Local Benefits of Mangrove Plantations in Coastal Bangladesh

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Mangrove Plantations in Bangladesh

- Original forest vegetation of Meghna estuary removed over a century ago
- Since 1966, monocultural plantations of *Sonneratia apetala* and *Avicenna officinalis* on char lands
- 148,500ha established
- ~45,000ha currently remain, more planted each year
- By law, jurisdiction allocated from Forest Department to Land Ministry after 20-25 years.
Research questions

- Motivation: Nearly 50 years of plantation activity… how do people use them?
- Q1: Resource extraction suggests what value per hectare and how does this vary spatially?
- Q2: Have these direct use benefits justified the establishment costs? Are new plantations justified based on direct use alone?
Methodology

• Field methodology:
  – Sample forest plots (up to two per village)
  – Household surveys (30-50 per village)

• Survey data (extraction activities):
  – Harvest quantities, frequency, hours, travel time/cost, wages, market prices, search radii

• GIS
  – Geographic coordinates of respondents
  – Land cover data
Study sites in Barisal

- Padma
- Sokina
- Momripara
- Babugonj

Sample household
Study sites in Chittagong

- Aladigram/Kalirchar
- Gazaria
- Saidpur
- Mirzanagar
Sokina, Barisal
Sokina, Barisal
Sokina, Barisal
Sokina, Barisal
Sokina, Barisal
Results: collection distance histogram
Results: fuelwood and NTFP collection
Results: fuelwood and NTFP collection
## Plantation Costs

<table>
<thead>
<tr>
<th>Source</th>
<th>Establishment (US$/ha)</th>
<th>Management (US$/ha-yr)</th>
<th>Monitoring (US$/ha-yr)</th>
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</thead>
<tbody>
<tr>
<td>World Bank 1980</td>
<td>38</td>
<td>9</td>
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<td>Islam 2000</td>
<td>343</td>
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<td>Ferguson and Das 2012</td>
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<td>World Bank 2013</td>
<td>876</td>
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<td>18</td>
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</tbody>
</table>
Retrospective Cost-Benefit Analyses

[Graph showing cost-benefit analyses for different locations and rates (5%, 10%, 15%) with specific mentions of Aladigram/Kalirchar, Babugonj, Gazaria, Mirzanagar, Momripara, Padma, Sokina, and Entire sample.]
New Plantation Cost-Benefit Analyses
Policy Implications

• Past plantations have largely been justified based on direct uses alone, due to low plantation costs.
• New plantations have greater potential returns where current use density is high, i.e., close to villages.
• Indirect uses (ecosystem services) must be accounted to justify some new plantations.
• Key services include climate change adaptation, e.g., land stabilization and storm surge protection.
Relative Exposure GIS Model
Relative Exposure GIS Model, HIES data
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