Conserving Carbon-rich Biodiverse Ecosystems with Environmental Markets

Brian Murray
Director for Economic Analysis, Nicholas Institute
Research Professor, Nicholas School

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And Duke Conservation Society

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What are Environmental Markets?

- A mechanism by which buyers and sellers can convene to exchange environmental (ecosystem) services
- Sellers – produce environmental services for compensation at an agreed upon price and quantity
- Buyers – pay the seller for the environmental services. Who might buy such a thing?
  - Government – traditional payment programs (e.g., Conservation Reserve Program, USDA)
  - Private parties
    - Voluntary/stewardship/philanthropy
    - Industry sustainability/supply chain standards
    - To meet compliance obligations
Markets for compliance obligation; pollutant trading

- Regulation limits a polluting activity
- Allows compliance flexibility
  - Trading within the regulated sector
    - Some regulated parties overcomply and sell credits to parties for whom it is more expensive to comply with limits
    - OK, as long as total limit is met and pollution hot spots are not created
  - Going outside the regulated sector: offsets
    - Pay parties who are not obligated to reduce their pollution at all to do so voluntarily, quantify the reduction, and use this as compliance credit
    - Same basic advantage as trading with a regulated firm
- Many examples: SO2/NOX trading, GHG cap-and-trade, nutrient trading,…
- Carbon-rich ecosystems of interest here (forests, wetlands, …) may (not) be directly regulated, but if not can enter the game as offsets
Example 1: REDD+

Reduced Emissions from Deforestation Degradation + Carbon stock enhancement

Deforestation ~ 12-15% of global greenhouse gas emissions
What is REDD+ Crediting?

• Payments to reduce CO$_2$ emissions from deforestation and degradation and carbon stock enhancement

• Usually refers to activity in tropical forest countries, but can be extended elsewhere

• “Crediting” implies that it may be part of an emissions trading system (though other payment systems could apply)
Rationale

• Need for a well-funded effort to reverse forest destruction
  – To combat climate change
  – To combat losses in biodiversity, water protection, local livelihoods,…

• Need for developing country role in “common but differentiated” strategy

• Opportunity for compliance cost containment in capped countries
International Action

- Rio Earth Summit
- UN Framework Convention on Climate Change
- Kyoto Protocol
- Negotiate Details
- US Rejects Kyoto
- Other Developed Countries (exc Australia) Ratify Kyoto
- Kyoto Takes effect
- Kyoto Phase I ends


Dec 2010: Cancun Agreement for post-2012
Dec 2011: Durban negotiations
REDD+ in Cancun Agreement

- **Goal** to “slow, halt, and reverse” forest cover and carbon loss.
  - No specific targets
- **Scope:**
  - Reduce emissions from deforestation
  - Reduce emissions from forest degradation
  - Conserve forest carbon stocks
  - Manage forests sustainably
  - Enhance forest carbon stocks
- **Requires** each forest country to develop
  - National strategy or action plan
  - National forest reference emission level and/or forest reference level (subnational as interim OK)
  - National forest monitoring system
  - System for providing information on safeguards (discussed below)
REDD+ (cont’d)

Three Phases

1. Development of national strategies or action plans, policies and measures, and capacity-building
2. Implementation of national policies … and results-based demonstration activities
3. Results-based actions that should be fully measured, reported and verified.

Safeguards

- National forest programmes and international conventions
- Governance/transparency
- Social/local rights (particularly indigenous)
- Biodiversity
- Reversals
- Leakage
The Road Ahead?

- **UNFCCC**
  - Continue negotiations heading into COP 17/Durban (AWG-LCA)
    - Funding commitments
    - Clarify role of markets for Phase III reductions
  - REDD+ methodological issues (SBSTA)
    - Study land use drivers in developing countries/mitigation potential
    - National monitoring systems
    - MRV

- **US Cap-and-Trade**
  - Once a great hope for REDD demand
  - Off the table for the foreseeable future

- **California**
  - World’s only compliance RED(D) system
  - Sector-based/state level (Brazil, Indonesia, Mexico, Nigeria)
  - A big breakthrough, but small in scale
Coastal Blue Carbon

Brian Murray

Based on work by
Brian Murray\textsuperscript{1}, Linwood Pendleton\textsuperscript{1},
Aaron Jenkins, and Samantha Sifleet

Environmental Markets Student Group
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\textsuperscript{1}Nicholas Institute for Environmental Policy Solutions
The Blue Carbon Story

• Coastal ecosystems have value
  – “blue carbon”
  – ecosystem services

• Conversion due to economic pressures
  (aquaculture, agriculture, development,…)

• Climate Policy: New incentives to protect?
  – Payments for reducing conversion and restoration
  – Similar to forests (REDD+)
  – Could be through carbon market or intergovernmental transfers
### What May Be Eligible for Crediting?

<table>
<thead>
<tr>
<th>Potential Credit Source</th>
<th>Time Period</th>
<th>Ecosystems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avoided Loss of Sequestration Flux</td>
<td>Perpetuity*</td>
<td>Seagrasses, Tidal Salt Marshes, Mangroves</td>
</tr>
<tr>
<td>Avoided Emissions from Soil Carbon</td>
<td>Several Years to Decades</td>
<td>Seagrasses, Tidal Salt Marshes, Mangroves</td>
</tr>
<tr>
<td>Avoided Emissions from Biomass (REDD)</td>
<td>Immediate</td>
<td>Mangroves</td>
</tr>
</tbody>
</table>

* Based on input from science team that blue carbon systems continue to sequester without saturation.
Green Payments for Blue Carbon
Economic Incentives for Protecting Threatened Coastal Habitats

Brian C. Murray
Linwood Pendleton
W. Aaron Jenkins
Samantha Sifleet

* Director, Economic Analysis, Nicholas Institute for Environmental Policy Solutions, Duke University
† Director, Ocean and Coastal Policy, Nicholas Institute
‡ Associate in Research, Economic Analysis, Nicholas Institute
§ Policy Research Associate, Nicholas Institute

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Gross Financial Returns

Source: Authors.
Potential Carbon-Credit Values

- **Seagrasses**
- **Salt Marsh**
- **Estuarine Mangroves**
- **Oceanic Mangroves**
- **Tropical forest**

Source: Authors:
Cost of Protection

- Seagrasses
- Salt Marsh
- Estuarine Mangroves
- Oceanic Mangroves
- Tropical forest

NPV $/ha

- Management costs
- Establishment costs
- Opportunity costs
Net Benefits of Blue Carbon: mangroves
Opportunity Cost

**Land Rent Differentials**

Representative Land Values ($US/ha)*

- $1,000,000: Beachfront real estate development
- $100,000: Residential Land
- $10,000: Industrial Land
- $1,000: Productive Agriculture/Aquaculture
- $100: Idle Land

*Authors’ rough approximations based on data from a range of sources. Can vary widely across and within countries.

Source: Authors.
Global supply potential at different prices

Figure ES-1. Mitigation-potential supply functions for low-cost, mean, and high-cost scenarios.
Conclusions

1) Economic value of blue carbon > financial value
2) Payments of blue carbon ➔ conservation
   - in some cases, but not all
     shrimp farms – YES
     mega hotels – probably not
3) Polluters pay for habitat protection and restoration
4) Value of protection >> Value of restoration
4) Much heterogeneity within countries (case in point – Indonesia)
5) Policy challenges remain
   - protocols (how much, additionality, stacking)
   - tenure
Exciting New MP Project

Development of Blue Carbon Offset Credits

Duke Carbon Offsets Initiative
Questions  ?