The Relationships Between Human Health and Environmental Conservation

Christopher Golden, PhD, MPH
HEAL (Health & Ecosystems: Analysis of Linkages)
Harvard University Center for the Environment and School of Public Health
Outline

• The nexus of environmental change and human health
• Wildlife consumption and human nutrition
• Broad connections of environmental resources and human health
• Future directions: research and interventions
Global Malnutrition
Disentangling environmental change and human health
HEALTH & ECOSYSTEMS: ANALYSIS OF LINKAGES
85% of all flora and fauna in Madagascar is endemic to the country.
50% of floral diversity is found in the Makira watershed.
Lemurs and all native carnivores are endemic only to Madagascar.
Ecological Transition

Intact, Natural Environments

Engineered Infrastructure/Markets

Increased capital, Increased inequality

The Poor

Loss of natural insurance: food, shelter, etc.
The bushmeat trade is a local to global market that is valued at billions of dollars per year.
Biodiversity Targeted

- Bat Hunting: 16%
- Bush Pig Hunting: 23%
- Carnivore Hunting: 40%
- Lemur Hunting: 49%
- Tenrec Hunting: 91%
Nutritional Value of Wildlife
Global Anemia Prevalence
Benefits of wildlife consumption to child nutrition in a biodiversity hotspot

Christopher D. Golden\textsuperscript{a,b,c,1}, Lia C. H. Fernald\textsuperscript{b}, Justin S. Brashares\textsuperscript{c}, B. J. Rodolph Rasolofoniana\textsuperscript{d}, and Claire Kremen\textsuperscript{c}

\textsuperscript{a}Harvard University Center for the Environment, Harvard University, Cambridge, MA 02138; \textsuperscript{b}School of Public Health and \textsuperscript{c}Department of Environmental Science, Policy, and Management, University of California, Berkeley, CA 94720; and \textsuperscript{d}Wildlife Conservation Society, Soavimbaohoaka, Antananarivo (101), Madagascar

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Terrestrial wildlife is the primary source of meat for hundreds of developing countries. IDA is caused by the inadequate intake of dietary iron. While infant iron deficiency anemia (IDA) is strongly associated with poor child health outcomes, the long-term morbidity and mortality consequences of IDA are not well understood. We examine the hypothesis that consumption of wildlife is associated with lower IDA rates in children. We measured hemoglobin concentrations in 7-11 yr children in eastern Madagascar and determined the dietary contributions of wildlife, fruits and vegetables, and other foods. Wildlife consumption was independently associated with lower IDA rates in children, controlling for factors such as income, education, and access to markets. Results from 71 villages, totaling 1,386 children, indicate that wildlife consumption has strong potential to reduce IDA rates in children.
Consequences of Anemia

• 28% increase in moderate mental retardation
• Cognitive deficits have been shown to persist 20 years into the future
• 25% increase in maternal & perinatal mortality
• Anemic individuals transport 15% less O2
  - reduced physical activity
Nutritional Importance of Wildlife

- **Wildlife**: 33%
- **Duck**: 15%
- **Chicken**: 26%
- **Beef**: 26%
Nutritional Importance of Wildlife

**Poor Households**
- Wildlife: 42%
- Duck: 12%
- Beef: 24%
- Chicken: 21%

**Rich Households**
- Chicken: 30%
- Beef: 27%
- Duck: 17%
- Wildlife: 27%
Those most vulnerable, are most affected.

Inequitable effects of income on health

- Predicted increase in anemia
$5-8 per individual per year
43-63% of household income per year
Zoonotic Disease Sampling
Laboratory Work

- 200 wildlife DBS
- Primates: retroviruses (PTLV3/4, SIV, SFV), pox, herpes, and bocavirus
- Bats: herpes and bocavirus
- Tenrecs: pox and plague
<table>
<thead>
<tr>
<th>Type of taboo</th>
<th>Prevalence of Taboo</th>
</tr>
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<tbody>
<tr>
<td>Hornless zebu</td>
<td>55.30%</td>
</tr>
<tr>
<td>Hedgehog tenrec</td>
<td>45.30%</td>
</tr>
<tr>
<td>Domesticated cat</td>
<td>31.80%</td>
</tr>
<tr>
<td>Octopus</td>
<td>27.80%</td>
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<tr>
<td>Blue coua</td>
<td>23.20%</td>
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<tr>
<td>Indri</td>
<td>23.10%</td>
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<tr>
<td>Eels</td>
<td>21.80%</td>
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<tr>
<td>Crested drongo</td>
<td>19.90%</td>
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<tr>
<td>Bush pig</td>
<td>18.70%</td>
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<tr>
<td>Insectivorous bats</td>
<td>18.20%</td>
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<tr>
<td>Madagascar blue pigeon</td>
<td>17.50%</td>
</tr>
<tr>
<td>Flying fox</td>
<td>15.80%</td>
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<tr>
<td>Taro leaves</td>
<td>14.30%</td>
</tr>
<tr>
<td>Madagascar magpie robin</td>
<td>13.90%</td>
</tr>
<tr>
<td>Eastern woolly lemur</td>
<td>12.80%</td>
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<tr>
<td>Madagascan rousette</td>
<td>12.50%</td>
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<tr>
<td>Malagasy coucal</td>
<td>11.10%</td>
</tr>
<tr>
<td>Aye-aye</td>
<td>11.10%</td>
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<tr>
<td>Sea turtle</td>
<td>10.00%</td>
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<tr>
<td>White-fronted brown lemur</td>
<td>8.60%</td>
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<tr>
<td>Ringtailed mongoose</td>
<td>7.80%</td>
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<tr>
<td>Fosa</td>
<td>7.70%</td>
</tr>
<tr>
<td>Eastern bamboo lemur</td>
<td>7.70%</td>
</tr>
<tr>
<td>Red-bellied lemur</td>
<td>7.10%</td>
</tr>
</tbody>
</table>
Successes

- Culture
- Religion
- Gender Equity
- Economics

*Ny teny toy ny atody; ka fo, manan-kelatra*
Conservation as Public Health Intervention
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