Human Wildlife Conflicts and Implications for Tiger Conservation – Case of Corbett Tiger Reserve, India

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Introduction

Divergent interests

Protected Areas

Biodiversity conservation

Local livelihoods

Conflicts

Human Wildlife conflict

Imbalance in sharing costs of conservation
Strong PA network for Tiger Conservation

Yet, tigers now exist in only 7% of their historical range, 41% decline in area occupied in past decade, 54% in the Indian subcontinent alone (Dinerstein et al 2006)

Tiger umbrella species for conservation of other species and ecosystems
India, stronghold for wild tigers, suffered a shock in 2005 when it was found that poaching and human wildlife conflict had eliminated/depleted tigers from well-protected NP and sanctuaries.

Gravity of these losses triggered a loud public outcry that led to a federal investigation initiated by India’s prime minister
Key questions

- What is the cost of tiger conservation borne by local people?
- Has human wildlife conflict contributed to decline in tiger population?
- Can we develop effective compensation mechanisms and equitable sharing of benefits derived from conservation schemes?
Corbett Tiger Reserve, India
Corbett Tiger Reserve ...

- Corbett NP (520.82 km²), Sonanadi WLS (301.18 km²), and a buffer zone (466.32 km²).
- Oldest National Park and ‘Tiger Reserve’ India
- Highest density of tigers in the country
- Part of the Terai Arc landscape (Highest priority)
- 92 resource dependent villages within 3 km of Reserve – Human Wildlife Conflict
The Corbett Landscape

Mixed Forest

Dry Woodlands

Moist Woodland-Grassland mosaic
The Flagship Species, dominate the conservation agenda
Intensive study villages
People-PA interactions
People-PA interactions
Methods: Assessment of Human Wildlife Conflicts

- Crop damage and livestock depredation
- Lost access to resources
- Structured and semi-structured interviews and survey schedules,
- Data on resource use, crop damage, livestock depredation and human injury or death caused by wildlife, and compensation received
## Results: Village socio-economics

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Village</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Kunkhet</td>
</tr>
<tr>
<td>Distance from reserve boundary (km)</td>
<td>3</td>
</tr>
<tr>
<td>Total village area (ha)</td>
<td>57.04</td>
</tr>
<tr>
<td>Mean household size</td>
<td>8.25 ± 0.95</td>
</tr>
<tr>
<td>Population having livestock (%)</td>
<td>83.33</td>
</tr>
<tr>
<td>Mean livestock holding family⁻¹</td>
<td>1.58 ± 0.13</td>
</tr>
<tr>
<td>Per capita income year⁻¹ (US$)</td>
<td>164.3</td>
</tr>
<tr>
<td>Income from occupation (%)</td>
<td>27.72</td>
</tr>
<tr>
<td>Income from agriculture (%)</td>
<td>23.31</td>
</tr>
<tr>
<td>Income from forest (%)</td>
<td>48.98</td>
</tr>
</tbody>
</table>
Results: Resource dependency

- 97.6% households (hh) dependent on forest for fuel wood (N= 119 hh)
- 94.7% hh dependent for fodder (N= 113hh)
- C 50% cattle grazed only in forest,
- 63.9% hh dependent or small timber (N =119 hh)
- Bhabhar (*Eulaliopsis binata*), a seasonal grass, extracted in summer, for rope making to supplement livelihoods
Results: Crop damaged and livestock depredation

88% of the total villagers (N=119) reported crop raiding by wild animals
97.96 % of livestock loss attributed to tiger, leopards only 2.04%

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Kunkhet</th>
<th>Chukam</th>
<th>Mohan</th>
<th>Teda</th>
<th>Ringora</th>
<th>Dhela</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crop damage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agricultural area (ha)</td>
<td>5.13</td>
<td>5.9</td>
<td>3.64</td>
<td>10.22</td>
<td>0.81</td>
<td>22.98</td>
</tr>
<tr>
<td>Losses ha$^{-1}$ (US$)</td>
<td>1,776</td>
<td>1,737</td>
<td>1,477</td>
<td>15,265</td>
<td>833</td>
<td>1,146</td>
</tr>
<tr>
<td>Total loss (US$)</td>
<td>23,396</td>
<td>10,250</td>
<td>5,376</td>
<td>15,601</td>
<td>663</td>
<td>26,325</td>
</tr>
<tr>
<td>Livestock depredation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total loss (US$)</td>
<td>1,143</td>
<td>976</td>
<td>2,310</td>
<td>1,417</td>
<td>1,476</td>
<td>13,238</td>
</tr>
<tr>
<td>Compensation paid (US$)</td>
<td>36</td>
<td>373</td>
<td>282</td>
<td>307</td>
<td>269</td>
<td>1,605</td>
</tr>
<tr>
<td>Net loss (US$)</td>
<td>1,107</td>
<td>603</td>
<td>2,028</td>
<td>1,110</td>
<td>1,745</td>
<td>11,633</td>
</tr>
<tr>
<td>Total loss due to crop and livestock depredation (US$)</td>
<td>24,503</td>
<td>10,853</td>
<td>7,404</td>
<td>16,711</td>
<td>2,408</td>
<td>37,958</td>
</tr>
</tbody>
</table>
Results: Livestock holdings and depredation

The graph shows the mean livestock loss and holding per household across different villages. The x-axis represents the villages (Kunkhet, Chukam, Mohan, Teda, Ringora, Dhela) and the y-axis shows the mean livestock loss and holding per household. The graph includes two lines: one for livestock holdings and another for loss of livestock.
Results: Crop yield and damage

<table>
<thead>
<tr>
<th>Villages</th>
<th>Paddy Yield</th>
<th>Paddy Damaged</th>
<th>Wheat Yield</th>
<th>Wheat Damaged</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kunkhet</td>
<td>260</td>
<td>120</td>
<td>180</td>
<td>90</td>
</tr>
<tr>
<td>Chukam</td>
<td>240</td>
<td>100</td>
<td>160</td>
<td>80</td>
</tr>
<tr>
<td>Mohan</td>
<td>220</td>
<td>80</td>
<td>140</td>
<td>70</td>
</tr>
<tr>
<td>Teda</td>
<td>200</td>
<td>60</td>
<td>120</td>
<td>60</td>
</tr>
<tr>
<td>Ringora</td>
<td>180</td>
<td>40</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>Dhela</td>
<td>160</td>
<td>30</td>
<td>80</td>
<td>40</td>
</tr>
</tbody>
</table>

villages

- Paddy yield
- Paddy damaged
- Wheat yield
- Wheat damaged
Results: Location of cattle kills

- Forest: 50 attended, 0 unattended
- Village: 1 attended, 1 unattended

Graph showing the number of kills at different sites.
Results: Response towards conservation of tigers

- Present situation is O.K: 67%
- Population control: 22%
- Kept in enclosures: 7%
- Exterminate: 4%
Effectiveness of the control measures

- Only 32.7% villagers reported control measures to be effective
- Wall or simple fence ineffective in reducing animal raiding in 77.0% cases
- Powered fence ineffective in reducing animal raiding in 41% cases
- Scarecrows and crackers not effective
Out of 30 deaths of wild animals in the study area in the past one year, 5 cases are attributed to poaching, 2 are natural deaths and 23 cases are accidental deaths.
Results: Attitudes towards alternatives to forest resources

- 68% Buy from market
- 9% Reduce cattle
- 7% Steal from forest
- 7% Switch to substitutes
- 6% Agitate
- 3% Grow fodder, reduce cattle
Discussion

- Significant support for tiger conservation e.g. NGOs spent >US$31 m globally for tiger protection from 1998 to 2003 (Christie 2006).

- Indian tiger reserves, received a budget allocation of US$17.75 m during IX 5-year plan (Project Tiger 2005). The unit cost of US$94/km²/year.

- Yet despite these and additional support from NGOs, tiger populations have drastically declined.

- Non-cooperation from surrounding communities.
Discussion

- Costs of conservation borne by local communities
  - Enlisting cooperation of local people through economic incentives
    - Tourism based on tigers and other wildlife
    - Payments for environmental services and even direct payments for supporting focal species such as tigers, other mega-fauna,
  - Carbon credit trading
Reduce human wildlife conflict

Stronger partnerships

Economic incentives

Marginal benefits of conservation to local people higher than marginal loss

Tigers a proxy for intact, healthy ecosystem services of to local people.

Reduce human wildlife conflict
Thank You