



# Tourism consumption of biodiversity: A global exploration of forest product use in thatched tropical resort architecture



José Antonio Sierra-Huelsz<sup>a,b,\*</sup>, Karen A. Kainer<sup>a</sup>

<sup>a</sup> School of Forest Resources and Conservation, Center for Latin American Studies, University of Florida, Gainesville, FL 32611, USA

<sup>b</sup> Centro de Investigación en Biodiversidad y Conservación, Universidad Autónoma del Estado de Morelos, Cuernavaca, Morelos 62209, Mexico

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## ABSTRACT

The influence of tourism on biodiversity consumption is massive, yet poorly understood. We investigate the emergence of the thatched hut as an icon of tropical tourism, exploring linkages between widespread conceptions of paradise, tourism architecture and tropical forest management. Drawing on fieldwork in Mexico, cross-disciplinary literature review and web-based research, we globally examined how ideas of paradise along with commodification of plant resources influence touristic use of plant-based construction materials. In contrast with declining subsistence use of forest-based building materials, thatched huts have become a prevalent element of tropical tourism architecture. We documented the use of 148 plant taxa in 31 tropical and subtropical countries on 4 continents. The emergence of thatched architecture in tourist contexts represents not only a scale-up in the demand of plant-based materials, but often resulted in changes in the species utilized, resource management regimes and governance, architectural uses, and often a partial or total substitution for synthetic look-alike materials. We identified four factors distinctive to the growing commercial versus declining subsistence presence of thatched hut architecture: (1) local regulations in forest product uses and building and urban development codes, (2) prevalence of aesthetic values over material authenticity and structural efficacy, (3) greater dependency on unpredictable economic and tourist destination cycles, and (4) greater maintenance needs in environments highly vulnerable to decay and extreme weather. Our pluralistic approach of examining the iconic thatched hut through diverse disciplinary perspectives facilitated identification of multiple facets of commonly overlooked forest product use and biodiversity consumption in tropical tourism.

## 1. Introduction

As one of the world's largest economic sectors with approximately 10% of the global GDP (World Travel and Tourism Council, 2015), tourism is a massive, diffuse and controversial economic driver, that exerts major impacts on the natural environment (Buckley, 2011). Scholarly research highlights the power of tourism to drive ecosystem degradation on one hand, and to foster conservation stewardship on the other. Land use change to support tourism infrastructure, greenhouse gas emissions from air travel, and the introduction of invasive exotic species are oft-cited examples of negative environmental impacts of tourism (Buckley, 2011; Hall, 2010). Conversely tourism, particularly ecotourism, is showcased as a key ally for biodiversity conservation. Though not without dispute (e.g. Stronza, 2007), ecotourism has been documented to support protected areas, foster environmental education, and generate income locally (de Vasconcellos Pegas et al., 2015; Hall, 2010, 2011). Indeed, local consumption of biodiversity is often considered as a problem, which could be alleviated if local livelihoods

integrate tourism income and be less dependent on proximate natural resources (Langholz, 1999, Wunder, 2000, Wyman and Stein, 2010). While this tourism-biodiversity link has been relatively well examined, the role of tourism as a direct driver of biodiversity consumption has received only partial attention (Buckley, 2012; de Vasconcellos Pegas et al., 2015; Hall, 2010, 2011). In fact tourism, especially ecotourism, is often uncritically assumed to make non-consumptive use of nature (but see Higham et al., 2016).

We use the thatched hut, an iconic element of tropical leisure and tourism architecture, to examine tourist-driven consumption of biodiversity. We employed multiple disciplinary and applied lenses to focus our attention on plant-based materials used for touristic resort construction, heeding Vellinga's (2015) call to study the sustainability of vernacular architecture in "a holistic, integrated and critical approach". Four research questions guided our exploration: (1) What has led to the commercial consumption of forest products in thatched tropical architecture? (2) How are forest-based building materials used in tropical and subtropical tourism and leisure construction across the globe? (3)

\* Corresponding author at: Centro de Investigación en Biodiversidad y Conservación, Universidad Autónoma del Estado de Morelos, Cuernavaca, Morelos 62209, Mexico.  
E-mail addresses: [jashpat@gmail.com](mailto:jashpat@gmail.com) (J.A. Sierra-Huelsz), [kkainer@ufl.edu](mailto:kkainer@ufl.edu) (K.A. Kainer).

What emerging trends of forest product consumption can be associated with tourism-driven commodification? and (4) What factors differentiate this growing commercial consumption from traditional subsistence use? Below, we first briefly review how tourism impacts extend from consuming extraordinary places to wild-harvested products, ultimately landing squarely on the role of the iconic thatched hut in tropical resort architecture. We then discuss how we went about data collection and analysis, followed by our findings that reveal how and why thatched resorts emerged to represent tourist paradise. This is followed by details of commercial use, trends and drivers of forest-based construction materials. We then suggest points more broadly applicable to the expanding context in which biodiversity is consumed, and close with final conclusions on the larger relationship between tourism and biodiversity.

### 1.1. Tourism and the consumption of extraordinary places and experiences

Tourism is generally characterized by its distinctive consumptive patterns of places, experiences, and non-essential goods (Ning and Dann, 2002). In his highly influential work, Urry (1990) placed aesthetics at the center of the tourism experience. The appeal of tourism is considered to be grounded in the pleasure of experiencing “places that are out of the ordinary in some way or other” (Larsen and Urry, 2011, p. 1110). These experiences include all senses, but foremost are centered in the visual consumption of a place (Larsen and Urry, 2011). How a place is visually consumed is largely constructed through photographs, videos, and advertisements that produce and reproduce images that are learned and recognized. Exposure to these images creates expectations for how a tourism destination can and should look, oft-cited as the “tourism gaze” (Urry, 1990). These expectations influence how places are made and remade (e.g. Pocock, 2005), and what and how souvenirs are crafted (e.g. Graburn, 1984). “There is no single tourist gaze as such. It varies by society, by social group, and by historical period” (Urry and Larsen, 2011, p. 2). Western ideas of a nature-culture divide (Cronon, 1996; Fletcher, 2014), particularly rooted in postindustrial upper-middle classes, have deeply permeated a particular tourism gaze, such that one seeks to escape to an idealized wild primitive nature, where life is purer and simpler (Fletcher, 2014). These ideas have been transferred from Europe to North America and likely elsewhere, and are materialized in second homes and national park architecture and landscaping (Carr, 1999; Essig, 2008; Lait, 2018). In Australia’s subtropical Golden Coast, iconic elements from Florida, Pacific Islands and Indonesia have been borrowed, influencing architectures and landscapes (O’Rourke and Memmott, 2014; Pocock, 2005). Here, as in many tropical beaches, the coconut palm, an arguably exotic species, has been naturalized and become an essential element of the local beach experience, changing local aesthetics and ecosystems (O’Rourke and Memmott, 2014; Pocock, 2005).

### 1.2. Tourism and consumption of wild-harvested products

The specific effects of tourism consumption of natural resources are highly contingent upon where and how these wild-harvested products are sourced. When products are locally-sourced, a higher proportion of the economic benefits are locally-retained, as are the environmental costs of production. Keeping benefits and costs close to home makes the specific impacts of tourism-driven consumption on resources and their management more readily apparent. Hunting and fishing-based tourism are the most direct and oft-cited examples of wild product consumption whereby the main motivation to travel is literally to consume (typically kill) wildlife in a natural environment (Buckley, 2011). In trophy hunting and sport fishing, animals with extraordinary or unique physical attributes are targeted by hunters/tourists (Mysterud, 2011), with different demographic effects on animal populations than when exploiting nature for subsistence use and traditional local markets (Mysterud, 2011). Scattered evidence suggests that when resources are

specifically harvested for tourist consumption, distinctive resource management patterns emerge. In northwest Mexico, for example, tourist-oriented restaurants specifically demand plate-sized Pacific red-snapper (*Lutjanus peru*). This provides price incentives to catch fish of that particular size, which in turn had observable effects on local fish populations of *L. peru* (Reddy et al., 2013). Even the widespread and seemingly innocuous removal of sea shells as souvenirs can affect local shellfish populations and ecosystem processes (Kowalewski et al., 2014).

Tourism driven consumption of forest resources remains little explored (Agrawal et al., 2013; Hall, 2011), but growing evidence suggests regional importance of tourism-forest linkages (Potter et al., 2000; Pröpper, 2015; Sierra-Huelsz et al., 2017). Forest-based handicrafts are arguably the most studied, with tourism, particularly in the global South, fueling a large handicraft demand. While such touristic consumption can support local forest-based livelihoods, it can also represent commodification of traditionally made artwork or utensils only used previously for subsistence (e.g. López Binnquist et al., 2012). It can stimulate creative innovations that modify the form and intensity of resource use (e.g. Virapongse et al., 2014), and can substantially impact the natural resources harvested for these uses (e.g. Belcher et al., 2013). Akin to the more established hunting- and fishing-based tourism, foraging wild plants and fungi is an incipient mode of tourism that is gaining traction by those who seek more meaningful connections with place and culinary heritage (de Jong and Varley, 2017; Hall, 2013).

Architecture is often a key element of the tourism experience (Chang, 2010). Tourism architecture, often inspired by local architecture traditions, can cause intensive use of locally sourced forest materials (Morrison et al., 2012; Racelis, 2009). Resort construction modeled after thatched huts, the essential feature of the natural paradise image crafted by marketing (Haldeman Davis, 2004, 2007), can be a significant driver of regional forest product markets (Pröpper, 2015; Sierra-Huelsz et al., 2017). The massive scale in which thatched huts are built in tourism-dependent regions has increased the demand not only for thatching materials, but also for forest-based structural elements (Sierra-Huelsz et al., 2017). Indeed, demand for these rustic building materials has been at least partially responsible for local depletion of forest products (Calvo-Irabién and Soberanis, 2008), and in some regions, has fueled new regulations (Racelis, 2009) and changed livelihoods and landscape management strategies (Potter et al., 2000; Sierra-Huelsz et al., 2017).

### 1.3. The iconic thatched hut

The presence of thatched huts in tropical destinations is undeniably a common global phenomenon. Travel magazines, brochures and commercial web pages boast images of thatched huts in tropical beach resorts, eco-lodges in wildlands, and ethnic villages (e.g. Pröpper, 2015). Few scholarly articles, however, explore the linkages between tourism and the forest products used to build these “images” (Agrawal et al., 2013). Forest management literature is centered on assessing extraction effects using ecological or production indicators (e.g. Olmsted and Alvarez-Buylla, 1995). Literature from architecture, tourism studies and the social sciences tends to vaguely mention the use of “thatching”, “local materials”, and “local architecture”, but seldom provides sufficient detail to identify linkages between plant species, specific forest products and the tourism and leisure sector (but see Rios-Calleja, 2017). Only a limited number of interdisciplinary studies provide more detail of the regional linkages between specific forest-based construction materials and tourism-driven demand (Potter et al., 2000; Pröpper, 2015; Racelis, 2009; Sierra-Huelsz et al., 2017). Commercial web pages sometimes provide sufficient information to link specific native and non-native plant species to tourism construction (Supplementary material II); others suggest synthetic substitutes. This iconic thatched hut, when examined through multiple lenses, can serve to gain insights into tourism consumption of biodiversity.

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