Climate Change and Sustainable Coastal Tourism in the Caribbean: Impacts, Adaptation and Mitigation

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• Principal, Sustainable Solutions Worldwide
THE PRESENTATION

• Brief Climate Change Science: Where are we, where will we be?
• Recent Studies and Projects: Any action?
• New Realities for Tourism
• Impacts on Sustainable Coastal Tourism in the Caribbean
• Adapting Sustainable Coastal Tourism in the Caribbean
• Tourism the Contributor
• Any Ideas?
• Some Climate Policy Impacts and Recommendations
BRIEF
CLIMATE CHANGE SCIENCE
Climate Change Science

➢ The Climate is Changing

‘The warming of the climate system is unequivocal’ (IPCC-AR4 2007)

Globally +0.8°C from 1906 to 2005

➢ Climate Change Has Just Begun

The pace of climate change is ‘very likely’ to increase over the 21st century +1.8 to 6.4°C by 2100

The biological response and sea level rise is likely to continue for centuries
RECENT CLIMATE CHANGE STUDIES AND PROJECTS
eCLAT, UNWTO, UNEP, WMO & CCCCC

- Djerba Declaration 2003, Davos Declaration 2007

- Technical Seminars / Conferences; NATO, ISB, ESF, EFIEA, IHDP, eCLAT

- UNWTO, UNEP, WMO: Tech. Report and Davos (eCLAT Executive Committee)

- UNEP, Oxford University, UNWTO, WMO
  - Publication and Int’l Seminar Series (Simpson et al 2008a)

- CTO Report: Source Markets (Simpson et al 2008b)

- CCCCC, Oxford University, CTO, UNEP, UNWTO
  www.geoq.ox.ac.uk/news/events/ccamts/ccamts.pdf
NEW REALITIES FOR TOURISM
The New Realities for Tourism in an Era of Global Climate Change

- Impacts and Adaptations at Tourism Destinations
  - Coastal regions and islands
  - Mountain regions
  - Natural and cultural heritage

- Implications for Tourism Demand
  - Geographic and seasonal shifts

- Emissions from Tourism: Status and Projections
  - Sub-sectors: transport, accommodations, activities
  - Results for 2005 baseline and 2035 projection

- Mitigation Measures in Tourism
  - Mitigation potential for 2035
Tourism Vulnerability ‘Hotspots’

- **Caribbean**: WS, WW, EE, MB, SLR, D, PD, TCI
- **North America**: WS, WW, EE, W, LB, SLR
- **Northern Europe**: WS, WW, LB, SLR, D
- **Mediterranean**: WS, W, LB, MB, D
- **South America**: EE, LB, MB, TCI
- **Africa**: WS, W, LB, MB, D, TCI, PD
- **Middle East**: WS, W, PD
- **South-East Asia**: EE, MB, SLR, D, PD
- **Pacific Ocean Small Island Nations**: EE, W, LB, MB, SLR, TCI
- **Indian Ocean Small Island Nations**: EE, W, LB, MB, SLR, TCI
- **Australia/New Zealand**: WS, WW, EE, W, MB, SLR, D, TCI

**Abbreviations**
- WS = warmer summers
- WW = warmer winters
- EE = increase in extreme events
- SLR = sea level rise
- LB = land biodiversity loss
- MB = marine biodiversity loss
- D = increase in disease outbreaks
- TCI = travel cost increase from mitigation policy
- PD = political destabilization
IMPACTS ON SUSTAINABLE COASTAL TOURISM IN THE CARIBBEAN
Major Impact Types at Coastal Destinations

- **Direct climatic impacts**
  - Warmer Summers (Dry Season)
  - Warmer Winters (Wet Season)
  - Precipitation Changes (water supply)
  - Increased Extreme Events

- **Indirect environmental change impacts**
  - Biodiversity Loss (terrestrial and marine)
  - Sea Level Rise
  - Disease

- **Impact of mitigation policy on tourist mobility**
  - Travel Costs and Destination Choice

- **Indirect societal change impacts**
  - Global/Regional Economic Impacts/Local Livelihoods
  - Increased Security Risks (social/governance disruption)
IMPACTS ON SUSTAINABLE COASTAL TOURISM IN THE CARIBBEAN

- Crucial interdependence: Tourism and Climate…
  - national economy, livelihoods, development, environment
- Gradual and Extreme

Key issues affecting Sustainable Coastal Caribbean tourism:
- Air temperature
- Sea surface temperature
- Sea level rise
- Coastal erosion
- Changes in levels of precipitation
- Extreme events: increase in intensity and frequency, e.g. drought, flood, storm surge, hurricane
- Seasonality shifts
THE INTEGRATED RELATIONSHIP BETWEEN SUSTAINABLE DESTINATIONS, TOURISM & SUSTAINABLE DEVELOPMENT

Sustainable agriculture

Sustainable societies and communities

Sustainable enterprises

Sustainable infrastructure and services

Sustainable environment and natural resources

Sustainable economic systems

Sustainable Destinations / Tourism

Adapted from Swarbrooke 1999

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Current and anticipated cross-cutting climate change impacts:

- **Sea level rise**
  - Saline intrusion into freshwater aquifers
  - Coastal flooding and erosion

- **Increased temperatures**
  - Heat stress
  - Coral bleaching
  - Biodiversity loss (UNESCO 2007)
  - Increased emergence of vector borne diseases
SUSTAINABLE COASTAL TOURISM  #2

- Changes in rainfall patterns
  • Droughts or floods
  • Decreased fresh water availability/ secondary industries

- Increased intensity of storm activity
  • Direct damage of infrastructure/comms/services
  • Loss of lives

- Direct damage to tourism plant and natural resources
  • Coral reefs
  • Beaches
North Atlantic hurricanes have increased with SSTs

- North Atlantic hurricanes have increased with SSTs (1944-2005) after 1994
- Marked increase after 1994

- Global number and percentage of intense hurricanes is increasing

WMO 2007

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SUSTAINABLE COASTAL TOURISM #3

- Loss of attractiveness of the region as a destination
  - Impacts on health – emergence of dengue, malaria,
  - Reduced dive tourism if coral reefs are damaged
  - Milder winters in the North (push-pull)

- Loss of employment in the industry / Livelihoods

- Insurance costs in vulnerable areas
  - US Gulf Coast & Caribbean Region: Mid to Late-21st Century - Estimated premium increase 20-80% - Drop coverage in high risk areas (ABI)

- Increased operating costs (e.g. water and energy i.e. a/c)

- Changes in tourist travel patterns and flows
ADAPTING SUSTAINABLE COASTAL TOURISM IN THE CARIBBEAN TO CLIMATE CHANGE
Essential Elements of an Adaptation Strategy

The eight elements of an adaptation strategy:

- Risk management plans
- Linking with other planning processes
- Legislation and enforcement
- Support networks
- Financing adaptation
- Information and good science
- Education and communication
- Responsibility for development

Tompkins et al 2005
Sequence in the process of Adaptation

Simpson et al 2008

www.geog.ox.ac.uk/news/events/ccamts/ccamts.pdf
IPCC (2001) Identifies 8 Determinants of Adaptive Capacity:

(i) available technological options
(ii) resources
(iii) the structure of critical institution and decision making authorities
(iv) the stock of human capital
(v) stock of social capital including the definition of property rights
(vi) the system’s access to risk-spreading processes
(vii) information management and the credibility of information supplied by decision makers
(viii) the public’s perceptions of risks and exposure.
TOURISM THE CONTRIBUTOR
# Emissions from global tourism, 2005

<table>
<thead>
<tr>
<th>Sub-Sectors</th>
<th>CO\textsubscript{2} (Mt)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air transport *</td>
<td>522</td>
<td>40%</td>
</tr>
<tr>
<td>Car transport</td>
<td>418</td>
<td>32%</td>
</tr>
<tr>
<td>Other transport</td>
<td>39</td>
<td>3%</td>
</tr>
<tr>
<td>Accommodation</td>
<td>274</td>
<td>21%</td>
</tr>
<tr>
<td>Activities</td>
<td>52</td>
<td>4%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>1,307</strong></td>
<td></td>
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</tbody>
</table>

| Total World         | 26,400                    |    |
| (IPCC 2007)         |                           |    |

| Tourism Contribution| 4.95%                     |    |

Transportation of Tourists = 75% of Sector Emissions

* does not include non-CO\textsubscript{2} emissions and other impacts
Expansion of Low Cost Carrier Routes

2001

2005
<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>Percentage of total emissions (2005)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>United States</td>
<td>22.2 %</td>
</tr>
<tr>
<td>2</td>
<td>China</td>
<td>18.4 %</td>
</tr>
<tr>
<td>-</td>
<td>European Union</td>
<td>11.4 %</td>
</tr>
<tr>
<td>3</td>
<td>Russia</td>
<td>5.6 %</td>
</tr>
<tr>
<td>-</td>
<td>Global Tourism Sector</td>
<td>5.0%</td>
</tr>
<tr>
<td>4</td>
<td>India</td>
<td>4.9 %</td>
</tr>
<tr>
<td>5</td>
<td>Japan</td>
<td>4.6 %</td>
</tr>
<tr>
<td>6</td>
<td>Germany</td>
<td>3.0 %</td>
</tr>
<tr>
<td>7</td>
<td>Canada</td>
<td>2.3 %</td>
</tr>
<tr>
<td>8</td>
<td>United Kingdom</td>
<td>2.2 %</td>
</tr>
<tr>
<td>9</td>
<td>South Korea</td>
<td>1.7 %</td>
</tr>
<tr>
<td>10</td>
<td>Italy</td>
<td>1.7 %</td>
</tr>
</tbody>
</table>
By 2035…

- Number of tourist trips: +179%
- Guest nights: +156%
- Passenger kilometres travelled: +223%
- CO₂ emissions: +161%
- Accommodation sector: emissions +170%
- Tourism activities: +305%
- Aviation-related emissions: from 40% in 2005 to 52% by 2035, and greatest absolute increase
Emissions from global tourism, 2005 & 2035

- Air Transport
- Car Transport
- Other Transport
- Accommodation
- Activities

Mt CO2

2005

2035
Future CO₂ Emissions from Global Tourism: Mitigation Potential in 2035

2035 Mitigation Scenarios

- Baseline 2005*
- ‘Business as Usual’ 2035*
- Technical Efficiency
- Modal-Shift/Length of Stay
- Combined

Mt CO₂

0
500
1000
1500
2000
2500
3000
3500

Baseline ‘Business as Usual’

2005*

-36%
-43%
-68%

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OXFORD UNIVERSITY
CENTRE FOR THE ENVIRONMENT
ANY IDEAS?
Three steps for destinations to become carbon neutral

1. **Measurement**: destination assesses its emissions; understand origin and where most economic to reduce. Focus on three sectors, transports, accommodation and activities. A meaningful system boundary for transports has been suggested to comprise all energy use within the destination, including fuel bunkered for all transports.

2. **Decarbonisation**: destination seeks to minimize energy use and switch to renewable energy to the largest extent possible. Economically - may translate into efficiency- or renewable energy infrastructure investments paying off in less than 10 years.

3. **Offsetting**: destinations seek to buy carbon offsets for remaining emissions. Many emission reduction units on offer, with a lower or higher degree of credibility. Recommended destinations considering the purchase of carbon credits use Gold Standard Certified Emission Reductions (CERs), (registered by UNFCCC - fulfil requirements of delivering sustainable development benefits)
Four steps to mitigation and carbon neutrality for businesses and institutions

1. **Eliminate** the emission of greenhouse gases by keeping away from certain activities that can be avoided without a considerable change on the tourism’s product or service quality.

2. **Reduce** the emission of greenhouse gases by focusing on energy efficiency practices in specific activities.

3. **Substitute** practices that are responsible for a big amount of greenhouse gases emissions with practices that have a lower climate footprint.

4. The institution or business unit can **offset** remaining emissions to achieve full climate neutrality.
Can Climate Science Help?

- All models are wrong – but some are useful
- Local Climate Responses
  - insights possible after careful model evaluation
  - downscaling of pre-filtered global models
- Local expertise crucial
SOME CLIMATE POLICY IMPACTS AND RECOMMENDATIONS
CTO Report: International Policy and Market Response to Global Warming: Challenges and Opportunities for Caribbean Tourism

- Accurate information on the international regulatory frameworks, national legislation and voluntary mechanisms
- Status of response to climate change in the Caribbean
- Recommendations and policy guidance

- Emissions Trading Schemes
- Oil Price
- Voluntary Offsetting
- Aviation Taxes

- For the Caribbean: Growth maintained but slowed
Key CTO Recommendation: Needs of destinations, nations and the region addressed as a whole by using a sectoral approach. For Example…

1. Water – management, quality, availability
2. Agriculture, Fisheries - food security
3. Energy – supply and distribution
4. Human Health – malaria, dengue, asthma
5. Marine and Terrestrial Biodiversity
6. Infrastructure and Settlements
Information and Good Science

• The Importance of Data - Caribbean CTO Report
  • Themes and individual subject areas focusing on ‘requirements’ and ‘knowledge gaps’ overlap and coincide in many areas
  • Most acute and most frequent = data, monitoring, policy development and implementation.

The Climate Change and Tourism Information and Implementation Nexus

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Simpson et al 2008
Selected Recommendations from CTO Report…

• Build capacity in adaptation and mitigation
• Implement the principles for ‘carbon neutral’ destinations
• Voluntary or ‘opt-out’ carbon offsetting of flights incorporated in packages asap (by 2009)
• Money collected from tourists re-invested in the region / destination.
• Combine voluntary with mandatory measures to ensure that the tourism industry supports goals
SOME BARRIERS TO BUILDING ADAPTIVE CAPACITY

Lack of:

- Data / and Replicable and Comparable
- Knowledge / Awareness
- Institutional and Technical Capacity
- Incentives
- Government Legislation
- Finance
- Extended Planning Horizons
- Technology
- Willingness to Act
Some Actions…

- More Information, More Research, More **Data**: e.g. climate, biodiversity, hazard/vulnerability mapping, adaptive capacity assessments

- Policies and Nat. Dev. Agenda: Implement **Enforce** e.g. setbacks

- Enhanced Mngmnt: Econ. Environ. Soc. Sustainable: **REAL** – ICZM

- Engagement, Collaboration, Awareness Raising, Education of **ALL** Stakeholders (inc. Public, Ministries/Depts., Private, NGO, Community)

- Product Diversification & Strengthen ‘shoulder seasons’

- Natural Disaster Mngmnt Office / Plans (early warning, response and post)

- Energy and Water Conservation: water harvesting, measure emissions
Key Recommendation from CTO Report

- Cross-sectoral, Inter-ministerial and cross-ministerial cooperation and collaboration is required

(Actually it’s Essential!!!)
The Future is Now…

• The scientific evidence is clear - climate change must be considered the greatest challenge to sustainable development and tourism in the 21st century.

• Tourism can play a significant role in addressing climate change. It must show leadership as an agent of change for both adaptation and mitigation – the time for action is now.
‘For me, I am an Optimist… there seems little point in anything else’

Winston Churchill

THANK YOU

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www.geog.ox.ac.uk/news/events/ccamts/ccamts.pdf