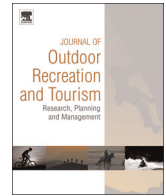




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Climate change perception of the dive tourism industry in Koh Tao island, Thailand

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ABSTRACT

Marine tourism is a major contributor to local economies of both developed and developing countries. However, the warming of the climate system, ocean acidification, coral bleaching, and extreme storm events are putting seaside communities and marine tourism industries at risk. The objective of this study was to identify how well stakeholders in the dive tourism industry of Thailand can adapt to climate change threats. Protection Motivation Theory (PMT) was used to frame stakeholders' perception of climate change threats, their level of vulnerability to climate change and their response efficacy to climate change. Nine semi-structured in-depth interviews were conducted with stakeholders from the dive tourism industry on Koh Tao Island, Thailand. Results revealed misconceptions regarding climate change causes and the temporal and spatial scales of climate change impacts. Perceived environmental changes were based on personal observation, and adaptive responses were generally related to livelihood strategies rather than direct responses to climate change. Therefore, the key policy recommendation is to first focus on engaging the local community in a participative education and communication program to remove misconceptions around climate change that is hindering people's adaptive capacity.

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1. Introduction

For decades, tourism in Thailand has been one of the most important income generating industries. In 2007, more than 14.5 million international tourists visited Thailand, a 43 percent increase from 10.1 million in 2003 (National Statistical Office of Thailand, 2010a). The total revenue from tourism in 2007 was US \$19 million (National Statistical Office of Thailand, 2010b), which accounted for 6.42 percent of the gross domestic product (GDP) (Office of the National Economic and Social Development Board, 2010). Despite the current unstable political situation in Thailand, the upward income trend from tourism and its percentage share in GDP gives us an obvious indication that Thailand's economy increasingly depends on tourism.

Environmental assets are very important to the tourism industry of Thailand, and to the well-being of local communities. Unfortunately, environmental degradation and destruction of natural resources is threatening local livelihood and tourism. So

far, the problems caused by direct human activities, such as deforestation are being acknowledged and partially resolved by increasing the number of protected areas. However, the variable climate pattern, which is an uncontrollable external factor, is likely to play a big role in changing the environmental conditions in the future.

Marine tourism is a major contributor to local economies of both developed and developing countries. The Caribbean derives half of its gross domestic product from the tourism industry (NOAA, 2011). In Southeast Asia, each square kilometer of healthy reef has a potential net benefit from the tourism industry of around \$23,100 to \$270,000 (Burke, Selig, & Spalding, 2002). In Thailand, a popular SCUBA diving destination called the Similan Islands is estimated to be worth \$55 million a year of gross income to the industry (Tapsuwan & Asafu-Adjaye, 2008).

Despite its economic significance, marine resources are extremely vulnerable to climate variation. The warming of the climate system is currently evident from observation of increases in global average air and ocean temperature, widespread melting of snow and ice, and rising global average sea level (IPCC, 2007). The impact of climate change could potentially be detrimental to the dive tourism industry on Koh Tao Island, yet little effort has been

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spent to understand and assess how well the local community—particularly, the diving community—is adapting to climate change. This problem is not only limited to Thailand; other developing or small island countries, which rely on marine tourism as their main source of income, such as the Philippines (see e.g. Cesar, 2000) and the Caribbean (see e.g. Scott, Simpson and Sim (2012) are facing similar challenges). Coastal communities are vulnerable to climate change because they are isolated, have small land mass, have population and infrastructure that are concentrated on the coastline, and have an economy that is dependent on natural resources (IPCC (2012) as cited in Scott et al. (2012)). Nonetheless, historical evidence suggests that communities can adapt to change and improve their resiliency to change in the process (Scott et al., 2012). For instance, communities can retreat inland in response to sea-level rise, and by doing so become more resilient to future changes (Koerth, Vafeidis, Hinkel, & Sterr, 2013).

In this paper, we applied a socio-psychological framework, called Protection Motivation Theory (PMT), to evaluate stakeholders' perceived severity of climate change consequences, perceived probability of climate change risks, perceived effectiveness of adaptive behaviors to cope with climate change, and perceived ability to perform adaptive behaviors successfully. The results are expected to direct us to identify appropriate mitigation and adaptation measures.

2. Case study site: Koh Tao Island, Thailand

Koh Tao Island is located in the Gulf of Thailand. The island is relatively small, covering an area of 21 square kilometers. The island is exclusively state property and officially managed by the Treasury Department under the Ministry of Finance. Some of the newer occupants are leasing the land from the government but most of the older inhabitants received their land use rights by inheritance. According to 2006 statistics, the estimated hidden population (i.e. people who reside permanently on the island but are not registered with the district office) was approximately 10,000 individuals and around 536,000 tourists visit the island each year (Koh Tao Subdistrict Administrative Organization, 2006). However, a 2008 census suggests that the number of local residents on the island was only 1554 (Department of Provincial Administration, 2008). Because of the booming tourism industry, more people are unofficially residing on the island.

The island contains more than 25 SCUBA diving sites and 50 dive schools and operators (see Fig. 1). Around 70 accommodation services (e.g. hotels, campsites, bed and breakfasts) are established on the island (Tourism Authority of Thailand, 2010).

Climate predictions suggest that average rainfall for Koh Tao Island is likely to increase by 26% due to the increased frequency of heavier rainfall in the next 30 years (Southeast Asia START Regional Center, 2009). Increased monsoonal weather will reduce the number of 'safe diving' days per year. Sea level is predicted to rise by 20 cm as compared to 2008 and monsoonal sea level rise will add another 2–3 cm to the rising level (Southeast Asia START Regional Center, 2009). Sea level rise will lead to vast coastal erosion of the island's flat beaches.

3. Methodology

3.1. Protection motivation theory (PMT)

Originally proposed by Rogers (1975), PMT has been used to examine a wide range of behaviors in response to environmental threats such as earthquake preparedness (Mulilis & Lippa, 1990), bushfire response (Martin, Martin, & Kent, 2009), and flood

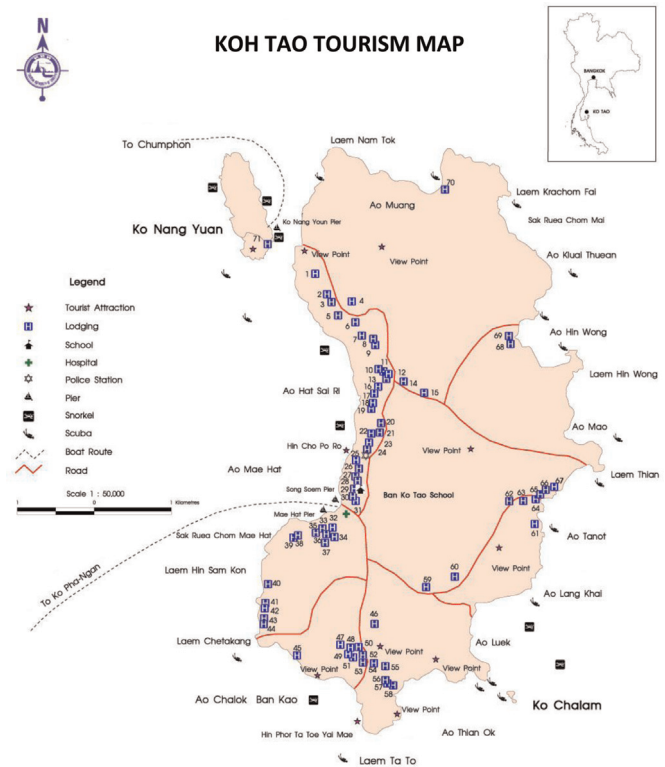


Fig. 1. Map of Koh Tao Island (Tourism Authority of Thailand, 2010).

preparedness (Grothmann & Patt, 2005). According to PMT, an increase in one's perceived vulnerability to an external threat combined with the perception of one's efficacy to mitigate the threat will motivate the individual to carry out adaptive behavioral responses. These cognitive processes are divided into two sub-processes, threat appraisal and coping appraisal. The threat appraisal process evaluates the factors that increase (i.e. benefits) or decrease (i.e. severity and vulnerability) the probability of making maladaptive responses, while the coping appraisal process evaluates factors that increase (i.e. self-efficacy and response efficacy) or decrease (i.e. costs) the probability of making the adaptive responses.

3.2. Sampling and data collection

We identified five main stakeholder groups affiliated with the dive tourism industry on Koh Tao Island. These stakeholders include dive tour operators, resorts and restaurant owners, government agencies, local communities and non-government organizations (NGOs). Each stakeholder plays an important role in supporting the livelihood of the island and the dive tourism industry. To account for heterogeneity in the SCUBA diving industry, three types of dive tour operators were selected: (1) dive tour operators who also operate dive boats, (2) dive tour operators who also run a dive school, and (3) dive tour operators who also own a resort (i.e. accommodation). We applied 'the key informant technique' (see e.g. Marshall, 1996) to select a representative from each stakeholder group. Representatives were selected based on their level of influence and seniority. The opinions of these people have significant influence on the economic, social, environmental and political activities on the island.

According to the literature on sampling and recruiting in-depth interview participants (see MacDougall and Fudge (2001) for a synthesis of methods used by qualitative studies), one of the best recruitment methods is to "recruit through existing organizations

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