Estimating wetland biodiversity values: a choice modelling application in Vietnam’s Mekong River Delta

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Vietnam Mekong River Delta (MRD)

- Population: 17 million (22% of Vietnam)
- Contribution:
  - 27% GDP
  - 50% rice production
  - 61% exported agricultural and fishery products
Wetlands in the MRD

- Wetlands: 90% area of MRD
- Various values: use and non-use
- However, degraded due to development
Wetland degradation in the MRD

Decline in mangrove area

Source: MONRE 2003

Decline in Sarus Cranes

Source: VEPA/GEF/IUCN 2005
Information gap

- Some studies on use values
- But no studies on non-use values yet
- Therefore, decisions made without info on correct values of wetlands
Case study of Tram Chim

- First wetland National Park
- RAMSAR site nominee
- High biodiversity
- Proposed conservation plan:
  - Improve biodiversity, but
  - increase flooding in adjacent rice farms
## Attributes and levels

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Status quo (level 0)</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of area having healthy vegetation</td>
<td>50</td>
<td>60</td>
<td>70</td>
<td>80</td>
</tr>
<tr>
<td>Number of globally threatened birds living in the wetlands</td>
<td>150</td>
<td>300</td>
<td>450</td>
<td>600</td>
</tr>
<tr>
<td>Number of fish species</td>
<td>40</td>
<td>50</td>
<td>60</td>
<td>70</td>
</tr>
<tr>
<td>Number of households incurring costs of changes in dyke and wetland management</td>
<td>0</td>
<td>600</td>
<td>900</td>
<td>1200</td>
</tr>
<tr>
<td>One-off change in current monthly electricity bill (thousand VND)</td>
<td>0</td>
<td>10</td>
<td>50</td>
<td>100</td>
</tr>
</tbody>
</table>
Survey implementation

- Thorough focus group studies and pretests
- Personal interviews: 980
- In 3 regions:
  - Cao Lanh (inside MRD)
  - Ho Chi Minh City (edge of MRD)
  - Ha Noi (outside MRD)
Model: Environmental Choice Modelling

- **Model 1: attributes & asc only**
  \[ U = \text{asc} + c\text{*cost} + v\text{*vegetation} + b\text{*birds} + f\text{*fish} + fa\text{*farmers} \]

- **Model 2: Model 1 + socioeconomic & attitude variables interacting with asc**
  \[ U = \text{asc} + c\text{*cost} + v\text{*vegetation} + b\text{*birds} + f\text{*fish} + fa\text{*farmers} + p1\text{*ascincome} + p2\text{*asceducation} + p3\text{*ascage} + p4\text{*ascgender} + p5\text{*asccheap{}talk} + p6\text{*asc{}knowldege} + p7\text{*ascvisit} + p8\text{*ascbequest} + p9\text{*ascprowetland} + p10\text{*ascconcern} \]
<table>
<thead>
<tr>
<th></th>
<th>Option A (status quo)</th>
<th>Option B</th>
<th>Option C</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of vegetation</td>
<td>50%</td>
<td>60%</td>
<td>80%</td>
</tr>
<tr>
<td>No. of Sarus Cranes</td>
<td>150 birds</td>
<td>300 birds</td>
<td>450 birds</td>
</tr>
<tr>
<td>No. of fish species</td>
<td>40 species</td>
<td>50 species</td>
<td>70 species</td>
</tr>
<tr>
<td>No. of local households affected</td>
<td>0</td>
<td>900</td>
<td>900</td>
</tr>
<tr>
<td>Cost to you</td>
<td>0</td>
<td>VND 10,000</td>
<td>VND 50,000</td>
</tr>
</tbody>
</table>

You would choose:
- Option A
- Option B
- Option C
Choice modelling: findings

- Status quo:
  50% healthy vegetation, 150 Sarus cranes, 40 fish species, no farmers affected.

- Proposed change:
  70% healthy vegetation, 600 Sarus cranes, 40 fish species, 300 households to be relocated
Choice modelling: findings

<table>
<thead>
<tr>
<th></th>
<th>Cao Lanh</th>
<th>Ho Chi Minh city</th>
<th>Hanoi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wilingness to pay</td>
<td>Zero</td>
<td>78,178 VND ($4.9)</td>
<td>93,910 VND ($5.9)</td>
</tr>
<tr>
<td>Distance to wetland</td>
<td>40km</td>
<td>250km</td>
<td>2000km</td>
</tr>
</tbody>
</table>
Policy implications

- Wetland conservation:
  - Cost: $1.27-1.65 mil.
  - Benefit: $1.8-2.23 mil.
  - Net benefit: $0.15-0.96 mil.

- Compensation paid to local farmers can be mobilised from populations outside MRD
Conclusions

- Wetland conservation would improve social welfare.
- Estimating environmental values is important.
- More nonmarket valuation/CBA needed to assist environmental/natural resources policymaking.
Thank you for your attention