Topic 1
Role of Economics in Forestry

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Flow

1. Role of Economics
2. Limitations
3. An Analytical Framework
4. Economic approaches to forestry
5. Problems

1. Role of Economics

- Forests means different things to different stakeholders
  - For forest communities, it is a source of livelihood, and are incentivized to conserve
  - For rural communities, it provides fuel, pasture, and can be converted to agricultural land; hence, less incentivized to conserve
  - For the industry, it is a resource meant to be exploited
  - For the urban well-heeled citizens with minimal interface, it provides ecosystem services, leisure, “goodness”, and so, an incentive to conserve
- The Economist uses several analytical tools to advice policy makers on this scarce resource allocation

2. Limitations

- Economists are routinely consulted to provide an economic valuation of forests and biodiversity to justify conservation. Limitations include:

1. But, assigning monetary values based on classical economics theory is not possible, due to the “public goods” nature of forests, as opposed to private goods
   - What are public goods ?
   - For example, the economic value of a drug depends on whose life it saves (Third word citizens seldom have access to expensive drugs, sans state control)
2. Future research investment is a function of the economic value of anticipated output
   - Economists from WB, IMF, and ADB set the research agenda in forestry and often ignore to integrate cultural, and ecological perspectives
3. Economics is anthropocentric, and the focus is human welfare

3. Analytical Framework for Linkages

- Systems to quantify the relationships between the changing conditions of forest stands and economic drivers are not new
- Growing in use and importance, are systems that also incorporate other aspects of forests such as ecosystem services
- The European and Asian literature proposes a framework to precisely understand the economics in forestry. Six modules are proposed:
  1. Land use changes in the country
  2. Forest inventory
  3. Timber market trends
  4. Exports and imports in forestry products
  5. Ecosystem services (A logical approach is to focus on those services that are easily measured and for which markets exist, such as carbon sequestration and water quality)
  6. Economic impact (translate the projected changes and trends in the forests and forestry sectors on the larger economic and social aspects of the country)
- (6) can provide changes in employment, income, tax revenue, production patterns, and other economic indicators

5. Economic approaches to forestry

- As forestry sectors around the world open their doors to private sector participation, governments have been attracted to market-based instruments for guiding private investment.
- Of the many instruments available to policy-makers, by far the most ambitious to date is the development of markets for forest environmental services, such as:
  - carbon sequestration,
  - biodiversity conservation (we briefly discuss this in the session),
  - watershed protection and
  - landscape values.
- Markets are thought to offer an efficient mechanism for promoting and financing forest protection and sustainable forest management
- However, policy-makers' enthusiasm for market development is not matched by practical understanding.

5. Economic approaches to forestry …

- Very little guidance is available on the mechanics of market evolution, or on the consequences of markets for human welfare.
- Unanswered questions abound:
  - What drives market development?
  - How should markets be established?
  - What costs are involved?
  - Will markets improve welfare?
- **Of particular concern is the lack of knowledge related to what market creation means for poor people**
  - The critical question is whether markets for forest environmental services can contribute to poverty reduction, while at the same time achieving efficient environmental protection

5. Economic approaches to forestry …

The markets for biodiversity conservation

- The process of commercializing the diversity of nature is not easy. Why?
  - The services are numerous, and intangible which makes them difficult to package for sale
  - Services are rarely consumed by a clearly identifiable clientele
  - Threshold effects in the supply of biodiversity (which mean that forest areas below a certain size will fail to deliver the demanded biodiversity) makes it difficult to portion out the services to individual buyers.
- However, governments, international NGOs, and private companies are paying for forest biodiversity conservation
  - Growing public awareness of biodiversity benefits and threats of loss are the main drivers
- Despite significant progress in recent years, for the most part payments for biodiversity services remain nascent and experimental
  - Major constraints to market development (transaction costs) associated with setting up and implementing trades remain
  - The constraints are greatest in poor communities of developing countries

Worked example 1: MB and MC

The table shows the marginal benefit to a paper mill of polluting a river and the marginal cost to residents who live downstream. In this problem assume that the marginal benefits and marginal costs are measured at (not between) the specific quantities shown.

Plot the marginal benefit and marginal cost curves. What is the efficient quantity of pollution? Explain why neither one ton nor five tons is an efficient quantity of pollution. In the absence of pollution fees or taxes, how many units of pollution do you expect the paper mill will choose to produce? Why?

Quantity of pollution (tons per week)	Marginal benefit	Marginal cost
0	$110	$0
1	100	8
2	90	20
3	80	35
4	70	70
5	60	150
6	0	300

Solution

- MC = cost imposed on residents due to one extra unit of pollution generated
- MB = benefit to the mill (saved costs from not installing abatement equipment) in generating one extra unit of pollutant.
- Efficient quantity = 4 tons
- At 1 ton, MB > MC; for efficiency MB =MC. The benefits to the mill is higher than the costs imposed.
- At 5 tons, MC > MB.
- In the absence of fees, taxes, etc., the paper mill will produce 6 tons where MB =0.

Worked example 2: NPV

Consider the role of discount rates in problems involving long time horizons such as climate change. Suppose that a particular emissions abatement strategy would result in a $500 billion reduction in damages 50 years into the future. How would the maximum amount spent now to eliminate those damages change if the discount rate is 2 percent, rather than 10 percent?

Solution

- In a benefits – costs comparison, NPV (benefits) > NPV (costs)
- We compute the maximum allowable costs by calculating NPV (benefits)
- NPV = (500*10**9)/(1+ r)**50
- With r=0.1, NPV = 4.3 billion units
- With r = 0.02, NPV = 185.8 billion units.
- R matters a lot in determining efficient current expenditures for long term problems.

References

1. Introduction to Forestry Economics, by Peter Pearse

End of session

Thanks