Why and how much are firms willing to invest in ecosystem services from tropical forests?
A comparison of international and Costa Rican firms.
in Ecological Economics (forthcoming)

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What is demand in $ for ecosystem services and what are motivations to buy?

- Goal
  - Quantification of willingness to invest (WTI) of companies in $
  - Professional motivations for buying ecosystem services

- Sample universe: Multinational companies chosen from MSCI World and Costa Rican Companies

- Method: Questionnaire, Multivariate statistics
MODEL OF FIRMS’ WILLINGNESS TO INVEST IN ECOSYSTEM SERVICES
Basic assumption: Manager preferences and citizen preferences involved in decision-making

- Decision-makers in firms dealing with social, ethical and environmental issues potentially activate
  - their manager preferences → increase revenues
  - their citizen preferences → increase „moral“ satisfaction

- Theory based on
In our model the CEO can have two roles ... 

- ... one as a manager and one as a good citizen.

CEO of MeadWestvaco

Model of institutional decision-making

Cost-benefit expectations
Experience
Characteristics of company
Behavioral control

Stated investments in ES

Observed investments in ES

Figure 1: General model of institutional decision-making with respect to stated investments and observed investments in ecosystem services ES.
METHOD
Questionnaire: General introduction

- Explanation of tropical forest types and ecosystem services
  - (A) Biodiversity conservation
  - (B) Carbon sequestration
  - (C) Scenic beauty
  - (D) Watershed protection

- Framework for payments for ecosystem services
Questionnaire: Central question part

1. Company’s willingness to pay per ha and year in $,
2. Willingness to invest in N certificates per year,
3. Motivations to purchase ecosystem service certificates,
4. External factors influencing decision to buy ecosystem services certificates
5. Background information about the company and the respondent.
Expected benefit of companies to invest in ecosystem services

<table>
<thead>
<tr>
<th>Type</th>
<th>Factors influencing WTI for each ES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct financial benefit</td>
<td>a. The service creates <em>direct financial income</em> for my company.</td>
</tr>
<tr>
<td></td>
<td>b. The service <em>reduces costs</em> for my company.</td>
</tr>
<tr>
<td></td>
<td>c. This ecosystem service ensures my company’s <em>natural resources</em>.</td>
</tr>
<tr>
<td></td>
<td>d. We are active in this field due to our <em>clients’ demand</em>.</td>
</tr>
<tr>
<td>Indirect financial benefit</td>
<td>e. It is a requirement by our <em>shareholders</em>.</td>
</tr>
<tr>
<td></td>
<td>f. We do mandatory compensation due to <em>legal compliance</em>.</td>
</tr>
<tr>
<td></td>
<td>g. We compensate our impacts on a <em>voluntary</em> basis.</td>
</tr>
<tr>
<td></td>
<td>h. We expect <em>image benefits</em> in the public.</td>
</tr>
<tr>
<td>Non-financial benefits</td>
<td>i. We perceive high pressure by <em>NGOs</em>.</td>
</tr>
<tr>
<td></td>
<td>j. We want to contribute to <em>human welfare</em>.</td>
</tr>
<tr>
<td></td>
<td>k. We want to act <em>ecologically responsible</em>.</td>
</tr>
</tbody>
</table>
### Surveyed companies

<table>
<thead>
<tr>
<th></th>
<th>INTERNATIONAL SAMPLE</th>
<th>COSTA RICA SAMPLE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Surv eyelied</td>
<td>Completed</td>
</tr>
<tr>
<td>INDUSTRIES (1+2+3+8)</td>
<td>328</td>
<td>17</td>
</tr>
<tr>
<td>CONSUMERS (4+5+6)</td>
<td>143</td>
<td>9</td>
</tr>
<tr>
<td>FINANCIALS (7)</td>
<td>142</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>613</td>
<td>31</td>
</tr>
</tbody>
</table>
RESULTS
Willingness to invest (WTI) in $ per certificate

<table>
<thead>
<tr>
<th></th>
<th>INTERNATIONAL</th>
<th>COSTA RICAN</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Std</td>
<td>Medi</td>
</tr>
<tr>
<td>BIO</td>
<td>14</td>
<td>32</td>
<td>0</td>
</tr>
<tr>
<td>CA</td>
<td>65</td>
<td>143</td>
<td>0</td>
</tr>
<tr>
<td>SC</td>
<td>10</td>
<td>29</td>
<td>0</td>
</tr>
<tr>
<td>WA</td>
<td>11</td>
<td>30</td>
<td>0</td>
</tr>
</tbody>
</table>
Expected benefit of carbon sequestration

Black line in boxplots is median
Expected benefit for carbon sequestration

![Graph showing expected benefit for carbon sequestration with categories: Direct financial, Indirect financial, Non-financial. ](image)
Professorship of Ecological Services (PES), University of Bayreuth, www.pes.uni-bayreuth.de

(A) Biodiversity conservation
(B) Carbon sequestration
(C) Scenic beauty
(D) Watershed protection

Expected benefit (1=low; 7=high)
Factor analysis of expected benefits

Indirect/non financial benefit

Direct financial benefit

(A) Biodiversity conservation

(B) Carbon sequestration

(C) Scenic beauty

(D) Watershed protection
Behavioral control of intended demand for ecosystem services
Public should pay?

The diagram shows the stated agreement on whether the public should pay for different ecological services. The horizontal axis represents the origin of respondents, divided into 'International' and 'Costa Rican'. The vertical axis indicates the degree of agreement, ranging from 'Not true at all' to 'Very true'. The shaded bars represent different ecological services:

- Biodiversity conservation
- Carbon sequestration
- Scenic beauty
- Watershed protection

The data indicates varying levels of agreement across different origins and ecological services.
CONCLUSION
Conclusion for survey

- Firms’ current intended demand for ecosystem services from tropical forests is low
  - In total the 45 companies would purchase certificates representing
    - 819 km² of forest for carbon sequestration,
    - 52 km² for watershed protection,
    - 4.8 km² for biodiversity conservation and
    - 2.5 km² for scenic beauty
- In Costa Rica 4200 km² are under PES
Motivation has financial and non-financial aspects depending on sector and service

- Image benefit of biodiversity conservation
- Voluntary compensation for sectors energy, materials
- NGO pressure is surprisingly low
- Answers might reflect personal motivation
  - International companies: 9 heads & 21 manager, mostly of dep. of safety, health, env.
  - Costa Rican: 4 respondents are member of the environmental department, 2 are member of the operations, 2 of sales and 15 are member of the general management
Does the “citizen” communicate with the “manager”?

- Interdependence and conflict between citizen and manager preferences
- Relative activation depends on endogenous (e.g. company’s policies) and exogenous variables (e.g. society, policy)