

**Title: Socio- Economic Benefits of Marine Turtles in the Sultanate of Oman**

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**Key Message:** The marine turtles in the Sultanate of Oman are part of its ecosystem wealth. In the past few years in addition to the country's efforts to conserve these species and their habitat, economic opportunities raised. This study represents the socio-economic values of marine turtles in Oman at Masirah Island and Ras Al Hadd.

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**1. What is the problem?**

On a global scale, the analysis of 18 turtle nesting sites from Africa, Asia, Latin America and the Caribbean revealed that the revenue generated from turtle tourism was three times higher than that from consumptive use such as killing turtles or collecting their eggs (Troeng & Drews, 2004). These benefits include tourism projects with economic inputs gained through selling souvenirs, employment opportunities, resorts construction and recreational activities (diving, fishing etc.) (Vogt, 1998). These potential benefits can be investigated for the case of Oman especially in Ras Al Hadd and Masirah Island related to marine turtle conservation. The non-consumptive use value of marine turtles was also documented in Oman in 1997: the 11558 visitors to Ras Al-Hadd generated estimated gross revenue in excess of 38,378 OMR (100,000 US\$) (Troeng & Drews, 2004). Moreover, from the prior investigation conducted for this study during the field visit to Ras Al Hadd and Masirah Island, the benefits of ecotourism and infrastructure were clearly visible especially at Ras Al Hadd and these include the paved roads, transportation, the accommodation and food facilities and the tourists shops. However, these benefits were not investigated from an empirical standpoint because of marine turtle conservation at both sites. Thus, this study aims to investigate these benefits and to provide an important tool for the national policy makers to promote the conservation of these species as part of the national plan of income diversification under the umbrella of Oman 9<sup>th</sup> five year national plan.

## 2. What ecosystem services are considered, and how?

Four species of marine turtles nest in Oman at Masirah Island, Ras Al Hadd, Bar Al Hikman, Ras Madrasah, Halanyiat Islands and the coasts of Dhofar. These species are listed as Endangered (EN), Critically Endangered (CR) or Vulnerable (VU) under the International Union of Conservation of Marine turtles (IUCN) red list: the loggerhead turtle (*Caretta caretta*) (VU), the Green Turtle (*Chelonia mydas*) (EN), the Hawksbill Turtle (*Eretmochelys imbricata*) (CR) and the Olive Ridley Turtle (*Lepidochelys olivacea*) (VU) (MECA, 2014). A fifth species, the Leatherback Turtle (*Dermochelys coriacea*) (VU) migrates through Omani waters where it feeds, but is not known to nest along the Omani coastline (Salm, 1981). The uniqueness of these species is also related to their nesting season at the different nesting sites in the country. Green turtle nesting in Ras Al Hadd take place almost all the year with a distinct peak between May and October (AlKindi et al., 2003). Hawksbills nesting in the Demaniyat Islands have a shorter nesting period, from May to July, whereas, olive ridleys on Masirah Island nest mostly between February and April-May (Omran, 2016). On Masirah Island, the much larger population of loggerheads nests from April to August (Ross & Barwani, 1982).

The marine turtles in Oman generate substantial economic value through socio-cultural activities spawning from recreation and tourism values. In Oman, the tourism sector is still in its infancy (OBG, 2016) and the development of this sector is closely linked to national development strategies outlined by the ‘Oman Vision 2020’(MNE, 2007). Tourism has been identified as one of the five sectors in its ninth Five-Year Plan (2015-2020) in need of progress towards economic diversification (SCP, 2017). The Oman Ministry of Tourism (MOT), established in 2004 with the mission to facilitate economic diversification, preservation of cultural integrity and protection of the environment, is responsible for tourism promotion, planning, development, administration and quality management (MOT, 2016b). This sector is expected to contribute to the GDP by 3% in 2020 (MNE, 2007) and by 6% in 2040 (NCSI, 2017).

Recognizing the country’s competitive strength in natural resources and the global demand for marine turtles-based tourism, Oman is promoting marine tourism activities such as dolphin and turtle watching, snorkeling and diving activities, through numerous operators distributed along its entire coastline (Feighery, 2012; MOT, 2016b; Ponnampalam, 2011).

### **3. Which approach was taken?**

This case study focuses on marine turtles socio-economic benefits at two sites Masirah Island and Ras Al Hadd. The following provides more information about these sites.

#### *I. Ras Al Hadd*

The site is famous as a green turtle nesting site. In addition to the creation of a marine turtle reserve in 1996, the Ras Al Jinz Scientific and Visitor's Center opened to public in 2008, and the Resort of Ras Al Jinz Turtle Reserve, which is attached to the center opened in 2010. The Visitor's Center provides educational, awareness information and nesting turtle watching tours. This site has recently been earmarked by the Ministry of Tourism to attract foreign investments in the tourism sector (MOI, 2016).

#### *II. Masirah Island*

The island is a proposed natural reserve and as a result, the new management practices are expected to mitigate the known threats for marine turtles at the nesting sites, such as incidental catch, coastal development impacts, urbanization and light pollution (MECA, 2014). The island is well-known for its globally important loggerhead (*Caretta caretta*) nesting population (MECA, 2014; MOT, 2016a; Tucker et al., 2018). The marine turtle concentration on Masirah Island along with the island's unique geographic characteristics are a major attraction for tourists. In response to this growing demand, several hotels were constructed, roads were built and the Oman Ferries Company inaugurated Masirah's ferries route in August 2014 to replace the old and undersized barge.

### **4. What input was required?**

Two questionnaire surveys were conducted at the two sites. The first questionnaire included three parts: Part1:Background information with demographic questions on nationality, gender, age, income, years of education, occupation, place of residence and membership of any conservation agency; Part 2: Site-specific information which included questions about the relative importance of the site to the respondent, threats to marine turtle (risk issues), and the respondent's willingness to pay a financial contribution for marine turtle conservation as a form of access fees and voluntary contribution; Part 3: Site preferences for sea turtle watching based on a series of potential scenarios for turtle watching. The sample size for this questionnaire was 164 from Masirah Island and 196 from Ras Al Hadd.

Questionnaire 2 included four parts: Part 1 (Background) included demographic questions about the respondents' nationality, gender, age, years of education, monthly income, occupation and membership to any conservation agency, society or group; Part 2 (What do you think?) included questions that identify the general knowledge of the respondents about marine turtles in Oman particularly at the study sites (threats, the conservation programs, the management practices and the respondent's willingness to make voluntary financial contributions for the conservation of marine turtles in Oman; Part 3 (Your perception) included questions on the socio-economic impacts of marine turtle conservation, the government and the local community role and rights and the perceptions of the respondents towards management practices such as the Protected Areas. And finally; Part 4 (Your feedback), was designed to get the respondents' perception on social, environmental, economic and cultural related aspects of marine turtle conservation. The sample size of this questionnaire was 115 from Masirah Island, 144 from Ras Al Hadd and 75 from the policy makers.

## 5. What did the results show?

***Marine turtles based tourism in Oman:*** From 2005 to 2015, Oman witnessed a positive trend in both inbound visitors arrivals and visitors' spending. Ras Al Hadd a targeted site for turtle tourism also witnessed this trend which highlight the economic potential of marine turtles tourism. Masirah Island on the other hand, is a promising site if it is well promoted for tourism. The data from the Oman National Ferries Companies (NFC) indicates that increase in number of travelers to the island is happening during the summer period, which could be used as a supporting tool for tourism on this island. Given that, the spectacular landscape with the fine weather and the availability of resources and infrastructure could be an instrument for marketing of the site along with the existence of the nesting turtles on the island's beaches.

***Determining Willingness To Pay (WTP):*** An empirical analysis was done using the Contingent Valuation Method (CVM) through questionnaire1 to estimate the mean willingness to pay access fees at tourist sites for turtle watching and one-time voluntary contribution for the protection of marine turtles in the country. The analysis showed that the mean willingness to pay for both of these cases was less for Masirah Island compared to Ras Al Hadd. This was consistent with the scope test results, which showed a significant difference between the sites in terms of respondents' preference structures.

The results also indicate that there are opportunities to raise the current access fees and support efforts to develop the conservation financing mechanism through voluntary contributions with the different payment options such as tax, as part of payment the utility bills, buying a quality souvenir or by other means such as cash donation at the airport or at any other tourism facilities.

***Preferred attribute at the turtle watching sites:*** The Conjoint Analysis (CA) showed that attributes such as: 'high number (5-10) of nesting turtles', 'low site congestion (<10)', 'guided tour', and 'managed site' were the highest preferred scenario (in terms of total utility score). The comparison of the marginal implicit price estimates of all attributes under the conjoint analysis revealed that the high number of nesting turtles was the most sought after attributes for Masirah Island and the guided tour for Ras Al Hadd. With regard to relative importance of attributes, number of nesting turtles ranked first followed by price for Masirah Island, while in case of Ras Al Hadd guided tour ranked first followed by the number of nesting turtles.

***The stakeholders perception:*** Most (>73%) respondents were aware of the importance of turtle conservation and of the threats to their survival, irrespective of their affiliation to a conservation organization. Most respondents agreed that law enforcement was currently insufficient to warrant efficient turtle conservation. There is some disagreement on the role of the government in the conservation process, particularly among the lower income group. In Ras Al Hadd, the perception of non-economic value positively influences the willingness to contribute voluntarily. If voluntary contribution from the local community is expected by the government as part of the community engagement, then the perception of non-economic value of marine turtles should be promoted in these planned activities. Based on the modelling results, in Masirah Island, the non-economic value of turtle conservation was poorly appreciated by all respondents irrespective of their categories. However, the economic values were well perceived at this site.

## **6. What was the policy uptake and what were the conditions for this effort to actually influence public management?**

***Marine turtle based tourism:*** To realize the economic potentials of marine turtles, the government should address various limitations such as employment of local workforce, law enforcement, transportation facilities, mismatch of turtle nesting and peak tourist season, enhance monitoring and the necessity of the local community's contribution in this process to give it more strength and efficiency. Moreover, turtle watching may promote empathy (pro-conservation attitudes) for the

conservation of marine turtles in Oman. However, the government should develop long-term plans to satisfy the growing demand in a sustainable management of the environment so that marine turtle tourism could be a distinct and promising possibility. The evidence of political commitment and government support is highly conducive to the formulation of such plans to exploit turtle resources sustainably and effectively.

***Willingness To Pay (WTP):*** Based on the empirical results, a differentiated pricing policy is more appropriate for the two sites. In addition differentiated access fees may also be considered in relation to national and foreign tourists. The estimated value provides justification to increase access fees to maintain the quality of the nesting beaches as a recreational site. It also provides guidance to policy makers who establish pricing policies.

***Preferred attribute at the turtle watching sites:*** In agreement with the WTP analysis and the highest total utility value, it is recommended that the management authority increase the admission cost to the existing facility while maintaining or even improving the attributes responsible for this preference to realize the economic potential identified by the CA.

Based on the attributes preference of the managed site, high number of nesting turtles, low site congestion and the existence of tourist guides at the site, improving site management (i.e. cleanliness, expertise of tour guides) and conservation efforts towards maintaining or increasing the number of nesting turtles are not only ecologically important, but also economically essential. Furthermore, offering a better management of the sites to take advantage of the turtle seasonality and differential pricing should be considered.

In terms of relative importance of the attributes, number of nesting turtles appears at both sites as important but price structure is important on Masirah whereas at Ras Al Hadd, it is the presence of guided tours. This reinforces our recommendations to improve guided tours at Ras Al Hadd through better education, training and equipment.

***The stakeholders' perception:*** The pro-conservation attitude and knowledge can be used by the government to create partnerships with the local communities to enhance conservation and facilitate sustainable touristic exploitation. It is essential to target the medium and lower income stakeholder in promoting partnerships and community engagement in future turtle conservation endeavors. The management authority of existing and future conservation areas should focus on a progressively more stringent enforcement of the laws and regulations. This can be achieved through quantitative employment of rangers, and a qualitative training and education. Most

respondents' awareness of the benefits and possible cost aspects of marine turtle-based tourism suggest the need for a proactive planning in sustainable tourism development. In the case of Ras Al Hadd where touristic infrastructures already exist, the excessive demands on economic and physical resources need to be taken into consideration in planning exercise to ensure environmental as well as economic sustainability.

In the case of Masirah, the perceived economic value of turtle conservation is higher among male respondents and those with a higher level of education and non-members of environmental organizations. It is thus, important to include women and members of the society with lower education levels into future awareness programs on the economic secondary benefits of marine turtle conservation. However, the cultural images, esthetic and intrinsic values were poorly developed at this site which would affect their non-economic perception of marine turtles.

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