



Case study

Multiple stressors impacting a small island tourism destination-community: A nested vulnerability assessment of Oistins, Barbados



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ABSTRACT

Small island nations face several challenges, both short- and long-term, in the context of a changing climate and socio-economic environments. Consequently, their communities are vulnerable to multiple sources of stress. This study examines the multiple stressors impacting a tourism community, based on 48 interviews and five focus groups, with local and national stakeholders in Oistins, Barbados. The research identifies mechanisms used by respondents to cope and adapt to change and finds that many are short-term oriented, and so under-estimate the potential of long-term climatic change. Moreover, responses to change are often ineffective. A nested analysis indicates important relationships between factors external to Barbados, those inherent to the island, and then those specific to the community. The paper concludes with the suggestion that sectoral and community-level adaptations are not always consistent and/or appropriate and that local stakeholder adaptation is not fully effective in reducing tourism vulnerability.

1. Introduction

The Caribbean is considered a 'tourism vulnerability hotspot', as the region has the world's most tourism intensive economy and because climate change impacts to its sector and economic livelihood are predicted to be significant (UNWTO, UNEP, & WMO, 2008; WTTC, 2015b). Within the Small Island Developing States (SIDS) that comprise most of the Caribbean, destination¹ communities, including workers and local operators, have been identified as the most vulnerable tourism stakeholders to climate change (Scott & Jones, 2006), particularly when employed in low-paid or seasonal positions (Dunn, 2008). Furthermore, as Caribbean countries depend upon the rest of the world for many aspects of their economies, they are also vulnerable to non-climatic global stressors, such as fluctuating commodity prices (Bishop & Payne, 2012). Therefore, it is essential that SIDS in the Caribbean adapt to the effects of climate change and consider how this interacts with non-climatic stressors (Becken, 2013), as failure to do so could have serious and detrimental impacts on their tourism and economic livelihoods (Simpson et al., 2010).

Community-Based Vulnerability Assessments (CBVAs) have been identified as a key method to examine vulnerability to climate change and other stressors, and develop adaptation strategies (Ford et al., 2010). Nevertheless, CBVAs can face challenges in their application, as studies are often isolated, localized and face limits in their comparisons

across and beyond communities, thereby limiting potential to develop adaptation interventions at non-local levels (Smit & Wandel, 2006). In particular, studies often assess vulnerability at the community level and do not consider the larger determinants (i.e., regional, national, global) that can affect the degree to which local adaptations are viable (Adger, Eakin, & Winkel, 2009). To address this, nested case studies can distinguish the determinants of vulnerability at several scales and detail connections between causes and outcomes of vulnerability across governance and geographic contexts (Adger et al., 2009). While the nested case study approach has been promoted to address the shortcomings of CBVAs, it has yet to be applied in a tourism community.

The following study applies the nested case study approach in the tourism destination community of Oistins, Barbados, in order to:

1. Determine whether the nested approach is appropriate for delineating vulnerability and developing adaptation strategies in tourism dependent communities;
2. Understand the climatic and non-climatic stressors influencing vulnerability at the tourism destination-community scale; and,
3. Consider the climate change vulnerabilities of tourism-dependent workers, which no studies have previously examined in the Caribbean, and is a broader gap in the tourism and climate change literature (Kaján & Saarinen, 2013).

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¹ Can be defined as a "... marketable destination... from a small nation to a region, or to a specific resort or site" (UNWTO, 2004, p. 21).

2. Vulnerability and the nested approach

Climate change vulnerability can be depicted as the extent to which a system is prone to harm (exposed), internally sensitive and capable of adapting to change (Smit & Pilifosova, 2003). An integrated approach considers vulnerability as scale and time dependent, that can have multiple stressors and is dynamic (Smit & Pilifosova, 2003). Due to this dynamic nature, it is easier to measure the processes that condition a system's vulnerability, where it is viewed as a pre-existing 'context' of a system that renders it susceptible to harm versus an 'outcome' of a linear set of stresses and seen as a particular point in time (O'Brien, Eriksen, Nygaard, & Schjolden, 2007).

Community (place)-based studies, like Community-Based Vulnerability Assessments, can identify the contextual determinants of vulnerability from a particular community, including the present ability to cope with stressors, to ascertain ways of enhancing adaptive capacity or implementing adaptation initiatives (O'Brien et al., 2007; Smit & Wandel, 2006). CBVAs recognize the community as the primary system of interest, but also examine the broader conditions within which it functions, including multiple stressors (Smit & Wandel, 2006). CBVAs have often been used in Arctic communities (Andrachuk & Smit, 2012; Ford & Pearce, 2012), although at the time of our research, none had been conducted in Caribbean tourism communities. More recently, one study has been completed in Jamaica, although it highlighted the need to understand how local communities are shaped by multi-scalar processes (Hogarth & Wojcik, 2016).

In the tourism context, place-based CBVAs would allow for the consideration of climatic conditions and tourism adaptation needs that are pertinent to community members (Becken, 2013; Kaján & Saarinen, 2013). Having said that this approach has critics, particularly those that argue that the connection to broader stressors and determinants of vulnerability are often not comprehensively characterized and limitations exist in comparisons across and beyond systems (Ford et al., 2010; Smit & Wandel, 2006). For these reasons, additional place-based methodologies are needed to more comprehensively capture the dynamic nature of vulnerability and facilitate adaptation planning (Ford et al., 2010).

Nested approaches to vulnerability assessment refer to "assessment where analysis conducted as one-scale is either 'up-scaled' or 'down-scaled', to examine multi-scale processes and determinants of vulnerability" (Preston, Yuen, & Westaway, 2001, p. 195). Such approaches distinguish vulnerability at several scales and detail connections between its causes and outcomes (Adger et al., 2009; Ford et al., 2010). Therefore, a multi-level community vulnerability assessment highlights the suitable scale for adaptation relative to the scale of problem (Pittman, Armitage, Alexander, Campbell, & Alleyne, 2015). Although the nested approach has provided important contributions to understanding vulnerability (Ford et al., 2010), it has yet to be applied in the Caribbean and there is limited understanding of whether this approach provides more useful information compared to the CBVA in tourism destination communities.

In the Caribbean, there have been limited studies examining vulnerability to climate change at the community level using the nested approach. Tourism studies have examined tourist perceptions of climate-related risks, developed disaster vulnerability frameworks and analyzed coastal vulnerability (Becken, Mahon, Rennie, & Shakeela, 2014; Forster, Schuhmann, Lake, Watkinson, & Gill, 2012; Student, Amelung, & Lamers, 2016), though none have examined vulnerability at the destination community level, while also making connections to broader scales. For example, grey literature in the Caribbean and Barbados has examined tourism climate change vulnerability at the national level (CCCCC, 2009; CDEMA, 2009; GOB, 2001; GOB, 2012; UNECLAC, 2011), although there are no connections to the community level. Knowledge gaps also remain in understanding the capacity of local stakeholders and those with tourism-dependent livelihoods in destination communities to adapt to climate change (Kaján & Saarinen,

2013). For these reasons, additional empirical studies are needed to examine the vulnerability of Caribbean tourism destination communities, with a particular focus on local tourism stakeholders (Becken, 2013; Bishop & Payne, 2012).

A further issue that requires study is the impact of multiple stressors on climate change vulnerability. Understanding the multiple interacting perturbations which can increase a system's vulnerability is key to comprehensively assessing exposure-sensitivity and adaptive capacity (Füssel & Klein, 2006), although knowledge limitations remain in understanding tourism sector vulnerability to multiple stressors at the community level in the Caribbean (Becken, 2013). Although some studies focusing on Barbados have examined climate change and tourism (CDEMA, 2013; GOB, 2001; GOB, 2012) and a few have addressed adaptation (CCCCC, 2009; UNECLAC, 2011), none have examined the impacts of multiple stressors.

The following study fills this gap and examines community level vulnerability in the tourism destination community of Oistins, Barbados, in order to determine the validity of the nested approach. The study also provides empirical evidence of community-level vulnerability in a destination community in the Caribbean, with a focus on understanding the vulnerabilities and adaptive capacities of local tourism-dependent stakeholders, and the multiple stressors these communities face.

3. Study site and methods

Barbados has a population of 285,916, with the majority settled along the southern and western coasts (WPR, 2014). Tourism is the island's primary industry and in 2014 was valued at US \$1.69 billion, contributing 36.1% to total global GDP (WTTC, 2015a). On average over 523,000 tourists visit Barbados annually for its climate and coastal environment (World Bank, 2015), with primary source markets from Canada, the United States, the United Kingdom and other European countries (GOB, 2012). The island and its tourism sector face high exposure to climate change due to its low-lying karst topography, pressure placed by a dense population on limited resources and a high reliance on coastal infrastructure (Bishop & Payne, 2012). Nevertheless, Barbados is thought to have a higher adaptive capacity than other Caribbean islands, as it has a high performing economy and has undertaken some initiatives to address climate change and its impacts on tourism (Bishop & Payne, 2012).

Oistins is the third most populous town in Barbados (2010 population: 1037) and is situated on the south-coast, within the Christ Church Parish and the South Christ Church (SCC) Constituency Council (Fig. 1) (GOB, 2010). Oistins' tourist attractions include its beaches (with recreational activities), hotels and restaurants, the Bay Garden Vendors Area (BGVA) and the Oistins Fish-Market (BTPA, 2015). Tourism-related activities are also connected to the consumption of fisheries, as Oistins hosts the largest fishing community in the island; these fisheries are important both for local food security and for the tourism industry, but have also experienced overfishing (GOB, 2004). Oistins has been identified as being at risk from an increase in climate-related events, as it supports small (i.e. vendors), medium (i.e. small hotels) and large-scale (i.e. large hotels) tourism related activities, lies low in a basin with its physical resources and infrastructure, including tourism facilities, fish-market and fishing boats, located very close to the coast (Simpson et al., 2012).

This research devises a conceptual framework to assess the nested vulnerability of a tourism destination community in a Small Island Developing State utilizing the four 'Climate Change Impact Pathways on International Tourism' developed by Scott, Hall and Gössling (2012a). The pathways include: 1) direct climate impacts; 2) indirect, climate-induced environmental changes; 3) indirect climate-induced socio-economic changes; and 4) impacts due to mitigation and adaptation responses in other sectors.

Fig. 2 portrays the nested, external factors and scales (international,

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