Tourism, scarce resources, and sustainable destinations: Energy, Water, Food

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Why your project will fail.

- Urgency of need to act misunderstood
- Dynamics of tourism system unacknowledged
- Desinterest among tourism stakeholders
- Disconnect business views and science
- Belief in green growth and technology
Decline in critical Earth systems

Fig. 3 Global-scale changes in the Earth System as a result of the dramatic increase in human activity: a atmospheric CO$_2$ concentration, b atmospheric N$_2$O concentration, c atmospheric CH$_4$ concentration, d percentage total column ozone loss over Antarctica, using the average annual total column ozone, 330, as a base, e northern hemisphere average surface temperature anomalies, f natural disasters after 1990 resulting in more than 10 people killed or more than 100 people affected, g percentage of global fisheries either fully exploited, overfished or collapsed, h annual shrimp production as a proxy for coastal zone alteration, i model-calculated partitioning of the human-induced nitrogen perturbation fluxes in the global coastal margin for the period since 1850, j loss of tropical rainforest and woodland, as estimated for tropical Africa, Latin America and South and Southeast Asia, k amount of land converted to pasture and cropland, and l mathematically calculated rate of extinction (Steffen et al. 2004, and references therein).

Exceeding critical thresholds

CO₂ emissions 1900-2050

Food consumption 1900-2050

IATA’s view on aviation and climate change

Mapping out the industry commitments

1. Improve fleet fuel efficiency by 1.5% per year from now until 2020.
2. Cap net emissions from 2020 through carbon neutral growth.
3. By 2050, net aviation carbon emissions will be half of what they were in 2005.

(Schematic, indicative diagram only)
Energy efficiency gains and absolute emission growth

Long haul aircraft fuel efficiency

- IPCC values
- Sigmoidal regression
- A380
- Piston powered airliners
- Additional jet airliners
- A350XWB
- B787
- Global aviation emissions
The destination dilemma

• Success is measured in growth (arrivals, spending, jobs)
• With declining ALS, arrival growth is a necessity
• Environmental management can only be incremental in this situation

⇒ If you are serious about “saving the planet”, then this will require a fundamental rethinking in destination management.
Monitoring resource use in destinations

1. What is relevant?
2. Assessment methods: choice of system boundaries, value chain, lifecycle?
3. Reduction potential – where to reduce at what cost?
4. Monitoring progress and assessing implications?
5. Desirable future to stakeholders?
Reducing emissions

- 75% of overall emissions are from transport
- Aviation most important (40% of total)

⇒ *Arrivals by air focus crucial!*

Emission intensities and distances

<table>
<thead>
<tr>
<th>Country</th>
<th>Average emissions per international tourist</th>
<th>Average distance flown per international tourist</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1995</td>
<td>2010</td>
</tr>
<tr>
<td>USA</td>
<td>1.02</td>
<td>1.57</td>
</tr>
<tr>
<td>Spain</td>
<td>0.37</td>
<td>0.37</td>
</tr>
<tr>
<td>China</td>
<td>0.83</td>
<td>0.81</td>
</tr>
<tr>
<td>Malaysia</td>
<td>0.45</td>
<td>0.43</td>
</tr>
<tr>
<td>Turkey</td>
<td>0.55</td>
<td>0.60</td>
</tr>
<tr>
<td>Maldives</td>
<td>2.00</td>
<td>1.49</td>
</tr>
<tr>
<td>Seychelles</td>
<td>1.58</td>
<td>1.45</td>
</tr>
<tr>
<td>South Africa</td>
<td>0.65</td>
<td>0.73</td>
</tr>
<tr>
<td>Singapore</td>
<td>1.06</td>
<td>1.00</td>
</tr>
<tr>
<td>New Zealand</td>
<td>2.00</td>
<td>1.83</td>
</tr>
<tr>
<td>Bahamas</td>
<td>0.57</td>
<td>0.58</td>
</tr>
</tbody>
</table>

Average per tourist emission intensities for various countries

Integrating environment and economy

Water management

- Wide range of indicators used in the past
- Few relevant indicators

Direct and indirect water use

Water indicators for destinations

Vulnerability
- Renewable water resources per guest night in high season

Planning
- Area of irrigated land per bed
- Area of pool per bed

Managing
- Area of solar thermal and PV installed per bed
- Amount of meats and dairy products per guest night
- Energy use per guest night
- Share of rooms fitted with low-flow devices
- Kg of laundry used per guest night

## 3Ps for food management

<table>
<thead>
<tr>
<th>Purchases</th>
<th>RED – buy as little as possible policy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Buy as little as possible vegetables grown in heated greenhouses</td>
</tr>
<tr>
<td></td>
<td>Buy as little as possible foods involving air transport</td>
</tr>
<tr>
<td></td>
<td>Buy as little as possible specific species, such as giant, king and tiger prawns, lobster</td>
</tr>
<tr>
<td></td>
<td>Buy as little as possible imported beef</td>
</tr>
<tr>
<td></td>
<td>Buy as little as possible aluminium foil</td>
</tr>
</tbody>
</table>

**AMBER – buy less policy**
- Buy less beef
- Buy less deep-sea fish (e.g. cod)
- Buy less farmed carnivorous fish (e.g. salmon)
- Buy less rice
- Buy less seasonal foods out of their season/storage time-

**GREEN – buy more policy**
- Buy more locally produced foods, if transported over short distances using CO₂-efficient modes
- Buy more potatoes
- Buy more grains (including pasta)
- Buy more pelagic fish
- Buy more pork
- Buy more chicken
- Buy more foodstuffs with longer shelf lives

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Preparation

- Purchase energy from renewable sources
- Use more energy-efficient cooking routines
- Do not prepare energy-intensive foods in-house
- Put dishes on the menu that use less meat and more vegetables
- Prepare meals only after orders have been placed
- Plan purchases to avoid waste
- Separate food waste from general waste

Overall, an estimated 50-80% of emissions avoidable. Possibly as much in water use.

## Resource Use Intensities

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Range of estimates</th>
<th>Global average</th>
<th>Global total (year)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Energy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- per guest night</td>
<td>3.6-3,717 MJ</td>
<td>272 MJ</td>
<td></td>
</tr>
<tr>
<td>- per trip (domestic &amp; internat. average)</td>
<td>50-135,815 MJ</td>
<td>3.575 MJ</td>
<td>17,500 PJ (2005)</td>
</tr>
<tr>
<td><strong>Emissions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- per night (accommodation)</td>
<td>0.1 – 260 kg CO₂</td>
<td>13.8 kg CO₂</td>
<td></td>
</tr>
<tr>
<td>- per trip (domestic and internat. average)</td>
<td>&lt;0.1 – 9.30 t CO₂</td>
<td>250 kg CO₂</td>
<td>1,304 Mt CO₂ (2005)</td>
</tr>
<tr>
<td><strong>Fresh water, L per tourist per day</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- direct (accommodation)</td>
<td>84-2,425</td>
<td>350</td>
<td></td>
</tr>
<tr>
<td>- indirect (fuels, food)</td>
<td>4,500-8,000</td>
<td>6,425</td>
<td></td>
</tr>
<tr>
<td>- combined</td>
<td>2,000-10,575</td>
<td>6,795</td>
<td>92.4 km³ (2000)</td>
</tr>
<tr>
<td><strong>Land use, m²</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- direct, per bed</td>
<td>30-4,580 m²/bed</td>
<td>40 m²</td>
<td>70,000 km² (1999)</td>
</tr>
<tr>
<td>- direct and indirect, per tourist</td>
<td></td>
<td>21.8 m²</td>
<td></td>
</tr>
<tr>
<td><strong>Food use, grams per day</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- per tourist per day</td>
<td>2,200-3,100g</td>
<td>1,800g</td>
<td>24.5 Mt (2000)</td>
</tr>
</tbody>
</table>

Conclusions

• Significant changes needed in global tourism system to reduce resource consumption;
• Can only be achieved by fundamentally different destination management approaches that emphasize optimization, not maximization*;
• High energy prices will be key in any endeavour to save resources;
• Stakeholders will have to be involved in measuring and monitoring resource consumption, and the identification of reduction goals.