

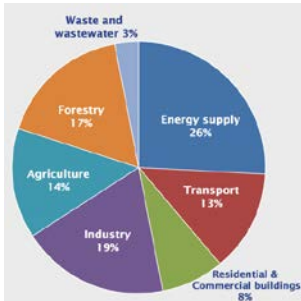
Fact Sheet #3: Climate Change, Tourism and Sinaloa Sur

Competitive and Sustainable Tourism in Sinaloa Sur



The Problem: The Impact of Climate Change on Coastal Tourism (and vice versa)

Climate change — caused when greenhouse gases (GHGs) trap heat around the Earth — is a reality. Human activity has increased the global temperature by about .8° C already,¹ and 2012 was one of the hottest years on record worldwide, the 36th consecutive year to exceed the 20th-century average of 13.9° C.² Early findings in a recent study by the United Nations suggest that the ocean may rise 3 feet by 2100;³ in Mexico, the rate of sea level rise is currently at 10 times the rate observed a century ago. The Center for Atmospheric Sciences (UNAM) predicts a 4° C change in Mexico by the end of the century, with the greatest warming in the north and northwest.⁴



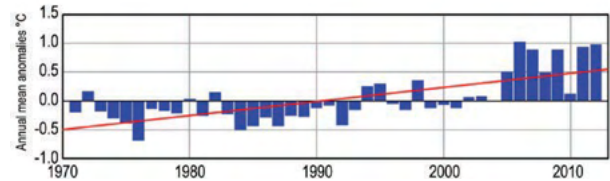
Global GHGs by sector, 2007
(Source: IPCC; data from 2004)

What human activities increase the amount of greenhouse gas in the atmosphere? Transportation is a major contributor. This, in part, explains how tourism accounts for 5%⁵ of global CO₂ emissions — though air conditioning, refrigeration, and agriculture (all part of tourism) are also culprits.⁶

Coastal tourism in particular doesn't just contribute to climate change; it can also make the impact of climate change worse. For example, in order to build new hotels, resorts, and vacation homes, developers often destroy mangrove forests and dunes, which absorb greenhouse gases from the atmosphere and protect the coastline from an increasing number of hurricanes and typhoons. Mexico alone loses 10,000 hectares of mangrove forests a year.⁷

Other impacts of climate change on coastal tourism in Mexico include:

- warming water temperatures causing ocean acidification, coral bleaching, and irreversible sea level rise
- increasingly extreme weather patterns — hurricanes of greater intensity and flooding — that threaten coastal resorts and vacation homes, typically built as close to the beach as possible
- threats to food security and agriculture because of variable weather patterns; a predicted 11% precipitation decrease by the end of the century⁸; drought; desertification;⁹ and flooding



Annual mean temperature anomaly (°C) in Mexico (bars) and linear trend. Departures are depicted as deviations from the 1971–2012 mean. (Source: National Meteorological Service of Mexico, SMN.)

With a total potential loss to the Mexican economy of 3.2% -10.4% of GDP by the year 2050, the Mexican government has had to address climate change.¹⁰ In response, President Pena Nieto's National Development Plan (2013-2018) outlines a broad strategy to address climate change, emphasizing "the transition to low carbon development in primary production sectors, industry, construction ... tourism, and transport." Other measures Mexico has taken include:¹¹

- Signed over 100 agreements related to the environment and sustainability.
- Adopted the General Law on Climate Change, which binds Mexico to reduce greenhouse gas (GHG) emissions (50% by 2050) and increase renewables use (to 35% of total energy by 2024).
- Implemented mitigation measures to reduce GHG emissions including planting 250 million trees, increasing protected areas to 3 million hectares, and upgrading electrical lines.

Negative Examples

Some countries and regions have failed to prepare adequately for events related to climate change, both the catastrophic and day-to-day events:

- Authorities in New Jersey and New York have allowed heavy development of high-risk coastal areas in recent decades. In part due to poor land use and building code regulations, Hurricane Sandy ultimately caused \$19 billion in damage and loss of economic activity in the city.¹² Yet all along the eastern shoreline, developers continue building and rebuilding beach houses and vacation homes in vulnerable areas.
- The beaches of Waikiki, Hawaii generate roughly 44% of the state's tourism expenditures¹³; however, beach front construction aimed at attracting sun seeking tourists has led to severe and seemingly irreversible coastal erosion. Less than a year after completing a \$2.2 million project to replenish the sand on 1,730 feet of shoreline, the replenished stretch of Waikiki Beach is already starting to erode.¹⁴ Going forward, though, government officials on nearby islands are using *construction set-back zones* based on the rate of chronic erosion that will delay the impact of erosion on beach properties.¹⁵



Floodwaters from Hurricane Sandy surge over houses on the Jersey Shore (Source: Flickr)



The Built Up Coastline of Waikiki, Hawai'i (Source: Wikimedia Commons.)

Positive Example

There are two broad strategies for dealing with climate change: adaptation, and mitigation.

Adaptation: Adaption is the adjustment of human and natural systems in response to the actual or expected impacts of climate change.¹⁶ The Inter-American Development Bank estimates that \$1 in adaptation can prevent up to \$4 in economic consequences in Latin America and the Caribbean.¹⁷ For example, adopting a comprehensive strategy towards climate change adaption, Barbados has built headlands, breakwaters, retaining walls, and walkways to stabilize the shoreline and limit beach erosion on the south and west coasts of the island. With a sophisticated understanding of shoreline dynamics, Barbados has also implemented a cost-effective beach replenishment plan – crucial in a country where tourism comprises 39% of GDP and 44% of employment. The project also incorporates a risk and hazard assessment that prepares for hazard risks associated with climate change, such as storms and coastal cliff instability.¹⁸

Mitigation: Mitigation refers to efforts to reduce or prevent the emission of greenhouse gases.¹⁹ For example, the Caribbean Carbon Neutral Tourism Program assessed the carbon footprint of the tourism sector in Belize, the Bahamas, Guyana, and Trinidad and Tobago. After assessment, the program identified and prepared financial mechanisms for integrating climate resilience within the tourism sector, with the goal of establishing carbon neutrality. The program focused on, among other issues, transportation and hotel energy use, and promoted renewable energy technology deployment to help diversify energy sources, and attracting more environmentally aware tourists.²⁰

Steps Forward: How Can Tourism in Sinaloa Address Climate Change?

The public and private sectors should collaborate to:

- Adopt a comprehensive strategy towards tourism and climate change, taking into account transport, energy, land use, water consumption, waste management, and building and infrastructure construction and operations.²¹
- Encourage farming and fishing communities to engage in diverse crop production and artisanal fishing practices that minimize the effects of changes in temperature and rainfall patterns.²²
- Follow internationally recognized criteria for sustainable tourism that address climate change, like those set out by the Global Sustainable Tourism Criteria for destinations.²³
- Consider the anticipated impacts of climate change in land use planning, and provide buffer zones between the ocean and building; enforce major regulatory measures aimed at protecting coastlines
- Invest in non-traditional renewable energy sources²⁴

RESOURCES



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⁵ "Sustainable Coastal Tourism: An integrated planning and management approach," United Nations Environment Programme (2009): 20-21, <http://www.unep.fr/shared/publications/pdf/DTIx1091xPA-SustainableCoastalTourism-Planning.pdf>.

⁶ "The Causes of Climate Change," United Nations <http://www.un.org/wcm/content/site/climatechange/pages/gateway/the-science/causes-of-climate-change>.

⁷ Emilio Godoy, "We Aren't Fighting Poverty Here, We're Improving the Quality of Life," *TierraAmerica* (March 6, 2013) <http://www.tierramerica.info/nota.php?lang=eng&idnews=4160>.

⁸ Deheza and Mora, "Climate Change, Migration, and Security," 15.

⁹ Duncan Wood, *Introduction* (Introduction to *Climate Change and Migration in Mexico: A Report Launch*, February 15, 2013) <http://www.wilsoncenter.org/event/climate-change-and-migration-mexico-report-launch> (VIDEO).

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¹¹ Deheza and Mora, "Climate Change, Migration, and Security," 69-74.

¹² Kia Gregory and Marc Santora, "Bloomberg Outlines \$20 Billion Storm Protection Plan," *New York Times*, June 11, 2013. <http://www.nytimes.com/2013/06/12/nyregion/bloomberg-outlines-20-billion-plan-to-protect-city-from-future-storms.html?ref=jennyanderson&r=1&>

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¹³ Tara L. Miller and Charles H. Fletcher, "Waikiki: Historical Analysis of an Engineered Shoreline," *Journal of Coastal Research* 19 (2003): 1026-1043. <http://www.soest.hawaii.edu/coasts/publications/JCRWaikiki.pdf>.

¹⁴ "Section of Waikiki Beach eroding less than a year after \$2.2M sand restoration," *Pacific Business News*, June 1, 2012. http://www.bizjournals.com/pacific/blog/morning_call/2013/01/section-of-waikiki-beach-eroding-less.html.

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²³ Walter Vergara, Claudio Alatorre and Leandro Alves, "Rethinking Our Energy Future: A White Paper on Renewable Energy for the 3GFLAC Regional Forum," Inter-American Development Bank (June 2013) <http://www.iadb.org/en/publications/publication-detail,7101.html?id=69434>.

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