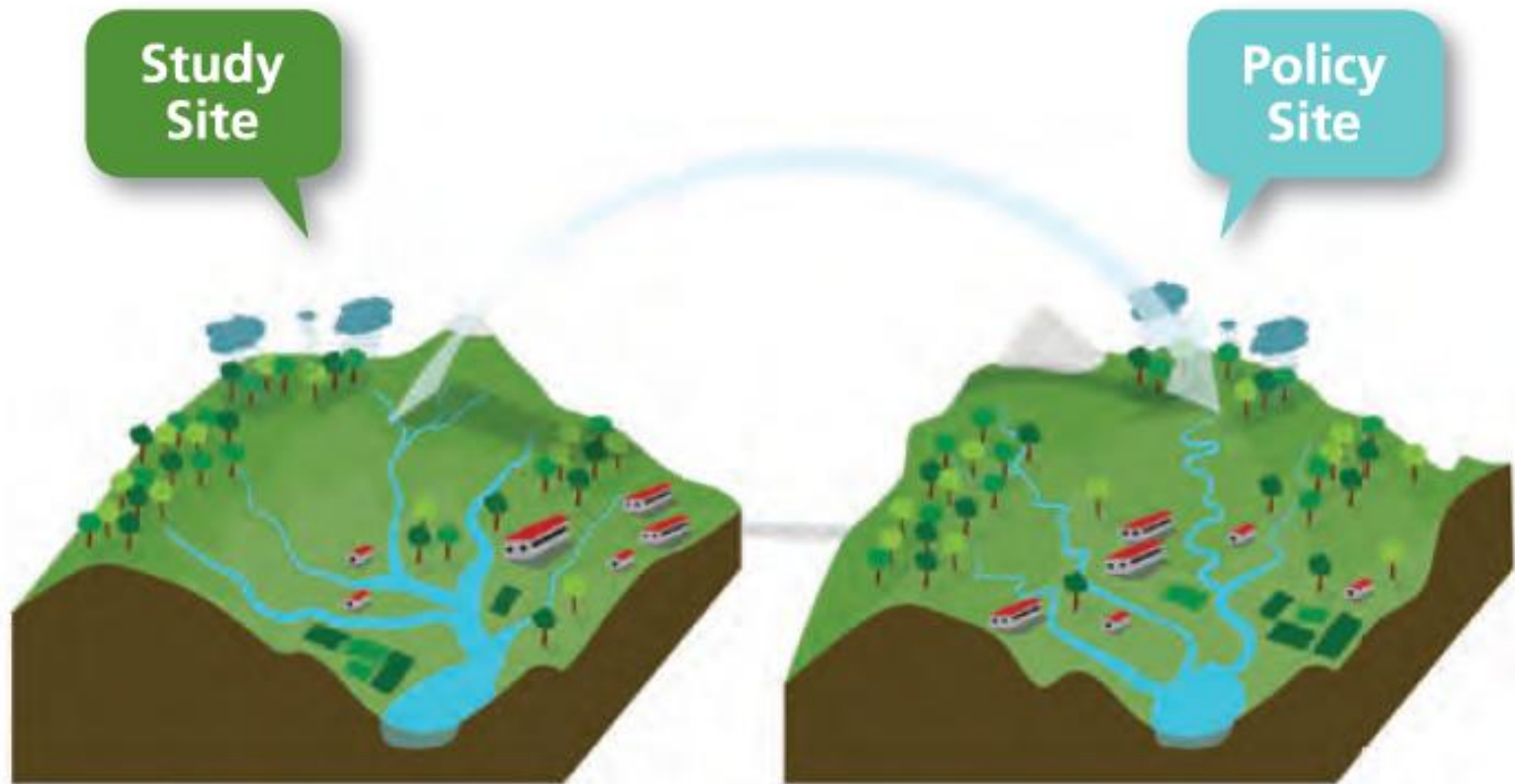
- Similar to preventive expenditure technique – to maintain the level of enjoyment or output are costed
- The activities are concerned with relocation of individual activities or entire firms or households, rather than adjustments to defend an existing activity at an existing location

Relocation Cost (2)

- When to use? When we want to estimate:
 - True costs of developments, policies and programmes
 - Opportunity costs of forgone benefits (e.g. *What do anglers do when their favourite fishing areas closes?*) - costs of loss of a fishing area

Benefit Transfer

- **Value transfer** involves estimating the value of ecosystem services through the use of value data and information from other similar ecosystems and populations of beneficiaries. It involves transferring the results of existing primary valuation studies for other ecosystems (“study sites”) to ecosystems that are of current policy interest (“policy sites”). (Brander, 2013). It is also called benefit transfer approach.



Value transfer is the procedure of estimating the value of an ecosystem service of current policy interest (“policy site”) by assigning an existing valuation estimate for a similar ecosystem elsewhere (“study site”) (Brander, 2013).

Benefit Transfer – 3 methods

Unit value transfer

- uses values for ecosystem services at a study site, expressed as a value per unit (usually per unit of area or per beneficiary), combined with information on the quantity of units at the policy site to estimate policy site values. Unit values from the study site are multiplied by the number of units at the policy site. Unit values can be adjusted to reflect differences between the study and policy sites (e.g. income and price levels).

Benefit Transfer – 3 methods

Value function transfer

- uses a value function estimated for an individual study site in conjunction with information on parameter values for the policy site to calculate the value of an ecosystem service at the policy site. A value function is an equation that relates the value of an ecosystem service to the characteristics of the ecosystem and the beneficiaries of the ecosystem service. Value functions can be estimated from a number of primary valuation methods including hedonic pricing, travel cost, production function, contingent valuation and choice experiments.

Benefit Transfer

Meta-analytic function transfer

- uses a value function estimated from the results of multiple primary studies representing multiple study sites in conjunction with information on parameter values for the policy site to calculate the value of an ecosystem service at the policy site. A value function is an equation that relates the value of an ecosystem service to the characteristics of the ecosystem and the beneficiaries of the ecosystem service. Since the value function is estimated from the results of multiple studies it is able to represent and control for greater variation in the characteristics of ecosystems, beneficiaries and other contextual characteristics.

Note:

Participants should refer to various textbooks for details explanation of each technique