



Analysis

Incorporating local visitor valuation information into the design of new recreation sites in tropical forests



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ABSTRACT

In rapidly industrializing countries, decisions need to be made as to what characteristics new tropical forest parks in or near urban areas should have. Using a discrete choice experiment, we estimate prospective visitors' willingness-to-pay for a range of forest park characteristics for a representative sample of Malaysian households in the Kuala Lumpur–Selangor region. To enable park managers to adapt park designs to important types of heterogeneity among park visitors, we further identify how these estimates vary across geography (i.e., residential location: urban, suburban, rural), major ethnic groups, and patterns of recreational behavior. We show how a model that includes a wide array of visitor heterogeneity can be used to identify configurations of park characteristics that maximize social welfare across both the general sample and specific subgroups of prospective visitors.

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1. Introduction

With evidence that nature-based tourism is on the rise globally, concern that public support for conservation will wane as a result of people becoming detached from their natural environment can perhaps be tempered (Balmford et al., 2009). How to manage nature-based destinations in light of this trend continues to be an issue, however (Onofri and Nunes, 2013; Lindberg and Veisten, 2012; Juutinen et al., 2011; Jacobsen and Thorsen, 2010). The challenge is to find the appropriate mix of natural and built attributes of nature-based recreation sites, consistent with society's preferences across those attributes and recognizing that there may be significant heterogeneity in preferences across cultural, ethnic, and socioeconomic lines.

In the case of recreation sites in tropical forests, failure to identify the right mix of attributes can have serious consequences for the achievement of conservation, tourism, and economic development goals. For instance, efforts to entice forest owners and managers, who are often state or national governments in tropical countries, to set aside land for conservation frequently highlight tourism

revenues as a replacement for logging revenues.¹ Failure to generate the expected revenues could result in forest parks losing their protected status. Similarly, excessive or poorly-planned tourism could threaten biodiversity within and around forested parks and, consequently, the sustainability of the parks for both conservation and tourism (Juutinen et al., 2011; Lindberg and Veisten, 2012).

The sustainability and success of forest parks depend on a number of related decisions by park managers that affect visitors' on-site experiences and welfare. First, park managers determine visitors' access to higher-valued natural attributes such as water bodies, waterfalls, scenic overlooks, and popular animal or plant populations. The potentially accessible set of natural site-specific attributes available to visitors is influenced not only by park siting decisions but also by the provision of on-site transportation infrastructure (e.g., trail and roadway designs) that gives visitors access to such natural features. Second, through decisions about the appropriate level of investment in on-site services and infrastructure, park managers determine levels of park attributes such as toilets, parking, lighting, picnic tables, and signage. Third, when formulating staffing plans, park managers determine the level of labor-dependent site attributes

¹ Indeed, as suggested in Balmford et al. (2009), nature-based tourism can generate "substantial resources for both conservation and local economic development" (Balmford et al., 2009; p. 1). In Malaysia, the creation of Royal Belum State Park offers an example of ecotourism being advocated as an activity that could offset the loss of government revenue resulting from restrictions on logging (Schwabe et al., 2015).

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such as litter levels, personal security, and the availability of interpretative services. Finally, by understanding how congestion levels impact visitors' on-site experience and welfare, park managers may better regulate congestion through parking and entrance fee policies.²

Discrete choice experiments (DCEs) have been suggested as a tool to assist forest managers in making these decisions by providing better information on society's preferences for natural versus built attributes of forest parks (Lindberg and Veisten, 2012; Juutinen et al., 2011; Abildtrup et al., 2013; Jacobsen and Thorsen, 2010; Christie et al., 2007). This information is required if park managers are interested in maximizing the social value of tropical forests as recreational destinations in and near urban areas. It enables government agencies to invest in park infrastructure and manage park services in ways that attract prospective visitors and balance the cost of providing park attributes with the benefits visitors receive from those attributes.³ And while management decisions can be complicated by the fact that prospective visitors come from diverse groups who may use and value parks in different ways, DCEs can be constructed so as to identify the preference heterogeneity across such diverse groups along with any differences in their values for site attributes such as natural amenities, on-site services, and infrastructure.

The current study uses survey-based data from Malaysia to illustrate how DCEs can be used to evaluate the design and value of a new tropical forest park intended to serve domestic, not foreign, users. It highlights how preferences for a new park differ across (i) the natural versus built attributes of the park and (ii) groups of prospective visitors. To our knowledge, this is the first such analysis in a developing country.⁴ We also provide an extensive analysis of how the conclusions one may draw from the results of a DCE can be influenced by modeling strategy.

We estimate prospective visitors' marginal willingness-to-pay (WTP) for a comprehensive set of natural and built characteristics of a hypothetical new forest park in Peninsular Malaysia: 1) drinking water and toilets, 2) walking trails, 3) picnic tables and grills, 4) level of crowdedness, 5) litter, 6) likelihood of seeing birds and other wildlife, 6) access to a stream and small waterfall, and 7) the entrance fee. We obtained data for these analyses by conducting a DCE using a stratified random in-person survey of nearly 1300 households in more than 200 locations within the federal Capital Territory of Kuala Lumpur (KL) and the neighboring state of Selangor in 2010. This survey differed from prior environmental valuation surveys in developing countries by including rural, suburban, and urban households, with representation of all major ethnic groups (Bumiputera, Chinese and Indian),⁵ which required four different language versions of the survey instrument (Malay, Chinese, Tamil, and English). The survey presented households with choice sets containing alternative park-attribute scenarios, plus the option to choose neither alternative.

Malaysia is an instructive case study because it is representative of the many forest-rich, middle-income countries with rapidly urbanizing populations comprised of diverse ethnic groups.⁶ We explore how these estimates of WTP for site attributes vary with the

residential location, ethnicity, and past recreational behaviors of prospective visitors. Our model encompasses many additional visitor characteristics (e.g., income, gender, age, and household size) which we use to identify the configuration of park attributes that maximizes the public's WTP for access to the park. We show how this model can identify the optimal configuration of park attributes for diverse groupings of visitors as well as for a nationally representative sample.

2. Relationship to Existing Literature

There are several distinct literatures that are relevant to our study and to which our study contributes. Our analysis is distinctive in that it evaluates WTP for alternative aspects of managed and natural site quality for a new park that will be visited by culturally distinct segments of the population. Most previous stated-preference studies on the recreational value of tropical forests have employed contingent valuation to value access to an existing site or to value creation of a new site with a fixed set of characteristics in a specific location (Loomis and Walsh, 1997; Chase et al., 1998; Mladenov et al., 2007; Samdin, 2008).⁷ DCEs have been applied to the valuation of goods and services from tropical forests (Rolfe et al., 2000; Othman and Bennett, 2004; Barkmann et al., 2008; Gelo and Koch, 2012; Vincent et al., 2014), but they have generally not focused on recreation.⁸ Two exceptions are DeShazo and Fermo (2002) and Naidoo and Adamowicz (2005), which both estimated the recreational value of site attributes in a tropical forest park. However, they focused on producing estimates that would support park design and management decisions at existing parks, not new ones, and they did not investigate how preferences varied with local domestic visitor characteristics.

We also characterize differences across visitors' valuation of park attributes in a distinctive way for this literature. Prior studies have explored variation in preferences for different park configurations by asking respondents for an assessment of the importance of specific attributes on a numeric rating scale (Li et al., 2010).⁹ In contrast, we use two approaches to investigate the role of heterogeneity in modeling consumer choice behavior: the popular mixed (random parameters) logit model that allows for (and estimates) a distribution of preferences over the attributes of a new park configuration (Train, 2009), and a conditional logit model, which is fully parameterized with a set of interactions between the park attributes and respondent characteristics.¹⁰ Except for income and past trip behavior, there has been relatively little economics research exploring the influence of respondent characteristics, particularly

² Visitors may be negatively or positively impacted by congestion depending on their preferences for social engagement or solitude.

³ Balmford et al. (2009; p. 4) similarly emphasize that nature-based tourism is only likely to be sustainable with local participation and effective planning and management.

⁴ Jacobsen and Thorsen (2010) was evidently the first study to use DCEs to evaluate the design and site designation of a new national park, albeit in a developed country.

⁵ In our analyses, we follow the Malaysian Department of Statistics' division of households into three ethnic categories: Bumiputera, Chinese, and Indian, where Bumiputera includes Malays, Orang Asli, and other groups classified as indigenous by the federal government.

⁶ Middle-income countries with significant tropical forests include Angola, Botswana, Brazil, Colombia, Costa Rica, Cuba, Ecuador, Gabon, Mexico, Namibia, Panama, Peru, Suriname, Thailand, and Venezuela.

⁷ Four studies that have used DCEs for forest park design in developed countries include Lindberg and Veisten (2012); Juutinen et al. (2011); Abildtrup et al. (2013), and Jacobsen and Thorsen (2010). Lindberg and Veisten (2012) evaluated how the preferences of local and non-local residents in Norway for the development of a gondola (along with other built-system attributes) adjacent to a national forest were influenced by perceived impacts on wild reindeer habitat (the natural system). Juutinen et al. (2011) focus on understanding tourist preference heterogeneity for attributes that influence biodiversity and recreational services of a national park in Finland. Abildtrup et al. (2013) focus on estimating the recreational user preferences for both built and natural system attributes within forests in Northeastern France, as well as identifying the determinants of preference heterogeneity. Jacobsen and Thorsen (2010) use a mail questionnaire within Denmark and find that preferences for different forest sites within Denmark and their attributes are largely influenced by cultural and regional views suggesting caution surrounding inclinations to transfer the results from one study site to another policy site.

⁸ Gelo and Koch (2012), for instance, use a DCE to value different elements of a community forest program. Their study focuses on the productive elements of the tropical forest for agricultural and nontimber forest collection rather than on a forest park for recreation.

⁹ The drawback of this rating approach is that different groups may use rating scales in different ways; also, rating scales do not force respondents to make actual choices between alternatives (Lee et al., 2007).

¹⁰ Mogas et al. (2006) compare estimates of the total value of afforestation programs in Spain using a single binary discrete choice question versus a more complex DCE using a sequence of multinomial choice questions, which allows explicit attributes to be valued. They found no statistically significant difference between the two approaches after interaction terms between the attributes were included in their model.

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