



# Informing management strategies for a reserve: Results from a discrete choice experiment survey



Bui Bich Xuan <sup>a, b, \*</sup>, Erlend Dancke Sandorf <sup>c</sup>, Margrethe Aanesen <sup>a</sup>

<sup>a</sup> Norwegian College of Fishery Science, University of Tromsø The Arctic University of Norway, 9037, Tromsø, Norway

<sup>b</sup> The Faculty of Economics, Nha Trang University, 02 Nguyen Dinh Chieu, Nha Trang, Viet Nam

<sup>c</sup> Centre for Environmental and Resource Economics, Swedish University of Agricultural Sciences, 90183, Umeå, Sweden

## ARTICLE INFO

### Article history:

Received 6 January 2017

Received in revised form

20 April 2017

Accepted 11 May 2017

### Keywords:

Marine protected areas

Discrete choice experiment

Non-market valuation

## ABSTRACT

It is well-known that operating within the boundaries of a national park provides commercial actors with the opportunity to charge a price premium, though this has to a lesser degree been demonstrated for marine protected areas. We estimate national tourists' willingness-to-pay a price premium for boat trips in the Nha Trang Bay Marine Protected Area, Vietnam, using a discrete choice experiment. Our results show that tourists are willing to pay an average price premium of 18 USD per trip for a large improvement in environmental quality, and that avoiding the loss of jobs for local fishermen is of minor importance. Furthermore, the economic benefits generated from management scenarios that combine biodiversity restoration and environmental quality improvement within the reserve sufficient to cover additional costs of such improvements.

© 2017 Elsevier Ltd. All rights reserved.

## 1. Introduction

Marine protected areas (MPAs) may be established to protect biodiversity, sustainably manage fisheries, and develop non-extractive uses of the area, e.g. in the form of “eco-tourism” (Alban et al., 2008). The first two objectives are broadly studied in the literature, and MPAs have been shown to be an appropriate management tool for biodiversity conservation (Halpern, 2003; Halpern et al., 2009) and sustainable fisheries (Sanchirico et al., 2006; Schnier 2005a, 2005b), the latter is, however, still debated. Development of non-extractive activities is often regarded as less important and has therefore received less attention (Alban et al., 2008).

Although the number of MPAs worldwide have increased substantially, from 0.9% to 8.4% of areas under national jurisdiction in the period 1990–2014 (Juffe-Bignoli et al., 2014), data suggests that only 20–30% of MPAs are effectively managed, with the remaining being regarded as “paper parks” (Depondt and Green, 2006). The most important obstacle to the success of MPAs is the lack of funding for management (Depondt and Green, 2006). Running an MPA is costly and funding often comes from limited public budgets.

Maintaining biological diversity and environmental quality, not to mention making improvements, is challenging. Consequently, how to get a sustainable financial source to cover maintenance of an MPA is a highly relevant question, and especially in developing countries.

It is well known that the use of terrestrial protected areas (national parks) for non-extractive commercial activities, such as eco-tourism, yields a price-premium due to the status of the area as especially serene (Jacobsen and Thorsen, 2010). Some studies underline the attractiveness of MPAs for tourists such as coral reefs, biodiversity, sea mammals, and water quality (Bosetti and Pearce, 2003; Can and Alp, 2012; Madani et al., 2013; Schuhmann et al., 2013; Parsons and Thur, 2008; Wallmo and Edwards, 2008). Authors show that tourists are willing to pay more than the current fees for improved biodiversity and environmental quality within MPAs, and it has been demonstrated that “eco-tourism” can serve as a source of funding for the management of MPAs (Depondt and Green, 2006; Madani et al., 2013).

While the development of MPA-based tourism may increase revenues in the local economy, it may at the same time lead to potential conflicts of interest between tourists and local fishers (Bosetti and Pearce, 2003; Milazzo et al., 2002; Ngoc and Flaaten, 2010; Lee and Iwasa, 2011). In the short-term, fishermen may oppose expanding the MPA for tourism development for fear of losing their jobs due to unavailable fishing grounds, reduced harvest due to smaller fishing grounds, and increased harvesting costs due to having to go further for available fishing grounds. On the

\* Corresponding author. The Faculty of Economics, Nha Trang University, 02 Nguyen Dinh Chieu, Nha Trang, Viet Nam.

E-mail address: [xuanbb@ntu.edu.vn](mailto:xuanbb@ntu.edu.vn) (B.B. Xuan).

other hand, in the long-term, local fishers may benefit from MPA creation or expansion due to positive spillover effects from the MPA to nearby fishing areas, as suggested in the literature (Sanchirico et al., 2005; Sanchirico and Wilen, 2001).

In this paper, we use the Nha Trang Bay marine protected area (NTB MPA) in Vietnam as the empirical background. The objective of the NTB MPA is “to enable local island communities to improve their livelihoods and, in partnership with other stakeholders, effectively protect and sustainably manage the marine biodiversity at NTB as a model for collaborative MPA management in Vietnam” (Dung, 2009). However, after one decade of protection, the recovery of biodiversity within the NTB MPA was very low, including both improvements and deteriorations (Tuan, 2011).

Insufficient funds for monitoring and enforcement of the protection regulations are presumed to be contributing factors (Van, 2013). Currently, the annual management cost of the NTB MPA is 150,000 USD. User fees levied on tourists visiting Mun Island, that is located in the MPA, cover about 80 percent of the cost and the remaining 20 percent comes from government subsidies.<sup>1</sup> Tourists visiting the MPA purchase their boat tickets through tourism companies. Included in the ticket price is an MPA user fee for swimming or diving, which the tourism company transfers to the government for funding the MPA.

The aim of the paper is to elicit national tourists' willingness to pay (WTP) a price premium for boat trips within the MPA using a discrete choice experiment (DCE) survey of Vietnamese tourists visiting the NTB MPA. The motivation given for the price premium is improvements in the environmental quality and increased biodiversity within the MPA, which result from an expansion of the MPA. So far, the application of DCEs to MPAs have been concerned with estimating benefits of environmental goods such as biodiversity, coral cover, endangered species, environmental quality and habitat values (Boxall et al., 2012; Can and Alp, 2012; Madani et al., 2013; Stefanski and Shimshack, 2015; Schuhmann et al., 2013). To our knowledge, so far no valuation study has included social factors such as unemployment of local fishermen that are affected by environmental improvements in an MPA.

DCE studies of environmental issues on land have considered this factor and show that respondents reaction to local unemployment is somewhat ambiguous.<sup>2</sup> Some studies show a positive WTP to maintain rural employment (Biol and Cox, 2007; Morrison, 2002; Morrison et al., 1999; Othman et al., 2004), while others show that people do not care about employment effects of a policy change (Adamowicz et al., 1998). As the NTB MPA provides jobs for a significant number of local fishers who live on the islands within the MPA, a loss of their livelihoods may be a consequence of restoring the environmental quality of the MPA. It is therefore relevant to include both social and environmental variables in the survey.

Our results show that tourists are willing to pay, on average, a substantial price premium on the current ticket price for a large increase in environmental quality. Environmental quality is by far the most important factor to national tourists and is larger by an order of magnitude compared to, for example, coral cover. Furthermore, we find that people are almost indifferent towards employment effects and that WTP to avoid job-loss is very small. Looking at the welfare effects of simulated management scenarios we find that the benefits generated for improved biodiversity restoration and environmental quality are sufficient to cover the management costs.

The rest of the paper is organized as follows: section two

presents a description of the NTB MPA, section three presents survey design, sampling, and model specification. Section four presents the results of the study and discussion of those results, section five presents the management implications and the last section contains conclusions.

## 2. Study area

Nha Trang city is located on the coast in the central part of Vietnam. NTB covers approximately 507 km<sup>2</sup> and is a hub of marine biodiversity, marine aquaculture, commercial fishing, tourism, and shipping. The biodiversity in NTB is the highest in Vietnamese coastal waters (Tuan et al., 2002) and it is relatively high for the overall Pacific Ocean with 350 species of hard coral (accounting for over 40% of all reef-building coral species in the world), 220 species of demersal fish, 160 species of mollusks, 18 species of echinoderms, and 62 species of algae and seagrass. This marine area is considered a major nursery ground supplying fish larvae to other Vietnamese waters and possibly also to Cambodian waters (Dung, 2009).

An assessment in 2002 indicated that marine biodiversity in NTB had declined substantially (Tuan et al., 2002). Coral reefs and some commercial fish stocks were in poor condition, and many species had become locally extinct due to human activities such as overfishing, aquaculture, tourism and urban run-off (Dung, 2009). Recognizing the importance of biodiversity in NTB and the increasing pressures on marine resources, the government established the first MPA in Vietnam here in 2002 (initially named Hon Mun MPA and later changed to NTB MPA) with a total protected area of 160 km<sup>2</sup> consisting of nine islands and their surrounding waters (Fig. 1). The MPA is regulated into three zones with different levels of use and protection (Tuan et al., 2002). First are the core zones (red color) with an area of 16 km<sup>2</sup>, stretching from the water's edge out to 300 m, including four islands with the highest biodiversity, and allowing tourism only. Second are the buffer zones (yellow color) from the core zones' border out to 300 m and/or 300 m from the water's edge of the remaining islands. Traditional fishing gears, marine aquaculture and tourism are allowed in these areas, but no trawling. Third are the transition zones (light blue color), open to all activities but including limitations on bottom trawl with regard to mesh size and engine power.

Although the NTB MPA was established with the main purpose of biodiversity conservation, it failed to achieve this goal (Tuan, 2011). Two main reasons have been suggested are: i) unplanned and unregulated human activities within the MPA have increased the pressure on local resources, and ii) the regulated core zones are too narrow to ensure biodiversity restoration and prevent marine environmental pollution (Dung, 2009). Expanding the core zone and changing management policy may improve marine biodiversity, coral reef cover and coastal environmental quality. However, the financing for sustaining and running the NTB MPA is indicated to be one of the greatest challenges (Dung, 2009) and expanding the core zone of the MPA is expected to increase management costs.

Initial funding for establishing and running the NTB MPA was provided for four years by the Global Environment Fund through the World Bank, the Danish International Development Agency, the International Union for Conservation of Nature (IUCN), and the Government of Vietnam. At the end of 2005, external funding by donations came to a halt (Thu et al., 2005). Since then income from user fees levied on tourists when visiting the Mun islands, the core zone with the richest biodiversity, has provided the main funding for running the NTB MPA. One possible way to cover the additional management costs is to increase the boat trip ticket price for tourists taking the sea/islands tour within the MPA. The managers' challenge is to explore whether there is WTP increased fees among the visitors and determine the size of this potential increase.

<sup>1</sup> Source of numbers: Nha Trang Bay Marine Protected Area Authority.

<sup>2</sup> Local unemployment is also denoted non-use value of employment (Morrison et al., 1999).

Download English Version:

<https://daneshyari.com/en/article/5473902>

Download Persian Version:

<https://daneshyari.com/article/5473902>

[Daneshyari.com](https://daneshyari.com)