

# Environmental Valuation for Economic Development

Priya Shyamsundar

SANDEE-PEI Workshop, August 2012

---

South Asian Network for Development and Environmental Economics

Kathmandu, Nepal

# Why Value Environmental Changes?

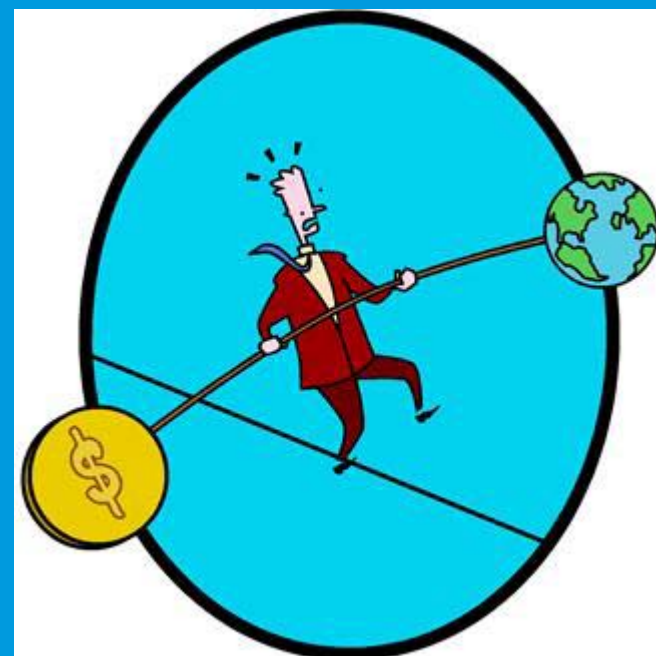
- Environmental change often a result of private productive actions that result in spatial and temporal 'externalities'
- Difficulty in accounting for extent of damage because of the public good nature of environmental goods
- No markets or prices to signal scarcity



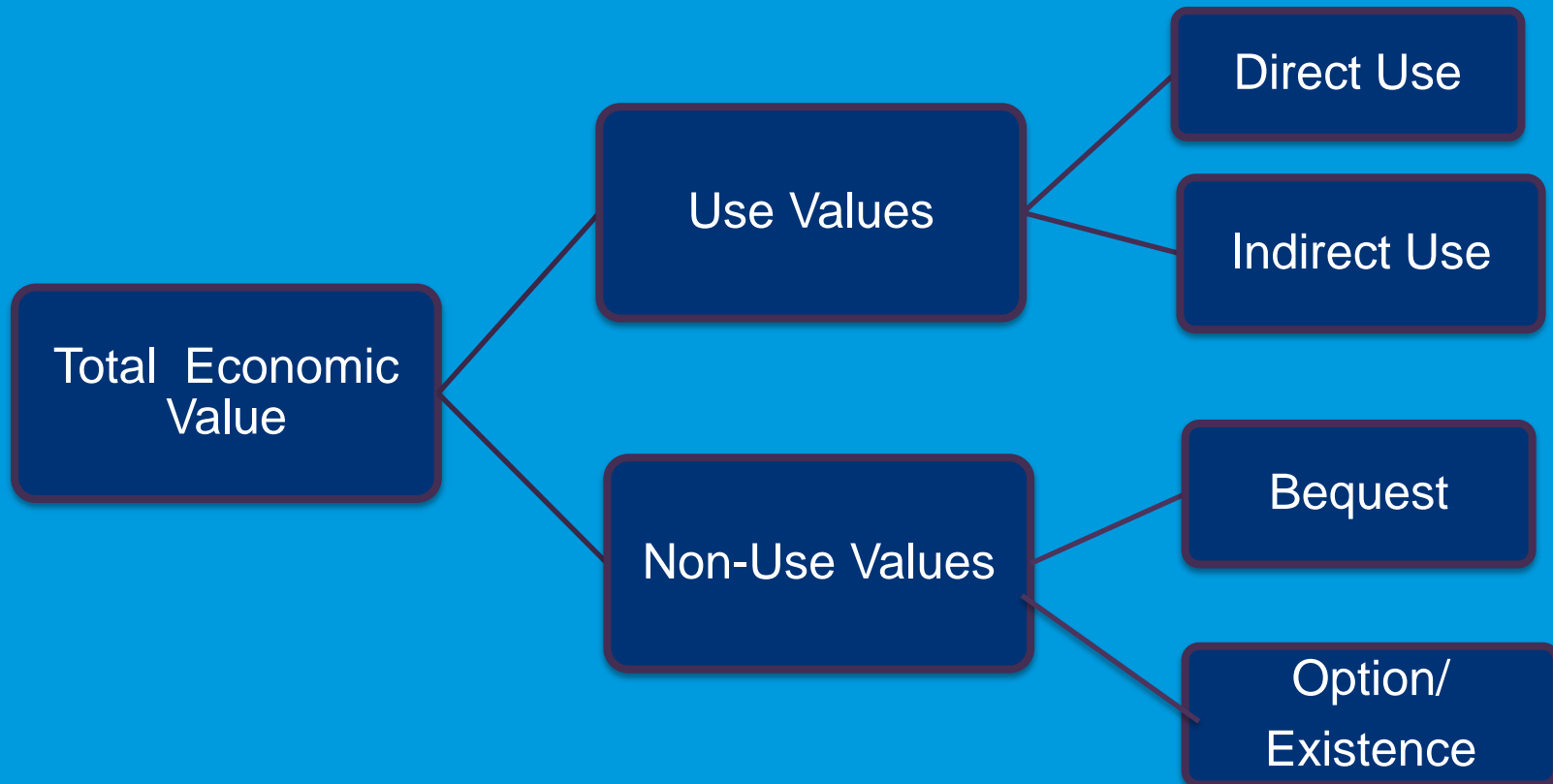
- Can we put a price on environmental losses and gains?

# Should we value the Environment?

- Economists take an anthropocentric approach – how do environmental changes matter to us humans?
- Limited by lack of knowledge, uncertainty, aggregation and ethical considerations...
- Choices inevitably based on economic values -- useful to obtain monetary estimates for public decision-making to clarify trade-offs



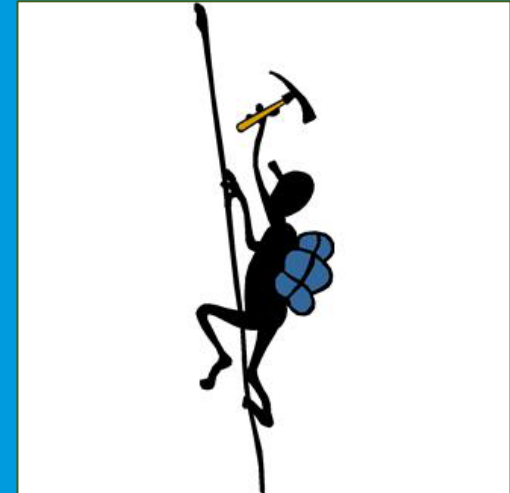
# What are different components of value?



# How do we value environmental changes?

## Revealed Preferences

- What do people's actions suggest about value?
- Travel cost and hedonic approaches



## Stated Preferences

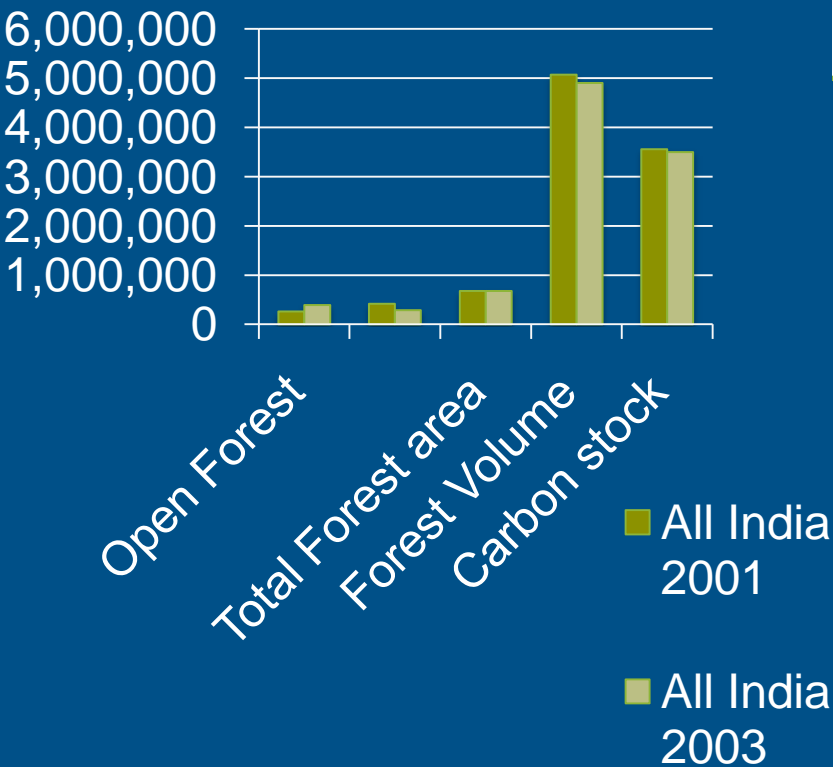
- How can we get people to reveal their willingness to pay or accept by asking them?
- Contingent valuation, choice modeling.....



# Where is the Policy-Valuation Interface?

- Greening National Accounts
- Allocating budgets
- Making Investment decisions
- Understanding the scale and distribution of externalities
- Evaluating Instruments or Policies
- Enabling trades
- Financing public goods

# Accounting for Forest Wealth in India (Gundimeda et al. 2005, 2006)



Price of timber and fuelwood	Value
Accounting price of NTFPs (Rs/Ha)	7,631
Accounting price of carbon (\$/ton)	20
Accounting price of recreation (Rs/Ha)	65,193
Accounting price of genetic material (Rs/ha)	22,646
<b>Total loss in forest wealth (million Rs)</b>	<b>-325,342 (USD 7 Bill)</b>

# Investment Decisions

- Cost Benefit Analyses of Investment Projects
  - Understanding Impacts of dams and roads, eg. on biodiversity
  - Should we invest in natural barriers such as mangroves?

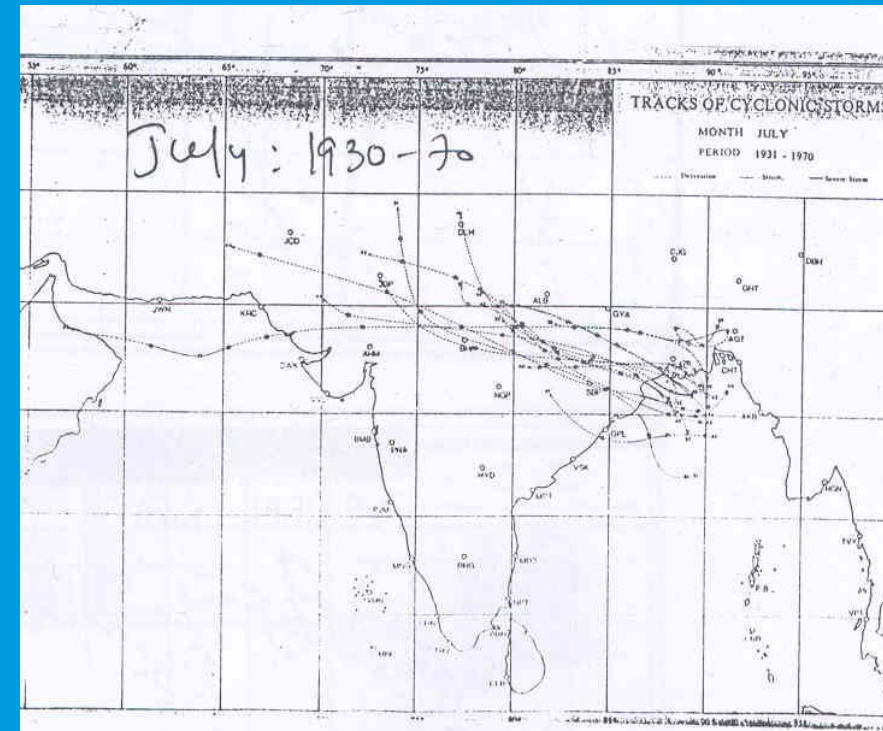
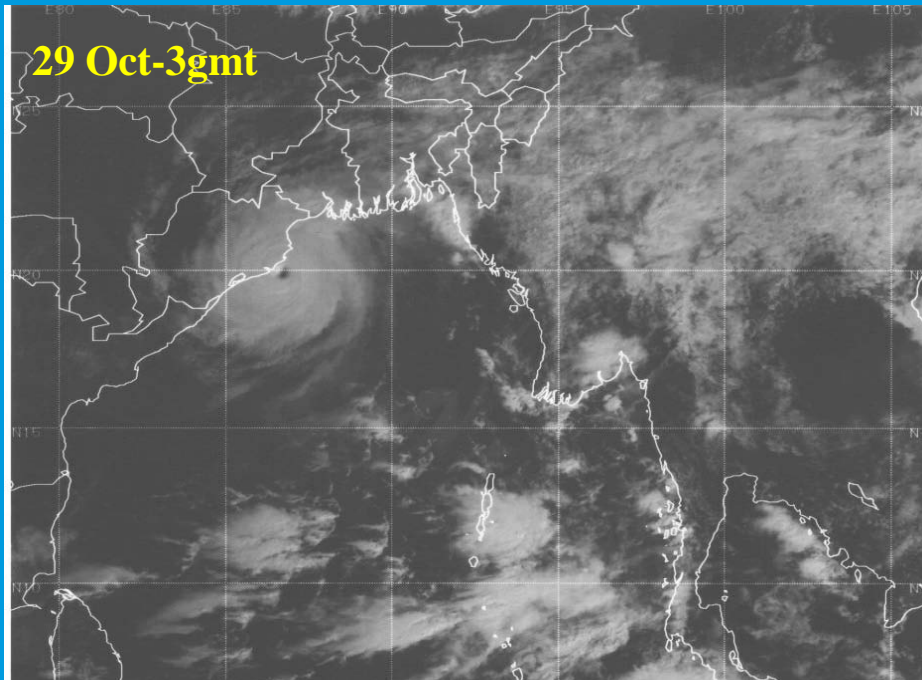


# Are Mangroves a good investment in cyclonic areas? (Das 2007, 2011)

- As we encounter climate change should we invest in natural barriers?
- 10,000 killed in Orissa (1999)
- Could more mangroves have provided protection against storm surge?



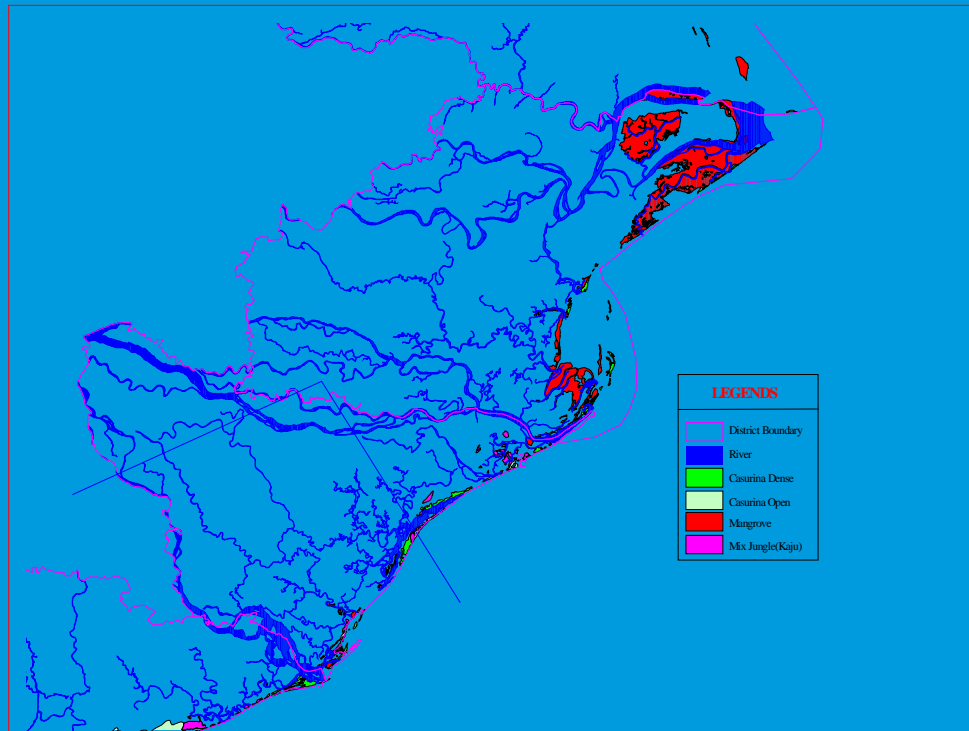
# Study Area – Kendrapada district of Orissa (Das 2007)



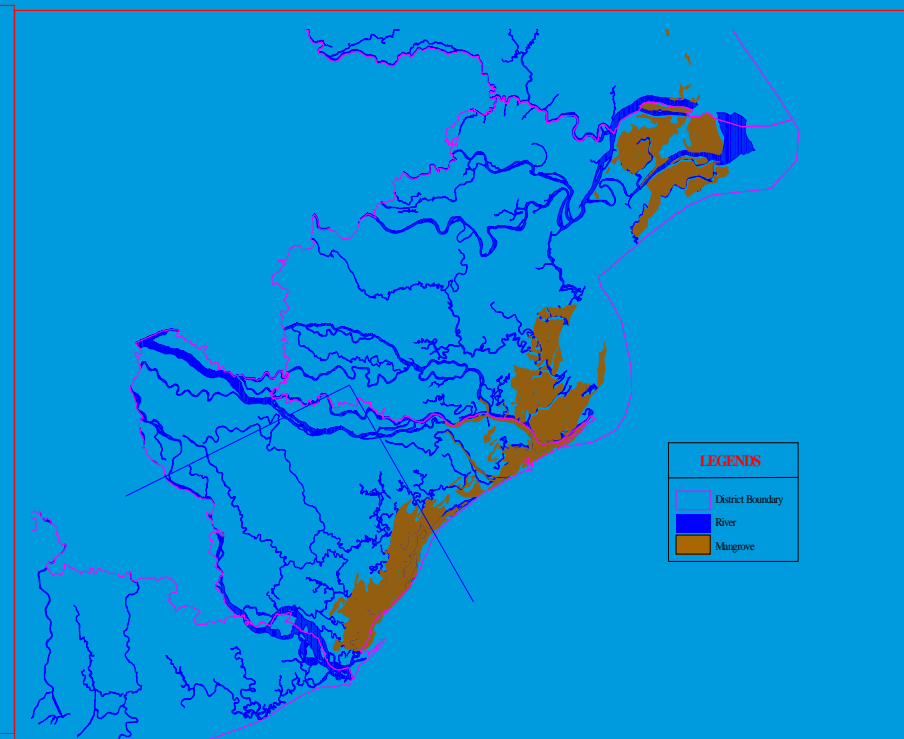
# Historical Mangrove Losses

(Das 2007, 2011)

1999



1950



# Annual Storm Protection Value (Kendrapada, Orissa)

## Death Reduction

- 54% with current mangroves
- 92% with 1950 mangroves

## Annual Storm Protection Values

- USD 694 / Ha/ Year
- Death reduction + Property Loss + Livestock Losses

## Annual Rental Value of Coastal Land

- USD 350 - 450 /Ha/ Year

# The Value of Statistical Life



**Economists do not try to measure the value of life, they measure people's interest in reducing risks to life**

- What are we willing to pay to reduce the risk of death by a small amount?
- VSL is WTP to save 1 statistical life or to reduce the entire population's risk of death by a small amount

# Valuing pre-mature mortality

Study	VSL (USD)
Madhwaran (2004), India	305,000 -318,000
Rafiq (2011), Pakistan	321,813- 775,193
World Bank (2006), Benefit Transfer, Pakistan	Approx 45,000

# Understanding the costs of Externalities

# Understanding Agrarian Externalities

- Shrimp farming a major industry in multiple South Asian Countries
- In South India
  - shrimp cultivation allowed beyond 500 mts of High Tide Line in *uncultivable* lands.
  - shrimp culture practiced in paddy lands along the tertiary canals.
- Agro-ecosystems affected by land salinity





# Soil salinity and Paddy Productivity (Umamaheshwari 2011)

- Do shrimp farms impose costs on agricultural land?
- What is the marginal impact on paddy yields from salinization?
  - Two villages in varying distance to shrimp farmers
  - Historical and current soil salinity
  - Crop data from 257 plots

# Estimating the value of Shrimp externalities (Umamaheshwari et al 2011)

## SOILS

Both paddy villages had normal soils in pre-shrimp period, 1994-95.

Distant village had normal soils during 2006.

Nearby village had high mean salinity in certain areas. Cultivated lands had lower EC

## YIELDS

Average net returns distant village Rs 5038/ha and nearby village was negative

10% increase in salinity associated with a 0.6% decrease in paddy yields.

Returns of INR 1000 to INR 5000 per ha by reducing salinity to safe levels in affected areas.

# Evaluation of Programs and Instruments

# Financing Public Goods

# Financing Public Goods in the Maldives

(Bhat, Bhatta and Shumais)

Economic Indicators	Units	Amt	Tax Burden (USD/visit)
Tourist population in 2007	# visitors	675,889	
Annual tourism benefits to all tourists	Million USD	695	
Annual revenue generated by taxing benefits at 2 percent	Million USD	14	20.57
Government expenditure on the environment	Million USD	11.06	
Env expenditure as percent of total	Percent	1.71	
Overseas environmental aid	Million USD	16.30	
Total environmental expenditure	Million USD	27.36	
Environmental expenditure as percent of annual Tourism Benefits	Percent	3.98	

# Issues and Priorities

- Costs
  - Data collection (cost per household): USD 10-15
  - Overall study - Basic: USD 15-20,000
  - Overall study – International peer review: +50%
- Skills and Data
  - Physical and Economic data
  - Multi-disciplinary analyses – is the science clear?
  - Multi-disciplinary teams?
- The Policy-Valuation interface
  - Evaluating a policy or an instrument
  - Financing a public good
  - National Accounts – building blocks
  - Understanding externalities – understanding connections, advocacy
  - Enabling trades -- experimental

# Acknowledgements

- Saudamini Das
- Bhat, Bhatta and Shumais
- Min Bikram Malla
- Md Rafiq
- Umamaheshwari
- Advisors and donors  
([www.sandeeonline.org](http://www.sandeeonline.org))

