



INSIDE STORIES

on climate compatible development

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Key messages

- The physical infrastructure and natural environments that underpin Belize's coastal tourism industry are highly vulnerable to climate change. To achieve climate compatible development in this sector, it is important to identify the areas and destinations with the greatest potential for resilience.
- A project to determine the climate vulnerability of coastal Belize, and propose solutions to climate-related threats, involved consultations and collaborations with local communities, privately owned tourism businesses and the government.
- The project used visual techniques including an interactive map to raise these groups' awareness of climate vulnerability and to deliberate solutions collectively, which included embracing 'grey-green' infrastructure¹ to guard against coastal erosion and flooding.
- Involving all these stakeholders encouraged buy-in and the uptake of adaptation actions, notably the Government of Belize's decision in February 2016 to adopt an integrated coastal zone management policy and related subnational action plans.
- Mainstreaming climate change adaptation strategies within national policies and sectoral plans, alongside sound development planning, can lead to maximum returns from tourism investments.

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Opportunities for climate-compatible coastal tourism: Lessons from Belize

Climate change is affecting coastal ecosystems globally, with severe implications for developing countries that are heavily reliant on their natural resources for economic growth. In Belize, coral reefs, mangroves and beaches are the cornerstone of the tourism industry, while coastal communities rely on mangrove- and reef-based fisheries for food and income. The growth of the tourism industry is viewed as essential to the country's economic development, but this growth is often accompanied by habitat degradation that directly threatens the resources upon which the industry depends.

The challenge faced by decision-makers is how best to develop the tourism sector while maintaining healthy, functioning coastal ecosystems that support the industry, sustain people's livelihoods and provide the coastline with natural resilience to climate change. A CDKN-supported project aimed to inform decision-makers by assessing the vulnerability of Belize's tourism sector to climate change, including the coastal ecosystems on which it depends and its essential infrastructure.

The overarching research question for the project was: how can we achieve the sustainable growth of coastal tourism in Belize while maintaining healthy, resilient coastal and marine ecosystems? To answer this question, the project had three key objectives:

1. Identify the most vulnerable coastal tourism areas that should be prioritised for adaptation action.
2. Determine the key policy instruments that support or hinder Belize's ability to make progress in achieving climate compatible development, and where gaps exist.
3. Identify and prioritise the policy reforms and adaptation strategies for integration into national policy.

Assessing tourism's vulnerability to climate change

Tourism in Belize is highly dependent on natural assets, destinations and attractions, but many of these are threatened by climate-related impacts, such as coastal

Forty percent of Belize's economy is based on tourism. Economically, it is a very critical concern for us that climate change is considered as we plan for the future in tourism."

– Abil Casteneda,
chief tourism officer,
Ministry of Tourism

storms, flooding and sea level rise. Other, non-climate-related issues threaten the assets on which tourism depends. The key threat is the direct loss of ecosystems due to coastal deforestation, which is linked to tourism developments and other coastal development (e.g. the growth of urban areas and infrastructure). These demands have led to unsustainable development practices, such as the clearance of mangroves in vulnerable areas and the infilling (or land reclamation) of low-lying coastal areas. These practices also increase the exposure of the population and infrastructure to the climate-related threats. Vulnerable coastlines have also experienced significant erosion and accompanied siltation, and the pollution of offshore coral reefs.

The project's assessment of Belize's coastal tourism found that up to 70% of the sector was vulnerable to these impacts. Models that integrated ecosystem services, tourism hotspots (both businesses, such as hotels, and recreation areas) and climate variables revealed that natural assets, including natural beauty, are increasingly threatened by biodiversity loss and

habitat fragmentation, coastal erosion and inundation associated with climate change.

Built infrastructure is also being damaged by extreme weather events such as storms, hurricanes and associated flooding, which are becoming more intense as a result of climate change. Low-lying areas, with elevations ranging from 0–5 m, were found to be the most vulnerable to coastal flooding. These areas are where many of Belize's tourism developments are located, and also where the pressure for further tourism developments is greatest.

Several useful tools and findings came out of the project's analyses.

- An **online interactive map**² was developed, which shows indicators of the vulnerability and relative vulnerability of different locations, which can be used by policy-makers and tourism operators. Although tourism and land developments continue to alter the face of Belize's coastal zone, increasing attention is

being given to using green or grey-green infrastructure to help stabilise the shorelines of private properties.

- The project helped to translate climate risks into **business-relevant language**, thereby building an 'architecture of participation' for tourism businesses to engage and act. This will support climate action and enhance Belize's adaptive capacity.
- The project's analysis showed that coastal and marine ecosystem services, such as mangroves providing protection from storms and sea level rise, should be highlighted to ensure **better-informed decisions** about tourism development.

The project also flagged the need to **seek alternatives to coastal tourism** in Belize, implement **legislation for better coastal management**, and design and implement **standards and measures for greater flood resistance** in coastal areas and flood plains. The project partners will continue to work

The project allowed us to do three things. Firstly, build our knowledge base and assess the current vulnerability of Belize's tourism system, which includes the natural and physical infrastructure as well as tourism destination sites; secondly, identify those climate-resilient areas in our tourism system [where] we, as a country, can then, thirdly, prioritise adaptation actions and policy decisions that will ensure a sustainable future for the tourism industry."

– Chantalle Clarke-Samuels, chief executive officer, Coastal Zone Management Authority and Institute

together to champion the integration of these recommendations into national and local policies.

New policies and plans for adaptive coastal management

The project analysed existing development policies and adaptation options to identify any gaps and areas where these could be strengthened. This provided strong sociocultural and economic justification for stakeholders, local communities and the national government to place more emphasis on conserving and restoring natural ecosystems, and implement better coastal-zoning and development-planning practices. The project team then invested time in reaching out to the targeted stakeholder groups that were in a position to implement the findings. These included representatives of the tourism and fisheries industries, local communities and government decision-makers. As a result of the action research and engagement process, the Government of Belize has adopted several new policies and plans, and is revising outdated ones. This can be partly attributed to the project's activities.

For example, the Belize Coastal Zone Management Authority and Institute recently developed a national integrated coastal zone management plan for Belize,³ with support from the World Wildlife Fund (WWF). This plan aims to ensure the sustainable use of coastal resources by balancing conservation ideals with the country's economic and social needs. The Government of Belize adopted this plan in February 2016. Furthermore, the Government has

The national integrated coastal zone management plan for Belize is a comprehensive and cross-sectoral planning framework that offers robust strategic solutions that build on the national agenda for growth, sustainable development and improved resources management. It links the economic potential and ecological value of the coastal zone with a balanced mix of utilisation and conservation, thereby promoting the long-term viability of the Belizean coastal zone."

– Honourable Gaspar Vega, Deputy Prime Minister and Minister of Agriculture, Fisheries, Forestry, the Environment and Sustainable Development, Belize⁴

adopted nine regional development guidelines for Belize's coast, which accompany the plan.

The Government of Belize is also planning to revise national mangrove regulations to grant greater protection to mangroves and reflect the critical goods and services provided by these ecosystems in buffering against climate impacts. A protected area is being proposed along the Placencia Peninsula, a tourism development hotspot, to protect mangrove forests, seasonally and permanently inundated wetlands, endangered species and nursery habitats for marine life, as well as to create buffer zones to reduce flood risk (see Box 1).

Alongside this, efforts are underway to revise the Belize coastal zone management act to grant greater protection to Belize's coastal habitats, including those beyond the high-water mark, as well as to ensure that it is sufficiently 'climate smart' to address the future risks and vulnerabilities posed by a changing climate.

Adaptation options identified through the project were proposed for inclusion within national-level initiatives via Belize's National Climate Change Office.⁵ This office is currently finalising the national climate change policy, strategy and action plan for Belize. Project partners are continuing to advocate for the incorporation of the project's outputs within these larger national efforts. For example, although tourism and land developments continue to alter Belize's coastal zone, increasing attention is being given to using 'green' or 'grey-green' infrastructure that helps to stabilise the shoreline; this has been pushed by the project since it started.

Challenges to coastal adaptation planning in Belize

Short project timeframes and limited funding

For a project to be successful, stakeholders (e.g. land owners, private sector tourism groups, the government and local

Box 1. Restoring Belize's mangrove forests

Many property developers in coastal Belize have traditionally chosen to clear forests on their land down to the shoreline of their properties. Not only is this activity illegal, but it often results in the immediate loss of part of their land to coastal erosion, as the loss of vegetative cover removes an important natural defence against erosion. This in turn often leads to 'hard' coastal defences, such as sea walls, which only serve to accelerate erosion further along the coast.

This problem was common on the Placencia Peninsula, where mangrove forests in particular were being destroyed. But recently, protests from local communities and concerned citizens' groups have seen calls for developers to implement better building practices and reduce the vulnerability of the peninsula and its adjacent lagoon system.

WWF worked in partnership with the NGO Southern Environmental Association, the Friends of Placencia Lagoon (a concerned citizens' group, representing diverse interests), shrimp aquaculture farmers, tourism developers and village councils to bring attention to the adverse effects of unsound development practices, and share information and training to develop a 'greener' approach.

Part of these efforts involved protecting and maintaining mangrove buffers along the lagoon banks, as well as proactively replanting mangroves in areas that had been cleared and were suffering from erosion. Some land developers and shrimp aquaculture farmers have even asked to donate areas on their properties that are newly covered by mangroves to the proposed Placencia Lagoon protected area.

"We planted thousands and thousands of mangrove seedlings, and the success rate [of regrowth] is probably around 98% or 99%," says Stewart Krohn from the Coco Plum Resort and Residential Development, one of the property developers working with WWF and its partners. "They grow very quickly and in many areas there is [already] a thick wall or hedge of mangroves along our waterways, which serves as an excellent erosion prevention [technique]. It is aesthetically very pleasing and promotes fish growth. The result actually saved us money, provided better coastal protection, promoted an increased presence of wildlife, and proved aesthetically superior to the construction of sea walls or the use of PVC [polyvinyl chloride] sheet piling."

These activities are helping to translate climate risks into business-relevant approaches. Although pressure for new developments – both tourism-related and for community expansion – continues on the peninsula, companies are opting for 'green' (i.e. natural vegetation) approaches to protect new developments, rather than grey (i.e. concrete seawall) ones, particularly on the lagoon side of the peninsula.

There are also aesthetic benefits – an important consideration for any tourism business. "Our entire project was designed to conserve the mangroves by making our landscaping fit into the mangroves – not vice versa," says Jennifer Bond from Sunset Pointe Development. "They are a natural work of art, protecting the shoreline and building a natural sea wall between land and sea. Mangroves are one of the most artistic trees there are; their gnarled trunks and branches are not only beautiful to look at, but are home to a multitude of birds, small animals and reptiles."



Mangrove trees, Belize.

[The Integrated Coastal Zone Management Plan is] one of the most forward-thinking ocean management plans in the world.”

– Fanny Douvere, United Nations Educational Scientific and Cultural Organization⁶

communities) needed to be fully engaged during and after the project. However, in this instance, the short project time frame (18 months) and limited funding hampered the ability of the project team to engage continually with communities and stakeholders. This reduced the effectiveness of efforts to establish long-term trust and buy-in for recommended adaptation activities.

Disseminating information

Throughout the project, it was a challenge to garner high turnouts at community consultations, and the team had to reschedule meetings and outreach initiatives to ensure that stakeholders were available to provide inputs. To this end, the team built partnerships with local non-governmental organisations and grassroots community groups to assist with the dissemination of project information and outputs to stakeholders.

For these groups, information was provided in simple language, using graphics and photo stories to demonstrate the environmental and economic benefits of the proposed green approaches. Project information and outputs

were also shared via the University of Belize’s Environmental Research Institute’s free, online data portal and the WWF website.

Data availability and collection

The collection of the required data (e.g. sourcing critical datasets for the vulnerability assessment) was complex, challenging and time-consuming. The project team intended to use up-to-date and robust national datasets on ecosystem services, climate variables and projections, and socioeconomic information of critical relevance to Belize’s tourism sector, economic stability and growth. Unfortunately, as is common with climate information, national decision-makers and researchers in Belize tend to use global information and projections, due to the lack of downscaled datasets. Also, analysis of climate impacts should include data on historic climate trends, but these are not comprehensive or readily available for Belize.

As a result, the best-available information was used. This included a mixture of data from global climate projections, national historic climate trends analysis and local knowledge. Using local knowledge, which included traditional knowledge and data from locally based socioeconomic and ecological research, was possible as a result of the participation of communities and other local stakeholders. This was very important, since these groups play a two-part role: they hold information that is not otherwise available, and they are the actors that need to be informed in order to implement the recommended actions.

Coastal adaptation planning: Success factors

The project was successful due to a combination of factors.

Supporting stakeholders to use climate information

The use of climate scenarios and graphics played a critical role in raising awareness and engaging communities and stakeholders on the need to implement adaptation best practices. However, it is not enough just to make scenarios and information available; they must be accompanied by ongoing guidance and support to ensure widespread and appropriate uptake. Dialogue between those providing information and the communities and stakeholders using it is vital. For example, this helps to manage expectations of what science can effectively deliver.

Forging partnerships

Working in partnership and building sustained relationships with local entities opened doors to influence better practice on the ground. This was very important, since these entities play important roles as advocates, sponsors, partners and agents of change. Where there is trust – between the project team, the communities involved and the stakeholders targeted by the project – communication was found to be very effective.

Lessons learned and implications

- Short time frames and insufficient investment can hamper a project’s impact on the ground. For example, these limitations can inhibit

opportunities to build on any progress made in establishing relationships and trust with stakeholders. It is necessary to ensure that these problems are addressed within a project's design and sustainability planning.

- Having a sustainability plan or strategy in place – including sufficient time and funds, clear policies to target, and links to stakeholders' priorities – is essential for a project's goals to be met in the long term. This is needed at an early stage, and should clearly spell out how project activities (outreach, advocacy, uptake, replication, fundraising, etc.) will be carried out to sustain activities in the long term.
- For this project, efforts were aligned with national and local government goals and targets (such as commitments to the Convention on Biological Diversity, the Millennium Development Goals, the Sustainable Development Goals, and local and regional conservation-planning guidelines), as well as with the main aims and objectives of targeted private sector stakeholders and local communities. This is important for securing buy-in from governments.
- One of the approaches used successfully in this project was to focus on developing or securing buy-in among strategic partners for certain aspects of the project that matched their interests; these partners can then provide leverage to acquire resources during the project or far in the future. A similar approach was to

If we don't keep these issues at the forefront of the developers' [minds], and if people are not the catalyst for causing the awareness, these kinds of unsustainable developments could continue to happen. We are at the threshold, where the country needs to develop sustainably, but also needs to understand what is at risk."

– Armeid Thompson, former director of quality assurance, Belize Tourism Board

- identify 'champions' for certain activities. These are essentially organisations and interest groups that benefit from the activities, or are interested in working with similar target groups or causes.
- When engaging with the tourism private sector, the project highlighted the economic arguments for taking action, such as costs, lost investments, and losses and damages from climate change or degraded ecosystems. The project team were not able to carry out a national-level cost–benefit analysis for the tourism sector, due to limited time frame and funding, but we have recommended this as a follow-up activity for the second phase of the project.
 - Projects should engage and collaborate extensively with stakeholders. Such consultation is critical to this type of project, and must take place throughout. For example, in this project the team were able to obtain insights on communities' and the private sector's thinking with respect to ecosystem services and climate vulnerability. Collaborating and communicating on a continual basis with partners allowed them to realise the benefits and feel that they were part of the overall

climate compatible development approach.

- When assessing the vulnerability of the tourism sector, there is a need to focus on mapping resilient and vulnerable ecosystems, in terms of their function and services. Integrating this with analysis of the extent to which tourists' choices may be affected by perceived projected impacts on coastal ecosystems and tourism facilities could also improve the understanding of the tourism industry's vulnerability. This is therefore a recommendation for future work in Belize – and in similar coastal environments.
- The potential benefits of different adaptation options can be quantified using storylines, spatial scenarios, information from literature, stakeholder expertise and modelling. However, this process can be improved through the use of cost–benefit analyses. For example, establishing the monetary values for costs and benefits of ecosystem services allows for a complete economic assessment of options and can enable cross-sector decision-making, across public and private sectors, and economic sectors such as tourism and fisheries.

Endnotes

- 1 Grey-green infrastructure combines the use of green (natural) and grey (hard or built) infrastructure techniques, for environmental management or as a risk-reduction strategy. This can be effective, economical and enhance communities' safety and quality of life.
- 2 See: www.geointerest.frih.org/NatCap
- 3 CZMAI (2016) *Belize Integrated Coastal Zone Management Plan*. Belize City: Coastal Zone Management Authority and Institute. (www.coastalzonebelize.org/wp-content/uploads/2015/08/BELIZE-Integrated-Coastal-Zone-Management-Plan.pdf).
- 4 Ibid. Page i.
- 5 The coordinator of the National Climate Change Office was a member of the project's expert panel.
- 6 UNESCO WHC (2016) 'Danger listed site Belize barrier reef gets visionary integrated management plan'. UNESCO WHC website, 29 February. Paris: United Nations Educational, Scientific and Cultural Organization World Heritage Centre. (<http://whc.unesco.org/en/news/1455>).



Diving and jet ski hire at Ambergris Key, Belize.

Photos: p1: Wollertz/Shutterstock.com; p.4: Astrida Valigorsky/istockphoto.com; p.7: Angela N Perryman/Shutterstock.com



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