A Review of Climate Change in the Caribbean and Implications for Tourism in Cuba

Una Revisión del Cambio Climático en el Caribe y las Implicaciones para el Turismo en Cuba

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Caribbean tourism trends

Tourism Trends: UNWTO

Thousands of visitors

- Bahamas
- Cuba
- Jamaica

Tourism growth in Cuba

Tourism investment is expected to rise to 4.8% per year over the next 10 years.

How will Cuba fill the tourism investment gap?
Climate trends: Temperature and precipitation in the Caribbean

Jones et al. (2016)
Future projections: Temperature and precipitation in the Caribbean

Extremely hot days
$T_{\text{max}} > 35^\circ \text{C}$

Tropical nights
$T_{\text{min}} > 25^\circ \text{C}$

Number of consecutive dry days

Simple daily precipitation index

Warm nights occurrence

Warm days occurrence

Hall et al. (2013)
In Cuba in 2100 there could be 80 days per year that are extremely hot (Tmax > 35°C), when right now there are <20
Warm ocean waters

NOAA Coral Reef Watch 5 km Maximum Satellite Coral Bleaching Alert Area

June 2014 - May 2017
Aridity

Karnauskas et al. (2018)
Aridity

- Water stress will increase for all countries in the Caribbean except Cuba.
- Cuba’s projected population decline will counteract the projected increase in aridity.
- However, this study did not take into consideration tourists.

United Nations Population Division
The future of tropical cyclones

- Models suggest that tropical cyclone development and track will shift away from the Caribbean.
- However, storms that do form will be stronger due to greater oceanic heat content.
- Storms will also rain more as the atmosphere will be able to hold more moisture.

Murakami and Wang (2010)

Associated Press
Impacts of enhanced storminess on hotels: Anguilla

Assuming 96 category 3 storms, 36 category 4 storms, and 5 category 5 storms to 2100

In a study on risk perception in Anguilla, if hurricane activity increases or is perceived to increase tourists will seek alternate destinations. This is especially true for Anguilla’s main tourist group: older retired Americans and ‘beach lovers’ (Forster et al. 2012).
Sea level rise

<table>
<thead>
<tr>
<th>Reference tide gauge</th>
<th>Coastal sector</th>
<th>Perm. flooding</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Los Morros</td>
<td>Cabo de San Antonio</td>
<td>5.43 cm</td>
</tr>
<tr>
<td>2 Siboney</td>
<td>Cabo de San Antonio – Cárdenas</td>
<td>33.40 cm</td>
</tr>
<tr>
<td>3 La Isabela</td>
<td>Cárdenas - Punta de Prácticos</td>
<td>11.99 cm</td>
</tr>
<tr>
<td>4 Gibara</td>
<td>Punta de Prácticos – Punta Maisí</td>
<td>22.70 cm</td>
</tr>
<tr>
<td>5 Average for south coast</td>
<td>South coast of Cuba</td>
<td>12.12 cm</td>
</tr>
</tbody>
</table>
Sea level rise

Hernández et al. (2013)
Goulart et al. (2018)
## Summary

<table>
<thead>
<tr>
<th>Climate change</th>
<th>Impacts on tourism</th>
<th>Frequent adaptation measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warming</td>
<td>Discomfort, coral bleaching</td>
<td>Create cooler microclimates with water, vegetation, shading, and air conditioning</td>
</tr>
<tr>
<td>Aridity</td>
<td>Lack of potable water, water restrictions, food insecurity, environmental degradation</td>
<td>Desalinize and use drought-tolerant landscaping</td>
</tr>
<tr>
<td>Stronger storms</td>
<td>Loss of coastal infrastructure and tourism due to actual or perceived threats</td>
<td>Mandate stronger building codes and install protection from wind and flood</td>
</tr>
<tr>
<td>Sea level rise</td>
<td>Loss of beaches and coastal properties</td>
<td>Rely on hardened structures to prevent erosion</td>
</tr>
</tbody>
</table>

Scott et al. (2012)
Alternatives to sand, sea, and sun

- Promote tourism activities in natural/rural settings in the interior
  - For many Caribbean islands it is cooler and wetter at higher elevations
  - Ecological parks
  - Cultural and community tourism
  - Agritourism
Conclusions

- The economy of the Caribbean has been built on tourism, but the region has been described as a “tourism vulnerability hot spot” (Cashman et al. 2012)

- In particular, “Cuba will face increasing anthropic pressures and environmental changes [and] of particular importance is increasing international tourism flux and climate change” (Goulart et al. 2018)

- There should be a concerted effort to increase investments in tourism that is responsible and sustainable - one option is to look towards the interior.

- Climate adaptation is as much about changing attitudes and behaviors as finding technical or engineering solutions (Dulal et al. 2009)
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