ECONOMIC VALUATION OF NATURAL RESERVES IN THE SULTANATE OF OMAN- CASE OF MARINE TURTLES

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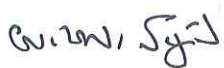   Signature: Date 18/9/2018

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To my companion in the path of life, Mohammed and to my angles Adhari, Hareb, Aljazi and MM4. Endless inspiration, thank you.

Dr. Mariam Al Busaidi

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I deferral this part to the very end of this journey because for me it is always difficult to put the words of gratitude on papers. I needed some time to go back to the beginnings and thus to draw this page. Therefore, I started from my determination to improve my knowledge, pursue my dream and explore another field of science so I'm thankful to my inner strength given to me by Almighty Allah. The chance came from an advertisement in a newspaper for the opening of registration for the postgraduate programs at the Sultan Qaboos University (SQU), thus I'm thankful for the administration of SQU and the Deanship of Postgraduate Studies (DPS). Then the official procedures started in my work entity, the Ministry of Environment and Climate Affairs (MECA) and for this, I'm greatly thankful to my long time mentor Mr. Ali Alkiyumi for his support since my first steps at MECA in 2008 and to my fellows in MECA.

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Economic Valuation of Natural Reserves in the Sultanate of Oman – Case of Marine Turtles

Mariam Mohammed Al Busaidi

Abstract

Although mostly arid, the Sultanate of Oman harbors a large diversity of ecosystems, which contribute to its geographical uniqueness, social make up and economic wealth. The importance of marine turtle conservation has long been recognized in Oman. Two of the global nesting sites at the Dimaniyat Islands and Ras Al Hadd were declared Nature Reserves in 1996, but Masirah Island remains at a project stage. Recognizing the country's competitive strength in natural resources and the global demand for nature-based tourism, Oman is promoting marine tourism activities such as dolphin and turtle watching, and recreational activities through numerous operators distributed along the whole coastline. Among the four species of marine turtle nest that in Oman the loggerhead (*Caretta caretta*) the green turtle (*Chelonia mydas*), the hawksbill (*Eretmochelys imbricata*) and the olive ridley (*Lepidochelys olivacea*), three nest in rookeries of global conservation values: the green turtle in Ras Al Hadd (Ras Al Jinz area), the loggerhead on Masirah Island and the hawksbill on the Dimaniyat islands.

Despite many studies on marine turtle biology and ecology there is a clear lack of economic indicators in Oman, which are critical for informed decision-making processes. While there is strong evidence of government commitment to develop nature-based tourism in the country, a number of key issues were highlighted through a SWOT analysis. Thus, the main objective of this research is to provide an empirical valuation of the economic opportunities that can be generated from the conservation programs of marine turtles in Oman at two sites: Masirah Island and Ras Al Hadd. The Contingent Valuation Method (CVM), the Conjoint Analysis (CA), and stakeholder perception analysis were adopted and the corresponding models were estimated from questionnaire responses of more than 600 interviews using logit regression techniques. Finally, the analytical results were used to develop a country study report under the Economics of Ecosystems and Biodiversity (TEEB) framework developed by the Convention on Biological Diversity (CBD).

Overall, the analytical results suggest that there is potential to improve the marine turtle conservation efforts and thereby increase the contribution of sustainable marine turtle tourism to Oman's gross domestic product. However, to realize this potential the sector needs to develop effective strategies to address the seasonal variation of tourists, accommodation capabilities especially at sites with ecological uniqueness, creation of employment opportunities for Omani nationals, effective targeted promotion, effective enforcement of the legislation protecting marine turtles and their habitats, community participation, partnership approaches and setting of differential pricing policies.

It is hoped that Oman's policymakers will use these findings to give a new impetus on marine turtle conservation and sustainable marine turtle tourism in Oman. Moreover it is also hoped that this pilot study on using TEEB approach for Oman and the region will emphasize Oman's commitment to the international agencies namely CBD.

التقييم الاقتصادي للمحميات الطبيعية – دراسة خاصة عن السلاحف البحرية

مريم محمد البوسعيدية

الملخص

تتميز سلطنة عمان بالتنوع في النظم البيئية والذي يضيف الى تميزها جغرافيا، وتكوينها اجتماعيا، وانتعاشها اقتصاديا على الرغم من جفاف أراضيها. ولقد أولت السلطنة اهتماما بالغا بالسلاحف البحرية. حيث تم الإعلان عن جزر الديمانيات وراس الحد والتي تعد من أهم مواطن التعشيش لهذه الأنواع كمحميات طبيعية في عام ١٩٩٦م، ولاتزال جزيرة مصيرة في مرحلة الدراسة للإعلان كمحمية. ونظرا لتمتع السلطنة بالتنوع في مصادرها الطبيعية وأهمية السياحة الطبيعية عالميا تقوم السلطنة بالترويج للأنشطة البحرية كمشاهدة السلاحف والدلافين وغيرها من الأنشطة البحرية وذلك من خلال عدة شركات تشغيلية على طول السواحل العمانية.

تعشش أربعة أنواع من السلاحف البحرية في شواطئ السلطنة وهي: سلاحف الريماني والسلاحف الخضراء وسلاحف الشرفاف وسلاحف ريدلي الزيتونة. حيث تعشش ثلاثة أنواع منها في الشواطئ الجبلية ذات الأهمية العالمية للصون في رأس الحد (منطقة رأس الجنز) وجزيرة مصيرة وجزر الديمانيات.

على الرغم من وجود العديد من الدراسات البيئية والاحيائية المتعلقة بالسلاحف البحرية الا انه لا زال هناك نقص في المؤشرات الاقتصادية لهذه الأنواع في السلطنة مما يؤثر على عمليات اتخاذ القرار. هناك دلائل قوية على التزام الحكومة بتطوير السياحة القائمة على الطبيعة، وقد تم تسليط الضوء على هذه الدلائل وأهم القضايا الرئيسية المرتبطة بهذا الموضوع من خلال تحليل SWOT ولذا تهدف في هذه الدراسة الئ توفير تقييم تحليلي للفرص الاقتصادية التي يتم خلقها من برامج حفظ وصون السلاحف البحرية في سلطنة عمان وذلك في جزيرة مصيرة وراس الحد باستخدام عدة طرق تحليلية وبيانات ناتجة من ٦٠٠ مقابلة ميدانية لأصحاب العلاقة.

كما استخدمت النتائج التحليلية من هذه الدراسة لصياغة تقرير وطني حول الإمكانيات الاقتصادية والاجتماعية الناتجة من برامج حفظ وصون السلاحف البحرية باستخدام أطار اقتصاديات النظم الايكولوجية والتنوع البيولوجي (TEEB) والذي تم استحداثه من قبل اتفاقية التنوع البيولوجي (CBD).

بشكل عام تشير النتائج التحليلية إلى أن هناك إمكانية لتحسين جهود حفظ وصون السلاحف البحرية وبالتالي زيادة إمكانية مساهمة سياحة السلاحف البحرية المستدامة في الناتج المحلي الإجمالي في سلطنة عمان. ولتحقيق هذه الإمكانية، يتطلب القطاع تطوير استراتيجيات فعالة للاستجابة للتنوع الموسمي للسياح، وتطوير واستحداث مرافق الإقامة خاصة في المواقع ذات التفرد الإيكولوجي، وخلق فرص العمل للمواطنين العُمانيين، والترويج المستهدف للمجموعات السياحية، وتحديد سياسات التسعير التفاضلية والتنفيذ الفعال للتشريعات والقوانين المحلية التي تحمي السلاحف البحرية ومواطنها بالإضافة الى تفعيل نهج الشراكة المجتمعية من مختلف الفئات ذات العلاقة.

ونأمل أن يستخدم صناع القرار السياسات في سلطنة عمان هذه النتائج لتطوير واعتماد منهجية محميات السلاحف والسياحة البحرية المستدامة في السلطنة. علاوة على ذلك، فمن المأمول أيضا أن تؤكد هذه الدراسة الرائدة حول استخدام اطار TEEB على التزام السلطنة بالاتفاقيات الدولية تحديدا اتفاقية التنوع البيولوجي.

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Chapter 1. Introduction

Conservation of ecosystems and biodiversity has been a practice of the communities and governments for a long time to protect the species and their habitats. However, this practice over the years became costly and a conflict between the livelihood of humans and conservation emerged affecting negatively the existence of the species and led to the extinction of others. Yet, this conflict was fundamental to many of the studies investigating its nature and why it exists (Chan et al., 2007; Kaimowitz & Sheil, 2007; McShane et al., 2011; Omondi, 1994). These studies revealed that loosing of habitats and the degradation of ecosystems have also a growing cost (Ring et al., 2010). Calls around the globe by governments and organizations have been made for economic evaluations to ensure the sustainability of resources and to maintain the livelihood of local communities as a way to reach a balance of this conflict.

Over the past two decades, socio-economic studies addressing the issues of economic evaluation of biodiversity by the local and indigenous communities, along with the cultural and social implications of human-species interactions have been conducted in Indonesia (van Beukering et al., 2003), Thailand (Seenprachawong, 2002), Madagascar, Malaysia, Sri Lanka, the United Republic of Tanzania, the United Kingdom (UK), the Caribbean region , the South Pacific (Laurans et al., 2013b) and the United States of America (Brander et al., 2007; Rosenberger et al., 2012a). Some of these studies have concentrated on the economic evaluation of ecosystem services based on the risks and returns (Abson & Termansen, 2010). Others focused on the goods and services resulting from a certain ecosystem. The study of Beaumont et al (2008) examined thirteen goods and services resulting from marine biodiversity in the United Kingdom as a way to emphasize the importance of an effective provision of theses goods and services and to highlight the impact of the decline in these goods and services on the society and the environmental health of UK. Other studies focused on the tourism implication and its impact to the conservation of species such as whales and marine turtles by demonstrating the impact of nature based tourism (Wilson & Tisdell, 2003).

In economic valuation, many studies use the Contingent Valuation Method (CVM) and Conjoint Analysis (CA). For example, to valuate goods and services of forests (Knetsch

& Davis, 1966; Riera et al., 2012; Rosenberger et al., 2012a), coral reefs (Brander et al., 2007; Laurans et al., 2013a) and fisheries ecosystems (Hoehn, 1987; Hundloe, 2002). Similar cases were shown in the Wider Caribbean Region (WCR) where these studies focused on the economic valuation of marine ecosystem especially reef (Schuhmann & Mahon, 2015). These techniques have also been used in the valuation of Protected Areas (PA's) with identifying the stakeholder's perception on the conservation process.

The importance of the participation of stakeholders is to ensure the sustainability of use of resource and to increase the efficiency of the conservation project through providing incentives to the local community. A study by Robertson & Caporossi (2003) was conducted to investigate the views of New England recreational fishers' at the United States toward marine protected area. That was done in order to examine their willingness to support the management activities and to explore the extent of differences in perception between supporters and opponents of PA is in that area. Stakeholder's perception analysis was also applied to investigate the communities' perception on the conservation activities and the benefits of resources and to identify the human- resources interaction. It was also used to promote the concept of living in harmony with nature, an approach that was highly emphasized by the international organizations such as the Convention on Biological Diversity (CBD). Though it has been made evident that the economic evaluation of the different ecosystem services helps society to make informed choices about the trade-offs (Loomis, 2000) and thus enhance the sustainability of these resources, studies using economic valuation are still not sufficient in the Gulf region to show the economic importance of such resources to these countries.

1.1. A brief on marine turtles in Oman

Biodiversity in Oman is unique in ecosystem diversity and species abundance. Groups of globally threatened species inhabit Oman's unique environment and include threatened mammals, birds, invertebrates, fishes, reptiles and unique flora.

Oman has numerous natural resources, which all contribute to its geographical uniqueness, social make up and economic wealth. In particular, the country harbors a large diversity of living species and ecosystems. More than 1200 documented plant species (3 globally threatened), 509 marine flora species, 766 marine invertebrate species, 988 fishes (globally 13 threatened), 89 reptiles (6.7% endemic), 518 bird species (12 globally threatened) and 93 mammal species (20 globally threatened) are documented in Oman (MECA, 2014).

Wild species in Oman are threatened in several economically important areas of the country such as Sohar, Muscat, Al Duqum, Masirah Island, Ras Al Hadd etc. due to the accelerated activities of urbanization, degradation of habitats, pollution and fisheries bycatch and poaching (MECA, 2014). All four species of marine turtles nesting in Oman are listed as Endangered (EN), Critically Endangered (CR) or Vulnerable (VU) under the International Union of Conservation of Nature (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). Marine turtles emerge mostly at night to lay their eggs on particular beaches and hatching occurs approximately 60 days later. Females lay clutches of 100 eggs on average (the number of eggs laid varies by species) in a nest chamber dug in the sand. Each female may lay several clutches of eggs during one reproductive season. Green turtle nesting in Ras Al Hadd takes place almost year round with a distinct peak between May and October (AlKindi et al., 2003). Hawksbills nesting on the Demaniyat Islands beaches 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 importance of marine turtle conservation has long been recognized in Oman. In 1987, IUCN proposed several sites in Oman that included the Demaniyat Islands, Ras Al Hadd and the South of Masirah Island (Figure 1.1) to be identified as natural reserves based on their biological and ecological value and their worldwide significance in marine turtle conservation (MRMEWR, 1995). In addition, Ras Al Hadd was also recommended for tourism development (MRMEWR, 1995). The government declared the Demaniyat Islands (23/96) and Ras Al Hadd (Royal Decree 25/96) as a Nature Reserves, but plans for Masirah Island are still under development (MECA, 2014). However, Bar Al Hickman opposite Masirah Island with similar biological and ecological importance was proclaimed as a Nature Reserve under the name of the Wetlands Nature Reserve in the Governorate of Al Wusta in 2014 (Royal Decree 51/2014). As soon as 1987, a marine turtle management plan was drafted under the Oman-American Joint Commission (Ross, 1987). Later on, as part of the national development plan, the Ministry of Commerce and Industry (MOCI) proposed Ras Al Hadd and Sur to be part of several wilderness destinations and Masirah Island to be proclaimed nature reserve (MNE, 2007). In 2013, a national committee was formed for marine turtles conservation and management in the Sultanate of Oman that included members from all the concerned governmental and non-governmental entities such as the Environment Society of Oman (ESO) (MECA, 2014).
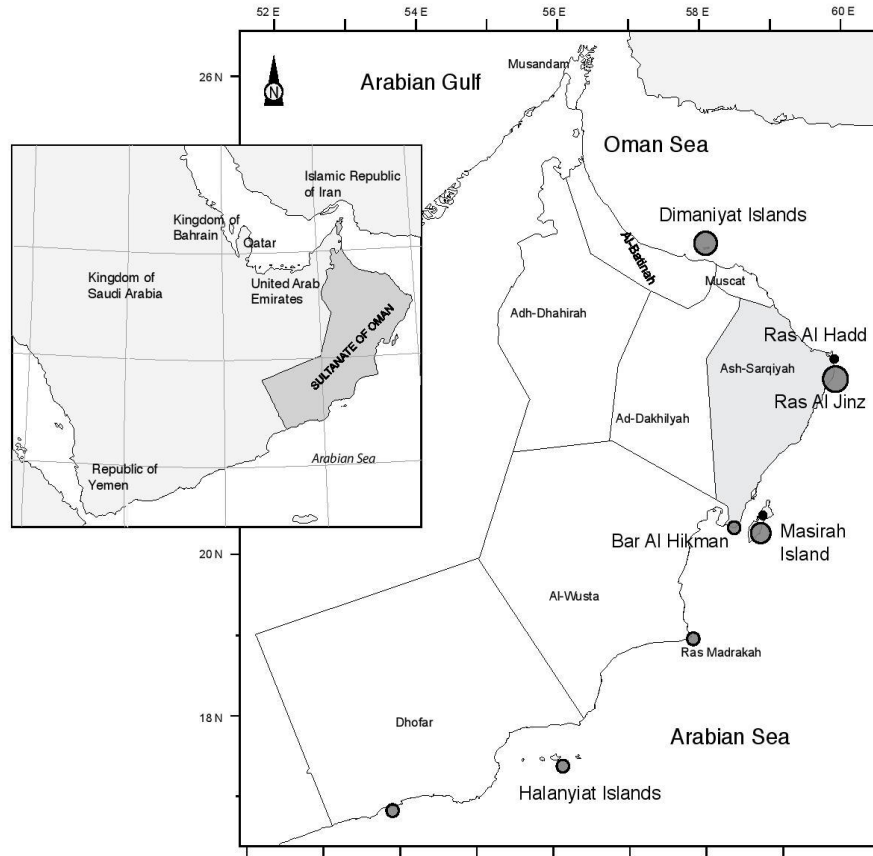
Figure 1.1: Main marine turtles nesting sites in Oman

The government of Oman continued to develop the marine turtle management plan adding various legislations to ensure the protection and sustainable conservation of marine turtles (Table 1.1).

Table 1.1: National Legislations relevant to turtle conservation in Oman	
Legislations	**Date of Declaration**
Royal Decree on Marine Pollution Control Law	1974
Royal Decree on Issuing Maritime Law	1981
Royal Decree on Territorial sea and continental shelf	1981
Ministerial Regulations for the Law of fishing and the protection of living aquatic resources	1989
Ministerial Decision on Executive regulation for law of marine fishing and conservation of living aquatic resources	1994
National Conservation Strategy for sustainable development	1996
Royal Decree on Establishing Turtle Reserve	1996
Royal Decree on Establishing Demaniyat Island Natural Reserve	1996
National Biodiversity Strategy and Action Plan (NBSAP)	2000
Royal Decree on the law of conservation of the environment and prevention of pollution	2001
Ministerial Decision on the prohibition of killing or hunting or wild animals and birds catch	2002
Royal Decree on nature reserve and wildlife conservation	2003
Ministerial Decision on the regulation of discharge liquid waste into the marine environment	2005
Source: (Al-Masroori, 2008 & MECA, 2018)	

However, the conservation of marine turtles requires efforts at the local, national, regional and international levels due to the endangered / critically endangered status as well as the migratory nature of these species. At the international level, Oman has ratified and joined several international conservation agreements. These agreements such as the Convention on Biological Diversity (CBD), the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), The International Union for Conservation of Nature (IUCN), and the Marine Turtle Memorandum of Understanding of the Indian Ocean and South-East Asian region (IOSEA) list marine turtles among the species of interest whether for international policies, research or applying approaches of conservation (Table 1.2). These international agencies were important to this research to access data, literature and experts in marine turtles on various related topics around the world.

Table 1.2: Oman's membership to the international and regional agreements, conventions and memorandum of understanding for the protection of wildlife species	
The Convention/ treaty/ organization	**Year of Ratification**
International Maritime Organization(IMO)	1974
International Convention for the Prevention of Pollution from Ships (MARPOL)	1974
International Union for Conservation of Nature (IUCN)	1975
Regional Organization for Protection of the Marine Environment (ROPME)	1979
International Whaling Commission(IWC)	1980
United Nations Convention on the Law of the Sea (UNCLOS)	1989
Convention on Biological Diversity(CBD)	1995
Indian Ocean Rim Association for Regional Cooperation (IORARC)	1997
Preservation of wildlife and its natural habitat in the Gulf Cooperation Council (GCC) agreement	2001
Memorandum of Understanding of the Indian Ocean and South-East Asian region (IOSEA)	2004
Convention on International Trading in Endangered Species of Fauna and Flora (CITES)	2008
The convention on wetlands (Ramsar)	2013
Source: (Al-Masroori, 2008; MECA, 2018 & the conventions websites)	

Yet, turtles in Oman as well as worldwide, are still facing threats from coastal development and increasing anthropogenic pressures especially in, more densely populated areas near the nesting beaches on Masirah Island and Ras Al Hadd. Some of these threats were witnessed during the field visits to both sites, which was conducted for the primary investigation and data collection for this research. The threats are light pollution, unsustainable tourism practices (littering, beach driving on the nesting beaches), hit accidents on the roads near the nesting beaches and the accidental catch of marine turtles in fisheries. The existing conflict between local community (namely fishermen) and the conservation projects in terms of resource and a space use is also influencing the survival of marine turtles and the potentials of any economic benefits at the study sites. These challenges are leading to the destruction of nesting and feeding habitats and the reduction in the number of nesting sites and species (MECA, 2014). This challenge can be addressed by involving local fishers in the conservation project so that the economic benefits derived from such project can be enjoyed by these stakeholders. However, the government, namely MECA, applied measures to mitigate the impacts of these threats

through awareness campaigns, rangers patrolling at the nesting sites and enforcement of legislations and protection measures.

Recently, marine turtles conservation projects took other measures to contribute in the country's vision of diversification of sources to the national economy while maintaining its goals of protection and sustainability. The tool used to reach this target was mainly through the tourism projects. To meet the long term objectives of the tourism sector, that is, to increase the contribution of this sector the national GDP and to increase the national employment as stipulated in Oman Vision 2020 (MNE, 2007), a number of projects related to marine turtles were initiated in cooperation with various local entities (Ministry of Agriculture and Fisheries (MAF), Ministry of Education (MOE), Sultan Qaboos University (SQU), regional entities (Gulf Cooperation Council countries (GCC)) and international agencies (IUCN, UNEP etc.). These projects followed the government management plans of coastal zones, the assessment of biological and ecological features and the development of regional cooperation in nature conservation with the objectives set by NBSAP in 1995 (MRMEWR, 1995). The objectives were to: 1) reduce the threats to marine turtles nesting in the different areas, 2) establish monitoring program, 3) conduct scientific research and develop local capacity building, and 4) develop tourism opportunity and generate employment. The sites of interest for these projects were Demaniyat Islands, Halanyiat Islands, Ras Al Hadd and Masirah Island.

This research will focus on the socio-economic aspects of nature conservation particularly on the economic evaluation of natural reserves in Oman for two key nesting sites, Masirah Island and Ras Al Hadd. The choice of these two sites was based on their attributes and importance.

Masirah Island is located in the South Sharqy'a governorate (Figure 1.1). The island is twelve to fourteen kilometer (12-14 km) wide, eighty kilometer (80 km) long and has an area of six hundred and forty nine square kilometer (649 km^2). The distance from Muscat (Oman's capital) is approximately four hundred and fifty kilometer (450 km) with an additional fifteen kilometer (15 km) of ferry crossing. This island is popular for recreational activities such as sightseeing, diving and water sports and recreational fishing and well known as a nesting site for loggerhead turtles. Other known species are dolphins,

whales, and birds. For its ecological importance, it is in the process to be proclaimed as a natural reserve. The community of the island is represented by mainly fishermen.

Ras Al Hadd is also in the South Sharqy'a governorate. It is two hundred and forty one kilometer (241 Km) from Muscat (Figure 1.1). The main nesting beaches at this site proclaimed as a turtle reserve in 1996. The reserve has an area of one hundred and twenty square kilometer (120 km$^{2)}$ and a coastline of forty-five kilometer (45 km). It is identified as globally important nesting site for the green turtles, hosting around 25,000 annually (Omran, 2016). The other species on the reserve includes birds, red fox, Arabian gazelles mangroves, coral reefs in Khawr Jaramah (a total of 130 of reefs corals) (MECA, 2014). It is located near two small villages where the locals work as fishermen, rangers and as tourist guides employed at Ras Al Jinz Scientific and Visitor Centre, the reserve and the resort. The main activities at this site are camping, sightseeing and turtle watching.

1.2. Research Objectives

The main objective of this research is to highlight the economic opportunities of marine turtles conservation in the Sultanate mainly through tourism at Ras Al Hadd and Masirah Island. Indirectly, it also aims to ensure the conservation and where necessary the recovery of marine turtles at both sites. Specifically, the research will:

1. Examine empirically the economic benefits of marine turtle conservation for two key sites (Masirah Island and Ras Al Hadd) using both Contingent Valuation Method (CVM) and Conjoint Analysis (CA) by collecting primary data through a questionnaire (Questionnaire 1).

The research will provide a statistical analysis (logit regression) using the data collected through questionnaire 1 at both sites of the study applying the CVM and CA to identify the economic potentials of marine turtles at the study sites.

2. Examine community perception on the protection of marine turtles using appropriate economic techniques by collecting primary data through a questionnaire (Questionnaire 2).

Following the same approach in objective 1, a second questionnaire is used to collect data from the local community that is needed to carry out the logit regressions model to identify the perception of the concerned community towards the conservation of marine turtles in Oman.

3. Link economic evaluation to the current initiatives of marine turtles conservation in the Sultanate of Oman using TEEB framework.

The Economics of Ecosystems and Biodiversity (TEEB) approach is a global initiative developed by the Convention on Biological Diversity (CBD). It is aimed to increase the coherence between the conservation programs and the countries or regional economic models. The approach is followed in this research using a summary of the key findings to develop Oman TEEB Country Study (TCS) on the socio- economic benefits of marine turtles in the Sultanate of Oman. Further details of this approach are given in Chapter 6.

1.3. Research Justification

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). The 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 with regards to marine turtle conservation. The non-consumptive use value of marine turtles was also documented in Oman in 1997, 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 research during the field visit to Ras Al Hadd and Masirah Island, the benefits of ecotourism and infrastructure were clearly visible and these include the paved roads, transportation, the accommodation and food facilities and tourist shops. However, these benefits have not been investigated from an empirical standpoint because of marine turtle conservation at both sites. Thus, this research 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 ninth five-year national plan (2016-2020).

Studies of the economic valuation of turtle conservation versus tourism in the gulf region are limited (IOSEA, 2015). Yet, while marine turtles may provide a source of economic benefits to Oman, the numbers of marine turtles are declining (MECA, 2014) and funds are spent without economic justification. Thus, the aim of research is to show these economic benefits and provide recommendations for sustainable economic outcomes of marine turtles while maintaining conservation standards.

This research will also provide useful information to many national entities from both public and private sectors and to Non-Governmental Organizations (NGOs). Those entities includes; the Ministry of Environment and Climate Affairs (MECA), the Ministry of Agriculture and Fisheries (MAF), the Ministry of Tourism (MOT) (Public sector), the National Ferries Company and Omran company (Private sector), and the Environment Society of Oman (ESO) (NGO). These entities have showed interest in this research and

contributed with logistic assistance, advising and collection of information. They all emphasized the importance of this research as it will complement ongoing conservation efforts by adding an economic component to the ecological and social conservation projects.

Moreover, the expected input of this research on the international level is to provide Oman TEEB Country Study (TCS). Thus, it will highlight upfront the conservation efforts of the Sultanate for the marine turtles and will contribute to Oman's commitment to the Convention on Biological Diversity (CBD), as a member of that convention by following its resolutions and applying its approaches in the national level. It will also set the basis for the country to report TEEB studies on other biodiversity components.

1.4. Thesis description

Chapter 1 is a scene-setting chapter and provides a brief introduction of the thesis topic. Chapter 2 provides an overview and critical analysis of marine turtle conservation issues and nature based tourism in Oman with a particular focus on marine turtles. Chapter 3 provides empirical estimates of stakeholders' willingness to pay using the Contingent Valuation Method (CVM). Chapter 4 describes the sites attributes and provides empirical analysis to justify their importance and ranking by the stakeholders preferences of these attributes using the Conjoint Analysis (CA). Chapter 5 provides the stakeholders perception of marine turtle conservation from the social and economic aspects. The final chapter, Chapter 6 provides Oman TEEB Country Study (TCS) following The Economics of Ecosystems and Biodiversity (TEEB) by summarizing the key findings of this research.

1.5. Thesis limitations

The research focused on two of the known nesting sites of marine turtles in Oman due to time and cost constrains under the PhD program. This study may also suffer a small sample bias. The scope of the study is limited as it considers one species and two study sites. Other species such as whales and dolphins are not considered.

1.6. Conclusion

Biodiversity conservation and the protection of species and habitats are costly task for the governments. This causes a conflict between its necessity and the livelihoods of the local communities. Studies to evaluate the economic importance of the components of the ecosystem became an important tool to reach solutions for this conflict by introducing the policy recommendations for ways of improvement and looking for economic opportunities.

Oman has a long history in the environment conservation of threatened species and their habitats. Marine turtle's conservation in many areas of the country was carried out since the seventies. For going forward with the aims of the conservation, this research is looking into the economic and social opportunities through using an empirical analysis of field collected data from Masirah Island and Ras Al Hadd under the logistic regression model using the Contingent valuation Method (CVM), the Conjoint Analysis (CA) and the stakeholders' perception. The research also summarizes the findings in a form of country study following The Economics of Ecosystems and Biodiversity (TEEB), an international framework designed by the Convention on Biological Diversity (CBD).

The next chapter will give information about the status of marine turtles in Oman, the inbound tourism related data to the marine turtle tourism and the opportunities and limitations of the marine turtles based tourism in the country.

Chapter 2. Overview and Critical analysis of Marine Turtle Conservation and Nature Based Tourism in Oman

2.1. Introduction

This chapter is design to connect with chapter 1 as away to move to the second phase of the importance of conservation of marine turtles to Oman. The information and analysis given will show how the conservation of marine turtles in Oman resulted in the socio and econmic benefits to the local commuinties in particular at the study sites of Ras Al Hadd and Masirah Island mainly through tourism.

The global tourism industry has witnessed an increase in international tourist arrivals and receipts from 674 million and 190 billion OMR (US$ 495 billion), respectively, in 2000 to 1186 million and 484 billion OMR (US$ 1260 billion), respectively, in 2015 (UNWTO, 2016). In 2015, about 53% of international arrivals travelled for holidays, recreation and other leisure activities, and about 54% arrived by air. Globally, the various tourism activities contributed 7% to the world's exports in goods and services in 2015 (UNWTO, 2016). Worldwide, the international tourist arrivals are expected to increase by 3.3% annually between 2010 and 2030 (UNWTO, 2016). In 2015, Oman experienced a 16% growth in international arrivals, which was mainly driven by intraregional demand from the Gulf Cooperation Council (GCC) countries (Bahrain, Kuwait, Oman, Saudi Arabia, Qatar, and the United Arab Emirates) (UNWTO, 2016). Tourism is promoted in the GCC countries as a common tool for decreasing economic dependency on oil and gas and for accelerating the strategic goal of economic diversification driven by the search for alternative sources of revenue; the tourism industry played a significant role in the economic diversification of the United Arab Emirates (UAE) (Karolak, 2014). Although, the GCC countries share similar socio-economic, cultural, and political conditions, the strategic approach chosen by the different governments to develop their tourism industry is affected by within-GCC competition. To avoid such competition, each country is attempting to develop niche markets based on its strategic resources through the promotion of cultural, natural, recreational, and entertainment attractions. For instance, the renowned Formula 1 Grand Prix races in Bahrain and Abu Dhabi, the Opera Houses in Oman and Qatar, religious tourism in Saudi Arabia, and shopping and city tourism (Burj Khalifa) in

Dubai (Al-Asoomi, 2011; Henderson, 2015; Karolak, 2014; Mansfeld & Winckler, 2007) and even cultural tourism (Le Louvre, Abu-Dhabi).

In Oman, the tourism sector is still in its infancy (OBG, 2016b) and the development of this sector is closely linked to national development strategies outlined by the 'Oman Vision 2020'(MNE, 2007). Oman Vision 2020 is a national strategic plan, developed by the Government of Oman that lays out policies to achieve economic diversification and to generate suitable conditions for directing the economy towards a sustainable development path. 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, 2016c). This sector is expected to contribute to the GDP by 3% in 2020 (MNE, 2007) and by 6% in 2040 (NCSI, 2017a). In 2005, the government established an investment arm, 'Omran', to the Ministry of Tourism to attract tourism-related investment in the country from private and foreign sources and to plan, develop and manage national tourism projects at sites with unique tourism, heritage or landscape values. To underline this strategy, the first national film 'Welcome to My Country' was produced in 2001 to increase Oman's visibility and competitive edge in the international tourism market through a visual representation of its people and natural resources (Feighery, 2012).

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

Given the local growth in tourism and the economic potential of tourism worldwide, and given the Omani government's commitment to the development of the tourism sector in Oman, the main objectives of this chapter are to (1) provide a qualitative assessment of the current status of marine turtle tourism from socio-economic, political, legal and environmental perspectives (2) evaluate future prospects of marine turtle tourism in Oman,

and (3) develop recommendations to facilitate the sustainable growth of the marine turtle-related marine tourism sector, while promoting conservation. This is essential at various levels. First, in recent years, tourism has received priority at the national level, and nature-based tourism has been identified as one of the most promising areas for economic diversification in Oman. Secondly, the conservation of marine turtles is a national priority (MECA, 2014), and therefore, it is important to examine whether past and future investments in marine turtle conservation can generate sustainable economic returns. Finally, despite many studies on marine turtle biology and ecology in Oman (AlKindi et al., 2003; Ferreira et al., 2006; Rees et al., 2012b; Ross & Barwani, 1982) there is a lack of socioeconomic studies and evaluations, which are critical to an informed decision making process.

2.2. Literature review

2.2.1. Nature-based tourism

Tourism is considered by the UNWTO as key to the economic development and the human well-being of a nation (UNWTO, 2016) and can be community-based (Neto, 2003), nature-based (Fredman & Tyrväinen, 2010; Neto, 2003; Orams, 1996; Priskin, 2001) or culture and heritage-based (Dowling, 2012). Although, their development intents are different, all forms are driven by similar socio-economic objectives such as earning foreign exchange, creating local employment and enhancing community well-being. In the context of Oman, the latter means creation of opportunities for cultural exchange and promotion of local cultural arts and crafts through local public markets, events and festivals. Decentralized economic development can also facilitate rural development initiatives taken by the government thereby reducing urban migration and the promotion and implementation of local employment regulations, which would also contribute to the Omanisation process while protecting the expatriate workforce in the tourism sector.

The UNWTO has announced the designation of 2017 as the International Year of Sustainable Tourism for Development (UNWTO, 2017). Within the framework of sustainable development, the World Tourism Organization (WTO) defines sustainable tourism as "tourism which leads to management of all resources in such a way that economic, social and aesthetic needs can be fulfilled while maintaining cultural integrity, essential ecological processes, biological diversity and life support systems." (Neto, 2003). It involves a process, which meets the needs of tourists and host communities whilst protecting and enhancing needs in the future. This concept of sustainable tourism faces some criticism regarding (1) un guaranteed sustainable flow of tourist demand, especially at the destination level, (2) lack of understanding of the complexity and dynamics of resources by users and providers, (3) insufficient attention to the fair distribution of benefits and costs among the concerned stakeholders, (4) insufficient understanding of the possible invasive impacts of tourism on the culture and social structure of host communities (5) limited success in identifying the limits or threshold of tourism growth and (6) unreliable dependency in any forms of tourism to achieve the targets of sustainable tourism development (Z. Liu, 2003).

Nature-based tourism that involves unique characteristics of the natural environment has been popularized in many developed and developing countries around the world (Eagles, 1997). In particular marine and coastal tourism was identified as one of the promising areas for development worldwide (Hall, 2001).

Research suggests that nature-based tourism has the potential to enhance global biodiversity conservation through the provision of alternative and non-destructive sources of livelihood to local populations (W. Liu et al., 2012). Using the examples of developing countries such as Costa Rica, Ecuador, Malaysia and South Africa, Neto (2003) argued that a well-managed ecotourism can bring socio-economic benefits (i.e. income, employment, positive attitudes towards conservation) to a host a community and can be successful in attracting private investments for the establishment of nature reserves. The same view is echoed in a series of country specific studies. For example, the Brazilian Sea Turtle Conservation Program (TAMAR) has been successful in creating a win-win situation by creating stable economic benefits (i.e. employment and income) and conserving sea turtles through the development of ecotourism and participation of local communities (de Vasconcellos Pegas & Stronza, 2010; Marcovaldi & Dei Marcovaldi, 1999). 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. The direct beneficiaries from non-consumptive use range from ten tourism operators to 1,280 persons per case study (Troeng & Drews, 2004). Using a case in Australia, Wilson and Tisdell (2001) argued that a significant economic potential did exist for marine turtle tourism, but that improved management efforts and adapted practices were necessary to realize and sustain such economic potential. Although, their development intents are somewhat different, these forms are driven by similar socio-economic objectives such as earning foreign exchange and creating local employment and community empowerment National Park in Costa Rica, marine turtle tourism brought in 6.7 million US$ (2.6 million OMR) annually since the beginning of ecotourism at this site in the late 1980's. Worldwide, around 175,000 tourists take marine turtle tours annually to more than 90 sites in more than 40 countries (Troeng & Drews, 2004). Meletis and Harrison (2010) provided justification to promote turtle tours as a tourism product and experience. The non-

consumptive use value of marine turtles was also documented in Oman in 1997: the 11558 visitors to Ras Al-Hadd generated an estimated gross revenue in excess of 38,378 OMR (100,000 US$) (Troeng & Drews, 2004). Creating a community awareness of the non-consumptive economic potential of marine turtles may generate significant community support to the protection of marine turtles (Wilson & Tisdell, 2003) and community engagement involving multiple stakeholders, through a local promotion of marine turtle tourism, can create opportunities for dialogue and consensus building and is likely to positively affect marine turtle conservation (Eckert & Hemphill, 2005; Neto, 2003). However, with the recognition of environment-economy interdependency and the potential negative impacts of tourism (Hall, 2001; Neto, 2003), a persuasive call for upholding the symbiotic/ close relationship between tourism, environment and the local community was made through the concept of sustainable tourism development by the United Nations World Tourism Organization (UNWTO).

In natural resource economics, five types of capital comprising natural, economic, financial, human and social are used to facilitate the discussion of conservation and sustainable development of natural resources. These capitals are treated as an asset that produces future flow of benefits to human societies. The well-known capital theoretic framework states that human well-being is highly dependent upon the flow of services from these five capital categories. In this regard, the sustainable development concept is designed to ensure the continuous flow of services is maintained and/or enhanced (Atkinson, 2008). For further details on this framework are discussed in (Atkinson, 2008).

In a policy-setting context for conservation, economic value of non-market goods and services is widely used as a measuring rod by policy makers in resource allocation decisions (Beaumont et al., 2008). Non-consumptive economic value such as turtle viewing indicates that the opportunity costs of consumptive uses such as harvesting turtle for consumption and higher non-consumptive economic value provides a strong rationale for conservation (Carter, 2003; Wilson & Tisdell, 2003).

In addition to consumptive and non-consumptive economic values, many other components of the overall values of marine turtles have been acknowledged, although rarely quantified in the literature. In particular, from the perspective of volunteer tourists

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involved in marine turtle conservation in Tortuguero, Costa Rica, Campbell and Smith, (2006) identified 8 categories of value attached to marine turtles: conservation (i.e., value associated with maintaining healthy and balanced ecosystem by conserving marine turtles), scientific (i.e., value generated through the generation of knowledge through education and research), aesthetic (e.g., value attached to cultural perception of the animal), humanistic (i.e., values due to emotional attachments to the animal), existential (e.g., values that arise from the knowledge that turtles exist and will continue to exist independent of any actual or prospective interactions with turtles), experiential (i.e. values arising from specific experiences through interactions with turtles), intrinsic (i.e. value of marine turtles based on existence and emotion regardless of whether it is useful to humans) to spiritual (e.g., value attached to turtles because they are considered as a symbol of good luck in several communities, or are part of the myths and believes) (Campbell & Smith, 2006; Wilson & Tisdell, 2001).

Educational benefits attached to marine turtles conservation were also identified (Meletis & Harrison, 2010; Wilson & Tisdell, 2001) that help establishing a personal bond between people and the places they visit (Tisdell & Wilson, 2005). In addition to direct benefits, ecotourism experiences can also encourage pro-environmental attitudes and behavioral change (Zeppel, 2008) and promote pro-conservation knowledge (Orams, 1996; Powell & Ham, 2008) among tourists. From a conservation standpoint, marine charismatic megafauna (turtles, whales, dolphins, manta rays, whale sharks, etc.) have played an important role in conveying the concept of conservation to a wide public (Giglio et al., 2015). The potential of protected areas with iconic species (such as marine turtles) to generate income to cover management cost is well known but also creates a risk of bias in conservation priorities (Goodwin & Leader-Williams, 2000).

Troeng & Drews (2004) analyzed socio-economic value of marine turtle conservation involving a number of developing countries around the world. The findings of the study indicate that marine turtle use and conservation generate economic revenue and jobs for local community in the concerned countries. Based on those findings, the authors strongly recommended government and community involvement in managing marine turtle use so

that the long-term sustainability of these resources can be maintained. For further details on economic estimates can be found in (Troeng & Drews, 2004).

Realizing the complexities in promoting nature based tourism, conserving natural resource and achieving effective management of natural resources, researchers are advocating co-management as a way forward to address these issues (Bodin et al., 2006; Notzke, 1995; Singleton, 2000). This approach to natural resource management advocates participation from various stakeholder groups with the aim to mitigate conflicts, reduce non-compliance behavior, and promote fairness and legitimacy in management decision-making.

As early as 1995, the Ministry of Regional Municipality, Environment and Water Resources (MRMEWR) in Oman prioritized the protection and conservation of the environment and natural resources through publication of the National Environment Protection Strategy (MRMEWR, 1995). The key objectives of this national strategy were to: (1) list and cite the natural resources, (2) identify the relations (economical, structural and functional) between the renewable and nonrenewable resources, (3) assess the pollution levels of natural resources, (4) identify the people–nature relationship and thus promote the sustainable use of the avilable resources, (5) propose plans and strategies to the main stakeholders about management, awareness, adaptation and resilience of Oman natural resources, and (6) propose the best means and practices for cooperation with the regional / international community to implement the objectives of this strategy (MRMEWR, 1995). Many of these objectives have been achieved through the adoption of new legislation and the enforcement of existing legislations, monitoring of pollutants, the establishment of the protected areas and engaging the local communities in awareness programs and management plans, but still there is a challenges that the government is trying to mitigate their impacts on the species and their natural habitsts such as pollution, poaching, destertification and land degradation (MECA, 2014).

To assess the economic potential of turtle conservation in Oman, this chapter will: 1) provide a descriptive analysis of secondary data of Oman's inbound tourism and the specific data from tourism facilities at Ras Al Hadd and Masirah Island visitors; 2) evaluate the seasonality of tourist visits and turtle occurrence, and; 3) perform a strengths,

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weaknesses, opportunities and threats (SWOT) analysis based on a thorough review of the existing literature.

2.3. Methodology

2.3.1. Data

Secondary data on global tourism indicators involving tourist arrivals, travel purpose and the mode of travel were collected from the United Nations World Tourism Organisation (UNWTO). Information on various national legislations along with the corresponding date of declaration, marine turtle counts at Ras Al Hadd and Masirah were collected from MECA. National data on inbound tourists (refer to as non-resident or foreign visitors) by nationality, travel purpose, travel mode, revenue and expenditures by type, tourism share to GDP, employment in the sector, accommodation were collected from the National Centre for Statistics and Information (NCSI). Data on number of passengers and vehicles on the Shanna–Masirah route were collected from Oman Ferries Company. The numbers of visitors to Ras Al Jinz Scientific and Visitor's Center and the guests at the Resort of Ras Al Jinz Turtle Reserve were collected from the Center itself. The cost and revenue of the resort were collected from MOT along with the information on the updated version of the 'Oman Tourism Strategy', which is yet to receive official accreditation.

2.3.2. Seasonality

The role of seasonality in the tourism industry is well recognized in the literature (Lee, Bergin-Seers, Galloway, O 'mahony, & Mcmurray, 2008). To investigate the seasonal patterns in visitors and turtle occurrence influenced by natural causes such as the weather and seasons of the year based on the secondary data, a widely used dummy variable method was used and the following regression model was considered (D. N. Gujarati, 2003):

$$V_t = \alpha + \sum_{i=1}^{11} \beta_i D_i + \varepsilon_t \qquad (2.1)$$

where, V_t = number of visitors (in thousands), D_i represent the dummy variables, taking a value 1 in the relevant month and 0 otherwise, and ε_t is the white noise error term. To avoid the dummy variable trap, 11 monthly values were included in the model and the month of December was used as a reference month. The statistical significance of the dummy variables coefficient will be indicated by the corresponding t-value of the

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estimate. The coefficients attached to the various dummy variables show by how much the average value of V_t in the month for which D_i took the value 1 differs from that of the reference month.

2.3.3. SWOT analysis

To assess the status of nature-based tourism with particular emphasis on marine turtles, an analytical approach of identifying Strengths, Weaknesses, Opportunities and Threats (SWOT) was used. This analysis that was widely used in business marketing and strategy has been extended beyond companies to countries, industries and education as a teaching tool (Helms & Nixon, 2010). It is used as a key tool for addressing difficult strategic situations by listing the key information needed to enhance decision-making (Learned et al., 1969).

The SWOT analysis is considered worldwide, as an effective way to analyze the status of marine turtle initiatives through the identification of strengths and weaknesses with regard to existing strategies, legislative arrangements, law enforcement, environmental conditions, and community concerns. It may also provide objective guidelines on how to capitalize strengths and opportunities, and to develop suitable strategies to address weaknesses and threats. This analysis was recommended by the United Nations Environment Programme (UNEP) (UNESCO, 2009).

The SWOT analysis carried out for this research followed a methodology well established for tourism research (Karolak, 2014; Reihanian et al., 2012). In addition, the choice of relevant criteria followed broadly the categories used by the World Travel & Tourism Council (WTTC) (2013) in rating tourism competitiveness and focused on environmental, institutional, social, economic, cultural, political and legal conditions. The baseline information was gathered from peer-reviewed papers, government reports and newspaper articles.

2.3.4. Study sites

Although turtles nest on many beaches of Oman (Figure 1.1 Chapter 1, section 1.1 A brief on marine turtles in Oman), two particular nesting sites have been recognized internationally as unique: 1) Masirah Island where around 12000 loggerhead turtles nest every year (MECA, 2014), 2) Ras Al Hadd area where more than 25000 green turtles nest

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every year (MECA, 2014). In addition to their biological importance, these sites were targeted for tourism as part of the country goal of the diversification of the sources of the national economy.

The government conservation programs of marine turtles at Masirah Island and Ras Al Hadd aimed for the protection of species while preserving the well-being of other marine resource users, in particular local fishers. The following will give more information about those two sites and their ecological importance in relation to the marine turtles.

I. 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 turtles 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.

Although both sites have large number of nesting turtles, they differ considerably. The local community at Ras Al Hadd had its share of recognition through the various development projects implemented at the site: the Ras Al Jinz Scientific and Visitor's Center and the Resort of Ras Al Jinz Turtle Reserve that came after the proclamation of the site as a protected area in 1996. These projects are good examples of the benefits that came because of the conservation process, particularly in terms of local employment. The approved tourism development plans for Ras Al Hadd are another example of the focused strategy of the government for marine turtles conservation and to increase the tourism contribution to the national economy. The tourism development on Masirah Island remained quite relatively low, although the ecological uniqueness and landscape were a major attractor to visitors for recreation and research (MOT, 2016a).

II. Ras Al Hadd

This site was described in the past as difficult to access by tourists (Devaux, De Wetter, & Dewynter, 2000), but the construction of roads, accommodation and bilingual signage and the presence of the site on numerous web sites, has made access much easier (Kotchen & Reiling, 2000; MOT, 2016b).

In addition to the creation of a nature reserve in 2006, the Ras Al Jinz Scientific and Visitor's Center opened to the 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 and awareness information and a brochure is available on the Center's website that includes information about the turtle species that exist in Oman, their nesting sites in the country as well as their nesting season. Other information given in the brochure is related to the turtle migration patterns and the conservation programs of these species in Oman. Specific information about Ras Al Hadd's archaeological heritage, the nature reserve ecosystem as a whole and the number of green turtle nests per year is also provided (Omran, 2016). Upon arrival at the Center, tourists receive additional briefing related to safety and tour regulations especially with their possible interaction with nesting turtles. More detailed information about the marine turtle nesting process, the history of the area, and the marine ecosystem is also provided by the rangers during turtle watching tours.

Omran currently manages both the Center and the resort. As part of the planned tourism expansion in the area, several hotels were constructed at Ras Al Hadd and Sur to receive visitors outside of the nature reserve area.

Ras Al Hadd has recently been earmarked by the Ministry of Tourism to attract foreign investments in the tourism sector (MOI, 2016). An announced 250 million OMR (647 million US$) investment will take place in Ras Al Hadd through a cooperation between the Omani and the Qatari Governments in an area covering 180 ha. The project initiated in 2016 and to be complete by the end of 2018. It will include not only hotels, residential villas and a traditional market, but also a wildlife center, a marine life center and a cultural area. This tourism investment should provide 836 jobs. In parallel, the Ministry of Communication and Transport (MCT) will expand the local airport to meet the new logistical needs (MOI, 2016).

2.4. Results

The inbound tourism data gathered from the National Centre for Statistics and Information (NCSI) indicated an average annual growth rate 8.12% during 2005 and 2014, which is higher than the global annual growth rate of 3.3% predicted by the UNWTO (UNWTO, 2016). Visitors from the GCC represented the largest share (49.4%) followed by Europeans (18.3%), Asians (17.7%), others (10%) and other Arabs category (4.7 %) (Table 2.1).

Table 2.1: Inbound tourism number of visitors (in thousands) by nationality between 2005 and 2014

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total	Share%
Number of visitors	1101	1385	1360	1540	1584	1500	1393	1714	1923	2098	15598	100
Cruise Ship Visitors	NA*	NA	NA	NA	NA	NA	NA	178	202	125	380	
GCC	613	807	779	781	839	698	660	696	870	961	6683	**49.4**
Other Arabs	33	38	39	75	76	80	70	103	124	130	638	4.7
Asian	141	166	167	295	249	291	258	389	435	475	2391	17.7
Europeans	220	259	261	248	270	270	250	321	372	403	2471	18.3
Other	95	114	113	140	151	161	155	204	121	129	1352	10.0
Foreigner[1]	456	539	541	683	670	722	663	914	928	1007	6214	46.0

* NA data not available. Source: (NCSI, 2016)

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[1] Foreigners include the groups of Europeans, Asian and Others. Other Arabs category includes citizens of the Arabian countries that are not part of the GCC countries and do not include Iranians and Turkish. Others categories refers to all citizens that do not belong to the GCC, Asian, European or other Arabs (Source, NCSI personal contact 20 July 2016)

The number of visitors who declared leisure and recreation to be the main purpose of their visit to Oman during 2005-2014 was 6,343,000, which represents 34% of the total inbound visitors (NCSI, 2016). Citizens of the GCC were the largest group of visitors (2,678,000: 42.2%) followed by Europeans (2,409,000: 38.0 %), Others (685,000: 10.8%), Asians (441,000:7.0 %) and other Arabs (129,000: 2.0%) (Table 2.2). The average annual growth rate of tourists for leisure and recreation in Oman during the same period was 5.09%.

Year	Total	GCC	Other Arabs	Foreigners		
				Asian	Europeans	Others
2005	451	200	3	29	171	49
2006	556	310	14	19	171	42
2007	777	445	12	26	221	73
2008	678	328	12	48	219	71
2009	732	323	15	75	239	79
2010	705	277	16	87	240	84
2011	479	168	9	26	213	63
2012	587	177	14	39	274	83
2013	673	206	17	44	317	89
2014	705	244	17	48	344	52
Total	6343	2678	129	441	2409	685
Share %		42.2	2.0	7.0	38.0	10.8
Source: (NCSI, 2016)						

Table 2.2: Inbound tourists (in thousands) for leisure and recreation by nationality from all ports of entry into the Sultanate of Oman from 2005 to 2014

Between 2005 and 2014, the overall inbound visitors spending increased from 128 million OMR (331 million US$) to 251 OMR (650 million US$) with an average annual growth rate of 9.27 % (Table 2.3). Of the total 251 million OMR (650 million US$) , accommodation was the highest budget item with 99 million OMR (256 million US$): 39.5 %), followed by air tickets (60 million OMR (155 million US$): 24%), food and beverages (38 million OMR (98 million US$): 15.2%), shopping (28 million OMR (72

million US$) : 11.3%), and finally within Oman transportation (14 million OMR (36 million US$) :5.6%; (NCSI, 2017b).

For that same period (2005-2014), the highest spenders (tourism and non-tourism visitors) were Europeans, (823 million OMR = 2 billion US$) followed by GCC citizens (440 million OMR = 1 billion US$), Asians (179 million OMR = 463 million US $) and Others (213 million OMR = 551 million US$) (Table 2.3). Thus, foreigners (European, Asian and Others) represented the highest spending by inbound visitors to the Sultanate with 1 billion OMR (2.6 billion US$) or on average 110 million OMR per year (286 million US$). The average growth rate in tourist spending during the period was the highest for Asians (17.62%), followed by Others (16.26%), other Arabs (10.25%), Europeans (6.24%) and GCC (3.89%) during that period (2005- 2014). The average annual growth rate of tourist expenditure for accommodation was 7.28 %. In response to this demand for accommodation, the number of hotels in the country increased from 161 in 2005 to 287 in 2014, with an average annual growth rate of 6.63%.

Table 2.3: Inbound visitors declared spending (in thousand OMR) by nationality group between 2005 and 2014

Year	Total expenditure (OMR)	GCC	Other Arabs	Foreigners			
				Asian	Europeans	other	Total
2005	127663	41419	5570	8653	63815	8206	80674
2006	146876	41793	12851	11739	65988	14505	92232
2007	167654	42371	6440	9476	81257	28110	118843
2008	178655	39397	4983	7391	104697	22188	134276
2009	144367	37489	6910	10931	73767	15271	99969
2010	140548	36777	6839	10571	71379	14892	96842
2011	158614	44142	7087	19766	66518	21100	107384
2012	200270	46566	10425	29802	85621	27856	143279
2013	227271	52000	12613	33591	99684	29382	162657
2014	250913	58412	13402	37274	109993	31833	179100
Total (2005-2014)	1742831	440366	8712	179194	**822719**	213343	1215256

Source: (NCSI, 2016)

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The number of employees in the tourism sector increased from 55,147 in 2009 to 126,857 in 2015, with an average annual growth rate of 14.89% and was male dominated; in 2015, 93% (118,718) of the total employees were males. In addition, the industry is dominated by expatriate employment. For instance, in 2015, expatriates represented 88.40%, (112,144 out of 126,857) of the workforce in this sector, which is 7.6 times higher than the local employment. More importantly perhaps, Omani employment dropped from 15% in 2009 to 11.6% in 2015 (Table 2.4). These expatriates are mainly from Southeast Asia (India, Bangladesh, Pakistan, Indonesia, Nepal, Sri Lanka and the Philippines), Africa (Ethiopia, Egypt and a small number from other African countries). In 2016, the estimated overall education level of the 1,825,603 expatriate workforce in Oman were illiterate (2.02%), basic (read and write) (28.01%), school level education (58.74%), post-secondary (9.0%) and post-graduate (0.96%). Others (not identified) represent (1.31%) (NCSI, 2017 b).

Table 2.4: The numbers of the workforce in the tourism sector between 2009 and 2015[2]								
Year	Omanis			Expatriate			Grand total	Omanisation (%)
	Male	Female	Sub-Total	Male	Female	Sub-Total		
2009	6,634	1,637	8,271	44,685	2,191	46,876	55,147	15.0
2010	7,464	1,927	9,391	48,210	2,334	50,544	59,935	**15.7**
2011	7,809	2,020	9,829	55,906	2,683	58,589	68,418	14.4
2012	7,521	2,037	9,558	62,848	3,070	65,918	75,476	12.7
2013	8,991	2,972	11,963	90,922	3,846	94,768	106,731	11.2
2014	9,429	3,362	12,791	98,425	4,123	102,548	115,339	**11.1**
2015	10,825	3,888	14,713	107,893	4,251	112,144	126,857	11.6
Source: (MOT, 2016, personal communication)								

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[2] These numbers represent the work force in all tourism facilities and not only hotels.

In Ras Al Hadd area, the average monthly number of visitors during the period (2010-2015) to the Ras Al Jinz Scientific and Visitor's Center at Ras Al Hadd varied seasonally with a minimum of 1047.5 visitors in June and a maximum of 3402 visitors in October. This visit pattern does not coincide with the peak-nesting season of marine turtles in the area that starts in May and nearly finished by the end of October. Between 2010 and 2015 there was also a variation in the annual number of visitors to the Center with a minimum number of visitors observed in 2013 (25,520) and a maximum number of visitors in 2014 (33,522). The coefficient of variation estimate indicates that 2010 and 2011 have the highest (46.11%) and lowest variability (35.15%), respectively. Between 2010 and 2015, the number of visitors to the Center grew at an average rate of 2.30% per annum (Table 2.5). Among the visitors of the Center, foreigners (Asians, Europeans and other non-Arabs, according to the classification used by the NCSI) were the dominant group (on average 81.5%) whereas the Omanis accounted for on average 14.4%, citizens of the Gulf Cooperation Council (GCC) countries for only 1.8 % and other Arabs accounted for 1.3% of the visitors (Table 2.6).

Table 2.5: Monthly number of visitors to Ras Al Jinz Scientific and Visitor's Center at Ras Al Hadd between 2010 and 2015										
Month	2010	2011	2012	2013	2014	2015	Mean	STD	CV	% CV
Jan	2295	2825	2325	2242	3030	3085	2,633.67	390.07	0.15	14.81
Feb	2891	3425	3054	2754	3409	3123	3,109.33	270.79	0.09	8.71
March	2560	2768	1675	2696	3721	3268	2,781.33	692.85	0.25	24.91
April	2290	2295	2310	2045	3990	3044	2,662.33	733.10	0.28	27.54
May	1026	893	1366	1447	1824	1556	1,352.00	343.68	0.25	25.42
June	455	1460	1309	1228	1099	734	1,047.50	380.29	0.36	36.30
July	2175	2482	1697	1158	2262	2189	1,993.83	483.29	0.24	24.24
Aug	970	1217	1872	2278	2790	1505	1,772.00	681.89	0.38	38.48
Sep	2826	2075	1418	1585	1975	2052	1,988.50	490.18	0.25	24.65
Oct	2294	2925	3222	3685	4763	3523	3,402.00	828.81	0.24	24.36
Nov	3717	3547	3621	3450	1401	3690	3,237.67	905.03	0.28	27.95
Dec	3952	2722	2931	952	3258	2986	2,800.17	1,000.98	0.36	35.75
Total	27451	28634	26800	25520	33522	30755				
Mean	2,288.00	2,386.00	2,233.00	2,127.00	2,794.00	2,563.00				
STD	1,054.88	838.66	802.21	895.51	1,108.81	932.48				
CV	0.46	0.35	0.36	0.42	0.40	0.36				
% CV	46.11	35.15	35.92	42.11	39.69	36.38				
Source: (RAJ, 2015, personal communication)										

Table 2.6: Distribution of the annual number of visitors by groups to Ras Al Jinz Scientific and Visitor's Center between 2010 and 2015[3]														
Year	Total	Index number[4]	Omani	Omani Share (%)	Index number	GCC	GCC Share (%)	Index number	Other Arabs[5]	Other Arabs[6] Share (%)	Index number[1]	Foreigners	Foreigners Share (%)	Index number[1]
2010	27451	100.0	3147	11.5	100.0	238	0.9	100.0	287	1.0	100.0	23779	86.6	100.0
2011	28634	104.3	4028	14.1	128.0	204	0.7	85.7	304	1.1	105.9	24058	84.0	101.2
2012	26800	97.6	5186	19.4	164.8	279	1.0	117.2	376	1.4	131.0	20667	77.1	86.9
2013	25520	93.0	5949	23.3	189.0	734	2.9	308.4	400	1.6	139.4	17923	70.2	75.4
2014	34522	125.8	2226	6.6	70.7	344	1.0	144.5	258	0.8	89.9	30212	90.1	127.1
2015	30755	112.0	3558	11.3	113.1	1819	4.4	764.3	902	2.2	314.3	24930	80.7	104.8
Average	28780.33		4015.7	14.4		603	1.8		421.2	1.3		23594.8	81.5	
SD	2923.1		1362.0			626.1			241.7			4160.8		
Source: (RAJ, 2015, personal communication)														

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[3] The subdivision of visitors into ethnic groups is based on NCSI data

[4] The index 100 is the reference point. Index number indicates change in magnitudes of the variable concerned relative to the magnitude at the year 2010 (base year).

[5] Other Arabs include the other Arabs nationality who are not mentioned in our table by the name of the country because they have small number who visit Oman and do not include Iranians and Turkish (source, NCSI personal contact 20 July 2016)

Between 2010 and 2015, the number of visitor who also stayed overnight (guests) at the Resort of Ras Al Jinz Turtle Reserve increased from 3,853 in 2010 to 10,215 in 2015. This represents an average annual growth rate of 21.53%. The resort has 31 accommodation units and is classified as a one star hotel according to Ministry of Tourism classifications (NCSI, 2016). During 2010-2015, the proportion of visitors who stayed in the hotel was on average 26.5 and the occupancy rate at the resort varied between 19.4 % to 48.4 % while the whole sector in the Sultanate experienced a global occupancy between 43% and 51% (UNWTO, 2016). Moreover, there was a high degree of positive correlation ($r = 0.99$, $p < 0.05$) between the revenue and expenses of the resort (Table 2.7).

Table 2.7: Revenue, guests and Occupancy rate/room of Sea Turtle Nature Reserve Resort between 2010 and 2015

Year	Guests	Revenue (OMR)	Expenditure (OMR)	Revenue/ Guest (OMR)	Occupancy rate/room (%)
2010	3853	220015	343983	57.1	19.4
2011	4839	263035	440748	**54.4**	22.6
2012	6799	319227	474097	47	32.3
2013	9175	426567	607546	46.5	41.9
2014	10861	468594	663788	43.1	48.4
2015	10215	453726	NA	44.4	45.2
Total	45742	2151164	2530162		

Source: (MOT, 2016, personal communication)

Visitor specific data such as their group (Nationalities) were not available for Masirah Island, which hinders comparative analysis with Ras Al Hadd. However, the passenger data collected from Oman Ferries Company, for the Shannah-Masirah link, from August 2014 to May 2016 indicated that the numbers of travelers to the island increased with an average growth rate of 4.77% per month since the inauguration of the route in August 2014 (Figure 2.1). An average of three passengers per vehicle transported each month on 4000 vehicles. The number of passengers on the Shannah-Masirah ferry was on average 12000/month between August 2014 and May 2016 with a peak value of 27,936 passengers in August 2015.
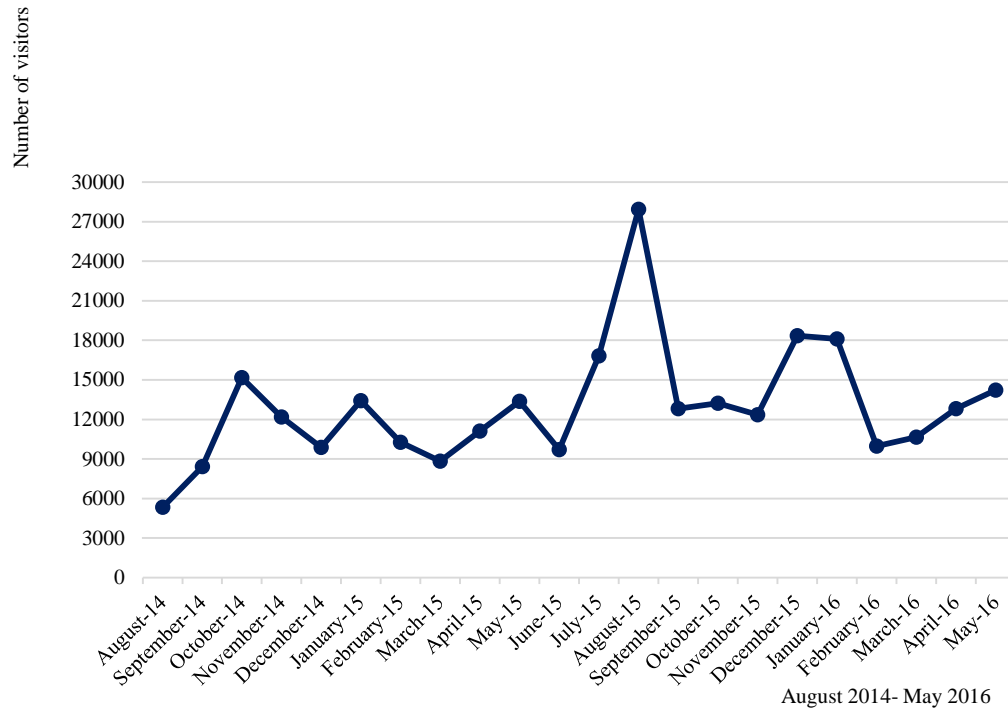
Figure 2.1: Passengers per month to Masirah Island (August 2014- May2016). Source: (NFC, 2016, personal communication)

In addition, the empirical results along with the summary statistics from the investigation of seasonal nature of visitors to Ras Al Jinz Scientific and Visitor's Center, there was a significant drop in the average number of visitors between May and September (Table 2.8), which correspond to the summer in Oman. The R^2 value suggests that 60 % of the total variation in the dependent variable is explained by the linear model and the F-test result indicated that all variables were jointly relevant. For Masirah Island case, the visitors to the islands reach the peak in August 2015 (Figure 2.1). However, the time series was too small to carry out any statistical trend analysis for this site.

Table 2.8: Results of the dummy variable model of seasonality (N=72)			
Variable	**Coefficient**	**t stat**	**p-value**
D1	-166.50	-0.45	0.655
D2	309.17	0.83	0.408
D3	-18.83	-0.05	0.960
D4	-137.83	-0.37	0.711
D5	-1448.17	-3.90	0.000
D6	-1752.67	-4.73	0.000
D7	-806.33	-2.17	0.034
D8	-1028.17	-2.77	0.007
D9	-811.67	-2.19	0.033
D10	601.83	1.62	0.110
D11	437.50	1.18	0.243
Intercept	2800.17	10.68	0.000
R^2	0.60		
SE	642.42		
F-value	8.32		0.000

2.4.1. SWOT Analysis

The results from the Strength, Weakness, Opportunities and Threats (SWOT) analysis with a particular reference to the turtle conservation initiatives in Oman are provided in Table 2.9. The following will give more information about this analysis.

Strength: The main strength of turtle tourism in Oman lies on the availability of worldwide recognized populations of several species of turtles and a favourable commitment by the authorities to take actions for the protection and the conservation of this resource. The unique environment, the many unspoiled landscapes, the political stability of the country, and the hospitality of the local population contribute to create a positive perception of Oman among travellers.

Weaknesses: The weaknesses in the development of marine turtle tourism are mainly related to the economic side: lack of economic studies, infrastructure still in progress, poorly planned (or uncontrolled) ecotourism activities and the proportion expatriate in the workforce in the tourism sector. This may be related to a lack of trained personnel in the hospitability and the ecotourism sectors (e.g., lack of multilingual eco guides). Despite considerable effort, perhaps sometimes poorly focused, the tourism sector remains marginal in terms of GDP. Another weak point is the insufficient enforcement of existing regulation for environmental protection from fisheries and coastal construction. Lack of coincidence between peaks of turtle nesting and peaks of inbound tourists indicates that the ecotourism potential of marine turtle presence at Ras Al Hadd is not fully exploited. It appears that currently tourists are not primarily concerned with the number of nesting turtles and feel satisfied even if they only witness a few nesting turtles

Opportunities: Clearly, the presence of several large turtle population creates unique opportunities for the development of a healthy ecotourism. The climate of Oman (in the winter) is ideal to target European tourists in search of a relatively close, sunny destination with a safe, diverse and ecologically unique environment. The diversity in species of turtles may also be exploited to widen the duration of the tourism season. The diversity in species of turtles may also be exploited to widen the duration of the tourism season although biologically, all four species of turtles nest during the summer in the Sultanate.

Threats: Threats come from two main sources: global and local. The global sources are mainly due to the increasing threats by climate change and pollution throughout the turtles

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whole migratory routes The local threats are the rapid development of the country (and its population), the increasing pressure of fishing, constructions and industrialization of the coastline combined with poor enforcement of some regulations.

Table 2.9: SWOT analysis of the marine turtle tourism sector in Oman	
Strength	**Weakness**
➢ Favorable policy environment in the country as tourism is promoted as a way of diversifying economy (OBG, 2016b). ➢ MECA is committed to conservation and protection of marine turtles (MECA, 2014). ➢ Establishment of Scientific Centre and turtle reserves at Ras Al Hadd. ➢ Planning to construct Ras Al Hadd Airport ➢ The existence of national legislation to protect marine turtles ➢ Ongoing joint research on turtle biology and ecology ➢ Strategic projects and joint research on turtle have been launched to gather data and information ➢ Country's political stability (MacGillivary, 2016; Wee, 2015). ➢ Hospitability of local population (Feighery, 2012; OBG, 2016a) ➢ Nesting species abundance in different sites and times	➢ The contribution of the sector to the economy is small ➢ Tourist infrastructure facilities is still a work in progress (Aulia & Almandhari, 2015; MNE, 2007; OBG, 2016a) ➢ Lack of basic economic research and appropriate data (e.g.) makes it difficult to assess the potential benefit (this study) ➢ Inadequate planning (Ponnampalam, 2011) ➢ Inadequate government strategy for public awareness (MNE, 2007), education and capacity development (ESO, 2011) ➢ Insufficient enforcement of existing regulations (Naser, 2014) ➢ High rates of expatriate labor force in the sector (this study ;MNE, 2007) ➢ Despite continuous efforts, progress in the sector is not substantial (MNE, 2007) ➢ Mismatch between peak of turtles nesting and peaks of site visitors
Opportunity	**Threat**
➢ Potential to contribute to the economy (OBG, 2016b) ➢ Strategic location with potential to become a prominent tourist destination (Dowling, 2012) ➢ Potential for development (this study) ➢ Plan of expansion of transport mode by Oman Air (Rejimon, 2016) ➢	➢ Possible reduction of investment due to financial crisis related to low oil prices ➢ Competition from other regional countries leading to loss of market share (MNE, 2007; OBG, 2016a) ➢ Environmental and ecological concerns (Gladstone, 2013) urban and coastal development (Corkeron et al., 2011; Minton, Collins, Findlay, & Baldwin, 2010; Pilcher et al., 2014), pollution and climate change (Naser, 2014; Pilcher et al., 2014) ➢ Human activities, fishing (Rees, Al-Kiyumi, Broderick, Papathanasopoulou, & Godley, 2012a), shipping (Pilcher et al., 2014) and traditional consumptive use (AlKindi et al., 2006; Pilcher et al., 2014) ➢ Socio-cultural influences local traditions (Feighery, 2012; Hazbun, 2004)

2.5. Discussion

Following the conventional economic argument, growth in the number of tourists can be treated as the first indicator of tourism development in the country. Although relatively lower than the national average, the Ras Al Jinz Scientific and Visitor's Center experienced a positive growth during 2010-2015. It is envisaged that the rate of increase in visitors in the Sultanate will be strengthened by various promotional campaign (e.g. the 'welcome to my country' film) and the development of national infrastructure (Muscat airport, hotels, etc.). In addition, near Ras Al Hadd a series of multi-phased eco-friendly tourism development initiatives such as the establishment of eco-themed resorts, hotels and residential villas, center for wildlife preservation, the creation of an observation park, market area, a marine life park and the development of Ras Al Hadd airport by the Sultanate's Government (MOI, 2016) will strengthen the local potential for ecotourism.

The expected growth in the number of eco-tourists must be managed to limit the undesirable environmental problems in the future. Thus, a precautionary approach is necessary for achieving the sustainable nature-based tourism as stipulated in the National Tourism Strategy 2040 (Bureau, 2015; Wee, 2015).

While it is realistic to pursue sea turtle tourism in Oman, the migratory nature of the animal necessitates some form of collective effort involving other relevant countries from the region to capture the economic potential of marine turtle conservation projects. Signs of cooperation are evident through the execution of Gulf Green Turtle project in May 2016 to identify critical habitats through tagging program (WWF, 2017) but remain marginal in comparison to the massive habitat destruction observed in the region through global changes and local anthropogenic pressure (Phillips, 2003).

Foreign visitors (European, Asian and others non-Arabs as classified by the NCSI) spent relatively more money than GCC nationals (Table 2.3) who represent the majority of visitors to the Sultanate (Table 2.1). This spending pattern could be taken into consideration to design strategic actions such as effective advertising and promotion campaigns for generating more economic returns by targeting this group in particular. Considering an estimate of 128.7 OMR (333.12 US$) per capita visitor expenditure, the estimated gross revenue generated by the number of tourists who visited the Ras Al Jinz Scientific and Visitor's Center at Ras Al Hadd increased from about 3,532,943 OMR

(9,087,490 US$) in 2010 to about 3,958,168 OMR (10,181,300 US$) in 2015 with an average growth rate of about 2.30%, which suggests the economic potential of the site. In 2013, while the total number of visitors to the country increased, the number of visitors to the turtle center declined without apparent reasons. A better understanding of the causes of such variations and discrepancies are important for mitigating risks in future and a visitors' satisfaction survey should be conducted to serve such purpose.

With regard to tourism employment, the dependency on expatriate workers may be necessary at the initial stage of development because of limited alternatives. However, strategies need to be developed to make tourism employment attractive to local people, which is not only a necessary condition for sustainable tourism but also one of the main strategic objectives of the sector. Given the diversity of tourists, a comprehensive guide training program with appropriate scientific knowledge and linguistic capability could be developed. This education approach can contribute to educating tourists, creating pro-environmental attitudes and perceptions among tourists and become an integral part of sustainable marine turtle tourism in the future.

The analysis of accommodation and financial data from the Resort of Ras Al Jinz Turtle Reserve revealed that despite the increase in number of guests, the resort was unable to generate economic profit (MOT, 2016, personal communication). The reason for this was not immediately apparent, but was contradictory to basic economic rule. The observed apparent lack of economic profit along with the high degree of positive correlation (r=0.99) between the revenue and expenses for the resort has important financial implication for a publicly operated enterprise. The revenue generated by the privately operated local hotels at Ras Al Hadd was about three times lower than that of the Resort of Ras Al Jinz Turtle Reserve (MOT, 2016, personal communication) suggesting either that the purpose/objective of the resort was different than generating benefits (for instance provide employment or training to local population or respond to some level of educational needs) or that these two hotels received different cross section of the visitors pool, had management deficiencies and/or a lack of promotional campaigns. A temporary economic loss may be justifiable if the main goal for the establishment of the resort was educational and contributed to local community development. However, if the main goal

of the conservation project is economic in nature that is its positives a contribution of the tourism share to the GDP, then a more comprehensive resource management study is required to reverse the trend. Furthermore, the occupancy rate per room has increased during 2010-2015 but remained low (<50%)This may be due to the limitation at the number of rooms (only 31) available for tourists, particularly during the peak season (generally from September to April) and to the low demand during the summer months. There is a limitation in the number of tourists who can stay overnight in at the resort due to the limited number of rooms (only 31). The occupancy rate per room for this resort showed large variations (19.4 % - 48.4 between 2010 and 2015), partially related to the decrease in the number of tourists during the summer period.

The results of the monthly number of visitor to Ras Al Jinz Scientific and Visitor's Center at Ras Al Hadd (Table 2.5) and the number passengers to Masirah Island (Figure 2.1) also showed significant seasonality but differences between the two sites. Although winter values are higher at Ras Al Hadd, mostly due to the foreign tourists, the high summer values observed on the ferry to Masirah showed a large number of Omani. This was likely related to the school holidays that usually start in Oman by the end of May and end in late August. To attract foreign tourists during the summer a less expensive lodge-based package tour could be experimented. Furthermore, marine turtle tourism should be combined with other activities centered on the ocean such as traditional fishing experience, wind surfing, kite surfing, which may help local fishing community and reduce possible conflicts.

The few months variations of the nesting season of the 4 marine turtles populations between species (Olive Ridley lay their eggs in February, Hawksbill, in April, Loggerheads in June, and Green turtles in July-August (Omran, 2016), could be used to attract visitors to different nesting sites during a wider nesting season, as long as tour operators and accommodation availability match the biological pattern in turtle reproduction. In addition, a more local tourism targeting visitors from the GCC, residents in Oman and citizen could be developed to increase the numbers of visitors to nesting sites during the peak nesting season (currently only partially exploited). A touristic exploitation

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of the hatching season (which peaks 6-8 weeks after nesting) can also been included in off-season packages.

The SWOT analysis indicated that, effective enforcement of existing rules and regulations which are intended to protect and conserved the threatened species of marine turtle is necessary. Moreover, studies focusing in management of marine ecosystems and the coastal development implication are important to be considered to reduce to the future effect of the rapid development plan in particular the ones that focus on human-turtle interactions and on the economic valuation of turtles which are still lacking and are much needed in the Gulf countries (Lavieren et al., 2011) to promote effective ecotourism without negatively impacting Oman's biodiversity .Otherwise, the notion of 'nature reserves' may not be an effective conservation tool. This is illustrated in the study by Buitrago, Guada, & Doyle, (2008) where various issues were affecting the success of the turtle conservation project in Venezuela. These issues were weak enforcement of regulations, the low level of participation in the community-based projects and environmental education programs, un realized impacts of the conservation efforts such as head-starting and nest translocation to hatcheries and un significant impact of research and researchers on the decision-making process. It is also important to enhance community outreach program to create local awareness as a management strategy to accelerate community participation as envisaged in the national tourism strategy private investment, which needs to be encouraged but would need to carefully and wisely monitor to minimize negative impacts. A case from Nicaragua applied by the organization Paso Pacífico has shown that the engagement of local community in the conservation approach is beneficial to both sides. Incentives were given to the local community to protect the nests and hatchlings of marine turtles from poachers. A program of marine turtles based tourism was also developed to generate economic benefits to the local community by training and providing support to establish tourism micro business (Smith & Otterstrom, 2009).

The threats to marine turtles and their habitats in particular need to be considered for future development of turtle tourism. The management of the nesting area and enforcement of laws needs to be improved to ensure the survival of an abundant nesting population and

an ideal tourist destination (boardwalks, adapted lighting system, self-guided system, educational facilities, etc.) Part of these issues is related to the training of qualified personnel but also to the development of adapted facilities and educational programs. Another issue is related to the sustainability of the resource, in particular in relation to human activities that could be addressed by better community participation and awareness.

Despite considerable differences in overall economic development (e.g., per capita GDP), natural resource use and management (non-governmental versus centralized), and development needs (reflected in the standard of living) some comparison between Oman's case and other experiences in turtle conservation can be made to identify key issues in developing further turtle tourism. Marine turtle tourism initiative in Oman is still in its infancy which is in marked contrast to the much longer, historical experiences of other turtle ecotourism destinations such as Costa Rica, Brazil, Malaysia, Venezuela,. Another key difference is the dependency of the Sultanate of Oman's tourism sector on an expatriate workforce in comparison to these other countries where local workforce was employed in these examples of conversion from consumptive to non-consumptive exploitation of the resource. In spite of these differences with regard to development status and employment, Oman shares some similar challenges that include: insufficient enforcement of rules and regulations (Buitrago et al., 2008), lack of infrastructure, poor planning, lack of active community participation in turtle conservation project (Buitrago et al., 2008; de Vasconcellos Pegas & Stronza, 2010), lack of trained personnel, and lack of appropriate incentives to engage the community (Buitrago et al., 2008; de Vasconcellos Pegas & Stronza, 2010; Marcovaldi & Dei Marcovaldi, 1999; Meletis & Harrison, 2010). Although the SWOT analysis clearly identified numerous strengths and opportunities, they cannot be translated into successful a marine tourism industry without addressing these most urgent weaknesses and threats.

The indication of an increase of the tourist flow to Masirah Island during the summer period reflect the demand of this site for domestic tourism (Times of Oman, 2016). This, however, even without the specific indication of the nationalities of the travelers along the NFC route is still a promising signal to amount of people going to this island. Taking into consideration the other attracting factors (weather, fishing activities and landscape)

(Garty, 2010; MOT, 2016a), the island could be promoted for the tourism with the fact of the nesting season of marine turtles that also exists during the summer period. The infrastructure , especially the accommodation facilities are moderate in nature and can fully cover the existing demand but it will however needs upgrading if the island is promoted for tourism.

2.6. Conclusion and policy recommendations

The positive trends in both inbound visitors arrivals and visitors spending enjoyed by the country and Ras Al Hadd in particular highlight the economic potential of marine turtle tourism. However, to realize such economic potentials the government should address various limitations such as employment of local workforce, law enforcement, transportation facilities, management of resort, mismatch of turtle nesting and peak tourist season.

The potential benefits have a dynamic aspect reflecting the type of tourist and their preferences and interest as well to the growing competition in the region. Therefore, to realize such economic potentials the government should develop long-term plans to satisfy the growing demand in a sustainable management of the environment so that the 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 the turtle resource sustainably.

Masirah Island, on the other hand, is a promising land 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 the tourism in this island. Given that, the spectacular landscape with 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. There are however, some associated limitations that have to be addressed for achieving the overall sustainable tourism goal of the country. One of these is insufficient monitoring and limitation to the beaches access. This could eventually be addressed after the proclamation of the island as a turtle reserve but precautionary measures has to be implemented in advance if the island is highlighted as a tourism site. Another issue is the necessity of the local community's contribution in this process to give it more strength as witnessed from the Ras Al Hadd case where the local community was committed to be an effected partner in this process.

However, while it is realistic to pursue marine turtles tourism in Oman, the migratory nature of the turtles across the region (Baldwin, Hughes, & Prince, 2003; Rees et al.,

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2012a, 2012b) and the whole Indian Ocean necessitates some form of collective effort involving other relevant countries to ensure their survival.

The next chapter will introduce and describe the Contingent Valuation Method (CVM) that was used in this research for the empirical analysis of data collected from the study sites through questionnaire 1 to calculate the mean willingness to pay in the form of access fees and voluntary contribution to the marine turtles conservation in Oman. It will also include literature review related to the CVM.

Chapter 3. Stakeholders Willingness To Pay Using the Contingent Valuation Method (CVM)

3.1. Introduction

Following the research objective 1 stated in Chapter 1 and the concluding remarks of Chapter 2, the main purpose of this Chapter is to present an empirical estimate of the mean willingness to pay in a way of: 1) access fees and 2) one-time voluntary contribution for the two study sites namely Ras Al Hadd and Masirah Island. The empirical estimates are generated under the Contingent Valuation Method (CVM) using a logistic regression model. These estimates signal the economic significance of marine turtle conservation.

From an economic perspective, there is a demand and a supply of marine turtle conservation. The demand reflects the valuation of consumptive and non-consumptive use, which is in turn, reflects the willingness to pay of the resource users. This demand function is influenced by various socio-economic, cultural and environmental factors. In addition, the demand function follows the conventional 'law of demand' and hence, downward slopping. On the other hand, the supply function represents the benefits of the development opportunities forgone due to marine turtle conservation (Panayotou, 1994). Access fees on public lands can reduce use and thus threats and generate revenue which can be controversial and opposed for many reasons (Marsinko, Dwyer, & Schroeder, 2003). This mechanism of payment was tested against a voluntary contribution for marine species conservation in Greece namely for the loggerhead turtle *Caretta caretta* and the monk seal *Monachus monachus* using the CVM. The findings of this study showed that the respondents WTP depends on their prior knowledge of the species and the management options for the conservation process (Stithou & Scarpa, 2012). Given the importance of both of these mechanisms of payment this research is aiming to investigate how much the respondents are willing to pay and what the preferred method of payment to enhance the marine turtles conservation in the Sultanate.

This chapter is structured to: (1) give an overview of CVM (the literature review and a conceptual note on CVM, section 3.2), (2) describe the process of collecting the data from both study sites for the two chosen tools of payment: mandatory access fees and one time voluntary contribution (the methodology, the data specification and the collection process,

the questionnaire formation, the pilot study, the implementation process and difficulties encountered, the data processing along with the model explanation, section 3.3), (3) describe the analysis process, (4) present the results (results of the descriptive and the empirical analysis, section 3.4), (5) discussion the results obtained (section 3.5) and (5) propose policy recommendations based on these results and a conclusion (section 3.6).

3.2. Literature review and a conceptual note on CVM

The Contingent Valuation Method (CVM) is a method which is part of the simulated market approach that uses the stated preference method (Blamey, 2002; M. Carter & Wilks, 2002). The stated preference methods are defined as "A set of pricing methods where people are asked how much they would agree to pay for avoiding a degradation of the environment or, alternatively, how much they would ask as a compensation for the degradation" (OECD, 2005). An economic value of environmental quality can be observed in market prices when the price of the goods and services exist. However, in many cases the prices do not exist for goods and services such as clean water or air or in the case of this research, the marine turtles conservation.

Environmental valuation of goods and services is concerned with Total Economic Value (TEV), which consists of both use and non-use values. The preference based approach is estimating the values of use and non-use values of these services (Hundloe, 2002) (Figure 3.1). The clarification of the classification of values is important for this study as the scope of focus is nonmarket goods by applying the CVM.
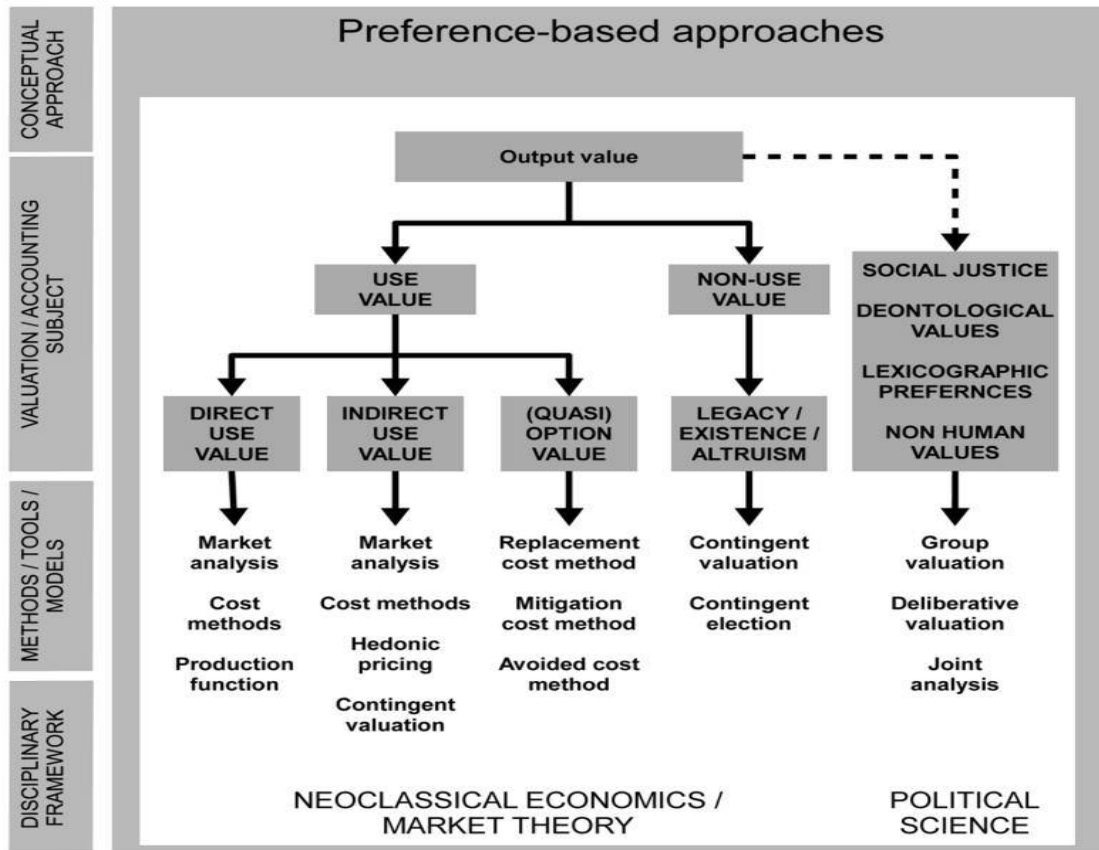
Figure 3.1: Preference based approaches (Adapted from (Kumar, 2010))

The CVM is used in the estimation of the value of nonmarket goods or for market goods where prices are currently not available by creating a hypothetical scenario in the provision of a good or service (Perman, Ma, McGilvray, & Common, 2003) and then investigating the respondents Willingness To Pay (WTP) for this hypothetical scenario or their Willingness To Accept (WTA) a certain level of compensation for loss or degradation of a resource (Adamowicz et al., 1998; Coursey et al., 1987; Rosenberger et al., 2012b). In other words, CVM is implemented through the estimation of values directly from individuals who are potentially affected by a change in the management practices (Hoehn, 1987) usually from carefully constructed survey questions (Bateman et al., 2002). The validity of CVM measures of nonuse value was evaluated by a distinguished panel of social scientists chaired by two Nobel laureates based on the recommendation made from the National Oceanic and Atmospheric Administration (NOAA) (Carson et al., 1996).

Considering the disparity between the two measures (WTP versus WTA) in relation to income effect, substitution effect, transaction costs, broad based preferences and others, and following NOAA panel recommendation in 1993 stating that WTP is the proper measure of value that should be used in the CVM studies rather than WTA (Arrow et al., 1993), this chapter focus to estimate the average WTP only in the form of access fees (to watch turtle nesting) or a one-time voluntary contribution for improvement of the recreational activities associated with the turtle watching experience at the two study sites.

In applying CVM, there are some key issues that require careful consideration: 1) the payment vehicle, 2) the plausibility of the hypothetical scenario designed by the researcher and 3) the approach or the method to convince the respondents (Blamey, 2002; Perman et al., 2003). Other points of concern in applying this method are related to the survey, namely the main goal to conduct the survey, the method used whether in person or through phone, email or via the internet (online surveys) (Babin & Zikmund, 2015; Whitehead, 1999), the targeted groups and the ways to reduce bias from respondents. In typical CVM surveys a public good is described to elicit the respondents WTP through well identified payment vehicle (Lew, 2015). There are two methods to conduct CVM surveys; the cheap talk, consequentialism and calibrating answers (Riera et al., 2012). Cheap talks warn the respondents about the tendency to overestimate WTP. Consequentialism aims to make respondents to believe that their answers could have actual consequences. Calibrating answers where the answers of YES with unsure status are treated as NO.

An important example on the integration of social psychological measures in CVM surveys as attitudes and behavior to avoid the mediation effect which is defined as: " the hypotheses that attitudes toward paying an annual fee would be directly associated with the intention to pay and indirectly associated with the stated payment amount were supported by the data and modeling approach" (Spash et al., 2009). This effect could exists by the differences in real WTP and the stated amount by the respondents (Spash et al., 2009). The integration of social psychological measures in CVM surveys will also be counted as an important tool to the decision makers before applying any policy measures on the nature resources management system such as applying a new fees system to certain recreational site (Rosenberger et al., 2012b). Analyzing CVM responses can be done by

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using the average of a sample data of WTP values and then assessing the survey results to make judgments of the accuracy of that estimates. It could be also done by using the total of WTP values of the targeted population for applying the Environmental Cost Benefit Analysis (ECBA) (Perman et al., 2003).

Carson (2012) highlighted that, CVM was implemented in over 130 countries to study the cultural, environmental, health, transportation and other issues. It is widely used in non-market use valuation of natural resources with different aspects for example recreation activities such as recreational fisheries (Blamey, 2002) and ecosystems goods and services such as forest (Riera et al., 2012; Rosenberger et al., 2012b). More specifically, it can be used in the economic valuation of threatened marine species (Lew, 2015) where economic values associated with these species result from non-consumptive values (Jin et al., 2010), such as Gray whale (J. Loomis & Larson, 1994), coral reefs (Brander et al., 2007) and marine turtles (Lew, 2015).

Many of these studies emphasized whether CVM was sufficiently reliable for use in assessing natural resource damages in lawsuits (Carson, 2012). However, it is important to remember that most estimates from contingent valuation studies are used in benefit-cost assessments, not natural resource damage assessments though the NOAA panel declared in its reports that "CV studies can produce estimates reliable enough to be the starting point for a judicial or administrative determination of natural resource damages including passive use values" and suggested a number of guidelines to help ensure the reliability of CV survey results (Carson, Flores, & Meade, 2001).

Considering all of this debate on the usefulness of the method, the pros and cons to identify the reliability of using CVM to fulfill the research objectives are summarized in Table 3.1.

Table 3.1 : Contingent Valuation Method (CVM) Pros and Cons	
Pros	Cons

-CVM standard survey usually provides more information than a typical market research survey
-People have control on timing of their purchase of private goods but not on timing for voting on public goods using CVM
-Simplicity for both researchers and respondents 'state-of-the-art' application
-Non used values such as existence value can be estimated through CVM which is not possible by other techniques
	- Depend mainly on survey format and how it is conducted and does not represent the actual payment, the treatment of substitutes or solution for the good or service valued.
	- Employ a disaggregation approach which involve impeding the goal or service of interest
	- Careful attention has to be in concern to the appropriate choice of payment vehicle (Fees/ Cash/ Coupons etc.)
	- Problems in convincing respondents that the improvement will actually eventuate and thus estimate their WTP.
	- Main weakness of CVM is susceptible to response biases in :
	    • Amenity- misspecification
	    • Inadequate consideration of substitutes.
	    • Protests responses
	    • Strategic
	    • Yes-Saying

Source:(Perman et al., 2003)	

Besides, the disadvantages listed in Table 3.1, the stated preferences methods including CVM are supported by many researchers as being more developed than behavioral methods and became more accepted by economists. CVM in particular has proved it reliability in tests. Related support came from the National Oceanic and Atmospheric Administration (NOAA) by recommending researchers to use WTP (Haab & McConnel, 2002). Moreover, it was accepted at political level as it has proven its ability to measure the benefits of environmental changes in wide variety of situations, providing aid to public decision making in the hands of politicians or experts.

At the early stages of this research, a Travel Cost Method (TCM) was considered as a possible method to fulfil Objective 1 of the research along with CVM and CA method. This method is part of surrogate market approaches and based on revealed preferences data (Blamey, 2002). It involves the estimation of a demand function and therefore prices (cost) for recreation or other uses (activity) associated with a location or site that is valued by visitors but which is not subject to an entry fee (M. Carter & Wilks, 2002). The cost of travel may include transport, cost of fuel, accommodation, food, and the cost of time incorporated in the visit and other related expenses (Blamey, 2002). However, this method

was not used in this research as it requires information on the respondents' cost of travel to the study sites and the origin of travel, which are complex and difficult to obtain as two sites differ, one is an island and the other is coastal.

3.3. Methodology

3.3.1 Logistic Regression Model

In most regression models we assume the dependent variable to be quantitative in nature, while the independent variables may be quantitative, qualitative, and dummy or a mixture of these. However, regression model responses, estimations and interpretations change when the dependent variable is qualitative and unobservable in nature. When the dependent variable can only take two values, say, 1 if the answer is yes and 0 if the answer is no, then the response variable is called a binary or dichotomous variable. In this context, the logit or probit models are widely used in the literature (Bose & Brown, 2000; Redkar, 2004) . The merits of logit model is that it is simple and provides good approximation to probit model (Bandara & Tisdell, 2003).

Following the study of Spinks and Bose (2002), this research considers the regression model as follows:

$$Y_i^* = \alpha + \sum_{j=1}^{k} \beta_j X_{ij} + U_i \qquad (3.1)$$

Where,

Y_i^* is an unobservable dependent variable that characterises the respondents willingness to pay the bid (access fees or the voluntary contribution), and the variable X_{ij} represents the different variables namely: Gender, Age, Education, Income, Place of residency, Occupation, Membership in environmental conservation agency, society, or group, Turtle watching Experience and Stakeholders categories.

The term U_i, is the residual. For the purpose of estimation, the binary variable Y_i is used and assumes values either '0' or '1' as a substitute for the unobservable dependent variable. This research has employed the logit model for empirical analysis. The logit model for the representative respondent 'i' can be expressed as follows:

$$P_i = F(\alpha + \sum_{j=1}^{k} \beta_j X_{ij}) = \left(\frac{Exp(I_i)}{1 + Exp(I_i)} \right) \qquad (3.2)$$

Where,

P_i is the probability of proxy variable $Y_i = 1$ and $F\left(\alpha + \sum_{j=1}^{k}\beta_j X_{ij}\right)$ is the cumulative

distribution function of the error term in (1).   The choice index is defined as,

$I_i = \left(\alpha + \sum_{j=1}^{k}\beta_j X_{ij}\right)$.   From equation (3.2) the probability of $Y_i = 0$ is calculated the as

follows:

$$(1 - P_i) = \left\{1 - F\left(\alpha + \sum_{j=1}^{k}\beta_j X_{ij}\right)\right\} = \left\{1 - \frac{Exp(I_i)}{1 + Exp(I_i)}\right\}$$

(3.3)

Dividing equation (3.2) by (3.3) and taking 'log' on both sides the following equation is obtained for the logit model:

$$\log\left(\frac{P_i}{1 - P_i}\right) = \alpha + \sum_{j=1}^{k}\beta_j X_{ij} + U_i$$

(3.4)

Where,

$\log\left(\frac{P_i}{1 - P_i}\right)$ is called the *log-odds* ratio, that is, the logarithm of the odds that a particular

choice will be made by the respondents and U_i is the error term. The *log-odds* ratio may

range from $-\infty$ to $+\infty$, depending on the range of the independent variables. This implies

that although the probability lies between 0 and 1, the *log-odds* ratios are not so bounded.

α and β are the parameters of the logit.

Equation (3.4) suggests that the log odds ratio is not only linear in X (in this study X represents Gender, Age, Education, Income, Place of residency, Occupation, Membership in environmental conservation agency, society, or group, Turtle watching Experience and Stakeholders categories) but also linear in parameters. The odds are converted to probability by the following:

$$\hat{Y} = \frac{ODDS}{1 + ODDS}$$

(3.5)

The result obtained from this equation is written in percentage thus, expressing the odds into a probability. To check for the significance of the estimated coefficients β_j, the Z statistic was used.

As already mentioned, the conventional R^2 does not apply to logit models. There are other applicable R^2, which is the Cox & Snell R^2, Nagelkerke R^2, and McFadden R^2 that also ranges from 0 to 1. To test whether the slope coefficients are significantly equal to zero, the equivalent of the F test known as the likelihood ratio (LR) statistic was used. It follows the Chi square distribution with degrees of freedom equal to the number of explanatory variables.

There is no compelling reason as to why one should chose logit over probit or vice versa. In which, the main difference between the logit and probit models is the first having a fatter tail in its distribution where it approach zero or one slower than the probit regression. However, most of the researchers prefer the logit model over the probit model because of its comparative mathematical simplicity (D. Gujarati, 2003). Moreover, most importantly, one can simply multiply the logit estimate by the value 0.625 to get the corresponding probit estimate (Maddala, 1991).

Following Hanemann, (1989), CVM responses were selected based on the respondents choice from a scale of 1 to 4 to pay a bid, where 1 is strongly agree and 4 is strongly disagree. Then, strongly agree and agree answers were considered as 1 and disagree and strongly disagree answers were considered as 0. These answers were then defined as observations of the dependent variable Y. The currency of the bid used in this questionnaire was OMR and it took the form of either access fees or one-time voluntary contribution. As suggested by Hanemann (1989) cited in (J. Loomis, Brown, Lucero, & Peterson, 1997), the following model represented by equation (3.6) is used:

$$log\left[\frac{Prob(Yes)}{1-Prob(Yes)}\right] = B_0 - B_1(BID\ Price) + B_2(X1) + \cdots B_n(X_n) \quad (3.6)$$

Where,

the $BID\ Price$ is the payment card of the access fees and one-time voluntary contribution. To calculate the mean WTP, the following formula is used (Hanemann, 1989).

$$\text{Mean WTP} = \frac{1}{B_1} * \left(ln\left(1 + exp\left(B_0 + \sum(B_n(X_n))\right)\right)\right) \quad (3.7)$$

Where,

B_n is the vector coefficient and X_n are the sample means of the associated independent variables listed above.

Following Park, Loomis, & Creel (1991), STATA software was used to estimate the values of mean WTP using the wtpcikr - a STATA software program - developed by (Jeanty, 2008) following (Krinsky & Robb, 1986) to obtain the upper and lower limits of mean WTP through calculating the confidence intervals. Further re-checking for accuracy of the estimated parameters was done using Eviews software.

I. Empirical Analysis and Econometric Modeling

As mentioned earlier for each study site, a logit model was used to estimate the parameters of equation (3.1) above. Since logit estimates do not usually have a straightforward interpretation (D. Gujarati, 2003), the results are discussed based on the log-odds ratio (Bose & Brown, 2000). The definition of the model variables along with their respective mean values are presented in Table 3.4 and 3.5.

II. Interpretation of Summary Statistics and Model Diagnostics

A general-to-specific methodology was followed using (Al-Masroori & Bose, 2016), where all the covariates were initially included in the modeling process and then removed progressively excluding some variables involving a number of systematic iterations to reach the preferred model. These covariates are presented along with the model results in the Result section (Section 3.4.1). The summary statistics consisting of three goodness-of-fit statistics namely the Cox & Snell R^2, Nagelkerke R^2, and McFadden R^2 were used to assess the quality of the regression. The higher their value, the better the model in terms of the variation explained. Regression Sum Squared Error (SSE) values are also used and lower the values better is the goodness-of-fit. The percentage of correct prediction is used to decide on the model adequacy. The higher the value of the prediction, it implies the better the model is correctly predicted the dependent variable. To examine the adequacy of the model, three model selection criteria namely the Akaike Information Criterion (AIC), Schwartz Criterion (SC) and Hannan-Quinn Criterion (H-QC) were used: the lower their values, the better the adequacy of the model. The log likelihood ratio (LR) statistic (which follows a standard $\chi 2$ distribution with degrees of freedom equal to the number of

independent variables included in the model) shows the joint significance of the all the variables included in the model.

III.   Scope Test

The scope test was performed to test the scope sensitivity in elicited valuations under the CVM studies as noted by (Desvousges, Mathews, & Train, 2012; Frederick & Fischhoff, 1998; J. Loomis & Ekstrand, 1997) to face the critics on CVM that often point to studies in which different groups of respondents express similar WTP despite wide variation on different influencing factor. As noted earlier in Chapter.2 of this research (Overview), there are notable differences between the study sites in relation to infrastructure development, regulatory measures etc.), which may influence the corresponding WTP. Following Jin et al., (2010), a dummy variable "D_{Site}" coded as (1) for Masirah Island and (2) for Ras Al Hadd was included to the logit regression model using pooled data.

The scope test was used for testing the following null hypothesis

$$WTP_{Ras\ Al\ Hadd} - WTP_{Masirah\ Island} = 0$$

Against the alternative hypothesis

$$WTP_{Ras\ Al\ Hadd} - WTP_{Masirah\ Island} > 0$$

Compromising both cases of payment: access fees and voluntary contribution.

3.3.2. Questionnaire design

To fulfil the objective 1 of this research, a questionnaire was designed that is Questionnaire 1 (provided in Appendix 1) with the goal to collect the primary data from the targeted groups; (1) Locals, (2) Tourists, (3) Ras Al Jinz reserve resort' guests and (4) Employees of the resort and hotels. The category of employees of the resorts and hotels was added to the targeted stakeholders due to their direct benefit from the tourism development at the sites of the study.

The data collected was needed to carry out Contingent Valuation Method (CVM) and Conjoint Analysis (CA). However, the general information regarding the formation of this questionnaire will be given in this chapter with the details related to the CVM, and the specific details related to the CA method will be given in Chapter 4.

The formation process of the questionnaire started several months with field visits to both sites to investigate the relevant economic and social factors associated with the

conservation process of marine turtles before the actual field work of implementation. From these visits and literature review along with the discussion with the thesis committee, several questions were considered prior the formation of the questionnaire. These are listed in Table 3.2.

Table 3.2: Elements of designing and conducting Questionnaire 1	
Elements	**Reasoning**
Why	To collect information needed for carrying out Contingent Valuation Method (CVM) and Conjoint Analysis (CA).
When	Jan –April 2017
With whom?	Visitors/ tourists, locals, guests and employee of the accommodation facilities at the site
Data used to design the questionnaire	- No of population at both sites (female / male) (NCSI data)No of household at each site (NCSI data) - No of visitors to Ras Al Jinz Research and Visitors Centre (MOT data) - No of travelers to Masirah (NFC data) - No of hotels at each site and hotels activity (NCSI data) - Oman inbound tourism data (NCSI data) - The national expenditure and allocation on the conservation/ environmental programs (7th Five year national plan and the 8th Five year national plan) - The economic expenditure on marine turtle conservation programs (MECA' data) - No of marine turtles species and classification at each sites (MECA' data) - Nesting season of the marine turtles (MECA' data)
Sample size	Minimum 75 from each site (Israel, 1992)
Model	Interval regression and logit regression
Software	Statistical Package for Social Sciences (SPSS), Eviews and STATA,
Validation	Expert opinion, versions from well-known organization (World Tourism Organization, the National Oceanic and Atmospheric Administration and the World Bank), focus group , pilot study and logical validation (ladder of payment and follow-up questions)

I.   Stakeholders

The following key stakeholders groups were considered based on their relationship to the marine turtle conservation in Oman.

- The Ministry of Environment and Climate Affairs (MECA): Beginning with the global agenda 21 that was launched in 1992 with the objectives of: 1) promoting an open, non-discriminatory and fair multilateral trading system that will enable all countries in particular, the developing countries, to improve their economics and the standard of living of their citizens, 2) improving access of developing countries to markets for exports, 3) improving the functioning and policies of commodity with optimizing its contribution to the sustainable development and considering the environmental impacts, 4) promoting and

supporting policies that enhance the economic growth and the environmental protection equally (UNCED, 1992). Then Rio+20 in 2012 urged the countries for the sustainable development and thus biodiversity conservation through the national framework and legislations. Oman as part of the global system and many of the international bodies listed in Table (1.2) have to comply with these calls and decisions. This compliance is done through MECA, the governmental mandated to protect the Omani environment; its ecosystems and species especially wild endemic and threatened species such as marine turtles. MECA is implementing the Five Year Environment Protection Plan of the country and under this plan collaborate with other national, regional and international stakeholders. The key information collected from MECA is the expenditure on the conservation projects, the management practices and marine turtles nesting data.

- The Ministry of Agriculture and Fisheries (MAF): is a key stakeholder due to its social role with relation to the overlap between the interests of fishermen needs and the conservation values of marine species. MAF is also a monitoring agency in cooperation with MECA to face the by-catch threat (accidental catch), one of the main threats to marine turtles in Oman. The joint reports produced by this entity in cooperation with MECA is an essential source of information to identify the strengths, weakness, opportunities and threats with regards to the conservation of marine turtles in Oman and thus to structure policy recommendations.

- The Ministry of Tourism (MOT): Marine turtles in the sites of this study are suggested as a tourism attraction sites due to their ecological and cultural potentials that witness in the past few years an increased number of visitors and the demand for recreational activities. However, this has not yet been evaluated from an empirical view. Thus, this stakeholder is concerned with promoting marine turtle conservation as part of implementing the strategic plan of the country to diversify the sources of national income in cooperation with MECA. Moreover, Ras Al Jinz Visitors and Research Center at Ras Al Hadd is managed by OMRAN under the supervision of MOT in cooperation with MECA. Thus, the collection of data related to revenue and expenditure of the center and the resort, number of visitors to the center, their nationality and seasonality was done through MOT.

- The Environment Society of Oman (ESO): The society is playing an important role in the awareness for the protection of marine turtles in Oman as well as their recognized role in the research field for these species. This stakeholder is important in providing logistics and information at the field work at the study sites especially at Masirah Island due to their long term projects there. It was also an important stakeholder for providing consultation in designing the questionnaires of the research due to the knowledge of its member, some of which have extended expertise in marine turtles in Oman and overseas.

- The National Centre for Statics and Information (NCSI): This Centre is the governmental data portal that provides a free access to its publications and releases. The Centre is a hive of all the national statistics for the inbound tourism data, population counts and the national economic reports that is essential for this research. This makes this stakeholder an essential partner in structuring the questionnaires and in designing the overview of the tourism in relation to marine turtles in the country.

- The National Ferries Company (NFC): The Company started the inauguration of Shannah - Masirah route on 14th August 2014. This represents one of the major ways of transport to the island. There is also a small domestic airport but passengers frequently travel through the ferries of this company. Thus this makes this stakeholder an important source of statistics for the numbers of travelers to the island and thus for deciding the timing period of the fieldwork based on the peak season.

II.   Sample size

A good sample is the one that accurately represents the entire group of project participants plus those eligible but not participating so that conclusions about project impact are valid. The sample size of the questionnaire is decided based on the number of population of each site and the other data associated with the inbound tourism and the community structure (male/ female). For instance the number of population in Masirah Island was 12,825 (Omanis and expatriate, 2013 counts) (NCSI, 2014).

It was also decided based on the following equation by Cochran, (1977) (Creative Research Systems, 2016).

$$SS = \frac{Z^2 * (P) * (1 - P)}{C^2} \qquad (3.8)$$

Where, SS = the sample size Z = Z value (e.g. 1.96 for 95% confidence level)

P = percentage picking a choice, expressed as decimal (0.5 used for this research)

C = confidence interval, expressed as decimal (e.g., .04 = ±4)

Israel (1992), used equation (3.8) to produce the following table (Table 3.3) that was used

in this research to decide on the needed sample size to run the model.

Table 3.3: Sample size for ±3% ±5%, ±7% and ±10% Precision Levels Where Confidence Level is 95% and P=0.5				
Size of Population	**Sample Size (n) for Precision (P) of:**			
	±3%	**±5%**	**±7%**	**±10%**
500	a[7]	222	145	83
600	a	240	152	86
700	a	255	158	88
800	a	267	163	89
900	a	277	166	90
1,000	a	286	169	91
2,000	714	333	185	95
3,000	811	353	191	97
4,000	870	364	194	98
5,000	909	370	196	98
6,000	938	375	197	98
7,000	959	378	198	99
8,000	976	381	199	99
9,000	989	383	200	99
10,000	1,000	385	200	99
15,000	1,034	390	201	99
20,000	1,053	392	204	100
25,000	1,064	394	204	100
50,000	1,087	397	204	100
100,000	1,099	398	204	100
>100,000	1,111	400	204	100
Adapted from: (Israel, 1992)				

[7] a : Assumption of normal population is poor (Yamane, 1967).

McCullough (2002) mentioned that 75 was the minimum sample size for any investigated cell to avoid any modelling error when carrying out CVM and CA methods and to ensure reliably estimation of data.

For this research, the sample size for Questionnaire 1 was three hundred and sixty (360) questionnaires in total collected from both study sites. One hundred and five (105) questionnaires were collected from Ras Al Hadd from the first fieldwork in the period of (3rd - 8th January 2016). An additional ninety one (91) questionnaires were collected from the second fieldwork at the same site conducted during the period of (26th-29th April 2016). Thus, in total one hundred and ninety six (196) completed questionnaires were collected from Ras Al Hadd. From the second site, Masirah Island, One hundred and sixty four (164) questionnaires were collected during the period of (9th -16th April 2016).

III. Data collection

Field visits were made prior the formation of the questionnaires to collect the primary data needed on marine turtle economic related factors in Turtle Reserve at Ras Al Hadd and Masirah Island. The questionnaire was designed in a process to maintain the validity as accurate as possible. Validity is defined as "the ability of an instrument to measure what it is designed to measure" (Vinet & Zhedanov, 2011) or in other words, "are we measuring what we think we are measuring ?"

There are three types of validity: 1) face and content validity which is the judgment that an instrument is measuring what it is supposed to and primarily based upon the logical link between the questions and the objectives of the study; 2) concurrent and predictive validity, concurrent validity is judged by how well an instrument compared with a second assessment. It is usually possible to express predictive validity in terms of a correlation between the predicted status and the criterion. Such a coefficient is called a validity coefficient. Predictive validity is judged by the degree to which an instrument can forecast an outcome; and, 3) construct validity, which is based upon statistical procedures. It is determined by ascertaining the contribution of each construct to the total variance observed in a phenomenon.

There are two approaches to establish the validity of an instrument for any type of validity used; the first one is to maintain the logical link between the objectives of the research and

the questions used in the instrument. The second one is the use of statistical analysis to demonstrate this link (Vinet & Zhedanov, 2011).

In this research, the validation of the questionnaire as mentioned in Table 3.2, was done through several procedures:

1. Expert opinion, the questionnaire was sent to thesis committee members for validation

2. Considered versions of questionnaires for similar cases in other countries published by well-known organization; World Tourism Organization (WTO), National Oceanic and Atmospheric Administration (NOAA), the World Bank (WB)

3. Focus group meeting involving experts from local government and non- government organizations (MECA, SQU, ESO and Five Oceans Environmental Services)

4. Pilot study which included a meeting with Sultan Qaboos University students (from the natural resource economics and marine science departments) to provide their feedback on the questionnaire.

5. Logical validation is conducted using follow-up questions. For example when asking a respondent's about their WTP for access fees or voluntary contribution a logical link was made to the respondent financial ability with regard to the income level and family size to confirm the answers given were reliable.

The personal interviews which is "A survey that gathers information through face-to-face contact with individuals" (Babin & Zikmund, 2015, page176) was used as a method to conduct this questionnaire. The method used to increase validity, reduce biasness and to increase the response rate as the categories chosen for this questionnaire cannot be reached by any other methods such as online, phone calls or mail.

The convenience sampling which is "The sampling procedure of obtaining those units or people who are most conveniently available" (Babin & Zikmund, 2015) was used as a procedure to conduct this questionnaire. This procedure was also chosen to increase the response rate especially with the tourist group.

IV.   Focus group

The planning and revising Questionnaire 1 started in in September 2016. Focus group meeting was carried out in the 13th of December 2016 to review the questions in the presence of thesis supervisor and co-supervisor. Members of this focus group were:

-       Mr Ali Al Kiyumi (MECA)

-       Mr Andrew Willson (Five Oceans Environmental Services)

-       Mrs Maia Sarrouf Wilson (ESO)

The comments of the focus group members on the questionnaire were about the sample size, location, validation of the questionnaire, more clarification to be given to the respondents with regards to the research information and the implantation process. They have also recommended that the field work should start at Masirah Island on April as it will be with the nesting season of loggerhead thus possible more tourists could come to the site for turtle watching.

V.   Pilot study

The questionnaire was discussed with a group of 10 postgraduates and undergraduates students including the research assistants. That was done as a trial to test the understanding of respondents to the questions and to estimate the timing needed to run the questionnaire with each respondent.

VI.   Addressing potential bias

According to Mitchell and Carson (1989), the potential response biases with CVM questionnaires (Table 3.1), could be:

1. Incentives to misrepresent responses from either a strategic or a compliance bias. In one hand, this could happen if the respondent misunderstands the way of provision of a good using the payment method than the researcher is pursuing. On the other hand, the respondent gives an answer to make a good impression that is not reflecting the true intended payment.

2. Implied value cues, this is an impression that might be given to the respondents because the interview is taken place because of this certain commodity; this sense of high importance was not given to them prior the interview.

3. Scenario misspecification: this could have three types of misspecifications:

    • Theoretical misspecification: the researcher build a scenario that might lead to different policy element or inconsistent with the economic theory.

    • Amenity misspecification if respondent value a good that is different from the one intended by the researcher.

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- Context misspecification in receiving different hypothetical market context than the one intended by the researcher in the property rights or payment vehicle or method of provision.

In this research these potential biases were reduced following Reaves et al., (1999) suggestions using different techniques for the estimates. This includes: 1) using payment card format not the open ended questions, 2) excluding the "I do not know" option from the Likert scale and 3) including a question on the payment method providing options for residents and nonresidents of the country.

Other types of potential biases such as: 1) range bias that could exist in payment card, was addressed in this research following (Reaves et al., 1999) through the pre-test of the questionnaire which was done with the pilot study and discussed with focus group, 2) the starting point bias which happen when respondents anchor their willingness to pay to the bid (Flachaire & Hollard, 2007), was addressed by using the starting amount of the bid as 5 OMR which is an existing amount for the access fees at the Ras Al Jinz Scientific and Visitors Centre at Ras Al Hadd. Other bias types that are 3) the question order bias 4) the self-selection bias and 5) the interviewer bias is addressed through focus group review, convenience sampling and training of research assistants respectively. Moreover, the issue of maintaining the group representatives was decided during the field work accordingly to ensure the representativeness of the targeted groups.

After a brief statement of the research and its objectives, the questionnaire was designed with three parts.

Part1: Background information

This background information included questions such as nationality, gender, age, income, years of education, occupation, place of residence and membership of any conservation agency.

Part 2: Site-specific information

This section included questions about the relative importance of the site to the respondent, threats to marine turtles (risk issues), and the respondent's willingness to pay a financial contribution for marine turtle conservation (the CVM part). The section was divided into two parts: WTP for the access fees (Q4.1) and WTP for the voluntary contribution (Q4.4). The current entrance fee for Ras Al Jinz visitors and scientific center for Omanis and

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residents is 3 OMR, which was used as a base bid for the entrance fees in question 4.1, whereas, the bid of the voluntary contribution in question 4.4 started with the value of 6 OMR.

Part 3: Site preferences for sea turtle watching

This final part included the conjoint analysis part of the questionnaire based on a series of potential scenario for turtle watching.

The following will present the questions (4.1 and 4.4 respectively) from questionnaire 1 that used to identify the respondent's willingness to pay for 1) access fees and 2) one time voluntary contribution, respectively.

Your Willingness of financial contribution for sea turtle conservation

Nature conservation is a costly endeavor for the Government of Oman. Typically, visitors to conservation areas are ask to pay to enjoy the services provided by the conservation effort (entrance fee, daily pass, etc.). Please evaluate from the list below your willingness to financially contribute to the conservation effort as a fee to access the site.

4.1 Ras Al Hadd is a Protected Area (PA) but Masirah Island is a proposed (PA). For the sake of conservation and protection of sea turtles, if this (PA) would need a financial support from the community, would you be willing to support this conservation effort through an entrance fee. Please tick for each OMR amount of contribution you are willing to pay. It would then become an obligation to see the turtle nesting in this site.

Access fees (OMR)	1	2	3	4
	Definitely yes	Probably yes	Probably no	Definitely no
3				
5				
6				
7				
8				
10				
12				
15				
20				

4.4 Turtles are considered by many as a "national treasure" or even a world heritage species. Wherever you live in Oman, or elsewhere in the world, would you consider voluntarily paying a one-time contribution for the conservation of sea turtle in the Sultanate? Please tick the amount that reflects best for each row, your willingness to contribute financially to this conservation effort.

One-time contribution (OMR)	1	2	3	4
	Definitely yes	Probably yes	Probably no	Definitely no
6				
10				
12				
20				
24				
30				
36				
40				
44				
48				
50				

3.3.3. Implementation

Prior to the field implementation of the questionnaire, a training was given to the research assistants by the main researcher and the thesis supervisor and co-supervisor. This was made to reduce variability, bias, misconduct or misunderstanding of the questions. The aim of this pre-training was also to increase the response rate from the targeted categories. For Ras Al Hadd, two research assistants were employed for the first field conduction in January 2017 and then four research assistants were employed to conduct the survey in April 2017. Whereas, for Masirah Island, six research assistants were employed to conduct the survey in April 2017. The research assistants were chosen based on their previous experience in conducting field surveys and their background (related work, research or education to the research topic). Most of the research assistants either had basic economics degree or they were working in marine related entities in the country. They were selected on their languages proficiency in both English and Arabic, facilitating interviews with possible respondents from different countries. The questionnaire was also translated to Arabic to limit possible ambiguity of questions. Logistic support was requested from the ESO and Ras Al Jinz Research and Visitor's Center, who provide the necessary support in the field such as giving announcements to tourists to attract their attention to the questionnaire and providing accommodation support for the research assistants. The first field survey, started in January 2017 (3rd -8th Jan 2017) to Ras Al Hadd followed by a field survey to Masirah Island (9th-16th April 2017) and back to Ras Al Hadd on (26th-29th April 2017). The weekends were part of the fieldwork each time to make sure to interview the domestic tourists in the questionnaire. The average time required for each questionnaire at Masirah Island was 20.61 minutes, whereas the average time required for each questionnaire at Ras Al Hadd was 16.83 minutes.

The timing of the field work was decided based on the number of visitors to Ras Al Jinz Research and Visitor's Center, which showed that the most significant increase for the number of tourists to Ras Al Hadd during the period of October to April each year (Table 2.5 at Chapter 2, section 2.4 Results). It was also decided based on the focus group recommendation based on the nesting season of loggerhead at Masirah Island.

The number of passengers to Masirah Island showed a similar pattern at the same period of the year based on the data collected from the National Ferries Companies (NFC) (Figure 2.1 at Chapter 2, section 2.4 Results).

3.4. Results

3.4.1. Descriptive results

10 explanatory variables were used for 196 interviews at Ras Al Hadd and for 164 interviews at Masirah Island. The variable of nationality was not used at the model because of the high correlation between place of residents and the nationality of the respondents (Appendix 2). For Masirah, as there was no hotels/guesthouse directly attached to the nesting thus, no guests were interviewed.

Table 3.4: Definition, mean, standard deviation and percentages of the variables used for the empirical analysis of WTP for access fees

Variable code	Definition	Response scale	Masirah Island Access fees		Ras Al Hadd Access fees	
			Mean	STD	Mean	STD
GEN	Gender	Male= 1, Female= 2	Percentages are displayed in figure 3.5			
AGE	Age (in years)	The mean of the age intervals	37.25	8.14	40.13	10.78
EDU	Education level	0 (illiterate)= 0, 1-12 years (High school diploma)= 1, 13-17 years (undergraduate)=2, 18-23 years (postgraduate)= 3, >23 years	1.89	0.68	2.42	0.63
INCOME	Monthly income in Omani Rial (OMR)	The mean of the income categories	1149.65	505.19	1327.90	597.37
RES	Place of residency	1= Oman, 2= GCC, 3= Other Arabian countries, 4= Europe, 5=Asia, 6=Other countries, later on it was changed for the modelling process to 1= Oman, 2= outside Oman	Percentages are displayed in figure 3.4			
WORK	Employment category (occupation)	Public sector =1, Private sector= 2, Self-employed= 3,Other= 4	Percentages are displayed in figure 3.9			
MEM	Membership of an Environmental Conservation Agency/Society/ Group	Yes= 1, No= 2	Percentages are displayed in figure 3.10			
Twatch	Watch the turtles before?	Yes= 1, No= 2	Percentages are displayed in figure 3.11			
CAT	Categories of the stakeholders for the questionnaire	Locals= 1, Tourists= 2, Guest of the resort= 3, Employee of the resort/hotel= 4	Percentages are displayed in figure 3.2			

Table 3.5: Definition, mean and standard deviation of the variables that were used for the modelling analysis with regard to WTP for voluntary contribution						
Variable code	**Definition**	**Response scale**	**Masirah Island Access fees**		**Ras Al Hadd Access fees**	
			Mean	**STD**	**Mean**	**STD**
GEN	Gender	Male= 1, Female= 2	Percentages are displayed in figure 3.5			
AGE	Age (in years)	The mean of the age intervals	36.71	8.10	39.76	10.26
EDU	Education level	0 (illiterate)= 0, 1-12 years (High school diploma)= 1, 13-17 years (undergraduate)=2, 18-23 years (postgraduate)= 3, >23 years	1.86	0.67	2.38	0.63
INCOME	Monthly income in Omani Rial (OMR)	The mean of the income categories	1116.10	496.29	1336.99	578.63
RES	Place of residency	1= Oman, 2= GCC, 3= Other Arabian countries, 4= Europe, 5=Asia, 6=Other countries, later on it was changed for the modelling process to 1= Oman, 2= outside Oman	Percentages are displayed in figure 3.4			
WORK	Employment category (occupation)	Public sector =1, Private sector= 2, Self-employed= 3,Other= 4	Percentages are displayed in figure 3.9			
MEM	Membership of an Environmental Conservation Agency/Society/ Group	Yes= 1, No= 2	Percentages are displayed in figure 3.10			
Twatch	Watch the turtles before?	Yes= 1, No= 2	Percentages are displayed in figure 3.11			
CAT	Categories of the stakeholders for the questionnaire	Locals= 1, Tourists= 2, Guest of the resort= 3, Employee of the resort/hotel= 4	Percentages are displayed in figure 3.2			

3.4.1.1 Demographic results

The results shown in Figure 3.2 to Figure 3.11 present the variation between the two sites in the respondents' demographic information.
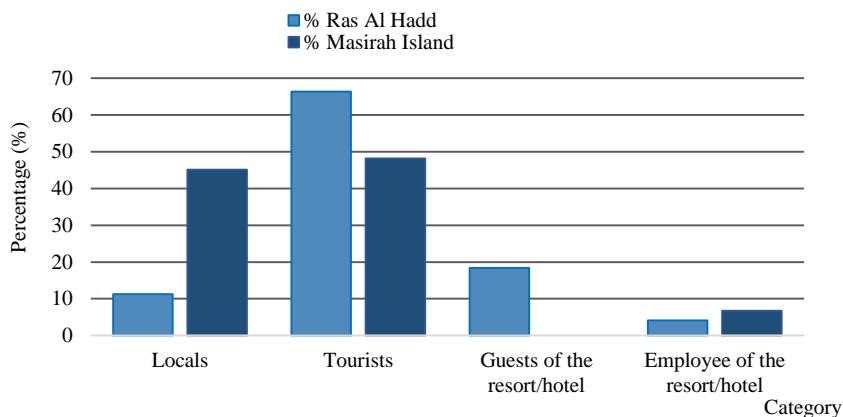
Figure 3.2: Categories of stakeholders (%) interviewed for Questionnaire 1
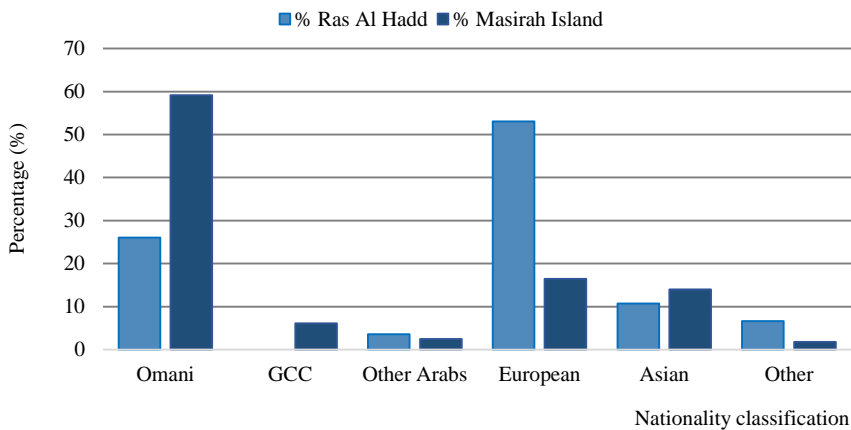
Figure 3.3: Nationality of stakeholders (%) interviewed for Questionnaire1
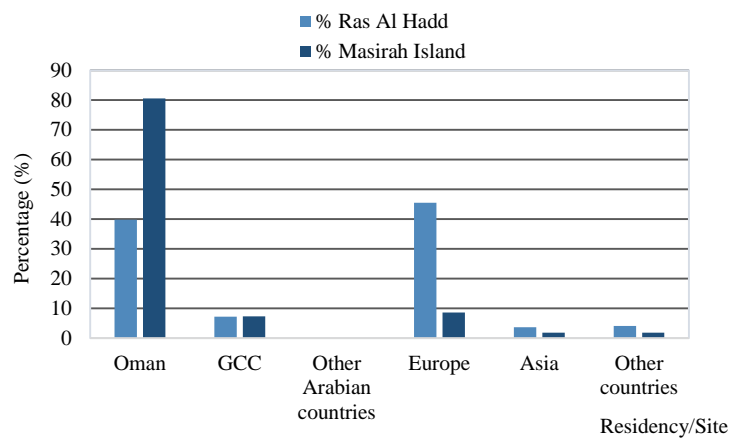
Figure 3.4: Place of residency of stakeholders (%) interviewed for Questionnaire 1
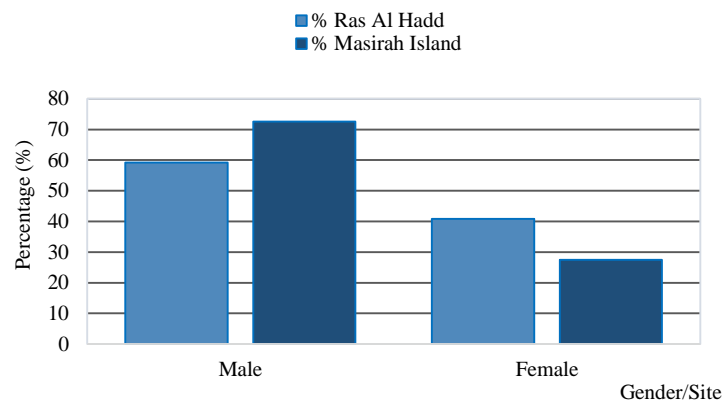
Figure 3.5: Gender of stakeholders (%) interviewed for Questionnaire 1
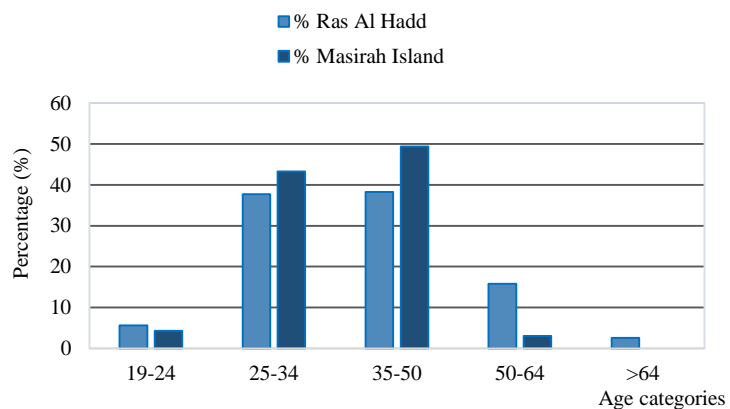
Figure 3.6: Age categories of stakeholders (%) interviewed for Questionnaire 1
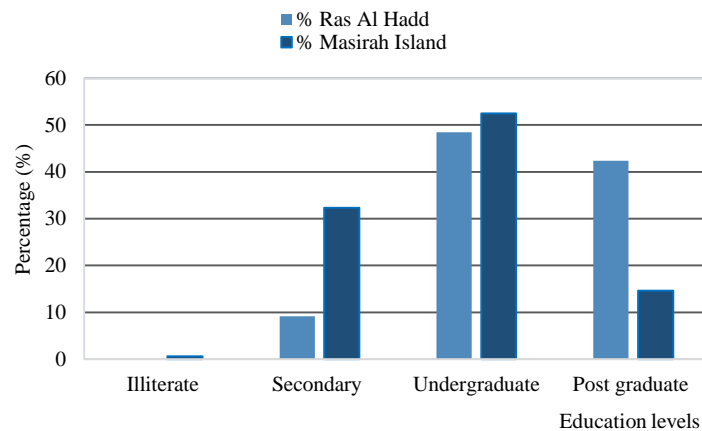
Figure 3.7: Education level of stakeholders (%) interviewed for Questionnaire 1

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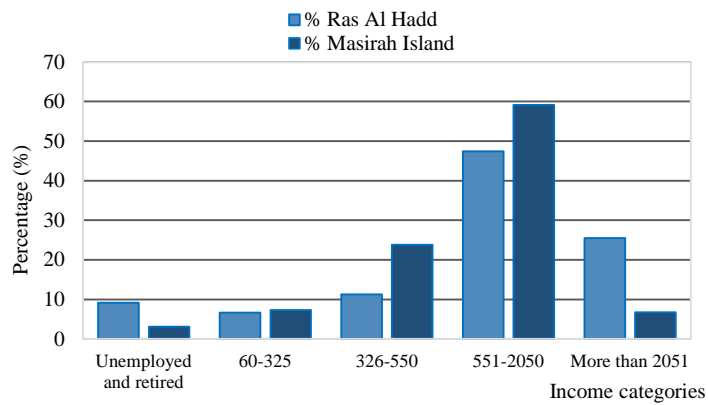
Figure 3.8: Income of stakeholders (%) interviewed for Questionnaire 1
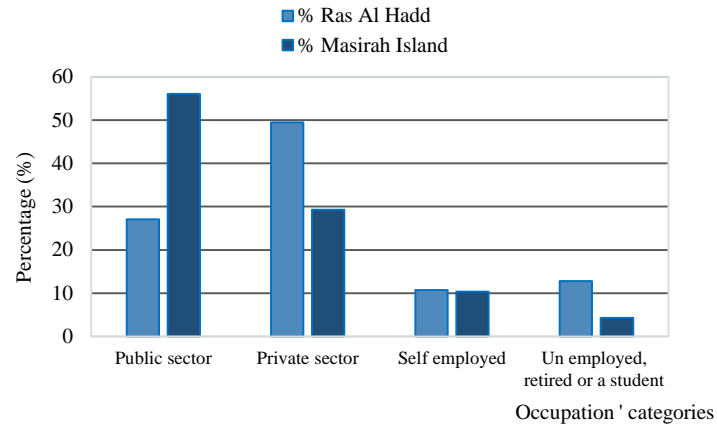
Figure 3.9: Occupation categories of stakeholders (%) interviewed for Questionnaire 1
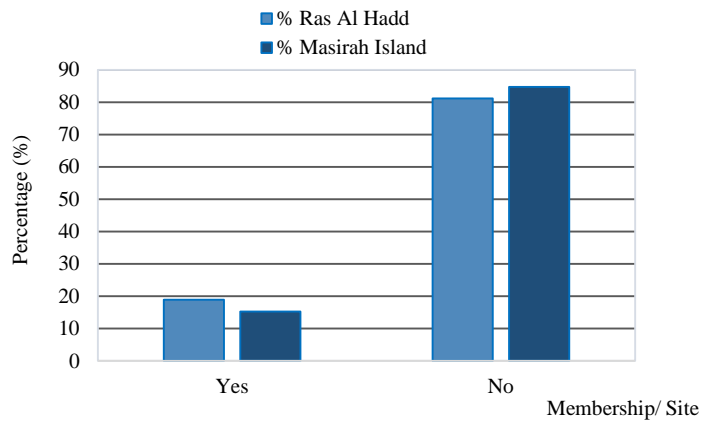
Figure 3.10: Membership of environmental entities of stakeholders (%) interviewed for Questionnaire 1
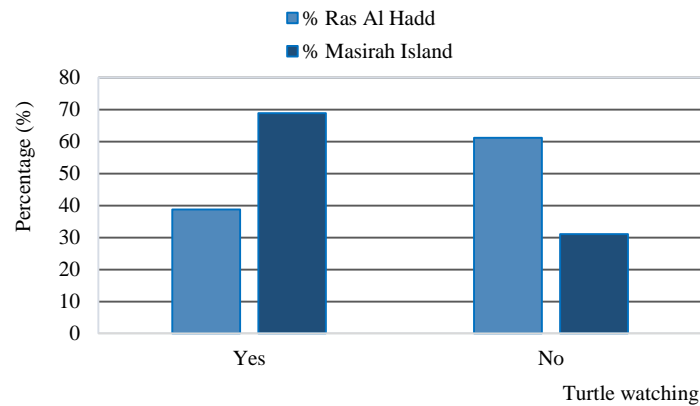
Figure 3.11: Turtle watching experience of stakeholders (%) interviewed for Questionnaire 1

I. Masirah Island

The categories of the respondents (CAT) at Masirah Islands were 48% tourists, 45% locals and 7% were employee of the resorts/hotels facilities at the site (Figure 3.2). With regards to nationalities (NAT), the majority of representative respondents were Omanis (59%), 16% European, 14% Asian, 6% citizens of the GCC countries, 2% Other Arabs (Citizens of the Arabian countries that are not part of the GCC countries and do not include Iranians and Turkish) and 2% from Other countries (Citizens that do not belong to the GCC, Asian, European or other Arabs) (Figure 3.3). In addition, in terms of residency status (RES), 80% of the respondents were Oman' residents, 9% are living in Europe, 7% are living in the GCC Countries, 2% are living in Asia and 2% are living in Other countries. No interviews were conducted to Arabian countries residents (Figure 3.4).

With regards to gender (GEN), 73% of males participated in the questionnaire on Masirah Island (Figure 3.5). Middle age respondents were dominant at Masirah Island in which; 49% were between the age of (35-50 years), 43% between the age of (25-34 years), 4% in the age category of (19-24) years, and 3% in the age category of (50-64 years). However there were no respondents from the group of older than 64 years responds at this site (Figure 3.6).

The education percentages (EDU) of the respondents at Masirah Island were as follow: 52% undergraduates (13-17 years), 32% High school diploma (1-12 years), 15% Postgraduate (18-23 years) and 1% Illiterate (Figure 3.7) .

In relation to income categories (INCOME) of the respondents at this site 59% had an income of 551-2050 OMR, 24% had an income of 326-550 OMR, 7% had an income of 60-325 OMR, similarly 7% had an income of more than 2051 OMR and 3% were unemployed or retired with zero income (Figure 3.8).

The occupation categories (WORK) at Masirah Island were showing that almost half of the respondents 56% are public workers, whereas 29% are working in the private sector, 10% are self-employed and 4% are unemployed retired or students (Figure 3.9).

The results of membership to environmental agency (MEM) of the respondents showed that, the majority of them (85%) were not members in any environmental conservation

agency, society or group (Figure 3.10). However, 69% of the respondents had enjoyed a turtle watching experience (Twatch) before (Figure 3.11).

II.   Ras Al Hadd

With regards to Ras Al Hadd respondents' categories (CAT) most of them were tourists with the percentage of 66%, 18% were guests of the reserve' resort, 11% were locals and 4% were employee of the resort/hotels facilities at Ras Al Hadd (Figure 3.2). Therefore in terms of nationalities (NAT), Europeans represented the highest percentage of 53%, followed by Omani's 26%, Asian 11%, Other 7% and finally Other Arabs with 4%. There were no respondents from the GCC countries (Figure 3.3). The residency status (RES) of these respondents were as the follow; 45% of the respondents were residents in various European countries, 40% were Oman' residents, 7% were GCC residents, 4% were Asian countries residents and 4% were Other countries residents (Figure 3.4).

Ras Al Hadd had the same result obtained at Masirah Island with regard to gender (GEN), in which males respondents represented the highest percentage (59%) (Figure 3.5).

The categories of age (AGE) of the respondents at this site were as follow; 38% between the age of 25 and 34 years, 38% in the 35-50 year age groups, 16% in the 50-64 years age groups, 6% between 19 and 24 years and 3% were older than 64 years (Figure 3.6).

In relation to the education level (EDU) of the respondents of Ras Hadd, 48% had Undergraduate degree (13-17 years), 42% had a Postgraduate education (18-23 years) and 9% had a High school diploma (1-12 years). No Illiterate responded to the questionnaire from Ras Al Hadd (Figure 3.7).

The income (INCOME) of the respondents of this site was as follow; 47% had an income of 551-2050 OMR, 26% had an income of more than 2051 OMR, 11% had an income of 60-325 OMR, 9% are unemployed, retired or student with no income and 7% have an income larger than 2051 OMR (Figure 3.8).

The occupation percentages (WORK) showed that almost half of Ras Al Hadd respondents are private sector workers (49%), whereas 27% are public sector servants, 13% are unemployed, retired or students and 11% are self-employed (Figure 3.9).

The results of membership (MEM) of the respondents at this site also showed similarity with the result obtained at Masirah Island in which the majority of the respondents (81%)

were not members in any environmental conservation agency, society or group (Figure 3.10) but only 39% had the experience of turtle watching (Twatch) before (Figure 3.11).

3.4.1.2 Voluntary payment mechanism

An additional question of the preferred mechanism of payment of the voluntary contribution was given to respondents to identify their preference. The options given to the respondents were: payment as a tax, as a part of utility bill, purchasing a quality souvenir or to state their own preferred option as other (Table 3.6).

Table 3.6: Voluntary payment mechanism				
Site	Tax	Part of utility bill	Purchasing a quality souvenir	Other
Masirah Island, Number of respondents willing to give voluntary contribution N=124	21	19	81	7
%	16.94	15.32	**65.32**	5.65
Ras Al Hadd, Number of respondents willing to give voluntary contribution N=166	56	18	60	50
%	33.73	10.84	**36.14**	30.12

The results showed that the preferred mechanism of payment the voluntary contribution for the marine turtle's conservation for the respondents from both sites was purchasing a quality souvenir (65.32% Masirah Island and 36.14% Ras Al Hadd).

3.4.1.3 Reasons for not willing to pay

Question 5 of the questionnaire was structured to get the reasons behind the respondents not willing to pay either access fees or voluntary contribution or both (Table 3.7).

Table 3.7: Masirah Island and Ras Al Hadd respondents answers for the reasons of no WTP, N number of respondents not willing to pay at Masirah Island was 60 (36.59% from the total respondents of 164) and 33 at Ras Al Hadd (16.84% from the total respondents of 196)

Question		Masirah Island				Ras Al Hadd			
		SA	A	D	SDA	SA	A	D	SDA
It is not worth paying for more conservation (I prefer things to stay the way they are)	count	12	15	18	15	5	6	11	11
	%[8]	20.00	25.00	30.00	25.00	15.15	18.18	33.33	33.33
I cannot afford paying money to this program	count	16	18	15	10	8	6	9	10
	%	26.67	30.00	25.00	16.67	24.24	18.18	27.27	30.30
I'm not convinced of the effect of protected area on turtle conservation	count	10	13	15	20	2	3	14	14
	%	16.67	21.67	25.00	33.33	6.06	9.09	42.42	42.42
It is the Omani government responsibility, not mine	Count	16	19	11	14	8	7	10	8
	%	26.67	31.67	18.33	23.33	24.24	21.21	30.30	24.24
There is no need for my contribution	Count	7	30	15	7	7	4	10	12
	%	11.67	50.00	25.00	11.67	21.21	12.12	30.30	36.36
We should not pay to enjoy Allah's given natural wonders	count	14	19	17.00	10	6	4	12	11
	%	23.33	31.67	28.33	16.67	18.18	12.12	36.36	33.33

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[8] For the Likert scale options (SA,A,D and SDA) the percentage calculation was made as the following (count of answer of question X / Total count of no WTP answers *100)

Table (3.7) shows that the main reason for not willing to pay for the respondents of Masirah Island was 'There is no need for my contribution'. Whereas, the main reasons for not willing to pay for Ras Al Hadd respondents were; 'I cannot afford paying money to this program and it is the Omani government responsibility, not mine'.

Table 3.8: Questionnaire 1 respondents preferred ways to volunteer at Masirah Island and Ras Al Hadd, N number of respondents not willing to pay at Masirah Island was 60 (36.59% from the total respondents of 164) and 33 at Ras Al Hadd (16.84% from the total respondents of 196)

Site	Masirah Island		Ras Al Hadd	
Results	**Count**	**%**	**Count**	**%**
Awareness campaigns	33	55.00	**21**	**63.64**
Patrolling	11	18.33	9	27.27
Raising funds	7	11.67	2	6.06
Guide tours	19	31.67	7	21.21
Scientific research	12	20.00	5	15.15
Beach cleanup	**36**	**60.00**	18	54.55
Other	1	1.67	2	6.06

As shown in (Table 3.7), 60 respondents from Masirah Island and 33 respondents from were not willing to pay. However, 46 respondents (76.67%) were willing to volunteer at Masirah Island and 26 respondents (78.79%) were willing to volunteer at Ras Al Hadd. The preferred way of volunteer for Masirah Island respondents was participating in beach cleanup campaigns followed by participating in raising awareness campaigns. Whereas, raising awareness was the preferred way to volunteer for the Ras Al Hadd respondents followed by participating in beach cleanup campaigns (Table 3.8).

3.4.2. Empirical results

I. Masirah Island Willingness to Pay through an access fee (Logit regression)

Table 3.9: Results of the Logit regression between willingness to pay for access fees and 10 variables for Masirah Island. N, the number of respondents was 164 who generated a total of 1404 observations								
Variable	**Coef.**	**SE**	**Wald**	**z-Statistic**	**P-value**	**(Odds-ratio)**	**95% C.I. for EXP(B)**	
						Exp (B)	**Lower**	**Upper**
Access Fees	-0.404	0.029	197.050	-14.037	<0.001	0.668	0.631	0.706
GEN	-0.543	0.194	7.810	-2.795	0.005	0.581	0.397	0.850
AGE	0.022	0.011	4.262	2.064	0.039	1.022	1.001	1.044
EDU	0.246	0.126	3.834	1.958	0.050	1.279	1.000	1.635
INCOME	0.001	<0.001	36.315	6.026	<0.001	1.001	1.001	1.002
RES	1.211	0.242	24.952	4.995	<0.001	3.357	2.087	5.398
WORK	0.337	0.118	8.202	2.864	0.004	1.401	1.112	1.765
MEM	-0.35	0.220	2.538	-1.593	0.111	0.705	0.458	1.084
Twatch	0.499	0.190	6.917	2.630	0.009	1.648	1.136	2.390
CAT	0.515	0.115	20.069	4.480	<0.001	1.674	1.336	2.097
Constant	-2.746	0.720	14.538	-3.813	<0.001	0.064		

Summary Statistics:			**Diagnostics: Model Selection Criteria**		
Mean (dependent variable)		0.262	Akaike Info Criterion (AIC)		0.755
SD (dependent variable)		0.440	Schwarz Criterion (SC)		0.796
McFadden R-squared		0.357	Hannan-Quinn Criterion (H-QC)		0.771
Cox & Snell R Square		0.337	Restr. Deviance		1615.304
Nagelkerke R Square		0.493	LR statistic = 576.967 (p value = <0.001)		
SSE (Sum Squared Error)			162.545		
Log likelihood			-519.169		
SE of regression			0.342		
% of correct prediction			73.800		
Mean WTP (OMR)			4.750 (10000 replications)		
95% Confidence Interval (OMR): Lower limit 4.240 and Upper limit 5.180					

Out of 10 explanatory variables, 8 were statistically significant at the conventional level of significance (1% or 5%): access fees (Access Fees), gender (GEN), income (INCOME), place of residence (RES), occupation (WORK), turtle watching experience (Twatch), the categories of the respondents (CAT) were significant at the 1% level. On the other hand, Age (AGE) was significant at the 5% level. The sign of the estimated coefficient assess the relationship between the dependent and independent variables. The following section provides the interpretation of the significant variables in terms of the corresponding odd-ratio as explained earlier. The non-significant variables were education (EDU) and the membership of an environmental conservation agency/society/group (MEM) (Table 3.9).

Access fees (Access Fees): The estimated coefficient carried a negative sign. This is consistent with the theory of demand, which states that, other things being equal, if the price of the product increases the quantity demand for the product decreases. The odd ratio was 0.668. This indicates if the access fees change by one unit, the odds in favor of WTP decreased by 0.668 times.

Gender (GEN): The estimated coefficient also carried a negative sign, which implies if the variable changed by a unit, the odds in favor of WTP decreases. The odds ratio of 0.581 indicates that female respondents were 0.581 times less likely to pay the amount of access fees than male respondents.

Age (AGE): The estimated coefficient of this variable carried a positive sign. The odds ratio was 1.022. Thus, if the variable of age changed on average by one unit the odds in favor of WTP increases by 1.022 times. Elder Respondents (age higher than 32 years on average) were 1.022 times more likely to pay the mandatory access fees. However, although income was statistically significant, its influence is very negligible

Income (INCOME): The estimated coefficient of income carried a positive sign which indicates that if the variable of income changed on average by one unit the odds in favor of WTP increases. The odds ratio was 1.001. Thus respondents with higher income (The calculated mean of income of the respondents at this site was 1149.648 OMR) were 1.001 times more likely to pay the mandatory access fees.

Place of residence (RES): The sign of the estimated coefficient was positive. The odds ratio was 3.357. This implies, if the variable of place of residence changed from Oman to other countries, the odds in favor of WTP increase by 3.357 times. This indicates that

residents of other countries than Oman show 3.357 times more likely to pay the mandatory access fees.

Occupation (WORK): The estimated coefficient for this variable also carried a positive sign. The odds ratio was 1.401. Thus if the occupation changed from the public sector to other sectors such as private sector or business, the odds in favor of WTP increase by 1.401 times. This indicates that, the respondents working in other than the public sector were 1.401 times more likely to pay the mandatory access fees.

Turtle watching experience (Twatch): The estimated coefficient carried a positive sign. Which indicates that if the variable changed by one unit, the odds in favor of WTP increase. The odds ratio was 1.648. Thus, the respondents that have not yet experienced turtle watching were 1.648 times more likely to pay the mandatory access fees.

Category (CAT): The estimated coefficient of this variable carried a positive sign. The odds ratio was 1.674. So if the variable changed by one unit the odds in favor of WTP increase by 1.674 times. This implies that respondents other than locals were 1.674 times more likely to pay the mandatory access fees.

The calculated mean of WTP for access fees at Masirah Island was 4.750 OMR with 95% level confidence interval of 5.180 OMR and 4.240 OMR.

II. Masirah Island Willingness to pay through voluntary contribution (Logit regression)

Table 3.10: Results of the Logit regression between willingness to pay for voluntary contribution and 10 variables for Masirah Island. N, the number of respondents was 164 who generated a total of 1738 observations

Variable	Coef.	SE	Wald	z-Statistic	P-value	(Odds-ratio) Exp (B)	95% C.I. for EXP(B) Lower	Upper
CONT	-0.088	0.005	291.610	-17.077	<0.001	0.916	0.907	0.925
GEN	0.703	0.165	18.088	4.253	<0.001	2.020	1.461	2.793
AGE	0.017	0.009	3.660	1.913	0.056	1.017	1.000	1.035
EDU	-0.514	0.106	23.590	-4.857	<0.001	0.598	0.486	0.736
INCOME	0.001	<0.001	42.373	6.509	<0.001	1.001	1.001	1.001
RES	-0.169	0.212	0.632	-0.795	0.427	0.845	0.558	1.280
WORK	-0.190	0.094	4.084	-2.021	0.043	0.827	0.688	0.994
MEM	-0.569	0.191	8.844	-2.974	0.003	0.566	0.389	0.824
Twatch	0.108	0.156	0.483	0.695	0.487	1.115	0.821	1.513
CAT	0.139	0.091	2.326	1.525	0.127	1.150	0.961	1.375
Constant	0.658	0.662	0.988	0.994	0.320	1.931		

Summary Statistics:		Diagnostics: Model Selection Criteria	
Mean(dependent variable)	0.253	Akaike Info Criterion (AIC)	0.869
SD (dependent variable)	0.435	Schwarz Criterion (SC)	0.904
McFadden R-squared	0.242	Hannan-Quinn criter (H-QC)	0.882
Cox & Snell R Square	0.239	Restr. deviance	1964.502
Nagelkerke R Square	0.354	LR statistic = 475.759 (p value = <0.001)	
SSE (Sum squared resid)	238.641		
Log likelihood	-744.372		
S.E. of regression	0.372		
% of correct prediction	74.700		
Mean WTP (OMR)	11.480 (10000 replications)		
95% Confidence Interval (OMR):	Lower limit 9.540 and Upper limit 13.190		

Out of 10 explanatory variables, 6 variables were statistically significant at the conventional level (1% or 5%). Five variables were significant at 1% level namely, voluntary contribution (CONT), gender (GEN), education (EDU), income (INCOME) and the membership of an environmental conservation agency/society/group (MEM). Occupation (WORK) was significant at the 5% level and 3 variables did not contribute significantly to the model: age (Age), place of residency (RES), turtle watching (Twatch) and the category of the respondents (CAT) (Table 3.10). The following section provides the interpretation of the significant variables.

Voluntary contribution (CONT): The estimated coefficient carried a negative sign. The odd ratio was 0.916. This implies that if the variable changed by one unit the odds in favor of WTP decrease by 0.916 times. Thus respondents were 0.916 times less likely to make a voluntary contribution for the conservation of marine turtles.

Gender (GEN): The sign of the estimated coefficient was positive. The odd ratio was 2.020. This indicates that if the variable changed by one unit the odds in favor of WTP increase by 2.020 times. Thus females were 2.020 times more likely to pay the voluntary contribution than males. The result obtained here was different from the one obtained in the mandatory access fees where females showed less WTP.

Education (EDU): The estimated coefficient of this variable carried a negatives sign. The odd ratio was 0.598. So if this variable changed on average by one unit, the odds in favor of WTP decrease by 0.598 times. This implies that respondents with higher degree than high school certificate were 0.598 times less likely to pay the voluntary contribution to the marine turtle conservation in Oman. The result obtained was different from the one obtained for the mandatory access fees payment at this site where respondents with higher education showed higher willingness to pay.

Income (INCOME): The estimated coefficient carried a positive sign. The odd ratio was 1.001. Thus, if this variable changed on average by one unit, the odds in favor of WTP increase by 1.001 times. This indicated that respondents with higher income (mean is 1116.076 OMR) were 1.001 times more likely to pay the voluntary contribution.

Occupation (WORK): The estimated coefficient for this variable also carried a negative sign. The odd ratio was 0.688. Thus if this variable changed by one unit, the odds in favor of WTP decrease by 0.688 times. This indicates that, respondents who work in the public

sector were 0.688 times more likely to pay the voluntary contribution to the marine turtle conservation. The result obtained is different from the mandatory access fees in which respondents working at the public sector showed less WTP.

Membership of an environmental conservation agency/society/group (MEM): The estimated coefficient carried a negative sign. The odd ratio was 0.566. So, if this variable changed by one unit, the odds in favor of WTP decrease by 0.566 times. This implies that respondents with a membership to an environmental conservation agency/society/group were 0.566 times more likely to pay the voluntary contribution to the marine turtle conservation in Oman.

The calculated mean of WTP for voluntary contribution at Masirah Island was 11.480 OMR with 95% level confidence interval of 13.190 OMR and 9.540 OMR.

III. Ras Al Hadd Willingness to Pay through an access fee (Logit regression)

Table 3.11: Results of the Logit regression between willingness to pay for access fees and 10 variables for Ras Al Hadd. N, the number of respondents was 196 who generated a total of 1593 observations

Variable	Coef.	SE	Wald	z-Statistic	P-value	(Odds-ratio)	95% C.I. for EXP(B)	
						Exp (B)	Lower	Upper
Access Fees	-0.320	0.018	317.083	-17.807	<0.001	0.726	0.701	0.752
GEN	0.483	0.152	10.139	3.184	0.001	1.621	1.204	2.183
AGE	-0.017	0.007	6.633	-2.575	0.010	0.983	0.971	0.996
EDU	0.319	0.117	7.438	2.727	0.006	1.375	1.094	1.729
INCOME	0.001	<0.001	42.877	6.548	<0.001	1.001	1.001	1.001
RES	1.501	0.173	75.007	8.661	<0.001	4.486	3.194	6.301
WORK	0.381	0.091	17.53	4.187	<0.001	1.464	1.225	1.75
MEM	0.040	0.174	0.054	0.232	0.817	1.041	0.741	1.463
Twatch	0.393	0.152	6.698	2.588	0.010	1.482	1.100	1.996
CAT	0.174	0.105	2.719	1.649	0.099	1.190	0.968	1.462
Constant	-2.992	0.561	28.426	-5.332	<0.001	0.050		

Summary Statistics:		Diagnostics: Model Selection Criteria	
Mean (dependent variable)	0.514	Akaike Info Criterion (AIC)	0.910
SD (dependent variable)	0.500	Schwarz Criterion (SC)	0.947
McFadden R-squared	0.353	Hannan-Quinn criter (H-QC)	0.924
Cox & Snell R Square	0.387	Restr. deviance	2207.096
Nagelkerke R Square	0.516	LR statistic= 778.962 (p value = <0.001)	
SSE (Sum Squared Error)	226.172		
Log likelihood	-714.067		
SE of regression	0.378		
% of correct prediction	51.400		
Mean WTP (OMR)	9.490 (10000 replications)		
95% Confidence Interval (OMR):	Lower limit 9.080 and Upper limit 9.910		

Out of 10 explanatory variables, 8 variables were statistically significant at 1% level, namely access fees (Access Fees), gender (GEN), age (AGE), education (EDU), income (INCOME), place of residency (RES), occupation (WORK) and turtle watching experience (Twatch). Two variables did not contribute significantly to the mode: membership of an environmental conservation agency/society/group (MEM) and the category of the respondents (CAT) (Table 3.11). The following section provides the interpretation of the significant variables.

Access fees (Access Fees): The estimated coefficient of the variable carried a negative sign. The odds ratio was 0.726. Thus, if the access fees changed by one unit, the odds in favor of WTP decrease by 0.726 times. The result is consistent with the theory of demand.

Gender (GEN): The estimated coefficient of the variable carried a positive sign. The odd ratio was 1.621. This indicates that if this variable changed by one unit, the odds in favor of WTP increases by 1.621 times. So females were 1.621 times more likely to pay the mandatory access fees from the male respondents.

Age (AGE): The estimated coefficient of the variable carried a negative sign. The odd ratio was 0.983. This indicates that, if this variable changed on average by one unit, the odds in favor of WTP decrease by 0.983 times. So, younger respondents (age equal or less than 65 years) were 0.983 more likely to pay the mandatory access fees from their counterparts respondents.

Education (EDU): The estimated coefficient of this variable carried a positive sign. The odd ratio was 1.375. So if this variable changed on average by one unit, the odds in favor of WTP increase by 1.375 times. Respondents with higher education level than high school diploma were 1.375 times more likely to pay the mandatory access fees.

Income: The estimated coefficient carried a positive sign. The odd ratio was 1.001. This implies that if the variable of income changed on average by one unit the odds in favor of WTP increases by 1.001 times. Thus, respondents with higher income were 1.001 times more likely to pay the mandatory access fees. The calculated mean of income related to respondents at this site was 1327.896 OMR.

Place of residencey (RES): The coefficient carried a positive sign. The odds ratio was 4.486. Thus, if the variable of place of residence changed by one unit, the odds in favor of

WTP increase by 4.486 times. This indicates that residents of other countries than Oman showed 4.486 times more likely to pay the mandatory access fees.

Occupation (WORK): The estimated coefficient for this variable also carried a positive sign. The odds ratio was 1.464 indicating that if this variable changed by one unit, the odds in favor of WTP increases by 1.464 times. Thus, the respondents working in other than the public sector were 1.464 times more likely to pay the mandatory access fees.

Turtle watching experience (Twatch): The estimated coefficient for this variable also carried a positive sign. The odds ratio was 1.482 indicating that if the variable changed by one unit, the odds in favor of WTP increase by 1.482 times. Thus, the respondents that have not yet experienced turtle watching were 1.482 times more likely to pay the mandatory access fees.

The calculated mean of WTP for access fees at Ras Al Hadd was 9.490 OMR with 95% level confidence interval of 9.910 OMR and 9.080 OMR.

IV. Ras Al Hadd Willingness to pay through voluntary contribution (Logit regression)

Table 3.12: Results of the Logit regression between willingness to pay for voluntary contribution and 10 variables for Ras Al Hadd. N, the number of respondents was 196 who generated a total of 1947 observations

Variable	Coef.	SE	Wald	z-Statistic	P-value	(Odds-ratio) Exp (B)	95% C.I. for EXP(B) Lower	Upper
CONT	-0.095	0.005	407.322	-20.182	<0.001	0.910	0.901	0.918
GEN	0.179	0.136	1.741	1.320	0.187	1.196	0.917	1.56
AGE	-0.032	0.006	27.178	-5.213	<0.001	0.969	0.957	0.98
EDU	-0.296	0.105	7.988	-2.826	0.005	0.743	0.605	0.913
INCOME	0.001	<0.001	21.614	4.649	<0.001	1.001	1.000	1.001
RES	-0.091	0.157	0.336	-0.580	0.562	0.913	0.671	1.242
WORK	0.265	0.080	11.010	3.318	0.001	1.303	1.114	1.524
MEM	-0.183	0.153	1.440	-1.200	0.230	0.833	0.617	1.123
Twatch	0.054	0.142	0.142	0.377	0.706	1.055	0.799	1.394
CAT	-0.049	0.093	0.283	-0.532	0.595	0.952	0.794	1.142
Constant	2.571	0.499	26.589	5.156	<0.001	13.081		

Summary Statistics:		Diagnostics: Model Selection Criteria	
Mean (dependent variable)	0.303	Akaike Info Criterion (AIC)	0.916
SD (dependent variable)	0.459	Schwarz Criterion (SC)	0.948
McFadden R-squared	0.262	Hannan-Quinn criter (H-QC)	0.928
Cox & Snell R Square	0.274	Restr. deviance	2386.950
Nagelkerke R Square	0.388	LR statistic = 624.549 (p value = <0.001)	
SSE (Sum Squared Error)	281.348		
Log likelihood	-881.201		
SE of regression	0.381		
% of correct prediction	69.700		
Mean WTP (OMR)	16.210 (10000 replications)		
95% Confidence Interval (OMR):	Lower limit 14.770 and Upper limit 17.500		

Out of 10 explanatory variables; 5 variables were statistically significant at 1% level, namely voluntary contribution (CONT), age (AGE), education (EDU), income (INCOME), and occupation (WORK). The other 5 variables that did not contribute significantly to the model were: gender (GEN), place of residence (RES), membership of an environmental conservation agency/society/group (MEM), Turtle watching (Twatch) and the category of the respondents (CAT) (Table 3.12). The following section provides the interpretation of the significant variables.

Voluntary contribution (CONT): The estimated coefficient carried a negative sign. The odd ratio was 0.910. This implies that if the variable changed by one unit the odds in favor of WTP decrease by 0.910 times. Thus respondents were 0.910 times less likely to make a voluntary contribution for the conservation of marine turtles.

Age (AGE): The estimated coefficient of the variable carried a negative sign. The odd ratio was 0.969. This indicates that if this variable changed on average by one unit, the odds in favor of WTP decrease by 0.969 times. So, younger respondents (age equal or less than 65 years) were 0.969 times more likely to pay the voluntary contribution from their counterparts.

Education (EDU): The estimated coefficient of this variable carried a negatives sign. The odd ratio was 0.743. So if this variable changed on average by one unit, the odds in favor of WTP decrease by 0.743 times. This implies that respondents with higher education level than high school certificate were 0.743 times less likely to pay the voluntary contribution to the marine turtle conservation in Oman.

Income (INCOME): The estimated coefficient carried a positive sign. The odd ratio was 1.001. Thus, if this variable changed on average by one unit, the odds in favor of WTP increase by 1.001 times. This indicate that respondents with higher income (mean was 1336.987 OMR) were 1.001 times more likely to pay the voluntary contribution.

Occupation (WORK): The estimated coefficient for this variable carried a positive sign. The odd ratio was 1.303. Thus, if this variable changed by one unit, the odds in favor of WTP increase by 1.303 times. This indicates that, respondents working in other than the public sector were 1.303 times more likely to pay the voluntary contribution to the marine turtle conservation.

The calculated mean of WTP for voluntary contribution at Ras Al Hadd was 16.210 OMR with 95% level confidence interval 17.500 OMR and 14.770 OMR.

V. Scope-test results: Mandatory contribution (access fees)

Table 3.13: Logit regression results for scope test value of the mandatory contribution. N, the number of respondents was 360 who generated a total of 2997 observations

Variable	Coef.	SE	Wald	z-Statistic	P-value	(Odds-ratio) Exp (B)	95% C.I. for EXP(B)	
							Lower	Upper
Access Fees	-0.342	0.015	512.457	-22.638	<0.001	0.711	0.690	0.732
D_{Sites}	0.263	0.116	5.108	2.261	**0.024**	1.301	1.036	1.635
GEN	0.092	0.113	0.667	0.816	0.414	1.097	0.879	1.370
AGE	-0.005	0.006	0.958	-0.979	0.328	0.995	0.984	1.005
EDU	0.321	0.082	15.258	3.906	<0.001	1.378	1.173	1.619
INCOME	0.001	<0.001	68.822	8.296	<0.001	1.001	1.001	1.001
RES	1.522	0.135	127.963	11.312	<0.001	4.580	3.518	5.961
WORK	0.351	0.069	25.951	5.094	<0.001	1.420	1.241	1.625
MEM	0.001	0.134	<0.001	0.009	0.993	1.001	0.769	1.303
Twatch	0.443	0.116	14.644	3.827	<0.001	1.558	1.241	1.954
CAT	0.323	0.076	18.041	4.247	<0.001	1.382	1.190	1.604
Constant	-3.599	0.405	79.078	-8.893	<0.001	0.027		

Summary Statistics:		Diagnostics: Model Selection Criteria	
Mean (dependent variable)	0.396	Akaike Info Criterion (AIC)	0.846
SD (dependent variable)	0.489	Schwarz Criterion (SC)	0.870
McFadden R-squared	0.376	Hannan-Quinn criter (H-QC)	0.855
Cox & Snell R Square	0.396	Restr. deviance	4024.269
Nagelkerke R Square	0.536	LR statistic = 1512.069 (p value = <0.001)	
SSE (Sum Squared Error)	396.009		
Log likelihood	-1256.100		
SE of regression	0.364		
% of correct prediction	60.400		

VI. Scope-test results: Voluntary contribution

Table 3.14: Logit regression results for scope test value of the voluntary contribution. N, the number of respondents was 360 who generated a total of 3685 observations

Variable	Coef.	SE	Wald	z-Statistic	P-value	(Odds-ratio) Exp (B)	95% C.I. for EXP(B) Lower	Upper
CONT	-0.091	0.003	698.538	-26.430	<0.001	0.913	0.907	0.919
D_{Sites}	0.421	0.107	15.596	3.949	**<0.001**	1.523	1.236	1.877
GEN	0.385	0.100	14.944	3.866	<0.001	1.470	1.209	1.788
AGE	-0.017	0.005	13.097	-3.619	<0.001	0.983	0.973	0.992
EDU	-0.345	0.072	22.741	-4.769	<0.001	0.708	0.615	0.816
INCOME	0.001	<0.001	54.430	7.378	<0.001	1.001	1.000	1.001
RES	-0.148	0.120	1.519	-1.233	0.218	0.862	0.681	1.091
WORK	0.075	0.059	1.645	1.283	0.200	1.078	0.961	1.209
MEM	-0.3	0.116	6.693	-2.587	0.010	0.741	0.590	0.930
Twatch	0.008	0.102	0.006	0.080	0.936	1.008	0.826	1.231
CAT	0.012	0.064	0.032	0.180	0.857	1.012	0.893	1.147
Constant	1.386	0.356	15.197	3.898	<0.001	3.999		

Summary Statistics:		Diagnostics: Model Selection Criteria	
Mean (dependent variable)	0.279	Akaike Info Criterion (AIC)	0.901
SD (dependent variable)	0.449	Schwarz Criterion (SC)	0.921
McFadden R-squared	0.2445	Hannan-Quinn criter (H-QC)	0.908
Cox & Snell R Square	0.251	Restr. deviance	4362.869
Nagelkerke R Square	0.362	LR statistic =1066.791 (p value = <0.001)	
SSE (Sum Squared Error)	527.174		
Log likelihood	-1648.039		
SE of regression	0.378849		
% of correct prediction	72.100		

The results presented in Table 3.13 and 3.14 showed that coefficients of "D_{Site}" were significant at 5% and 1% level respectively for both cases of mandatory access fees and voluntary contribution.

3.5. Discussion

3.5.1. Descriptive results

3.5.1.1 Demographic results

The percentage of nationalities showed the similarity in the categories in both sites where tourists represents the highest with the difference in nationalities between both sites where Omani's were the highest at Masirah Island and European were the highest at Ras Al Hadd. This could be due the fact that most of the interviews at the Ras Al Hadd were carried out at the Visitors and Scientific center at Ras Al Jinz which is a visitors facility and during the peak season at the site which is featured by international tourists coming before and after the summer period and this was reflected in the highest category of the respondents that are European countries residents (45%). Moreover, Omani's represents relatively less proportion of the interviewed stakeholders however this does not necessarily represent the exact numbers of visitors as most of them came to the center with families (mostly children under the age of the targeted age groups; ≥ 18 years). Locals were invited to participate in the questionnaire and their number was lower than tourists. On the other hand, Omanis (Tourists 48% and locals 45%) were higher at Masirah Island and this site is mainly featured by the domestic tourists. This could be also related to the fact the highest portion of the respondents were Oman's residents at this site (80%).

The results of gender have shown that males' respondents are higher in percentage than females. However, this does not represent the fact that females are less interested in turtle watching but this happened due to the fact that many of them were taking care of their children during the survey or because of cultural barrier as most of the research assistants were males.

Middle age respondents' (35- 50 years) were the dominant age group at both sites. This might be due to their interest to give their feedback in the whole process and in viewing marine turtles. Similar result obtained for the education categories in which the dominant education category was the undergraduates (13-17 years) for both sites. The similarity between both sites was also witnessed in income in which the category of (551-2050 OMR) was the dominant one.

The higher percentage of respondents that do not have membership of any environmental conservation agency, society or group reflects an important fact that it is not necessary to be a member to show an interest for turtle watching. At Ras Al Hadd most of the respondents were tourists and interviewed in a tourism facility for turtle watching but they are not members. This is important in developing opportunities for the economic potentials for this sector as it shows that it will attract all categories and not only the environmentalists.

The percentage of the respondents that enjoyed the experience in turtle watching was lower at Ras Al Hadd (39%) and higher at Masirah Island (69%). This could be related to the fact that Ras Al Hadd is a natural reserve since 1996 and thus there is a restriction in access to the nesting beaches which is not the case at Masirah Island were tourists and local can enjoyed the open access to the nesting beaches. Moreover, the higher percentage of respondents at Ras Al Hadd were tourists interviewed at the center and the majority of them were waiting to go to turtle tour for the first time in their lives.

3.5.1.2 Reasons for not willing to pay

The results of volunteering in which the opposite preferred volunteering activities were chosen from the study sites respondents reflect that way of thinking of the respondents of that sites that why respondents of Ras Al Hadd were more considered to be involved in participating in raising awareness campaigns as they were more organized because of the development of the area and the witnessed opportunities generated from marine turtle and the threats on these species. Whereas, at Masirah Island the respondents were more considering in participating in cleanup campaigns as this might be the demanding issue at the site that is still in its way to witness any development related to marine turtles.

3.5.2. Empirical results

The results of mandatory access fees estimated at both site showed similarities in the significance of variable with some of them showing difference of behavior of the respondents towards their WTP as the bid value increases. This kind of findings resulted from implementing a mandatory bid was also identified in (Jin et al., 2010) where respondents of four cities; Beijing (China), Davao (the Philippians), Bangkok (Thailand) and Ho Chi Minh/ Hanoi (Vietnam) showed less WTP to the mandatory bids (0.02 – 7.5 USD$) for marine turtle conservation which is also as stated earlier, consistent with the theory of demand.

The mean of WTP at Ras Al Hadd (9.490 OMR at 95% level) is higher than the one calculated at Masirah Island (4.750 OMR at 95% level). This was expected result as process of imposing access fees for turtle watching is already applied at Ras Al Hadd but it is not at Masirah Island. Thus, the perception of respondents at Masirah Island was conservative in this issue. Females at Ras Al Hadd showed more WTP than those at Masirah Island. This might be due to the priories and the quota of respondents at both sites from this gender. However, from the field work it was clear that the perception of females at Masirah Island was showing less WTP.

Moreover, the age category also showed contradictory result in which elder respondents are more WTP at Masirah Island and younger respondents are more WTP at Ras Al Hadd. This was consistent with the results obtained by (Sakurai, Ota, Uehara, & Nakagami, 2016).

Other variables: income, place of residence, occupation education and turtle watching experience show the same behavior. For education results the finding was supported by the study of (Jin et al., 2010) in which it is consistent with the fact the more educated people have the more awareness of the social, political, economic and environmental issues Membership of an environmental Conservation Agency/Society/Group was not significant variable at both sites whereas category of the respondents was only significant at Masirah Island in which respondents other than locals (Omanis and non-Omanis living in Masirah) shows more WTP.

The results of the voluntary contribution estimated at both sites also showed similarities in significant variables but with some differences in their behavior as bid value increases.

The calculated mean of voluntary contribution at Masirah Island was 11.480 OMR which was lower than the one calculated at Ras Al Hadd, 16.210 OMR. Similar to the case of mandatory access fees this was expected result for the same reason. Public workers at Ras Al Hadd showed less WTP than those at Masirah Island. Other variables of education and income showed similar behavior at both sites as they have positive relationship with the increase in the bid values. Gender and membership of an environmental Conservation Agency/Society/Group were only significant at Masirah Island were they impose an impact on the WTP process and this was observed during the interviews conducted at the field work. Age is significant only at Ras Al Hadd were younger respondents showed more WTP than elders. Variables of place of residence, Turtle watching experience and category were not significant at both sites.

The scope test results presented in Tables 3.13 and 3.14 revealed that D_{Site} variable was significant for both cases (the access fees and the voluntary contribution) at the 5% and 1% level respectively. Thus the null hypothesis should be rejected and the alternative hypothesis should be accepted. This suggests that two sites differ significantly and therefore each site has to be studied separately to derive any estimates of WTP for policy recommendation.

3.5.3 Difficulties

During the fieldwork difficulties arise. Some were general whereas others were site specific especially with the lack of understanding of respondents to the objective of this research. However, this was clarified during the interviews by the research assistants. Other issues were related to identifying the predefined category groups especially at Masirah Island as there were no specific center for visitors on the island except the hotels and resorts unlike in Ras Al Hadd were categories groups especially tourists were easy to find during the specific hours for turtle watching at the visitor's center. Other difficulties were related to low number of assistants (only 2 assistants) during the first fieldwork at Ras Al Hadd as there were no available funding for the research and the researcher was unable to get any financial support. Thus, the team (the researcher and the two assistants) had to stay extra days to complete the predefined number of interviews for the first questionnaire. Other issues were related to the respondents. Some of them refused to participate in the questionnaire either because some of them feeling tired from a long drive, wanted to have their dinner before the turtle watching tour start, or were busy with their kids or because of the language barrier as some of them they did not speak neither English nor Arabic. In addition, some of them came late from the watching tour and thus many of them were tired and reluctant to participate in the interviews though some of them promised to do that after coming back from the turtle tour. With the limited number of research assistants, it was hard to cover the large numbers of visitors coming to the center at the same time; 7-9 pm. Approximately, 175 - 200 people come each night for the turtle watching at the center. The quota for the number of visitors going to the nesting beach for turtle watching is restricted to 200 for the evening time and 100 for the morning time which is set as a monitory regulation by the Ministry of Environment and Climate Affairs (MECA). Guests of the resort are also included in the interviews along with the other visitors.

3.6 Conclusion and policy recommendations

3.6.1 Policy recommendations

From the empirical estimate (provided in this chapter) of the mean willingness to pay as access fees and one time voluntary contribution, it was clear that the mean willingness to pay for both of these cases was less for Masirah Island compared to Ras Al Hadd. The reason behind this could be that Ras Al Hadd is well organized for marine turtle related tourism with regard to infrastructure and facilities. The site was declared as a natural reserve since 1996. Whereas Masirah Island is still lacking the recreational facilities related to marine turtle tourism and it is proposed as a natural reserve. Consequently, both sites are not close substitutes for each other. This is consistent with the scope test results, which showed a significant difference between the sites in terms of respondents' preference structures. In this context, a differentiated pricing policy is more appropriate for the two sites. In addition differentiated access fee may also be considered in relation to national and foreign tourists, this is also consistent with the empirical results. This practice was applied in various countries such as Nepal, Ecuador and Bonaire (CBD, 2001). 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.

Moreover, turtle watching may promote empathy (pro-conservation attitudes) for the conservation of marine turtles in Oman.

Meanwhile, the status quo of payment fees at the Ras Al Jinz Scientific and Visitors Center is 3 OMR for adults; Omani and residents and 5 OMR for foreigners. This research indicates that there are opportunities to raise the 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 and buying a quality souvenir or any other ways such as cash donation at the airport or any other tourism facilities.

In addition higher access fees generate higher revenue based on number of visitors at the nesting sites but taking into consideration the recommendations provided at Chapter 2 on improving the management of these facilities to reduce the cost.

3.6.2 Concluding remarks

The analysis presented in this chapter aimed to fulfil the objective 1 of the research that is to examine the economic benefits of marine turtles conservation at Masirah Island and Ras Al Hadd. This was done by providing empirical estimates of the questionnaire 1 respondents' willingness to pay in the form of access fees and voluntary contribution. Three hundred and sixty (360) survey questionnaires were collected from the study sites (164 from Masirah Island and 196 from Ras Al Hadd). The results using the logit regression under the CVM, showed that the mean WTP of access fee was higher for Ras Al Hadd (9.490 OMR) than that of Masirah Island (4.750 OMR). In addition, the mean WTP of voluntary contribution at Ras Al Hadd (16.210 OMR) was also higher than that of Masirah Island (11.480 OMR). The preferred way to make this contribution as stated from the questionnaire respondents was purchasing a quality souvenir. However, respondents who were not willing to make this financial payment (60 out of 164 at Masirah Island and 33 out of 196 at Ras Al Hadd) were willing to volunteer in beach cleanup campaigns at Masirah Island (46 respondents) and in awareness campaigns at Ras Al Hadd (26 respondents|).

The scope test results showed that the null hypothesis that is WTP at Masirah Island is equal to WTP at Ras Al Hadd to be rejected for both forms of payment (access fees and voluntary contribution). Thus, the alternative hypothesis of WTP at Ras Al Hadd is greater than WTP at Masirah Island was accepted.

The next chapter will present the analysis conducted for the purpose objective 1 of this research by using the logit regression under the Conjoint Analysis (CA). It will highlight the preferred attributes by the questionnaire 1 respondents at the marine turtles tourism sites. Moreover it will gives the values (price) for these attributes and their relative importance to the respondents as an attempt to reflect these findings in the strategy development for the recreational sites based on marine tourism in Oman.

Chapter 4. Stakeholders Preferences of Attributes Using the Conjoint Analysis (CA)

4.1. Introduction

Following the research objective 1 stated in Chapter 1 and the concluding remarks of Chapter 2, that is to conduct further analysis to measure the economic potentials of marine turtles conservation in Oman, the main purpose of this Chapter is to present an empirical estimate using the Conjoint Analysis (CA) under logistic regression model for the respondents preferences of the site attributes of Ras Al Hadd and Masirah Island to enjoy turtle watching.

Conjoint Analysis have been carried out since the 70s in different fields ranging from health care, transportation, market and ecological studies (Green, Krieger, & Wind, 2001). This analysis has also been extensively used for environmental fields such as recreation, ecosystem management, products, environmental evaluation, pollution, energy, land management, agriculture, forestry, waste management and risk analysis (Alriksson & Oberg, 2008). For instance, and similar to this research, CA was used for recreation purposes to estimate the economic value of nature reserve (Baarsma, 2003), to identify recreational site choice (W. L. Adamowicz, 1994), to estimate the impact of user fees at public recreational sites (Schroeder & Louviere, 1999) and others. With regard to ecosystem management it was used in cases such as the evaluation of nature conservation (Li, Kuuluvainen, Pouta, Rekola, & Tahvonen, 2004), the evaluation of biodiversity conservation policies (Garber-Yonts, Kerkvliet, & Johnson, 2004) beside other management practices.

Thus, this chapter is structured to (1) give an overview of CA, (2) describe the process of collecting the data from both study sites, (3) describe the analysis process, (4) present the results and (5) propose policy recommendations based on these results. The literature review and a conceptual note on CA are given in section 4.2. The methodology with the data specification and the collection process, the questionnaire formation with the pilot study, the implementation process and difficulties encountered, the data processing along with the model explanation are provided in section 4.3. Analysis providing the descriptive and the empirical results is provided in section 4.4. Discussion of these results is provided

in section 4.5. Finally, using the results generated by this research, a conclusion will be given in section 4.6 to highlight the preferences of the respondents in a form of policy recommendation.

4.2. Literature review and a conceptual note on Conjoint Analysis (CA)

Conjoint Analysis is a stated preference survey method that been used since the 1970s for the estimation of consumers preferences in markets (among this is health care preferences (Hauber et al., 2016)) and transportation research (Alriksson & Oberg, 2008; Baarsma, 2003). Green, Krieger, & Wind (2001), stated that Conjoint Analysis (CA) is referred to as "The most used marketing research method for analyzing consumer trade-offs" (page s57). It was also applied to environmental studies and in that context, it was used to analyze recreation, ecosystem management, environmental evaluation, pollution, energy, land management, agriculture, forestry, waste management, and risk analysis (Alriksson & Oberg, 2008; Baarsma, 2003). The stratification of the consumers is important for any project to continue and to develop (Padilla, Villalobos, Spiller, & Henry, 2007) because CA mainly deals with the question "Why do consumers choose one brand or one supplier over another?" by breaking a product or a service down into its constituent parts (attributes) then testing combinations of these parts in order to find out the respondent's behavior and preference (Alriksson & Oberg, 2008; Green et al., 2001; Louviere, 1988). Thus, the first step in any CA is the selection of the product attributes and their levels. This selection process is based on information based on a pre-survey of the product (Halbrendt, Wang, Fraiz, & O'Dierno, 1995). It could be also based on qualitative methods such as interviews, focus group and literature review (Boesch, Schwaninger, & Weber, 2012). To determine the right customer preference a few things can be done: 1) ask a representative group of people and design their choice of attributes, 2) create a survey with all combinations of "attributes and values" and ask prospective customers to rank their preference and, 3) choose the choice that has the highest ranking (Bhaskaran, 2007). This is important so that the policy makers can introduce the right product to the market or provide the most preferred options to the concerned customers or consumers.

Prior to the selection of CA as method used for this research, the pros and cons were identified and summarized in Table 4.1.

Table 4.1: Conjoint Analysis (CA) Pros and Cons	
Pros	**Cons**
- Helps to understand customer preferences and choices so that the right product can be introduced to the market. - Helps to solve the criticisms of the belief that intentions often do not match actions in the self-administered and rated models by creating actual hypothetical products that user can choose. - It allows the attributes to be measured jointly.	- As the number of options in each choice set increases, the difficulty of completing the ranking exercises rises exponentially. - The results cannot be completely repeatable. - Expert / researcher driven choice of attributes - The risk of not capturing the true preferences. - The results might be biased by cognitive and contextual impacts - Design base is extremely crucial (avoid vague questions, irregular number of attributes, wide range of attributes and attributes additive) and pre-tests are invaluable. - Selection of respondents might lead to false indicators if dominant groups are more representative than the random groups. - If questions giving are too many or too less this might lead to confuse respondents. - A possibility of false interpretation of the results.
Source: (Alriksson & Oberg, 2008; Bhaskaran, 2007)	

CA helps decision makers to reveal preferences, priorities and the relative importance associated with a product or a service (Hauber et al., 2016). Thus, this method is developed in this research to draw the policy options for the concerned stakeholders based on respondents' preference of hypothetical attributes at the marine turtles tourism site, the highest value from these attributes and their relative importance. This is aimed to highlight the uniqueness of each site and what each site is lacking in order to increase the efficiency of the projects and their economic benefits to the county and to the local community.

4.3. Methodology

4.3.1. Logistic Regression Model

The empirical analysis of this part followed the same procedure as mentioned in Chapter 3, (CVM, section 3.3.1), the logistic regression model. The dependent variable used in the analysis was the respondents' preference. The independent variable were the site attributes (the number of nesting turtles, the site congestion, the managed site, the guided tour and the price) and the demographic information of the respondents that is; their gender, age, level of education, income, place of residence, occupation, membership to environmental entity and the category.

In pursuing CA the three other related concepts that is the total utility, marginal implicit price and Relative importance of attributes were investigated for further elaboration of the results.

Total utility (TU)

Following Padilla et al., (2007), a part worth model (additive function model was employed to calculate the total utility). The equation used for this research was:

$$\text{TU} = \beta_{price} + UNNTH + USCM + UGTY + UMSM \qquad (4.1)$$

Where, β_{price} is the coefficient for the price attribute, $UNNTH$ is the utility (coefficient) of the level high for the number of nesting turtles attribute, $USCM$ is the utility of the level more for the site congestion attribute, $UGTY$ is the utility of the level yes for the guided tour attribute and $UMSM$ is the utility of the level managed for the managed site attribute. The constant will not be used in the calculation of this part as it was excluded from the empirical analysis.

Marginal implicit price

Following Padilla et al., (2007) and Yacob et al., (2009), the marginal implicit price of the attributes was calculated using the equation:

$$MWTP = -\left(\frac{Uattribute_i}{\beta_{price}}\right) \qquad (4.2)$$

Where, $Uattribute_i$ is the utility (coefficient) of each attribute with it's level.

Relative importance of attributes

Following Padilla et al., (2007) and Halbrendt et al., (1995), the relative importance of attributes was calculated using the equation:

$$RI_i = \left[\frac{Utility\ Range_i}{\sum Utility\ Ranges\ \forall\ attributes}\right] * 100 \qquad (4.3)$$

Where, $Utility\ Range_i$ = highest utility value - lowest utility value.

4.3.2 Questionnaire design

The CA part (Part 3 Site preferences for sea turtle watching) was in questionnaire 1. This questionnaire is explained in detail in Chapter 3 (the Contingent Valuation Method). The site attributes of Ras Al Hadd and Masirah Island were decided based on field observation, the consultation with the stakeholders, the researcher experience and the literature review (Table 4.2). These attributes then were classified to get the common attributes in order to be used for the analysis. The final attributes selected were:

- Number of nesting turtles. The conservation program could offer visits with a high number of turtles nesting every night (5-10) or a lower number (up to 3).
- Site congestion. The conservation program could offer visits with a selected few visitors (<10) or alternatively in larger groups (25 visitors).
- Guided tours. The conservation program could offer guided visits with knowledgeable trained tour guides or without the guided tours.
- Managed site. A managed site is defined here as a turtle nesting beach adapted facilities (boardwalk, garbage collection) and monitoring of the flows of visitors, vehicles and their impacts on the habitat.

The price of each card was calculated using a controlled price of each level of the attributes (Table 4.2).

Table 4.2: Controlled preferences with the cost of each preference	
Preferences	**Your choice**
Number of turtles (Would you prefer to see more or less turtles at the site of visit?	High (5-10) turtles (NNTH)= 5 OMR Less (2-3) turtles (NNTL)= 3 OMR
Site congestion (Do you prefer to share this experience with a crowd or you would like to have less crowd?)	High (25 people) (SCM)= 3 OMR Low (less than 25 people) (SCL)= 5 OMR
Guided with information? (Would you prefer to have a guide at the site with sufficient information?)	Yes (GTY)= 3 OMR No (GTN)= 0 OMR
Managed beach? (Regularly cleaned-up and monitored or open and neglected?)	Managed site (MSM)= 2 OMR Unmanaged (NSM)= 0 OMR

Thus, these four attributes with the two levels for each, produced 10 selected different choice scenarios. Other scenarios that were similar in attributes preferences were skipped. At the field conduction of the questionnaire, these scenarios were provided to the respondents in 10 drawing cards (Appendix 3) in order to make it easier for the respondents to understand the scenarios given to them and thus to state their preferences using a Likert scale with four options: strongly like, like, dislike and strongly dislike. The price of each card was given in both currencies; the Omani Rial (OMR) and the US Dollar (USD) given that the foreign tourists were one of the targeted categories (Table 4.3).

Table 4.3: The 10 cards with choice scenarios of site preference attributes and the price		
Card No.	Choice scenario (cards)	Price
1	High number (5-10) of nesting turtles Low site congestion (<10) Guided tours Managed site	15 (OMR) 39 (USD)
2	Low number (up to 3) of nesting turtles Low site congestion (<10) Guided tours Managed site	13 (OMR) 34 (USD)
3	High number (5-10) of nesting turtles High site congestion (25 visitors) Guided tours Managed site	13 (OMR) 34 (USD)
4	High number (5-10) of nesting turtles Low site congestion (<10) Guided tours Un managed site	13 (OMR) 34 (USD)
5	High number (5-10) of nesting turtles Low site congestion (<10) Un guided tours Managed site	12 (OMR) 31 (USD)
6	Low number (up to 3) of nesting turtles High site congestion (25 visitors) Guided tours Un managed site	9 (OMR) 23 (USD)
7	Low number (up to 3) of nesting turtles High site congestion (25 visitors) Un guided tours Managed site	8 (OMR) 21 (USD)
8	High number (5-10) of nesting turtles High site congestion (25 visitors) Un guided tours Un managed site	8 (OMR) 21 (USD)
9	Low number (up to 3) of nesting turtles Low site congestion (<10) Un guided tours Un managed site	8 (OMR) 21 (USD)
10	Low number (up to 3) of nesting turtles High site congestion (25 visitors) Un guided tours Un managed site	6 (OMR) 16 (USD)

I.   Stakeholders

The collection of data for this part of research followed the same process for the Contingent Valuation Method (CVM) (Chapter 3). Thus the same stakeholders mentioned above in Chapter 3 (Section 3.3.2.i) that is the Ministry of Environment and Climate Affairs (MECA), the Ministry of Agriculture and Fisheries (MAF), the Ministry of

Tourism (MOT), the Environment Society of Oman (ESO), the National Centre for Statics and Information (NCSI) and the National Ferries Company (NFC) were approached for the collection of the primary data, information, consultation and logistic support.

II. Sample size

The number of collected questionnaire were three hundred and sixty in total (360), where one hundred and ninety six (196) questionnaires were collected from Ras Al Hadd and one hundred and sixty four (164) were collected from Masirah Island. McCullough (2002), stated that to ensure reliability of estimates, 75 was the minimum sample size required for carrying out CVM and CA involving a group.

III. Data collection

The collection process of data has four different procedures: full profile techniques, compositional techniques (self-explicated) hybrid techniques and adaptive conjoint analysis. CA is fit into part-worth (discrete) model with any procedure used to collect data, but sometimes vector and ideal-point models are also used (Green et al., 2001).

The focus group and the pilot study that were involved for the CVM part were also assigned to give opinion for the CA part. These include members of academic, management and research institutions related to the marine turtles programs in Oman.

IV. Addressing potential bias

Selecting the attributes and their levels (Table 4.2) was based on the researcher experience, the field observation from the study sites and literature review. It was also based on interviews with the stakeholders mentioned above. Moreover, following Rao (2014), that is to ensure the relevance of the included attributes, attributes should be actionable from a management point of view. There were many attributes selected, but were refined to make it simple for selection by the respondents taking into consideration that there is an upper limit to how many alternatives respondents will be able to respond before they reach the fatigue effect that is not completing the task in the preferred way (Alriksson & Oberg, 2008).

4.3.3. Implementation

The implementing process of this part followed the same steps stated in section 3.3.3 (Chapter 3, Stakeholders Willingness To Pay Using the Contingent Valuation Method (CVM)).

4.4. Results

4.4.1. Descriptive results

The demographic information related to the category, nationality, place of residency, gender, age, level of education, income, occupation, membership to environmental agencies and turtle watching experience of the respondents from both sites were presented in Chapter 3 (CVM), section 3.4 Results (Figure 3.3- 3.11). The highest percentage of Masirah Island respondents were tourists, Omanis, living in Oman, males, of age 35-50 years, undergraduates (18-23 years of education), had a monthly income of 551-2020 OMR, working at the public sector, not a member of any environmental agency and had experienced turtle watching. Ras Al Hadd respondents were tourists, Europeans, living in Europe, males, age of 35-50 years, undergraduates (18-23 years of education), had a monthly income of 551-2020 OMR, working in the private sector, not a member of any environmental agency and did not experienced turtle watching before.

I. Accommodation preferences

Table 4.4: Accommodation preferences, by the Questionnaire 1 respondents at Masirah Island (MI) and Ras Al Hadd (RH)				
Site	**MI (N=164)**		**RH (N=196)**	
Accommodation preferences	**Count**	**%**	**Count**	**%**
4 Star hotel	34	20.732	51	26.02
3 Star hotel	19	11.585	42	21.429
2 Star hotel	8	4.878	17	8.673
1 Star hotel	6	3.659	5	2.551
Bed and breakfast	16	9.756	59	30.102
Camping and glamping[9]	56	**34.146**	61	**31.122**
Hotel apartments	36	21.951	34	17.347
Eco lodge facilities	17	10.366	51	26.02
No Preferences	44	26.829	29	14.796

The respondents of both sites with the percentage of 34.146% (MI) and 31.122% (RH) preferred Camping and glamping as a way of accommodation (Table 4.4).

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[9] Glamping is outdoor camping with amenities and comfort (Merriam-Webster Dictionary, 2018)

II. Preferences on species to watch

Table 4.5: Preferred species of the marine turtles to watch at Masirah Island (MI) and Ras Al Hadd (RH)						
Site	Turtle species	Green Turtle	Loggerhead Turtle	Hawksbill Turtle	Olive Turtle	Any
MI	COUNT	83	61	52	49	81
(N=164)	%	**50.610**	37.195	31.707	29.878	49.390
RH	COUNT	29	15	16	11	165
(N=196)	%	14.796	7.653	8.163	5.612	**84.184**

The preferred species to watch by Masirah Island respondents was the green turtle (50.610%), whereas Ras Al Hadd respondents do not have any preferences regarding the species to watch from the marine turtles (84.184%) (Table 4.5). In this question, some respondents did choose more than one species to watch and they were not restricted to choose only one answers from the options given to them.

4.4.2 Empirical results

4.4.2.1. Visitors preferences of sites attributes (Logit regression)

I. Masirah Island

Table 4.6: Results of the Logit regression between site preference of attributes and 5 variables for Masirah Island. N, the number of respondents was 164 who generated a total of observations = 1500								
Variable	Coef.	SE	Wald	z-Statistic	P-value	(Odds-ratio) Exp (B)	95% C.I. for EXP(B)	
							Lower	Upper
NNTH	1.654	0.174	90.788	9.528	<0.001	**5.228**	3.720	7.347
SCM	-0.777	0.122	40.673	-6.378	<0.001	0.460	0.362	0.584
GTY	0.540	0.171	9.998	3.162	0.002	1.716	1.228	2.398
MSM	0.799	0.161	24.503	4.950	<0.001	**2.224**	1.620	3.051
PRICE	-0.250	0.021	141.534	-11.900	<0.001	0.779	0.747	0.812
Summary Statistics				**Diagnostics: Model Selection Criteria**				
Mean (dependent variable)	0.199			Akaike info criterion (AIC)			0.945	
SD (dependent variable)	0.400			Schwarz criterion (SC)			0.962	
McFadden R-squared	NA[10]			Hannan-Quinn criter (H-QC)			0.951	
Cox & Snell R Square	0.361			Restr. deviance			1498.431	
Nagelkerke R Square	0.482			LR statistic			NA	
SSE (Sum Squared Error)				225.030				
Log likelihood				-703.460				
SE of regression				0.388				
% of correct prediction				80.067				

All of the five independent variables that is the high number of nesting turtles (NNTH), the more site congestion (SCM), the guided tour (GTY) and the managed site (MSM) and the price were statistically significant at the 1% level of significance (Table 4.6). The analysis provide at Appendix 4, shows the behavior of these variables if the constant added to the analysis. Inclusion of the constant into the model produced data redundancy, thus the constant was excluded from all of the analysis of this part of the research based on the fact that, the respondents were not given the no choice option thus they had to provide their choice of preference otherwise the constant has to be added to the analysis following (Haaijer, Kamakura, & Wedel, 2001). The odd ratio was the highest for the variable of higher number of nesting turtles followed by the existence of the management at the site.

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[10] NA= Not Applicable

This gives an indication of the importance of these two attributes for the respondents of Masirah Island.

A further investigation of the behavior of sites attributes and the price was done by adding eight (8) independent demographic variables (gender, age, education level, income, place of residency, occupation, membership of an environmental conservation agency/society/group and the categories of the respondents (Table 4.7). All the variables showed more or less a similar behavior of significance at the 1% level except the variable of guided tour (GTY) (10% significance level). Their coefficient also carried the same sign as before (Table 4.6). All of the independent demographic variables were statistically insignificant. Moreover, the odd ratio value was the highest for the same attributes as before, the higher number of nesting turtles and the existence of the management at the site.

Table 4.7: Results of the Logit regression between site preference of attributes and 13 variables for Masirah Island. N, the number of respondents was 164 who generated a total of observations = 1500

Variable	Coef.	SE	Wald	z-Statistic	P-value	(Odds-ratio) Exp (B)	95% C.I. for EXP(B) Lower	Upper
NNTH	1.650	0.230	51.276	7.161	<0.001	**5.205**	3.314	8.175
SCM	-0.772	0.194	15.787	-3.973	<0.001	0.462	0.316	0.676
GTY	0.533	0.284	3.519	1.876	0.061	1.704	0.976	2.975
MSM	0.795	0.221	12.885	3.590	<0.001	**2.214**	1.434	3.416
PRICE	-0.248	0.079	9.926	-3.151	0.002	0.781	0.669	0.911
GEN	-0.015	0.160	0.009	-0.096	0.924	0.985	0.720	1.348
AGE	<0.001	0.009	0.003	0.050	0.960	1.000	0.983	1.019
EDU	<0.001	0.112	<0.001	-0.001	0.999	1.000	0.803	1.246
INCOME	<0.001	<0.001	<0.001	-0.022	0.982	1.000	1.000	1.000
RES	0.001	0.065	<0.001	0.008	0.994	1.001	0.881	1.136
WORK	<0.001	0.102	<0.001	-0.002	0.998	1.000	0.818	1.222
MEM	-0.009	0.192	0.002	-0.045	0.964	0.991	0.680	1.444
CAT	0.002	0.091	0.001	0.026	0.979	1.002	0.838	1.199

Summary Statistics		Diagnostics: Model Selection Criteria	
Mean (dependent variable)	0.199	Akaike info criterion (AIC)	0.955
SD (dependent variable)	0.400	Schwarz criterion (SC)	1.001
McFadden R-squared	**NA**	Hannan-Quinn criter (H-QC)	0.972
Cox & Snell R Square	0.361	Restr. deviance	1498.431
Nagelkerke R Square	0.482	LR statistic = NA	
SSE (Sum Squared Error)	224.993		
Log likelihood	-703.450		
SE of regression	0.389		
% of correct prediction	80.070		

II. Ras Al Hadd

Table 4.8: Results of the Logit regression between site preference of attributes and 5 variables for Ras Al Hadd. N, the number of respondents was 196 who generated a total of observations = 1570

Variable	Coef.	SE	Wald	z-Statistic	P-value	(Odds-ratio) Exp (B)	95% C.I. for EXP(B)	
							Lower	Upper
NNTH	1.698	0.181	87.581	9.358	<0.001	**5.461**	3.827	7.792
SCM	-1.548	0.139	124.242	-11.146	<0.001	0.213	0.162	0.279
GTY	1.724	0.192	80.875	8.993	<0.001	**5.605**	3.850	8.160
MSM	0.379	0.165	5.268	2.295	0.022	1.461	1.057	2.020
PRICE	-0.274	0.023	148.607	-12.190	<0.001	0.760	0.727	0.794

Summary Statistics			Diagnostics: Model Selection Criteria	
Mean (dependent variable)		0.189	Akaike info criterion (AIC)	0.848
SD (dependent variable)		0.392	Schwarz criterion (SC)	0.865
McFadden R-squared		**NA**	Hannan-Quinn criter (H-QC)	0.854
Cox & Snell R Square		0.420	Restr. deviance	1522.963
Nagelkerke R Square		0.560	LR statistic = NA	
SSE(Sum Squared Error)		207.682		
Log likelihood		-660.563		
SE of regression		0.364		
% of correct prediction		81.100		

The variables of the high number of nesting turtles (NNTH), the more site congestion (SCM) and the guided tour (GTY) and the price were statistically significant at the 1% conventional level of significance. The managed site (MSM) was statistically significant at the 5% (Table 4.8). The analysis provide at Appendix 4 show the behavior of these variables if the constant is added to the analysis of this site. Similar to Masirah Island and because of data redundancy the intercept was excluded from all of the analysis of this part of the research given that the respondents were not given the 'no' answer as a choice in which they have to provide their choice of preference. The odd ratio was the highest for the variable availability of guided tour of followed by the higher number of nesting turtles. Which gives an indication of the importance of these two attributes for the respondents of Masirah Island.

Similar to Masirah Island, further investigation of the behavior of the sites attributes and the price was done by adding 8 independent demographic variables (gender, age, education level, income, place of residency, occupation, membership of an environmental

conservation agency/society/group and the categories of the respondents (Table 4.9). All the variables showed more or less a similar behavior of significance at the 1% level except the variable of managed site (MSM) which became statistically insignificant. Their coefficient also carried the same sign as before (Table 4.8). Moreover, all of the independent demographic variables were statistically insignificant. The odd ratio value was the highest for the same attributes as before, the availability of guided tour and the higher number of nesting turtles.

Table 4.9: Results of the Logit regression between site preference of attributes and 13 variables for Ras Al Hadd. N, the number of respondents was 196 who generated a total of observations = 1570

Variable	Coef.	SE	Wald	z-Statisti	P-valu	(Odds-ratio) Exp (B)	95% C.I.for EXP(B)	
							Lower	Upper
NNTH	1.658	0.227	53.285	7.300	<0.001	**5.247**	3.362	8.188
SCM	-1.508	0.195	59.902	-7.740	<0.001	0.221	0.151	0.324
GTY	1.663	0.281	35.088	5.924	<0.001	**5.277**	3.043	9.150
MSM	0.339	0.215	2.484	1.576	0.115	1.403	0.921	2.138
PRICE	-0.254	0.072	12.418	-3.524	<0.001	0.776	0.673	0.893
GEN	0.059	0.153	0.151	0.388	0.698	1.061	0.786	1.433
AGE	-0.003	0.007	0.239	-0.489	0.625	0.997	0.984	1.010
EDU	0.007	0.120	0.003	0.056	0.956	1.007	0.796	1.274
INCOME	<0.001	<0.001	0.028	0.169	0.866	1.000	1.000	1.000
RES	0.007	0.051	0.017	0.129	0.897	1.007	0.911	1.113
WORK	0.010	0.097	0.010	0.100	0.920	1.010	0.835	1.222
MEM	-0.043	0.176	0.059	-0.244	0.808	0.958	0.678	1.353
CAT	-0.053	0.107	0.250	-0.500	0.617	0.948	0.769	1.169

Summary Statistics		Diagnostics: Model Selection Criteria	
Mean (dependent variable)	0.190	Akaike info criterion (AIC)	0.858
SD (dependent variable)	0.392	Schwarz criterion (SC)	0.902
McFadden R-squared	**NA**	Hannan-Quinn criter (H-QC)	0.874
Cox & Snell R Square	0.420	Restr. deviance	1522.963
Nagelkerke R Square	0.560	LR statistic = NA	
SSE(Sum Squared Error)	207.210		
Log likelihood	-660.237		
SE of regression	0.365		
% of correct prediction	81.083		

4.4.2.2 Total Utility, Marginal implicit price and the relative importance of sites attributes

Further investigation of the data were done to identify the preferred card from the ten (10) cards presented to the respondents by estimating the total utility (equation 4.1). Another investigation was done to identify the preferred attribute from the four attributes presented to the respondents in each card. This was done though the estimation of the relative importance (equation 4.3). Furthermore, an estimation of the value of each attribute was done through the calculation of marginal implicit price using equation 4.2. All of these investigations were done to provide a clear scene of what is important of each site (attributes), what is the most important of these attributes and how much people are willing to pay to have this attribute, and thus the policy makers can use these information for a better policies and strategies that can provide the best economic and social advantages.

The following are the results obtained from this analysis.

I.   Total Utility

The total utility for the cards 1, 2, 3, 4 and 5 carried a positive sign whereas the total utility for the attributes of the cards 6,7,8,9 and 10 carried a negative sign (Table 4.10). Indicating that the attributes of the first five cards made them the preferred cards out of the 10 cards provided to the respondents.

Table 4.10: Total Utility of the cards provided as a choice scenario for the respondents of Questionnaire 1		
Total Utility	**MI**	**RH**
Card 1	**3.52**	**5.074**
Card 2	**0.212**	**1.679**
Card 3	**1.967**	**1.978**
Card 4	**1.922**	**4.315**
Card 5	**2.44**	**1.627**
Card 6	-2.94	-2.176
Card 7	-2.422	-4.864
Card 8	-0.712	-2.228
Card 9	-2.466	-2.527
Card 10	-4.02	-5.623

II.   Marginal implicit price

The marginal implicit price for each card was calculated to identify which attribute is the most preferred by the Questionnaire 1 respondent's (has the highest importance in their decision making for choosing the scenario giving to them). The results showed that the attribute of 'higher number of nesting turtles' was given the highest price value at Masirah Island (6.619 OMR) and the attribute of 'guided tour' was given the highest price value at Ras Al Hadd (6.185 OMR) (Table 4.11).

Table 4.11: Marginal implicit price (OMR)		
Attribute	**MI**	**RH**
NNTH	**6.619**	6.185
SCM	-3.108	-5.640
GTY	2.161	**6.280**
MSM	3.198	1.382

III.   The relative importance

The relative importance was calculated to identify how much respondents of questionnaire 1 are willing to pay for each site attribute. The results showed that the number of nesting turtles (NNT) was given the highest relative importance (33.795%) at Masirah Island, whereas the highest relative importance was for the guided tour (GT) as an attribute at Ras Al Hadd (26.193%) (Table 4.12).

Table 4.12: Relative importance for the site attributes (%)		
Attribute	**MI**	**RH**
NNT	**33.795**	25.798
SC	15.871	23.519
GT	11.034	**26.193**
MS	16.325	5.758
Price	22.975	18.733

4.5. Discussion

4.5.1 .Descriptive results

The respondents' similarity in the accommodation preference of camping and glamping could be related to the ecological features of both sites and their relative isolation from the cities. Moreover, this could be highly related to the security status of the country and the hospitality nature of the local community as identified in the SWOT analysis (Table 2.9). The culture of the community could be the main influencing factor of the species to watch. Masirah Island respondents were 45% locals and thus this might be related to food culture to this community, as some of them are still illegally catch the green turtles to eat.

4.5.2. Empirical results

4.5.2.1. Visitors preferences of sites attributes

Model analysis had similar results at both sites. Most of the site attributes independent variables (number of nesting turtles, site congestion, guided tours, managed sites and price) were statistically significant. Adding other demographic independent variables to the analysis that is gender, age, education, income, residency, occupation, membership to environmental agencies and category did not affect the results, as all were statistically insignificant. The odd ratio value at Masirah Island revealed that the high number of nesting turtles is the most significant attribute (odd ratio = 5.228) followed by the management of the site (odd ratio = 2.224). This was influenced by the status of the site, as it was clear from the field visits that monitoring and awareness campaigns are needed to reduce the amount of litter thrown at nesting sites. At Ras Al Hadd, the guided tour attribute was the highest followed by the high number of nesting turtles (odd ratio = 5.605 and odd ratio = 5.461 respectively). This was also influenced by the status of the site as a tourism facility and thus respondents emphasized the importance of such services.

McFadden R-squared and LR statistic were not applicable to this model presented in the analysis (Tables 4.6- 4.9) as the model does not include the intercept (constant). The Likert scale provided for the respondents did not include a "no answer' option thus, including the intercept does not make sense.

4.5.2.2. Total Utility, Marginal implicit price and the relative importance of sites attributes

The negative sign of the total utility of the cards 6, 7, 8, 9 and 10 mean that these cards are the least preferred cards (Orme, 2010).

The results obtained for the marginal implicit price showed that the high number of nesting turtle a dominant factor for the respondents of both sites while they are making their choice on the preferred scenario of attributes. It was given the highest price from the respondents of Masirah Island and the second highest price from the respondents of Ras Al Hadd. This reflects the importance of this attribute in making the pricing policy where sites with a higher number of nesting turtles could have higher fees than those with lower number of nesting turtles on Oman's beaches. However, the guided tour was given the highest implicit price by Ras Al Hadd respondents, which, reflects the level of tourism requirement for that site.

The relative importance results were consistent with the results obtained from the implicit price discussed above in which, the respondents of Masirah Island gave more importance to the number of nesting turtles as an attribute whereas, guided tour was the more important for the case of Ras Al Hadd respondents. The open beaches in Masirah Island and the lack of tourism facility such as the visitor's center was a possible driver for the respondent of this site to give more importance to the number of the nesting turtles to watch and neglecting the importance of the other site attributes.

4.5.3 Difficulties

The difficulty faced with conducting this part of Questionnaire 1 during the fieldwork was to solve any misunderstanding or ambiguity of scenarios given to the respondents. However, providing these scenarios in drawing cards with adequate training to the research assistants made it easier to explain the different attributes. Another difficulty faced during the fieldwork was related to the time constrain in applying this part as it was part of a questionnaire with three other parts that were related to other analysis (descriptive statistics of the respondents and the CVM part). Thus, to ensure getting answers from the respondents the four Likert scale (strongly like, like, dislike and strongly dislike) was replaced by asking the respondent to give their first and second choice of the 10 cards.

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Thus, their first choice was considered as strongly like, and the second choice was considered as like

4.6. Conclusion and policy recommendations

4.6.1. Policy recommendations

The most preferred scenario (card 1; high number of turtles, low site congestion, guided tours and site management, 15 OMR) received the highest level of support from the respondent.

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.

Since none of the selected socio-economic and demographic factors played a role in the preference structure of the respondent, it is not indispensable to consider these in future management plan reflecting the preferred attributes.

Even though all attributes influenced significantly the selection of the card, the high number of nesting turtles (visible during a single visit) appeared among the most influential attributes for both sites. However, the other attribute was the actual management of the site on Masirah but the presence of guided tours at Ras Al-Hadd. The same preference structure appears also in the analysis of the marginal value estimates that signals higher economic influence on choice behavior. Therefore improving site management (i.e. cleanliness, expertise of tour guides) and the 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 in 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 the recommendations to improve guided tours at Ras Al Hadd through better education, training and adapted equipment.

A further policy recommendation is to use the results of this chapter for developing management strategy of the Masirah Island since it is in the process of proclamation as a natural reserve with no current restriction on the beach access. Following the study of Ishizaki, Teel, & Yamaguchi (2011), a management practices of beach patrol, restrictions

on beach access and restriction on human behavior could be used in the surveys for the community and visitors preferences to ensure the involvement of the concerned stockholder in the conservation schemes at that site.

4.6.2. Concluding remarks

This Chapter represent the analysis of logit regression under the Conjoint Analysis (CA). The conjoint analysis 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) with the fee structure of 15 OMR. The comparison of the marginal implicit price estimates of all attributes under the conjoint analysis revealed that the high number of nesting turtle was the most sought after attribute for Masirah Island (6.619 OMR) and the guided tour (6.280 OMR) for Ras Al Hadd. With regard to relative importance of attributes, number of nesting turtles ranked first followed by price for Masirah Island (33.795% and 22.975% respectively) ,while in case of Ras Al Hadd guided tour ranked first followed by the number of nesting turtles (26.193% and 25.798% respectively).

Moreover, the preferred accommodation option was camping and glamping for both Masirah Island and Ras Al Hadd respondents. On the species preferences to watch, Masirah Island respondents preferred the green turtles, whereas the Ras Al Hadd respondents do not have any preference.

The next chapter is aimed to fulfil objective 2 of this research. The results provided using logit regression is presenting the stakeholders perception on the conservation of marine turtles in Oman. The perception on the economic and social values of marine turtles and the government role on the conservation process were investigated using the data collected through the conduction of questionnaire 2 at the two study sites for the local community perception and online for the policy makers' perception.

Chapter. 5 Stakeholders perception of Marine Turtle Conservation

5.1. Introduction

Following the research objective 2 as stated in Chapter 1, the main purpose of this Chapter is to identify the factors influencing the community perception towards marine turtles conservation at the two study sites: Ras Al Hadd and Masirah Island. The logistic regression model was used to empirically analyze the primary data collected through a questionnaire (Questionnaire 2, provided in Appendix 5) involving key stakeholders from the local community that is from: the educational sector, the civil society, investors in the recreational or tourism activities, the employees of resorts, fishermen and officials. This was done to determine the social, economic and ecological significance of marine turtle conservation. Which is essential to for policy makers to take the perception of the community stakeholder into consideration before designing any future policies regarding marine turtles to ensure the efficiencies of the plans and the sustainability of the resources. This chapter is structured to provide a literature review and a conceptual note on stakeholder's perception in section 5.2 and the methodology in section of 5.4 with the details on the questionnaire design, the pilot study, the questionnaire implementation, difficulties encountered and finally data processing. The analysis in section 5.4 started with the descriptive results in section 5.4.1 followed by the empirical results in section 5.4.2 and the non-parametric results in section 5.4.3. The discussion of these results is provided in section 5.5. Using all the findings from the results, a policy recommendations and a conclusion are provided in section 5.6.

5.2. Literature review and a conceptual note on stakeholders' perception

Eliciting stakeholders' views and their perception on specific issues related to natural resources and ecosystems is a common practices in developing the management strategies and policies for the mitigation of threats and the enforcement of the protection and conservation regulation on these resources and their components (De Juan, Gelcich, & Fernandez, 2017; Trakolis, 2001). A number of studies have been conducted to investigate the different factors influencing the stakeholder's perception. Some of these studies looked at the different practices from the stakeholder's point of views using different methods such as conducting surveys, making scenarios, using focus groups, conducting interviews and local community gatherings and meetings. For example a survey was conducted by Robertson and Caporossi (2003) in the United States to investigate anglers' views toward Marine Protected Areas (MPA's). The results of this study showed that the support of angler was depending on the aims of establishing these MPA's, the location and the restrictions imposed on access. However, the recreational anglers were more interested in the benefits and habitats' restoration of the MPA's.

Other studies looked into the conflict between resource users and conservation paradigms. An example of this is a study conducted in central Chile by de Juan et al., (2017) to investigate the perception and preferences of fishermen, tourists and permanent residence to the coastal areas attributes (scenery, fishing, clean water, clean beach, biodiversity….etc) and activities (diving, seafood, swimming, nature, …etc) by resource users. The study concluded that fishermen' priorities were mostly based on the economic outcomes and not the intangible services.

Furthermore, some studies focused on the conservation impact versus damaging resources and habitats through the unsustainable use of resources. These studies used economic analysis to attract stakeholder's attention on a certain cause or issue. For example a study was conducted in Indonesia by (van Beukering et al., 2003) to investigate community perception on conservation versus deforestation of the Leuser National Park through calculating the Total Economic Value (TEV) of this ecosystems and its benefits. The study was based on scenarios developed to attract the stakeholders' interest, which included all of the possible benefits (revenue from tourism, hydro-electricity, flood and drought prevention, agriculture and plantation fishery, etc) and damages (degradation, increased

erosion, reduction of forest are, water retention, reduction of pollination and pest control and pollution) on the resource itself, the surrounding environment and the stakeholders. The study provided empirical estimates for the policy makers proving that the economic benefits from the conservation scenario was higher than those of the selective utilization scenario (logging of primary forest is substantially reduced and replanting of logged forest is assumed to be compulsory) and the deforestation scenario. It also showed that conservation spread the benefits equally among stakeholders and thus could help preventing social conflict and reducing the gap between rich and poor.

All of these above-mentioned examples suggest that applying stakeholder's perception studies depends highly on the objectives to be achieved. In this research, Questionnaire 2 was structured to serve the design of the Social Science Experiment (SSE). SSE is a methodology used by economists and social scientists. It is based on surveys providing various choices for respondents to test hypothesis for the decision making process. In this method however, stakeholders are not involved in the design process of the model (Voinov & Bousquet, 2010).

The selection of stakeholders is an important step in which involving a diverse group of stakeholders to represent a variety of interests could lead to public acceptance and reliance on the results produced (Voinov & Bousquet, 2010). However, some researchers urge on the importance of specifically defining the stakeholders so that they target only a concerned group based on their category: local, resource users, experts, civil society and others. An example of this approach is a study conducted by Campbell (1999) in which the perception and opinion of experts, and in particular marine turtles experts, about various conservation paradigms were obtained using interviews. The study concluded that the interpretation of concepts was the main driver of actions towards these different conservation paradigms. It also revealed the complexity of practical implementation of some conservation paradigms versus the theoretical statements upon which they were based.

Even the process of inviting the concerned stakeholders to participate to the study has to be handled carefully so that the invitation has certain legitimacy to avoid any negative impression or rejection (Voinov & Bousquet, 2010).

In a local fisheries resource management context, Al-Balushi et al., (2016), highlighted the importance of stakeholders perception analysis from equity, legitimacy, and efficiency perspectives. These perspectives form the basis of sustainable development (Lélé, 1991). Al-Balushi et al., 2016, argued that gathering the views of primary and secondary stakeholders on the key issues pertaining to the effective management of natural resource management is important as this type of participatory approach not only develops decision makers' understanding of stakeholders' perceptions and attitudes, but also encourages knowledge integration in resource management (Hartley & Robertson, 2008; Mackinson, 2001), develops mutual respect that fosters cooperation (Bose & Crees-Morris, 2009), and encourages compliance with rules and regulations (Al-Subhi et al., 2013; Pomeroy & Berkes, 1997).

5.3. Methodology

The model selection for carrying out a stakeholder's perception research is critical to reach the research goals and is subject to the availability of data, period and funding. The model should also be flexible to allow for any improvement during the modelling process in (Voinov & Bousquet, 2010). Thus, the modelling process of the stakeholder's perception is a complete set of stages as shown in Figure (5.1) that will build up the structure needed to fulfil the project goals. These stages can be reordered and some may be skipped.
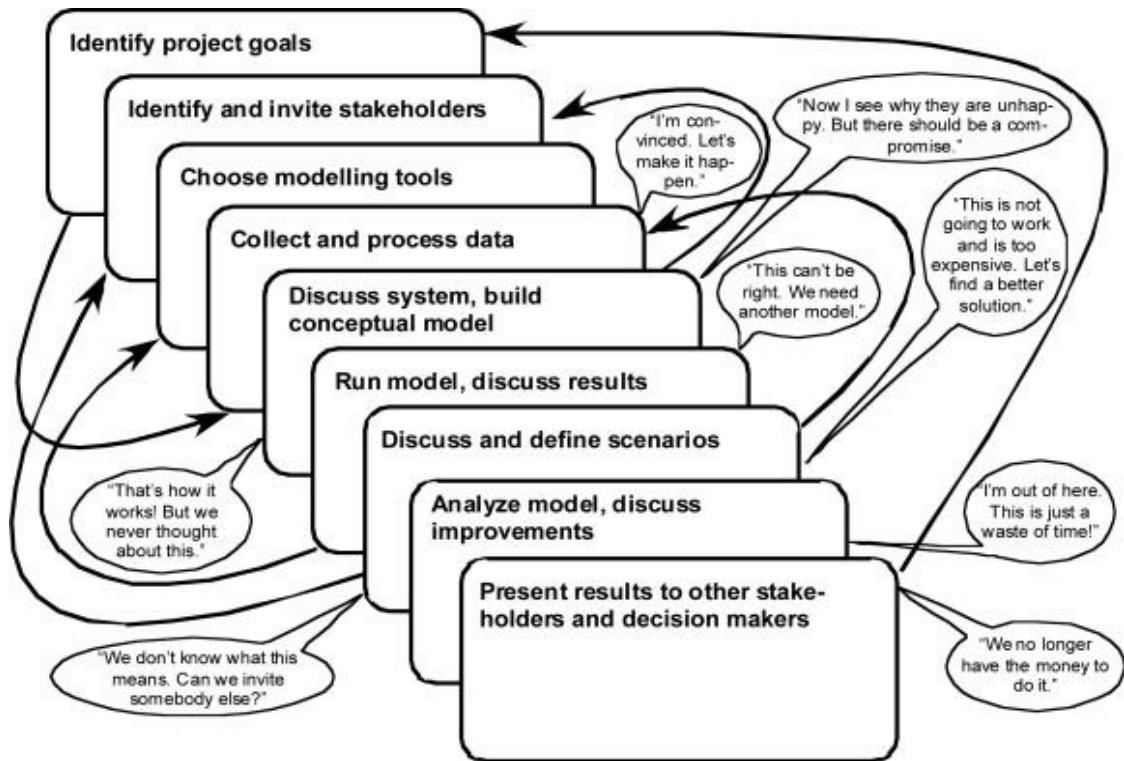
Figure 5.1: Stages of participatory modelling process (Adapted from Voinov & Bousquet (2010))

The full description of logit regression model used here is given in Chapter 3, (section 3.4 Methodology). The respondent's perception recorded on a Likert scale was used in the model as the dependent variable (Y), where strongly agree and agree answers were considered as yes and coded as (1) and strongly disagree and disagree answers were considered as no and coded as (0). Moreover, the independent variables used in this model were different: the variables were selected based on the targeted groups for Questionnaire2. Thus, the explanatory (independent) variables used were gender, age, education, monthly income (OMR), occupation, membership to environmental

conservation agency, society, or group, stakeholder's categories (i.e locals, officials, educational sector, employee of the resorts/ investors, civil society and fishermen), the respondents general knowledge of the marine turtles conservation at Masirah Island and Ras Al Hadd and their willingness to make any financial voluntary contribution to the marine turtle's conservation (Table 5.1). The mean and standard deviation of all of these variables are also presented in Table 5.1.

The targeted stakeholders for the questionnaire were the community members that involves locals, the educational sector, the civil society, investors in the recreational tourism activities, and the employees of resorts, fishermen and officials.

Table 5.1: Definition, mean, standard deviation and percentages of the variables that were used for empirical analysis of stakeholders perception

Variable code	Definition	Response scale	Stakeholders					
			Masirah Island		Ras Al Hadd		Policy makers	
			Mean	STD	Mean	STD	Mean	STD
GEN	Gender	Male= 1, Female= 2	Percentages are displayed in figure 5.4					
AGE	Age (in years)	The mean of each age interval	37.37	8.75	33.23	9.40	36.07	11.77
EDU	Education level	0 (illiterate)= 0, 1-12 (High school diploma)= 1, 13-17 (undergraduate)=2, 18-23 (postgraduate)= 3	1.53	0.73	1.89	0.67	2.25	0.70
INCOME	Monthly income in Omani Rial (OMR)	The mean of each income category	904.37	469.48	699.35	559.71	1020.08	627.58
WORK	Employment category (occupation)	Public sector =1,Private sector= 2, self-employed= 3, Other= 4	Percentages are displayed in figure 5.8					
MEM	Membership of an Environmental Conservation Agency/Society/ Group	Yes= 1, No= 2	Percentages are displayed in figure 5.9					
CAT	Categories of the stakeholders for the questionnaire	Locals= 1, Officials= 2, Educational sector= 3, Employee of the resorts/ Investors= 4, Civil society= 5, Fishermen=6	Percentages are displayed in figure 5.5					
Awareness	Awareness of respondents to the marine turtles conservation at Masirah Island and Ras Al Hadd	Yes=1, No=2	1.16	0.36	1.26	0.44	1.21	0.41
VCONT	A financial voluntary contribution to marine turtles conservation	Yes=1, No=2	1.52	0.50	1.44	0.50	1.47	0.50

5.3.1. Questionnaire design

Similar to the formation process of Questionnaire 1, the process of designing Questionnaire 2 included a field visit to both sites. Many questions were considered during the designing process of this questionnaire. These included the data needed, the investigated aspects (social, cultural, economic and environmental), the reason for implementation this questionnaire, the methodology (field/online), the period of implantation, the targeted groups, the sample size, the model to be used, the software to be used for the analysis and the validation process (focus group, pilot study, expert opinion, logical validity using follow-up questions and distracting questions). Moreover, a literature review of related studies was done to reach highly specification of questions to reach the questionnaire objectives. Some of the studies that examine the different relationships between the stakeholders and turtle related economic, social and environmental aspects were prioritized especially the ones with same tourism influence. One example of these studies that looked into this issue was a study in Cheju Island, Korea (Ko & Stewart, 2002). The other values associated with morals and behaviors towards marine turtles such as aesthetic qualities, intrinsic rights of marine turtles and raising awareness and environmental consciousness were also examined using examples from studies such as the one conducted at Baja California Sur in Mexico (Schneller & Irizarry, 2014).

The same stakeholders mentioned in Chapter 3 (Section 3.3.1.1) that is the Ministry of Environment and Climate Affairs (MECA), the Ministry of Agriculture and Fisheries (MAF), the Ministry of Tourism (MOT), the Environment Society of Oman (ESO), the National Centre for Statics and Information (NCSI) and the National Ferries Company (NFC) were approached for the collection for the primary data and information, consultation and logistic support for this questionnaire. Moreover, the sample size and the sample selection that is the convenience sampling was decided using the same method applied for Questionnaire 1 presented in Chapter 3 (Section 3.3.1.2) because the model used is the same; the logistic regression model. The validity of the questionnaire was also tested using the same procedure applied for questionnaire 1 with the help of the expert opinion of Dr Kellie Pendoley (International Dark Sky- Australia- Pendoley Environmental Pty Ltd).

The data entry in Excel was carefully organized based on the research needs and objectives. A total of 144 questionnaires were collected from Ras Al Hadd and another 115 questionnaires were collected from Masirah Island. Thus, in total 259 questionnaires were collected from both sites. An additional 75 online questionnaires were collected to target the policy makers. Those policy makers were members from officials (MECA, MAF & MOT), academics and research (SQU, The Research Council (TRC), Five Oceans Environmental Services, students, teachers, researchers and), private companies (Omran) and non-governmental organizations (ESO).

However not all of the collected questionnaires were used in the empirical analysis especially those from respondents with zero income and un-complete questionnaires which were discarded from the modelling process. Data were analyzed using both, Statistical Package for Social Sciences (SPSS) and Eviews software.

Questionnaire 2 was conducted in the field and online to collect the primary data. It was structured to get community perception towards the different management and conservation strategies applied in Oman for marine turtle's conservation especially at the study sites. Other questions were aimed to identify the stakeholders perception towards the negative and positive socio- economic outcomes of the conservation process, their general knowledge and awareness of the marine turtles species and the conservation projects and their preference for the different conservation narratives; traditional / new (Table 5.2).

Table 5.2: Elements of the traditional and counter narratives of wildlife conservation	
Traditional conservation	**New conservation**
Exclusive Parks & protected areas Restrictive/ prohibitive Institutional (state) control Modern Top down	Inclusive Land use pattern Sustainable use Community control Postmodern Bottom up
Source: (Campbell, 1999)	

The questionnaire started with the introduction of the research and the statement of its purpose. It consist of four parts; Part 1, Background information, Part 2, What do you think?, Part 3, Your perception and Part 4, Your feedback. The Likert scale and multiple

choice answers were used as a tool to get the respondents answers for the different parts of the questionnaire. The Likert scale used in the questionnaire had the classification of: Strongly agree= 1, Agree= 2, Disagree= 3 and Strongly disagree= 4. Neutral option was not used in some of the questions to make sure an answer from the respondents is provided. Part1 (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. Therefore, this part included questions about threats marine turtles face in Oman, the conservation programs, the management practices and the respondent's willingness to make voluntary financial contributions for the conservation of these species in Oman. Some of the questions in this part were added intentionally as distracting questions to test the respondent's general knowledge as a validation tool to test the reliability of answers provided by the respondents. 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. The options in this part included a scale of importance ranging from 1-100% to be selected by respondents as an estimation of the confidence of their answers. However this scale was not used in the modelling process as many of the respondents did not provide a percentage for their answers. 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 final two questions of this part are related to negative impact impressions. Following (Bandara & Tisdell, 2003; Croasmun & Ostrom, 2011), these questions were intentionally added to assess the respondents reaction towards such a negative impacts and to minimize response bias. Then the answers to these questions were reversed in the modelling analysis.

I.   Focus group

The planning and revising process of Questionnaire 2 started in January 2017 through the scanning of questionnaires conducted in other studies for similar goals (Babin & Zikmund, 2015; Bandara & Tisdell, 2003; de Juan et al., 2017; Kusumawati & Huang, 2015).

Meetings and discussions were carried out for a consecutive three months from January to March 2017 before the field implementation. Following a proven methodology the questionnaire was sent via email to a focus group for comments and reviews on how to improve the questionnaire and to gain important insights towards the marine turtles conservation in Masirah Island and Ras Al Hadd (Kontogianni et al., 2001). The focus group who contributed to the development of this second questionnaire included:

- Mr Ali Al Kiyumi (Ministry of Environment and Climate Affairs)
- Dr Nadiya AlSaady (The Research Council)
- Dr Hussain Al Masroori (Sultan Qaboos University)
- Mr Andrew Willson (Five Oceans Environmental Services)
- Mr Mohammed Al Siyabi (Ministry of Agriculture and Fisheries)

The members of the focus group were selected based on their related work experience with the environment in Oman (field and policies planning and implementation) and based of their academic research on marine turtles in Oman and in other countries. Their comments were used to improve the questionnaire by adding several questions regarding the threat on marine turtles and the enforcement of rules and regulations for the protection of marine turtles in Oman. Other comments were related to the order of the questions in order to make it more easily to understand the flow of the questions by the respondents.

II.   Pilot study

Following a similar process as the one used for Questionnaire 1, Questionnaire 2 was discussed with a group of 10 postgraduates and undergraduates students from the Natural Resource Economics Department (NRE) and the Marine Science and Fisheries Department (MSF) at the College of Agricultural and Marine Sciences. It was also discussed with the research assistants. This was done as a form of trial of the questionnaire to evaluate clarity and to reduce any research bias.

III.   Questionnaire implementation and difficulties

The fieldwork carried out to conduct Questionnaire 2 was done during the period of 9 to 16 of April 2017 at Masirah Island and from the 26 to the 29 of April 2017 at Ras Al Hadd at the same time to collect the data for Questionnaire 1. This was done to reduce the cost

and effort and to ensure a sufficient number of completed questionnaires for the analysis. Moreover, the timing for conducting the questionnaire at Masirah Island was based on the recommendation of the focus group members as it corresponded to the nesting season of the loggerhead marine turtle on the island. The number of respondents was selected at each of the study based on the sample size decided in advance and on the availability of the targeted groups (convenience sampling).

The online survey using Google forms was carried out between June and September 2017. In additional to the difficulties experienced during the conduction of Questionnaire 1, some of the stakeholders' groups were difficult to reach especially fishermen as they were always in remote areas.

5.4. Results

5.4.1. Descriptive results

I. Part 1 of the questionnaire: Background information
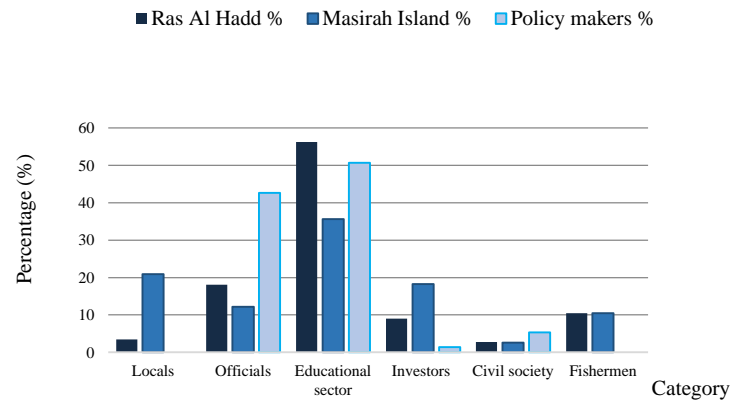
Figure 5.2: Categories of stakeholders (%) interviewed for Questionnaire 2
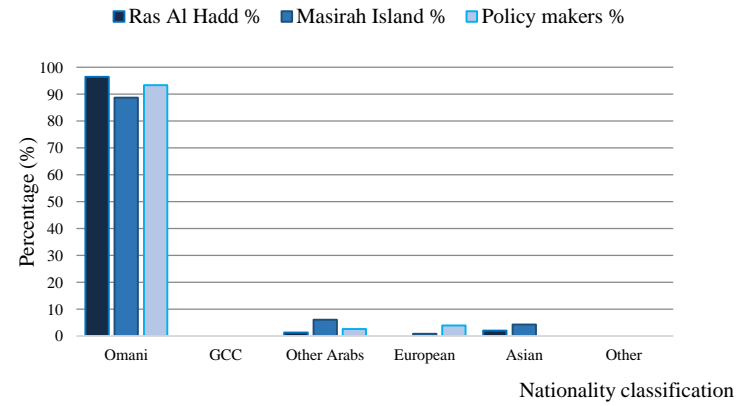
Figure 5.3: Nationality of stakeholders (%) interviewed for Questionnaire 2
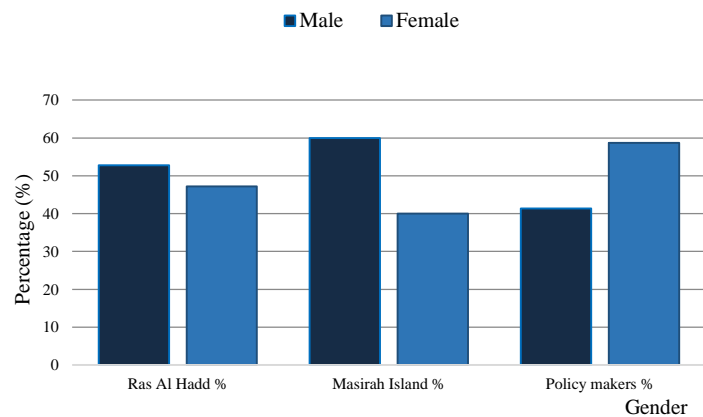
Figure 5.4: Gender of stakeholders (%) interviewed for Questionnaire 2
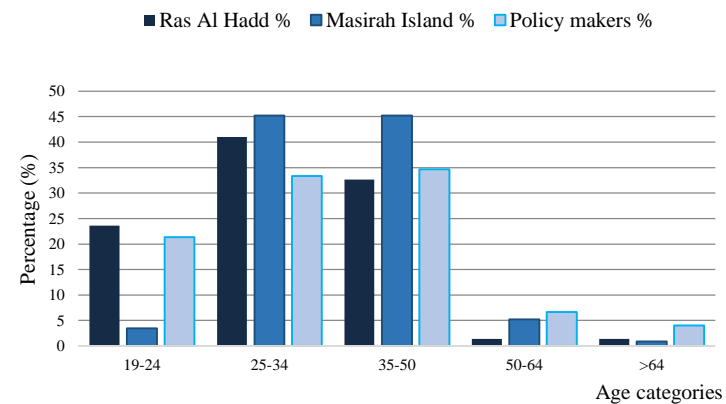
Figure 5.5: Age categories of stakeholders (%) interviewed for Questionnaire 2
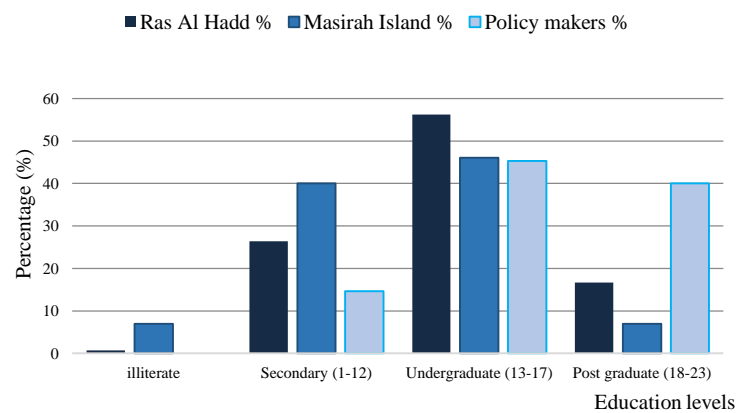
Figure 5.6: Education level of stakeholders (%) interviewed for Questionnaire 2
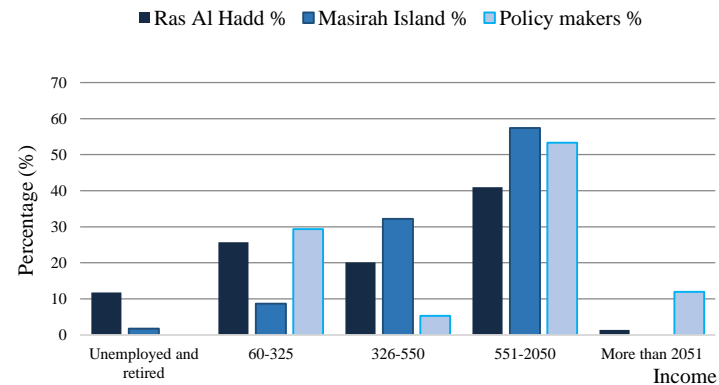
Figure 5.7: Income of stakeholders (%) interviewed for Questionnaire 2
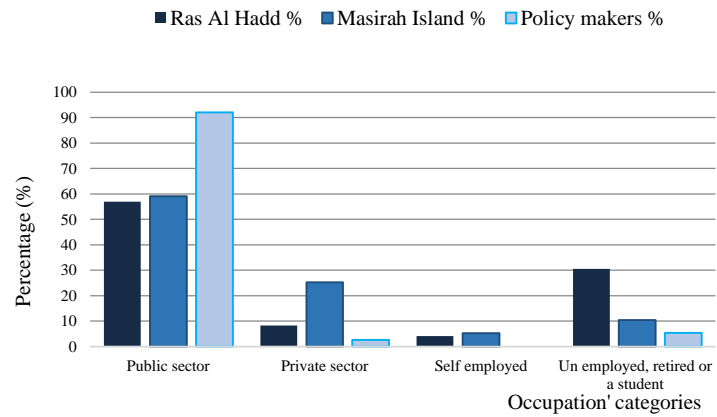
Figure 5.8: Occupation' categories of stakeholders (%) interviewed for Questionnaire 2
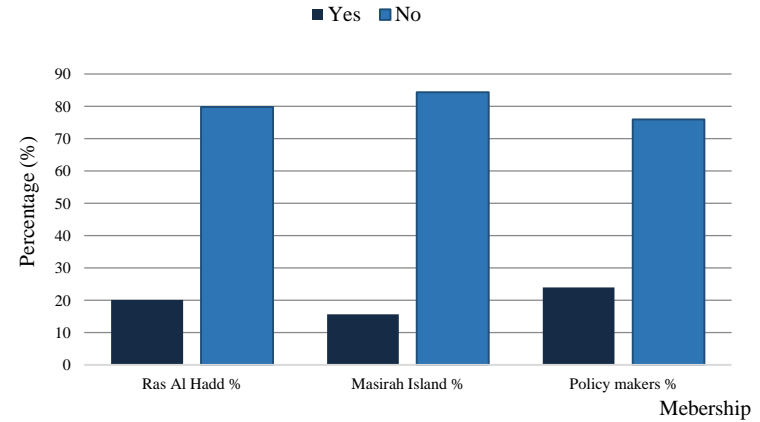
Figure 5.9: Membership of environmental entities of stakeholders (%) interviewed for Questionnaire 2

The majority of the respondents were from the educational sector (56% at Ras Al Hadd, 36% at Masirah Island and 51% of policy maker's group: Figure 5.2). Omanis were the dominant nationality of the respondents. Their percentage ranged from 89% to 97%. Only a small percentage of respondents were from Other Arabs[11] countries, European and Asian. There were no respondents from the GCC or from the Other countries (Figure 5.3). Figure 5.4 indicates that the number of male respondents were higher than female (53% at Ras Al Hadd and 60% at Masirah Island), whereas, from the policy maker's group, females were higher (59%). Age statistics presented in Figure 5.5 showed that the majority of respondents were 50 years of age or younger and the middle age respondents (25-50 years old) were the dominant group with different percentages: 74% at Ras Al Hadd, 90% at Masirah Island and 68% from the policy maker's group. Moreover, 56% at Ras Al Hadd, 46% at Masirah Island and 45% from the policy maker's group had an undergraduate certificate (13-17 years of education) (Figure 5.6). The monthly income of 551-2050 OMR was the income of 41% respondents at Ras Al Hadd, 57% respondents at Masirah Island and 53% of the policy maker's group (Figure 5.7). The majority of respondents worked in the public sector: 57% at Ras Al Hadd, 59% at Masirah Island and 92% for the policy maker's group (Figure 5.8). Finally, the majority of the respondents were not members of any environmental conservation agency, society, or group. The percentages of non-members were 80% at Ras Al Hadd, 84% at Masirah Island and 76% from the policy maker's group (Figure 5.9).

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[11] Other Arabs category includes citizens of the Arabian countries that are not part of the GCC countries and do not include Iranians and Turkish. Others categories refers to all citizens that do not belong to the GCC, Asian, European or other Arabs (Source, NCSI personal contact 20 July 2016)

II. Part 2 of the questionnaire: what do you think

The results for this part from the respondents of Masirah Island (MI), Ras Al Hadd (RH) and the Policy Makers (PM) were as follows:

Question	Answer			
Table 5.3: Responses to part 2 of Questionnaire 2; what do you think , N the number of respondents for Masirah Island (MI)= 115, Ras Al Hadd (RH)= 144 and Policy Makers (PM)= 75				
Question	Answer			
Are you aware of the sea turtles conservation at Ras Al Hadd and Masirah Island?			Yes	No
MI	97 (84.35%)	18 (15.65%)		
RH	106 (73.61%)	38 (26.39%)		
PM	59 (78.67%)	16 (21.33%)		
Have you seen the turtles at Ras Al Hadd or Masirah Island?			Yes	No
MI	106 (92.17%)	9 (7.83%)		
RH	124 (86.11%)	20 (13.89%)		
PM	50 (66.67%)	25 (33.33%)		
Have you participated in any sea turtles conservation activities?			Yes	No
MI	28 (24.35%)	87 (75.65%)		
RH	46 (31.94%)	98 (68.06%)		
PM	22 (29.33%)	53 (70.67%)		
Are you aware of any threats to sea turtles at Ras Al Hadd and Masirah Island?			Yes	No
MI	103 (89.57%)	12 (10.43%)		
RH	118 (81.94%)	26 (18.06%)		
PM	65 (86.67%)	10 (13.33%)		
The rules and regulations for the protection of sea turtles are	Sufficient	Insufficient	I'm not aware of these rules and regulations	
MI	38 (33.04%)	43 (37.39%)	34 (29.57%)	
RH	42 (29.17%)	74 (51.39%)	28 (19.44%)	
PM	14 (18.67%)	39 (52.00)	22 (29.33%)	
The enforcement of the rules and regulations for the protection of sea turtles is	Sufficient	Insufficient	I'm not aware of the implementation process	
MI	27 (23.48%)	52 (45.22%)	36 (31.30%)	
RH	36 (25.00%)	76 (52.78%)	32 (22.22%)	
PM	6 (8.00%)	42 (56.00%)	27 (36.00%)	
Do you like to visit a nature reserve?			Yes	No
MI	94 (81.74%)	21 (18.26%)		
RH	138 (95.83%)	6 (4.17%)		
PM	72 (96.00%)	3 (4.00%)		
Do you think nature reserves / protected areas should be managed by	Community- based management	Government	Private sector	Partnership / co-management
MI	27 (23.48%)	57 (49.57%)	4 (3.48%)	27 (23.48%)
RH	18 (12.50%)	93 (64.58%)	5 (3.47%)	28 (19.44%)
PM	12 (16.00%)	12 (16.00%)	6 (8.00%)	45 (60.00%)
Are you willing to financially contribute to the sea turtles conservation?			Yes	No
MI	55 (47.83%)	60 (52.17%)		
RH	80 (55.56%)	64 (44.44%)		
PM	40 (53.33%)	35 (46.67%)		

It can be noted from (Table 5.3) that:

- The majority of the groups were aware of the marine turtles conservation and the threats on these species at Masirah Island and Ras Al Hadd. They had seen the turtles at Ras Al Hadd or Masirah Island but did not participate in any marine turtles conservation activities.

- The majority of the groups believed that the rules and regulations for the protection of marine turtles are insufficient but the enforcement of these rules and regulations for the protection of marine turtles is insufficient.

- The majority of the groups would like to visit a nature reserve; however, Masirah Island and Ras Al Hadd respondents thought that nature reserves or protected areas should be managed by the government, whereas policy makers thought that the management of the nature reserves or protected areas should be a partnership between the government, the private sector and the community.

- Almost half of the respondents from the different groups of the questionnaire were willing to make financial contribution to the marine turtle conservation.

iii. Part 4 of the questionnaire: Your feedback

Table 5.4: Feedback from the respondents of Masirah Island (MI), Ras Al Hadd (RH) and Policy makers (PM) regarding the marine turtle conservation in Oman																	
Site/group		**MI (N= 115)[12]**					**RH (N=144)**					**PM (N=75)**					
Question	**Scale[13] 13**	**SA**	**A**	**IDK**	**D**	**SDA**	**SA**	**A**	**IDK**	**D**	**SDA**	**SA**	**A**	**IDK**	**D**	**SDA**
Creates opportunities for the local communities to get formal and informal education and training	**count**	52	51	11	1	0	62	62	14	5	1	31	36	7	1	0
	%	45.22	44.35	9.57	0.87	0.00	43.06	43.06	9.72	3.47	0.69	41.33	48.00	9.33	1.33	0.00
Increases public safety and security through the associated infrastructure development, e.g. roads, buildings and facilities	**count**	45	49	13	8	0	57	71	10	5	1	26	26	12	8	3
	%	39.13	42.61	11.30	6.96	0.00	39.58	49.31	6.94	3.47	0.69	34.67	34.67	16.00	10.67	4.00
Leads to uncontrolled sea turtle tourism, which can have a negative impact on adult and hatchling sea turtles and their nesting beaches	**count**	19	35	25	33	3	30	56	36	19	3	13	18	16	21	7
	%	16.52	30.43	21.74	28.70	2.61	20.83	38.89	25.00	13.19	2.08	17.33	24.00	21.33	28.00	9.33
Provides / promotes greater understanding between the governmental and civil associations.	**count**	39	48	23	5	0	52	73	18	1	0	29	44	2	0	0
	%	33.91	41.74	20.00	4.35	0.00	36.11	50.69	12.50	0.69	0.00	38.67	58.67	2.67	0.00	0.00
Creates excessive demand on economic (e.g. water, electricity) and physical (infrastructure, roads, accommodation) resources at Ras Al Hadd and Masirah Island	**count**	13	27	27	39	9	28	47	40	26	3	5	21	18	26	5
	%	11.30	23.48	23.48	33.91	7.83	19.44	32.64	27.78	18.06	2.08	6.67	28.00	24.00	34.67	6.67

[12] N is the total number of respondents

[13] SA (Strongly Agree)= 1, A(Agree)=2, D(Disagree)= 3, SDA(Strongly Disagree)=4 and IDK (I Don't Know)=0

Continued Table 5.4: Feedback from the respondents of Masirah Island (MI), Ras Al Hadd (RH) and Policy makers (PM) regarding the marine turtle conservation in Oman

Leads to alien (negative) habits / culture implication. Has a bad influence on cultural habits, beliefs and values	**count**	11	19	14	62	9	21	36	41	44	2	4	16	18	26	11
	%	9.57	16.52	12.17	53.91	7.83	14.58	25.00	28.47	30.56	1.39	5.33	21.33	24.00	34.67	14.67
Leads to negative impact on tourism due to the limitation measures enforced by the conservations (e.g. restriction on access to the nesting beaches)	**count**	10	29	14	48	14	24	40	31	43	6	8	17	9	28	13
	%	8.70	25.22	12.17	41.74	12.17	16.67	27.78	21.53	29.86	4.17	10.67	22.67	12.00	37.33	17.33

The key findings from (Table 5.4) showed that:

- The majority of all groups strongly agreed that conservation of marine turtles was likely to create opportunities for the local communities to get formal and informal education and training, to increase public safety and security through the associated infrastructure development, example; roads, buildings and facilities and to provide or promote a greater understanding between the governmental and civil associations.

- The majority of all groups disagreed that conservation of marine turtles was likely to lead to alien (negative) habits or cultural implication and has a bad influence on cultural habits, beliefs and values. They also disagreed that the conservation of these species was likely to lead to negative impact on tourism due to the limitation measures enforced by the conservations (e.g. restriction on access to the nesting beaches).

- Masirah Island and Ras Al Hadd respondents agreed that the conservation of marine turtles was likely to lead to uncontrolled marine turtle tourism, which can have a negative impact on adult and hatchling marine turtles and their nesting beaches and Ras Al Hadd respondents agreed that conservation of marine turtles was likely to create excessive demand on economic (e.g. water, electricity) and physical (infrastructure, roads, accommodation) resources at Ras Al Hadd and Masirah Island.

5.4.2. Empirical results

I.   Masirah Island Logit regression: Economic values perception

Table 5.5: Results of the logit regression between economic values perception and 9 variables for Masirah Island. N, the number of respondents was 115 who generated a total of observations of 107

Variable	Coef.	SE	Wald	P-value	z-Statistic	(Odds-ratio) Exp (B)	95% C.I. for EXP(B) Lower	Upper
GEN	-3.822	1.642	5.415	0.020	-2.327	0.022	0.001	0.547
AGE	0.131	0.097	1.818	0.178	1.348	1.140	0.942	1.380
EDU	3.405	1.649	4.263	0.039	2.065	30.118	1.189	763.199
INCOME	-0.001	0.001	0.304	0.581	-0.552	0.999	0.996	1.002
WORK	-0.247	0.942	0.069	0.793	-0.2622	0.781	0.123	4.950
MEM	3.371	1.618	4.341	0.037	2.083	29.113	1.221	694.056
CAT	-0.239	0.641	0.139	0.709	-0.373	0.787	0.224	2.766
Awareness	-2.167	1.651	1.723	0.189	-1.313	0.114	0.005	2.913
VCONT	-2.020	1.465	1.901	0.168	-1.379	0.133	0.008	2.343
Constant	1.584	5.457	0.084	0.772	0.290	4.874		

Summary Statistics		Diagnostics: Model Selection Criteria	
Mean (dependent variable)	0.944	Akaike Info Criterion (AIC)	0.448
SD (dependent variable)	0.231	Schwarz Criterion (SC)	0.697
McFadden R-squared	0.400	Hannan-Quinn criter (H-QC)	0.549
Cox & Snell R Square	0.157	Restr. deviance	46.230
Nagelkerke R Square	0.449	LR statistic	18.334 (p value =0.031)
SSE (Sum Squared Error)	4.246		
Log likelihood	- 13.948		
SE of regression	0.209		
% of correct prediction	94.400		

Out of 9 possible explanatory variables, 3 variables were statistically significant at the conventional level of 5%: gender (Gender), education (EDU) and the membership to an environmental conservation agency/society/group (MEM) (Table 5.5). The sign of the estimated coefficient assesses the relationship between the dependent and independent variables. The following section provides the interpretation of the significant variables in terms of the corresponding odd-ratio as explained earlier. The non-significant variables were age (AGE), income (INCOME), occupation (WORK), category of the respondents (CAT), awareness (Awareness) and the voluntary contribution to the marine turtle conservation in Oman (VCONT).

Gender (GEN): The estimated coefficient carried a negative sign. The odds ratio was 0.022 that indicates that if this variable changed by one unit the odds in favor of the perception towards the economic values decreases by 0.022 times. Thus, females are 0.022 times less likely to realize and to be convinced by the economic values of marine turtle conservation form male respondents**.**

Education (EDU): The estimated coefficient carried a positive sign. The odds ratio was 30.118. Therefore, if this variable changed on average by one unit, the odds in favor of the perception towards the economic values increase by 30.118 times. This means that, respondents with an education level higher than high school diploma were 30.118 times more likely to realize and to be convinced by the economic values of marine turtle conservation.

Membership to an environmental conservation agency/society/group (MEM): The estimated coefficient carried a positive sign. The odds ratio was 29.113. So if this variable changed by one unit, the odds in favor of the perception towards the economic values increases by 29.113 times. This implies that respondents who were not members of any environmental conservation agency/society/group were 29.113 times more likely to realize and to be convinced by the economic values of marine turtle conservation.

II.   Masirah Island Logit regression: Non- Economic values perception

Table 5.6: Results of the logit regression between none-economic values' perception and 9 variables for Masirah Island. N, the number of respondents was 115 who generated a total of observations of 107

Variable	Coef.	SE	Wald	P-value	z-Statistic	(Odds-ratio) Exp (B)	95% C.I.for EXP(B) Lower	Upper
GEN	-0.532	0.643	0.683	0.409	-0.826	0.588	0.167	2.074
AGE	-0.001	0.042	<0.001	0.990	-0.012	0.999	0.920	1.086
EDU	-0.375	0.564	0.442	0.506	-0.665	0.687	0.228	2.076
INCOME	<0.001	0.001	0.001	0.975	0.031	1.000	0.998	1.002
WORK	-0.053	0.449	0.014	0.906	-0.118	0.948	0.393	2.287
MEM	0.185	0.735	0.063	0.802	0.251	1.203	0.285	5.075
CAT	-0.305	0.318	0.920	0.337	-0.959	0.737	0.395	1.375
Awareness	0.827	1.109	0.557	0.456	0.746	2.287	0.260	20.084
VCONT	0.219	0.582	0.142	0.706	0.377	1.245	0.398	3.897
Constant	2.716	2.830	0.921	0.337	0.960	15.116		

Summary Statistics		Diagnostics: Model Selection Criteria	
Mean (dependent variable)	0.860	Akaike Info Criterion (AIC)	0.956
SD (dependent variable)	0.349	Schwarz Criterion (SC)	1.206
McFadden R-squared	0.051	Hannan-Quinn criter (H-QC)	1.058
Cox & Snell R Square	0.040	Restr. deviance	86.735
Nagelkerke R Square	0.073	LR statistic	4.411 (p value = 0.882)
SSE (Sum Squared Error)	12.279		
Log likelihood	- 41.162		
SE of regression	0.356		
% of correct prediction	86.000		

There were no statistically significant variables estimated from the results shown in Table 5.6. This gives an indication that none of the independent variables contributed to the overall perception of Masirah Island respondents to the non-economic values of marine turtle conservation.

III. Ras Al Hadd Logit regression: Economic values perception

Variable	Coef.	SE	Wald	P-value	z-Statistic	(Odds-ratio) Exp (B)	95% C.I.for EXP(B) Lower	Upper
GEN	0.165	1.407	0.014	0.907	0.117	1.179	0.075	18.607
AGE	0.069	0.099	0.486	0.486	0.697	1.072	0.882	1.302
EDU	0.351	1.133	0.096	0.757	0.310	1.421	0.154	13.099
INCOME	0.001	0.002	0.161	0.689	0.401	1.001	0.998	1.004
WORK	0.060	0.627	0.009	0.924	0.095	1.062	0.310	3.632
MEM	1.428	1.211	1.392	0.238	1.180	4.172	0.389	44.743
CAT	0.449	0.514	0.763	0.382	0.873	1.567	0.572	4.294
Awareness	-1.353	1.169	1.339	0.247	-1.157	0.259	0.026	2.555
Constant	-2.033	5.576	0.133	0.715	-0.365	0.131		

Table 5.7: Results of the logit regression between economic values perception and 8 variables for Ras Al Hadd. N, the number of respondents was 144 who generated a total of observations of 125

Summary Statistics		Diagnostics: Model Selection Criteria	
Mean (dependent variable)	0.968	Akaike Info Criterion (AIC)	0.381
SD (dependent variable)	0.177	Schwarz Criterion (SC)	0.584
McFadden R-squared	0.165	Hannan-Quinn criter (H-QC)	0.463
Cox & Snell R Square	0.046	Restr. deviance	35.407
Nagelkerke R Square	0.185	LR statistic	5.837 (p value= 0.665)
SSE (Sum Squared Error)	3.564		
Log likelihood	-14.785		
SE of regression	0.175		
% of correct prediction	96.800		

There were no statistically significant variables estimated from the results shown in Table 5.7. This gives an indication that none of the independent variables contributed to the overall perception of Ras Al Hadd respondents to the economic values of marine turtle conservation. Further investigation to the data in relation to the dependent variable (Y) and independent variable (VCONT) revealed that the switching pattern in responses was very similar to each other, which, creates quasi-complete separation (Eviews). Consequently, VCONT dropped from the model for this part.

IV. Ras Al Hadd Logit regression: Non- Economic values perception

Table 5.8: Results of the logit regression between none-economic values perception and 9 variables for Ras Al Hadd. N, the number of respondents was 144 who generated a total of observations of 125

Variable	Coef.	SE	Wald	P-value	z-Statistic	(Odds-ratio) Exp (B)	95% C.I.for EXP(B) Lower	Upper
GEN	-0.328	0.516	0.405	0.525	-0.636	0.720	0.262	1.979
AGE	-0.036	0.026	1.890	0.169	-1.375	0.964	0.916	1.016
EDU	-0.125	0.365	0.118	0.731	-0.344	0.882	0.432	1.802
INCOME	<0.001	0.001	0.202	0.653	0.450	1.000	0.999	1.001
WORK	0-.072	0.244	0.087	0.768	-0.295	0.931	0.577	1.501
MEM	-0.434	0.664	0.427	0.514	-0.653	0.648	0.176	2.382
CAT	0.003	0.216	<0.001	0.988	0.015	1.003	0.657	1.531
Awareness	-0.861	0.495	3.025	0.082	-1.739	0.423	0.160	1.115
VCONT	-1.111	0.463	5.750	0.016	-2.398	0.329	0.133	0.816
Constant	6.531	2.144	9.277	0.002	3.046	685.828		

Summary Statistics			Diagnostics: Model Selection Criteria		
Mean (dependent variable)		0.744	Akaike Info Criterion (AIC)		1.177
SD (dependent variable)		0.438	Schwarz Criterion (SC)		1.403
McFadden R-squared		0.106	Hannan-Quinn criter (H-QC)		1.269
Cox & Snell R Square		0.114	Restr. deviance		142.208
Nagelkerke R Square		0.167	LR statistic		15.070 (p value=0.089)
SSE (Sum Squared Error)		21.083			
Log likelihood		-63.569			
SE of regression		0.428			
% of correct prediction		74.400			

Out of 9 explanatory variables, 2 variables were statistically significant at the conventional level of 5 % (VCONT) and 10 % (Awareness) (Table 5.8). The sign of the estimated coefficient assesses the relationship between the dependent and independent variables. The following section provides the interpretation of the significant variables in terms of the corresponding odd-ratio as explained earlier. The non-significant variables were gender (GEN), age (AGE), education (EDU), income (INCOME), occupation (WORK) and the category of the respondents (CAT).

Awareness (Awareness): The estimated coefficient carried a negative sign. The odds ratio was 0.423, which indicates that, if this variable changed by one unit the odds in favor of the perception towards the non-economic values decreases by 0.423 times. Thus, respondents with lack of awareness of marine turtle's conservation at Masirah Island and Ras Al Hadd were 0.423 times less likely to realize and to be convinced by the non-economic values of marine turtle conservation.

Voluntary financial contribution (VCONT): The estimated coefficient carried a negative sign. The odds ratio was 0.329, which indicates that if this variable changed by one unit the odds in favor of the perception towards the non-economic values decreases by 0.329 times. Thus, the respondents with no willingness to give any financial contribution for marine turtle's conservation were 0.329 times less likely to realize and to be convinced by the non-economic values of marine turtle conservation.

V. Policy makers Logit regression: the perception of the government role in marine turtle conservation in Oman

Table 5.9: Results of the logit regression between the government role perception of marine turtle conservation in Oman and 9 variables for policy makers. N, the number of respondents was 75 who generated a total of observations of 75

Variable	Coef.	SE	Wald	P-value	z-Statistic	(Odds-ratio) Exp (B)	95% C.I.for EXP(B) Lower	Upper
GEN	-0.704	0.610	1.333	0.248	-1.154	0.495	0.150	1.634
AGE	0.052	0.031	2.825	0.093	1.681	1.053	0.991	1.118
EDU	-0.550	0.446	1.520	0.218	-1.233	0.577	0.241	1.383
INCOME	-0.001	0.001	4.413	0.036	-2.101	0.999	0.998	1.000
WORK	-1.122	0.657	2.914	0.088	-1.707	0.326	0.090	1.181
MEM	-1.369	0.762	3.227	0.072	-1.796	0.254	0.057	1.133
CAT	0.734	0.598	1.505	0.220	1.227	2.084	0.645	6.735
Awareness	0.930	0.751	1.533	0.216	1.238	2.535	0.581	11.055
VCONT	-0.878	0.587	2.236	0.135	-1.495	0.416	0.131	1.314
Constant	4.101	3.297	1.547	0.214	1.244	60.406		

Summary Statistics			Diagnostics: Model Selection Criteria	
Mean (dependent variable)		0.587	Akaike Info Criterion (AIC)	1.407
SD (dependent variable)		0.496	Schwarz Criterion (SC)	1.716
McFadden R-squared		0.159	Hannan-Quinn criter (H-QC)	1.530
Cox & Snell R Square		0.194	Restr. deviance	101.707
Nagelkerke R Square		0.262	LR statistic	16.21780 (p value= 0.062)
SSE (Sum Squared Error)		14.474		
Log likelihood		- 42.745		
SE of regression		0.472		
% of correct prediction		58.700		

Out of 9 explanatory variables, only one variable was statistically significant at 5 % level and 3 variables were statistically significant at 10 % level that is: income (INCOME), age (AGE), occupation (WORK) and the membership to environmental conservation agency/society/group (MEM). Gender (GEN), education (EDU), the Category of the respondents (CAT) and voluntary contribution (VCONT) were not statistically significant (Table 5.9). The following section provides the interpretation of the significance of these variables.

Age (AGE): The estimated coefficient carried a positive sign. The odds ratio was 1.053. This indicates that if this variable changed on average by one unit, the odds in favor of the perception towards emphasizing the government role for marine turtles' conservation in Oman and the mitigation of the negative impacts on resources users increases by 1.053 times. So, elder respondents (age higher than 22 years on average) were 1.053 times more likely to emphasize on the government role on this issue.

Income (INCOME): The estimated coefficient of income carried a negative sign. The odds ratio was 0.999. This implies that if the variable of income changed on average by one unit the odds in favor of the perception towards the government role for marine turtles' conservation in Oman and the mitigation of the negative impacts on resources users decreases by 0.999 times. Thus, respondents with higher income were 1.001 times less likely to emphasize on the government role on this issue. The calculated mean of income related to respondents of this category was 1020.08 OMR.

Occupation (WORK): The estimated coefficient for this variable also carried a negative sign. The odds ratio was 0.326. Thus, if this variable changed by one unit, the odds in favor of the perception towards the government role for marine turtles' conservation in Oman and the mitigation of the negative impacts on resources users decreases by 0.326 times. This indicates that, respondents that work in other than the public sector are 0.326 times (three times) less likely to emphasize on the government role on this issue.

Membership to an environmental conservation agency/society/group (MEM): The estimated coefficient carried a negative sign. The odds ratio was 0.254. So if this variable changed by one unit, the odds in favor of the perception towards the government role for marine turtles' conservation in Oman and the mitigation of the negative impacts on resources users decreases by 0.254 times. This implies that respondents that were not members to any environmental conservation agency/society/group were 0.254 times (four times) less likely to emphasize on the government role on this issue.

5.4.3 Non-parametric result: Group Mean Scores, Test Statistic ($\chi 2$, df & p-value) and Highest Frequency Score (HFS)

A Non- parametric test has been conducted to make further investigation for the empirical results obtained above.

Table 5.10: Group mean scores, test statistics and Highest frequency statistics of the perception of stakeholders excluding zero income respondents[14]									
Element **(1= SA, 4= SDA)**[15]	**Group Mean Scores**			**Test Statistic** **χ2, df and p-value**			**Highest Frequency Score (HFS)**		
	MI **N=109**[16]	**RH** **N=127**	**PM** **N=75**	**MI vs RH**	**MI vs PM**	**RH vs PM**	**MI**	**RH**	**PM**
1.Conservation of sea turtles is important for economic reasons (e.g. tourism, employment, and investments)	1.35	1.24	1.44	8.687 (8) p-value = 0.369	9.737 (16) p-value = 0.880	6.550 (8) p-value = 0.586	1	1	1
2.Conservation of sea turtles is important for non-economic, social, reasons e.g. (cultural beliefs, morals, values, understanding and conservation and social association development)	1.54	1.43	1.39	9.333 (16) p-value = 0.899	21.147 (16) p-value = 0.173	51.848 (16) p-value = **<0.001**	2	2	2
3.The government should pay more attention to sea turtles conservation and the mitigation of human sea turtles conflict especially with the resources users at the targeted sites	1.30	1.35	1.35	6.622 (12) p-value = 0.882	3.763 (9) p-value = 0.926	7.816 (9) p-value = 0.553	1	1	1
4.The local community from the surrounding boundaries of the nature reserves should have more involvement in the sustainable marine turtle conservation	1.42	1.02	1.36	4.138 (8) p-value = 0.844	5.200 (8) p-value = 0.736	0.504 (4) p-value = 0.973	1	1	1
5. Sea turtle numbers are already declining globally. It does not matter if their numbers are reduced more to provide more beaches for human recreational activities and fishing	2.81	2.37	3.40	10.592 (16) p-value = 0.834	8.750 (12) p-value = 0.724	10.473 (12) p-value = 0.575	3	3	4
6.The value of the protected areas and their beauty would be the same with or without sea turtles	3.07	2.44	3.36	9.145 (16) p-value = 0.907	8.664 (12) p-value = 0.731	8.543 (12) p-value = 0.741	4	3	4

[14] MI (Masirah Island), RH (Ras Al Hadd) and PM (Policy Makers)
[15] SA (Strongly Agree)= 1, A(Agree)=2, D(Disagree)= 3, SDA(Strongly Disagree)= 4
[16] There might be some variation of the number of respondents here from those used at the model because of the inconsistency of some of the responses

As mentioned earlier, Questionnaire 2 attempted to seek feedback on different aspects (that includes factors such as economic, non-economic, social, governmental responsibilities and commuinty participation) of marine turtle conservation.

A four-point Likert scale with '1' representing strongly agree and '4' representing strongly disagree along with the option of 'I do not know' was used to measure responses. One distinct null-hypothesis H_0, there is no significant differences in responses of key respondent groups were tested using Chi-square (χ^2) statistics. This non-parametric test is based on individual responses (frequencies of responses) rather than the mean scores. Because, the equality of the mean scores between the two groups does not necessarily mean that there is no differences in responses from the two groups as individual responses may differ significantly from each other. The test results along with group mean of HFS are presented in Table 5.10.

Ras Al Hadd residents and policy makers showed significant differences in responses at the 5% level for the non-economic and social factors. However, there was agreement in all other factors presented at this part between all the groups with regards to the ecological and economic importance of marine turtles. This indicates considerable similarities in perception regarding the key aspects of the marine turtle conservation and thus the coherence in answers that was reflected in the less statistically significant variables in the empirical analysis.

5.5. Discussion

5.5.1. Descriptive results

I. Part 1 of the questionnaire: Background information

The majority of respondents to Questionnaire 2 were Omanis. This is due to the fact that this questionnaire was targeting stakeholders from the community and not from any unrelated category such as tourists. Moreover, males represented a higher percentages at the site but not online. This can be related to some of the cultural barriers as all of the research assistants were males so it may have been difficult to approach females during the fieldwork.

Middle age respondents (Age 25-50) represented the dominant group, which might be related to their interest in the research topic and to give their perception and feedback on ways of improvements. This result might also be linked to the fact that the majority of respondents were from the educational sector category (teachers, college/university students and researchers) and thus for that most of the respondents had undergraduates certificates (13-17 years of education). The monthly income results could be justified by two reasons. On one hand, this might be related to their occupation in which public workers were the dominant group and on the other hand, it might be also related to their dominant category (educational sector), thus the mean of monthly income for workers at this sector is higher than 500 OMR.

The result of membership to an environmental conservation agency, society or group proved that the willingness of community stakeholders to provide their perception on the conservation of marine turtles is not bounded to a membership to these entities. This is an important finding for policy formation to enhance the community participation in this process.

II. Part 2 of the questionnaire: what do you think

The finding of this part (Table 5.3) showed that though all of the groups of the study were aware of the conservation programs at Masirah Island and Ras AL Hadd , the threats on marine turtle at these sites, had seen the marine turtle there , believes that the rules and regulations to protect marine turtles are insufficient as well as the enforcement of the recent rules and regulation, did not participate in any of the marine conservation activities but would like to visit a nature reserve or protected area. But, yet, only half of the respondents from all the groups were willing to make financial contribution for the conservation of the marine turtles. Moreover, Masirah Island and Ras AL Hadd respondents believed that the management of the nature reserve or the protected areas should be a solo responsibility of the government. From the felid visits to both sites and interviewing locals, this finding could be explained by the fact that the local community namely at Masirah Island and Ras Al Hadd are still highly relying on the government to play the major role in managing natural resource and this was reflected by their un willingness to financially contribute to such programs.

However, the policy makers' group respondents believed that the management of nature reserve or a protected area should be a partnership between the government, the private sector and the community. Given the fact that those policy makers from the officials academics, private companies and NGO's were not residents at both sites it might influenced their perceptions towards the management practices.

III. Part 4 of the questionnaire: Your feedback

The findings of this part indicated group agreement on the benefits generated from marine turtles conservation with regards to formal and informal education and training, enhance public safety and security, providing or promoting greater understanding between governmental and civil association and all disagreed that marine turtles conservation might lead to alien negative habits or cultural implication and it may have a negative impact on tourism. This shows the success the conservation of marine turtles in producing positive perception and discarding any negative perception related to the marine turtles.

Policy makers' respondents disagreed on the assumption that marine turtle tourism is likely to lead to uncontrolled marine turtle tourism. In addition, Ras Al Hadd respondents agreed on the assumption that the conservation of marine turtles is likely to create excessive demand on economic (e.g. water, electricity) and physical (infrastructure, roads, accommodation) resources at Ras Al Hadd and Masirah Island. This could be explained by the fact that Ras Al Hadd community already witnessed the situation in which tourism is promoted through the establishment of the facilities related to the marine turtles.

5.5.2. Empirical results

The estimates obtained for the perception of the respondents at Masirah Island and Ras Al Hadd towards the economic values of marine turtles conservation in Oman (Tables 5.5 and Table 5.7 respectively), showed that no variables were statistically significant at Ras Al Hadd. Whereas, three out of nine variables namely gender (GEN), years of education (EDU) and the membership to an environmental entity (MEM) showed significance at Masirah Island. That is males (60%), high-educated respondents (undergraduates 46%) and non-members to any environmental conservation agency, society or group (84%) were more aware and convinced of the economic values of marine turtle conservation. Masirah Island local community are fishermen and since this industry is dominated by men, this lead to their realization of the economic impacts of marine turtles in their industry. Moreover and because of the government focus on this site as a tourism haven and since they (local community; males) started to engaged more in this industry they realized the important role of marine turtles to attract tourists. Moreover, especially in case of Oman, often the educated people have greater awareness of social, political, economic and environmental issues in general and conservation issues in particular. In addition it is not important yet for Omanis (local community) to be a member of any entity and among these the environmental entities in order to play a valuable role in any case that you do care of, because in Oman there are other channels to deliver your voice through the national communities (tribal councils and others).

The estimates obtained about the perception of the respondents at Masirah Island and Ras Al Hadd towards the non-economic values of marine turtles conservation in Oman (Table 5.6 and Table 5.8 respectively) showed different findings. There were no statistically significant for Masirah Island case and R square values were very low. The low values of

the R square could be justified by the high number of insignificant variables and because all the data collected, was cross section data collected at a particular point in time. Whereas two out of nine variables namely awareness (Awareness) and willingness for voluntary contribution (VCONT) showed significance at Ras Al Hadd. That is locals with lack of awareness of marine turtles conservation at Masirah Island and Ras Al Hadd and not willing to pay any voluntary contribution. These results were consistent with the fact that lack of knowledge on any issue will drive the person to underestimate the values associated to that issue and thus unwillingness for any financial contribution to it.

Moreover, the estimates about the perception of the policy makers towards the government role in the conservation marine turtles in Oman (Table 5.9) showed that age (AGE), income (INCOME), occupation (WORK) and membership to an environmental entity (MEM) are statistically significant. Therefore, young respondents, with higher income, working in non- public sector and non-members to any environmental entity are less emphasizing on the government role on this issue. These findings on one hand might also be related to the descriptive findings as the majority of respondent from this group were middle age (25-50 years: 68%), have high income (551-2050 OMR: 53%) and non-members to any environmental entity (76%). On the other hand, these groups tend to believe in the collaborative effort to protect and conserve the natural resources and their components.

5.5.3. Non parametric results: Group Mean Scores, Test Statistic (χ2, df & p-value) and Highest Frequency Score (HFS)

The significant difference in responses between Ras Al Hadd and policy makers indicates the differences in perception in relation to non-economic and social values of the marine turtles conservation. Although no significant differences were evident in five out of six questions presented to the respondents in this part of the questionnaire, in several cases the scores with the highest frequency from either or both of the groups were close to or lower than the central point (i.e. 2.5) of a 4-point scale (Table 5.10). These scores indicate the extent to which the corresponding factors influenced the conservation. The management authority should take these factors (with lower scores) into account and design strategies accordingly to improve the efficiency and effectiveness of the program.

Strong disagreement on question 5 and 6 reflect the community stakeholders concerns about the protection and conservation of marine turtles.

5.6. Conclusion and policy recommendation

5.6.1. Policy recommendations

Most (>73%) respondents were aware of the importance of turtle conservation and of the threats to their survival, irrespectively of their affiliation to a conservation organization. This pro-conservation attitude and this knowledge can be used by the government to create partnership with the local communities to enhance conservation and facilitate sustainable touristic exploitation. Most respondents agreed that rule and regulation enforcement were currently insufficient to warrant efficient turtle conservation. The management authority of existing and future conservation areas should focus on a progressively more stringent enforcement of the rules and regulations. This can be achieved through quantitative employment of rangers but also through a qualitative training and appropriate acknowledgements. There is some disagreement on the role of the government in the conservation process, particularly among the lower income group. It is thus essential to target the medium and lower income stakeholder in promoting partnership and community engagement in future turtle conservation endeavors. Most respondents' awareness of the benefits and possible cost aspects of nature based tourisms 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 such 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 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.

In Ras Al Hadd, the perception of non-economic value is positively influenced by 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 Ras Al Hadd, the non-economic value of turtle conservation was poorly appreciated by all respondents irrespective of their categories.

This indicates that cultural images, esthetic and intrinsic values as identified in Chapter 2 were poorly developed.

5.6.2. Concluding remarks

This chapter was aimed to fulfil objective 2 of the research that is to examine community perception on the conservation of marine turtles in Oman. The analysis was done using logit regression on the data collected through conducting questionnaire 2 at the study sites and online. Two hundred and fifty nine questionnaires were collected from the study sites (115 from Masirah Island and 144 from Ras Al Hadd) to cover the local community perception at both sites. Additional 75 questionnaires were collected online to cover the perception of the group of policy makers. The stakeholders perception analysis revealed that, for both sites, a majority of the respondents were aware of the marine turtles conservation program in Oman and believed that the current extent of enforcement was insufficient for an effective protection of marine turtles. Furthermore, all of the groups disagree the statements that the marine turtles could produce any negative impacts on the community and emphasize on the importance of the existence of these species as an important part of the ecosystem components of the country. Moreover, a Chi-Square test indicated that a majority of the stakeholders from all groups (Masirah Island and Ras Al Hadd local community and policy makers) strongly perceived that the conservation of marine turtles was important for economic reasons.

The next chapter will fulfil the third (final) objective of this research, which serves two purposes in its structure to give the summary of the findings of this research in the form of Oman TEEB Country Study that could be reported to the Convention on Biological Diversity (CBD).

Chapter.6 The Economics of Ecosystems and Biodiversity (TEEB)

6.1. Introduction to Oman- TEEB Country Study (TCS)

Following the research objective 3 stated in Chapter 1, and as a concluding chapter of this research. The main purpose of this chapter is to prepare a country study report using The Economics of Ecosystems and Biodiversity (TEEB) approach, with a particular focus to marine turtle conservation in Oman. To serve this purpose this chapter uses all the key findings from the previous chapters and feeds them into the TEEB framework. The structure of the rest of this chapter is as follows; approach and methods (section 6.2), TEEB framework (section 6.3) and Oman-TEEB Country Study (section 6.4).

Oman as a signatory member of the CBD since 1995 became obliged to fulfil the convention's resolutions. The convention urged the parties to provide their TEEB Country Studies (TCS) since the recognition of TEEB as an approach to the convention in 2007 (Sukhdev, 2010). It focuses on "making marine turtles' values visible" to increase the coherence between the conservation programs and the countries/ regional economic development models (TEEB, 2013). TEEB is set up to resolve challenges at the ecological, economic and political scales. At the ecological scale, it aims to use the current state of knowledge to provide the basis of economic evaluation of natural resources without the need to develop a new methods or techniques. At the political scale, TEEB aims to highlight the effective and efficient policies in generating benefits. At the economic scale, it emphasizes the importance of linking biodiversity to poverty and how to enhance the GDP of the poor (Ring et al., 2010). (Rodríguez-Labajos & Martínez-Alier, 2013), page 334) states that; GDP of the poor is "The total sources of livelihoods of rural and forest-dwelling poor households in some large developing countries"

The TEEB framework can be applied by demonstrating the economic benefits of an ecosystem at the local level up to the global level such as in the case of Amazon forest where the benefits were estimated at different spatial levels (Ring et al., 2010). Different case studies were provided by the member countries of the Convention on Biological Diversity (CBD). The cases that were considered for producing this chapter were the ones that focused on marine turtles (Watamu Turtle Watch, 2010), protected areas (Kajala, 2013) and recreational values (P. V Beukering & Cesar, 2010).

6.2. TEEB approach and methods

The areas of work for TEEB are agriculture and food, natural capital accounting, and TEEB for business, oceans and coasts, water and wetlands. From that, many ecosystem services can be considered as TEEB Country Studies (TCS) that includes, energy provision, agriculture, forestry and water management, tourism and recreation, health and protection against natural disaster, basic service provision and transport infrastructure development (TEEB, 2013). The Contingent Valuation Method (CVM) is one of the methods used to conduct TEEB are presented in Chapter 3, section 3.2 (Literature review and a conceptual note on CVM). This chapter is designed to provide information regarding the 'tourism and recreation' component of ecosystem services in relation to the marine turtles representing oceans and coastal discipline under TEEB. This is performed by incorporating the key findings of the CVM, the Conjoint Analysis (CA) and the stakeholder's perception analysis of the present research.

6.3. TEEB framework

The formation process of TEEB Country Study (TCS) has to go through six phases as designed by the United Nations Environment Programme in guiding manual (TEEB, 2013). The phases are:

1. Refine the objectives of the TCS by consultations on the key policy issues with stakeholders
2. Identify the most relevant ecosystems and ecosystem services.
3. Define information needs and select appropriate methods.
4. Assess and value ecosystem services.
5. Identify and outline pros and cons of policy options including distributional impacts.
6. Review, revise, and report study results.

All of these phases have key outputs and these outputs listed in Table (6.1). This research has followed all of these phases to design the Oman TEEB Country Study (TCS). However, this study report will be presented and discussed with the national authority in Oman, the Ministry of Environment and Climate Affairs (MECA) for review and submission to Convention on Biological Diversity under the umbrella of TEEB.

Table 6.1: An overview of the main phase of TEEB framework

Steps	STEP 1. Refine the objectives of the TCS by consultations on the key policy issues with stakeholders	STEP 2. Identify the most relevant ecosystems and ecosystem services	Step 3. Define information needs and select appropriate methods	STEP 4. Assess and value ecosystem services	STEP 5. Identify and outline pros and cons of policy options, including distributional impacts	STEP 6: Review, revise, and report study results
Key outputs	• Clearly defined objectives and scope for the study, with the appropriate level of stakeholder involvement, especially from national and local policy-makers • Basic grasp of the differences in perspectives and potentially conflicting interests across different policy dependencies as well as impacts. • Understanding of which institutions currently govern ecosystems and biodiversity and how decisions are made. • Brief problem statement that can be referred to in order to guide the study.	• Basic understanding that can guide assessment of how different stakeholders value and prioritize ecosystem services. • Key concerns identified with regard to ecosystem degradation or loss, the main drivers and trends, and related stakeholder groups. • List of prioritized ecosystem services which are linked to the objectives of the study.	• Clarity on what information needs to be generated and how this information will be used to further the overall objectives of the study. • Decision made regarding methods to be used, with justifications for the choice provided. • Clarity on key data sources and matching of intended methods with data, time, capacity and resources available for conducting the analyses.	• Assessment and valuation of relevant ecosystem services, including the trends in usage, degradation, ecosystem health, and resilience. • Detailed understanding and assessment of the key drivers of changes (what and by whom) in ecosystem service provision, and how stakeholders are affected by the changes. • Understanding of how the benefits associated with ecosystem services and the costs associated with their degradation are distributed.	• Broad outline of currently existing policies and alternative policy options or measures, tested against consistent criteria including distributional implications. • List and brief description of policy options or measures which show promise, giving a broad rationale. • If relevant, assessment of ecosystem service provision under different policy scenarios or use options, including the trade-offs involved. • Recommendations on how to best deal with un-avoidable negative distributional impacts that may arise.	• Review of study with recommendations either integrated into the study or clear reasons given for non-integration. • Final reporting appropriate to the needs of targeted decision-makers and other audiences. • Statement of recommended criteria and indicators to be considered for impact analysis and regular reporting of outcomes, after recommended policy changes are implemented

Adapted from (TEEB, 2013).

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6.4. Oman- TEEB Country Study (TCS)

The following section will present Oman TEEB- Country Study based on the structures of submitted reports by other member countries to the Convention on Biological Diversity (CBD) (P. V Beukering & Cesar, 2010; Kajala, 2013; Watamu Turtle Watch, 2010)

Title: Socio- economic benefits of marine turtles in the Sultanate of Oman

Author: Mariam Al Busaidi

Short title: Socio- economic benefits of marine turtles in the Sultanate of Oman

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, an economic opportunity has been raised. This study represents the socio-economic values of marine turtles in Oman at Masirah Island and Ras Al Hadd.

Suggested Citation: TEEB study by M.M Al Busaidi (2018) Socio- economic benefits of marine turtles in the Sultanate of Oman, available at: TEEBweb.org.

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 research 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 research 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 9th five year national plan. Studies of the economic evaluation of turtle conservation versus tourism in the gulf region are limited (IOSEA, 2015). Yet, while marine turtles may provide a source of economic benefits to Oman, the number of marine turtles are declining (MECA, 2014) and funds are spent for conservation without assessed economic benefits. Thus, the aim of this research is to show these economic benefits and provide recommendations for sustainable economic outcomes of marine turtles while maintaining conservation standards.

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 Madrakah, Halanyiat Islands and the coasts of Dhofar (Figure 1.1). 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 takes place almost all year round 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, 2016b) 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, 2016c). This sector is expected to contribute to the GDP by 3% in 2020 (MNE, 2007) and by 6% in 2040 (NCSI, 2017a).

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, 2016c; Ponnampalam, 2011).

3.   Which approach was taken?

This case study focuses on marine turtles socio-economic benefits of 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 the 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 at 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 (the CVM part) as a form of access fees and voluntary contribution; Part 3: Site preferences for sea turtle watching that included the conjoint analysis part of the questionnaire 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: Part1 (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: 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 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: 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.

Future research could be done in evaluating the economic opportunities of other threatened species especially the endemic species. As Oman is unique with its diverse biodiversity this could enhance the conservation efforts along with moving forward with the development goals of the country.

6.5 Conclusion

It is well recognized that biodiversity conservation and the protection of species and habitats are costly undertakings. This causes a source of tension between its necessity and the livelihoods of the local communities. However, recognizing the importance of these two aspects, this research is devoted to generate policy prescriptions for decision makers through the application of critical review and empirical techniques using marine turtles as a case. Economic valuation of marine turtle conservation is both difficult and controversial. However, such economic analysis can help promote the design of effective strategies for marine turtle conservation. With this in mind, this research attempted to 1) identify the economic potentials for such conservation task, 2) estimate willingness to pay for marine turtle conservation, 3) identify site-specific preferential attributes along with their economic importance, 4) evaluate the perception of stakeholders with regard to both economic and non-economic value of such conservation program. Finally, this research also used an international framework to produce a country study by compiling all the key findings from this research.

Chapter 2 critically analyses the current tourism potential considering both inbound visitors arrivals and visitors spending enjoyed by the country and in particular at the sites of the study. To realize such economic potentials the government should address various limitations such as employment of local workforce, law enforcement, transportation facilities, management of resort, mismatch of turtle nesting and peak tourist season.

The potential benefits have a dynamic aspect reflecting the type of tourist and their preferences and interests as well the growing competition in the region. Therefore, to realize such economic potentials the government should develop long-term plans to satisfy the growing demand in a sustainable management of the environment so that the 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 the turtle resource sustainably.

Having said that, some associated limitations need to be addressed for achieving the overall sustainable tourism goal of the country. One of these is the insufficient monitoring and limitation to the beaches access. This could eventually be addressed after the proclamation of the island as a turtle reserve but precautionary measures have to be

implemented in advance if the island is highlighted as a tourism site. Another issue is the necessity of the local community's contribution in this process to give it more strength as witnessed from the Ras Al Hadd case where the local community committed to be an effected partner in this process.

Though it is realistic to pursue marine turtles tourism in Oman, the migratory nature of the turtles across the region (Baldwin et al., 2003; Rees et al., 2012a, 2012b) and the whole Indian Ocean necessitates some form of collective effort involving other relevant countries to ensure their survival.

Chapter 3 provides empirical estimates of Questionnaire 1 respondents' Willingness To Pay (WTP) in the form of access fees and voluntary contribution using three hundred and sixty (360) survey questionnaires collected from the study sites (164 from Masirah Island and 196 from Ras Al Hadd). The results of the logit regression model using the Contingent Valuation Method (CVM), showed that the mean WTP of access fee was higher for Ras Al Hadd (9.490 OMR) than that of Masirah Island (4.750 OMR). In addition, the mean WTP of voluntary contribution for Ras Al Hadd (16.210 OMR) was also higher than that of Masirah Island (11.480 OMR). The preferred way to make this contribution was purchasing a quality souvenir. However, respondents who were not willing to make this financial payment (60 out of 164 at Masirah Island and 33 out of 196 at Ras Al Hadd) were willing to volunteer in beach cleanup campaigns at Masirah Island (46 out of 60 respondents) and in awareness campaigns at Ras Al Hadd (26 out of 33 respondents).

The scope test results showed that the null hypothesis, i.e., WTP at Masirah Island is equal to WTP at Ras Al Hadd to be rejected for both forms of payment (access fees and voluntary contribution). Thus, the alternative hypothesis of WTP at Ras Al Hadd is greater than WTP at Masirah Island was accepted. Thus, a policy of differentiated prices for both sites is recommended based on these results.

Chapter 4 provides a description of sites attributes and further analysis of logit regression model using the Conjoint Analysis (CA) was made to examine the consumer preferences of these attribute to justify their importance and ranking by the stakeholders. The analysis 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) with the fee structure of 15 OMR. The comparison of the marginal

implicit price estimates of all attributes under the conjoint analysis revealed that the high number of nesting turtle was the most sought after attribute for Masirah Island (6.619 OMR) and the guided tour (6.280 OMR) for Ras Al Hadd. With regard to relative importance of attributes, number of nesting turtles ranked first followed by price for Masirah Island (33.795% and 22.975% respectively) ,while in case of Ras Al Hadd guided tour ranked first followed by the number of nesting turtles (26.193% and 25.798% respectively).

Moreover, the preferred accommodation option was camping and glamping for both Masirah Island and Ras Al Hadd respondents. On the species preferences to watch, Masirah Island respondents preferred the green turtles, whereas the Ras Al Hadd respondents do not have any preference.

Chapter 5 provides the stakeholders perception of marine turtle conservation from the social and economic aspects. An empirical analysis was also done using logit regression for the data collected through conducting of Questionnaire 2 at the study sites for the local community and online for the policy makers. Two hundred and fifty nine questionnaires collected from the study sites (115 from Masirah Island and 144 from Ras Al Hadd) and 75 questionnaires collected online. The stakeholders' perception analysis revealed that, for both sites, a majority of the respondents were aware of the marine turtle conservation program in Oman and believed that the current extent of enforcement was insufficient for an effective protection of marine turtles. Furthermore, all of the groups disagree the statements that the marine turtles could produce any negative impacts on the community and emphasize on the importance of the existence of these species as an important part of the ecosystem components of the country. Moreover, a Chi-Square test indicated that a majority of the stakeholders from all groups (Masirah Island and Ras Al Hadd local community and policy makers) strongly perceived that the conservation of marine turtles was important for economic reasons.

Finally, Chapter 6 provides Oman TEEB Country Study (TCS) following The Economics of Ecosystems and Biodiversity (TEEB) an international approach designed by the Convention on Biological Diversity (CBD) by summarizing the key findings of this research. It is aimed that this study report will highlight upfront the Sultanate effort on the conservation of marine turtle and will contribute to Oman's commitment to the

Convention on Biological Diversity (CBD), as a member by following the CBD resolutions and applying its approaches in the national level. It will also set the basis for the country to report TEEB studies on other biodiversity components.

Overall, the results obtained in this research showed that the economic and social benefits of the marine turtle conservation exists in the Sultanate. It is also emphasizing on the statement that replacing the consumptive use by the non-consumptive use will maintain the continuity of the economic benefits and reinforce the conservation efforts. Moreover, the findings are stressing on the conservation strategies of marine turtles must include tangible local benefits.

However, further research could be done by using baseline hypothesis from this research to test it further (example using WTA instead of WTP in the CVM). It could also be done by changing the tested variables such as differentiating of population (tourists versus locals), increase the sample size, other study sites, other species or other empirical approach (different types of appropriate model for).

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Category:

Sultan Qaboos University

College of Agriculture and Marine Sciences

Department of Natural Resource Economics

Research Title: Economic Valuation of Natural Reserves in the Sultanate of Oman (Case of Marine Turtles)

Questionnaire Code: |____|____|____|

Date of Interview: _____/_____/ 2017

The interview started at: _____ AM/PM

Place of the interview (location): _____

Sea turtles are threatened species worldwide. In response to this international status, Oman's government has developed conservation programs on Masirah Island and Ras Al Hadd to ensure the sustainable existence of all species of sea turtles in Oman. There are 4 species nesting on Omani beaches and 1 more feeding in Omani waters. These 4 species are the loggerhead turtle, the green turtle, the hawksbill turtle and the olive ridley Turtle.

The leatherback turtle migrates through Omani waters but does not nest on our beaches.

Research has shown that conservation programs of marine turtles do not only generate environmental and ecological benefits but also create economic and social benefits especially to local communities.

Part 1: Background information

1. The following questions will help us on the analysis process. The answers will be confidential and you will not be identified in any way.

<u>Please tick your answer:</u>

1.1 Nationality	
Omani	Other Please indicate

1.2 Gender	
Male	Female

1.3 Age (in years)				
19- 24	25-34	35- 50	51-64	4>

1.4 Years of education
1 2 3 4 5 6 7 8 9 10 11 1 2 13 14 15 16 17 18 19 20 21 22 23

1.5 Monthly income (Omani Rial (OMR) and in US Dollars ($))			
OMR 60- 325 US $ 156- 844	OMR 326-550 US$847-1,429	OMR 551-2050 US $ 1,432- 5,327	More than OMR 2051 US $ 5,330

1.6 Place of residency
Country: Governorate/Province/State City

1.7 Employment category (occupation)			
Public sector ✓Ministry ✓Council ✓Hospital ✓Education institutions ✓Other	Private sector ✓Investment ✓Tourism and recreation ✓Banking ✓Industry ✓Retail ✓Consultation ✓Education ✓Health ✓Other	Self employed ✓Consultant ✓Lawyer ✓Investor ✓Sales ✓Doctor ✓Other	Un employed ✓Student ✓Retired ✓

1.8 Are you a member of an Environmental Conservation Agency / Society / Group?	
Yes	No

1.9 Did you see the turtles?

                              Yes   Not yet

Part 2: Site-specific information

2. The importance of the site to you

Masirah Island and Ras Al Hadd are sites, which were identified as important to the conservation of sea turtles. Ras Al Hadd was proclaimed as a protected area by Royal Decree (25/96) in 1996 while Masirah Island is only in the process of becoming an official protected area.

Please assess the importance of this site to you based on the following activities.

Tick one of the answer for each reason (row).

	1	2	3	4
Reason	Very important	Important	Slightly important	Not important
2.1 Recreational activities (snorkeling, diving, beach scenery, beach activities, etc.)				
2.2 Fishing				
2.3 Sea turtle watching				
2.4 Visiting relatives living here				
2.5 Discovering new areas (adventure)				
2.6 Experiencing the uniqueness of this site (biodiversity, landscape, history, remoteness)				
2.7 Education and research				
2.8 Working (Employment)				
2.9 Looking for investment opportunities				
2.10 Bird watching				

3. Threats to sea turtle at this site (Risk issues)

All 4 species of marine turtles nesting in Oman are classified as Endangered (EN), Critically Endangered (CE) or Vulnerable (VU) according to the International Union of Conservation of Nature (IUCN). These species are 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). A fifth species, the leatherback turtle (*Dermochelys coriacea*) (VU) migrates to Omani waters where it may feed, but does not nest on the Omani coastline.

Please assess the degree of threats created by the sources listed below.

(Please tick one of the answer for each source (row).

Sources of possible harm	0	1	2	3	4
	I don't know	No real harm	Slightly harmful	Harmful	Strongly harmful
3.1 Traditional turtles fishing (hunting)					
3.2 By-catch (accidental catch) from fishing activities					
3.3 Light pollution (from houses, roads, hotels, cars etc.)					
3.4 Urbanization (private housing and roads construction)					
3.5 Loud sounds (noise pollution)					
3.6 Direct tourism impacts (littering, tire tracks, footprints)					
3.7 Observation of the turtle with red light at night					
3.8 Climate change (changes in seawater temperature, salinity or frequency of storms)					
3.9 Swimming at the beach					
3.10 Feral animals (dogs)					
3.11 Beach driving					
3.12 On shore fishermen activities (fish landing sites, stored nets)					

4. Your Willingness of financial contribution for sea turtle conservation

Nature conservation is a costly endeavor for the Government of Oman. Typically, visitors to conservation areas are ask to pay to enjoy the services provided by the conservation effort (entrance fee, daily pass, etc.). Please evaluate from the list below your willingness to financially contribute to the conservation effort as a fee to access the site.

4.1 Ras Al Hadd is a Protected Area (PA) but Masirah Island is a proposed (PA). For the sake of conservation and protection of sea turtles, if this (PA) would need a financial support from the community, would you be willing to support this conservation effort through an entrance fee. Please tick for each OMR amount of contribution you are willing to pay. It would then become an obligation to see the turtle nesting in this site.

Access fees in OMR	1 Definitely yes	2 Probably yes	3 Probably no	4 Definitely no
3				
5				
6				
7				
8				
10				
12				
15				
20				

4.2 Should the government introduce new facilities that could produce business opportunities for the local, which facilities would like to see at this site?

☐ Educational center

☐ Picnic areas

☐ Boat rides

☐ Camping facilities

☐ Dining and barbeque stations

☐ Others, …………….

4.3 Would you be willing to pay additional fees to access these facilities?

YES   NO

     If YES, Please indicate by how much more? _____OMR

4.4 Turtles are considered by many as a "national treasure" or even a world heritage species. Wherever you live in Oman, or elsewhere in the world, would you consider voluntarily paying a one-time contribution for the conservation of sea turtle in the Sultanate? Please tick the amount that reflects best for each row, your willingness to contribute financially to this conservation effort.

One-time contribution (in OMR)	1 Definitely yes	2 Probably yes	3 Probably no	4 Definitely no
6				
10				
12				
20				
24				
30				
36				
40				
44				
48				
50				

4.5 If you said Probably yes or Yes to any of the question in 4.4 , what methods of payment would you rather see being used to collect your contribution:

☐ As a tax

☐ As part of some utility bill (telephone, electricity, water)

☐ Through the purchase of quality souvenir.

☐ You may have other suggestions.

   Please indicate …………….

Answer the following question only if your answer was not to make any financial contribution to question (4) , otherwise please proceed to the next part (Part 3).

5. Please assess the following statements to suit your personal views on the reason for not making any financial contribution for sea turtles conservation. Consider the scale provided at each row and tick the one that is more relevant for your reasoning.

Please tick one of the answer for each reason (row).

Reason	1 Strongly agree	2 Agree	3 Disagree	4 Strongly disagree
5.1 It is not worth paying for more conservation (I prefer things to stay the way they are)				
5.2 I cannot afford paying money to this program				
5.3 I am not convinced of the effect of protected area on turtle conservation				
5.4 It is the Omani government responsibility, not mine.				
5.5 There is no need for my contribution				
5.6 We should not pay to enjoy Allah's given natural wonders				

Other reason(s) (please explain)

5.7 If you were not willing to pay for any fees, would you be willing to volunteer to protect turtles?

       YES   NO

5.8 What aspect of volunteering are you most willing to take part of?

☐   Awareness

☐   Patrolling

☐   Raising fund

☐   Guide tours

☐   Scientific research

☐   Beach cleanup

☐   Other?

Part 3: Site preferences for sea turtle watching

6. Sea turtle conservation generates benefits to the turtles, their habitats but also to the livelihood of the local community and to the country as a whole. Each row of the following table represents a different choice scenario of potential services within the conservation programs of sea turtles: i.e. a combination of 4 characteristics imposed upon you. Each of these ten scenario has a price, determined from existing costs and services offered in Oman and elsewhere. The 4 characteristics we identified are:

- Number of nesting turtles. The conservation program could offer visits with a high number of turtles nesting every night (5-10) or a lower number (up to 3).

- Site congestion. The conservation program could offer visits with a selected few visitors (<10) or alternatively in larger groups (25 visitors)

- Guided tours. The conservation program could offer guided visits with knowledgeable trained tour guides or not.

- Managed site. A managed site is defined here as a turtle nesting beach adapted facilities (boardwalk, garbage collection) and monitoring of the flows of visitors, vehicles and their impacts on the habitat.

Identify your preferences for these scenarios taking into consideration their price in Rial Omani (OMR) and in US Dollars ($).

Card ID	Choice scenario	Price	1 Strongly like	2 Like	3 Dislike	4 Strongly dislike
6.1	High number (5-10) of nesting turtles Low site congestion (<10) Guided tours Managed site	OMR 15 US $ 39				
6.2	Low number (up to 3) of nesting turtles Low site congestion (<10) Guided tours Managed site	OMR 13 US $ 34				
6.3	High number (5-10) of nesting turtles High site congestion (25 visitors) Guided tours Managed site	OMR 13 US $ 34				
6.4	High number (5-10) of nesting turtles Low site congestion (<10) Guided tours Un managed site	OMR 13 US $ 34				
6.5	High number (5-10) of nesting turtles Low site congestion (<10) Un guided tours Managed site	OMR 12 US $ 31				
6.6	Low number (up to 3) of nesting turtles High site congestion (25 visitors) Guided tours Un managed site	OMR 9 US $ 23				
6.7	Low number (up to 3) of nesting turtles High site congestion (25 visitors) Un guided tours Managed site	OMR 8 US $ 21				
6.8	High number (5-10) of nesting turtles High site congestion (25 visitors) Un guided tours Un managed site	OMR 8 US $ 21				
6.9	Low number (up to 3) of nesting turtles Low site congestion (<10) Un guided tours Un managed site	OMR 8 US $ 21				
6.10	Low number (up to 3) of nesting turtles High site congestion (25 visitors) Un guided tours Un managed site	OMR 6 US $ 16				

Other preferences

Please tick your preference (s), from the options listed below:

6.11 Accommodation preferences

- ☐ 4 Star hotel

- ☐ 3 Star hotel

- ☐ 2 Star hotel

- ☐ 1 star hotel

- ☐ Bed and breakfast

- ☐ Camping and glamping

- ☐ Hotel apartments

- ☐ Ecolodge facilities

- ☐ No preferences

6.12 Preferences on species type to watch

- ☐ The Green turtle

- ☐ The Loggerhead turtle

- ☐ The Hawksbill turtle

- ☐ The Olive Ridley

- ☐ Any

Thank you for your participation

Would you like to add anything regarding the sea turtle conservation program in Oman and its improvement?

The interview ended at: _____AM/PM

Appendix 2: Results of logit regression by including nationality as independent variable for Masirah Island and Ras Al Hadd willingness to pay using SPSS

i.   Results of logit regression between willingness to pay for access fees and 11 variables including nationality for Masirah Island

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
Variables in the Equation									
								Lower	Upper
Step 1ᵃ	Accessfees	-.406	.029	197.164	1	.000	.667	.630	.705
	NAT	.445	.232	3.662	1	.056	1.560	.989	2.461
	GEN	-.586	.196	8.966	1	.003	.557	.379	.817
	AGE	.021	.011	3.682	1	.055	1.021	1.000	1.042
	EDU	.155	.134	1.320	1	.251	1.167	.897	1.519
	INCOME	.001	.000	39.971	1	.000	1.001	1.001	1.002
	RES	.883	.296	8.878	1	.003	2.418	1.353	4.321
	WORK	.357	.119	8.981	1	.003	1.429	1.131	1.805
	MEM	-.347	.220	2.501	1	.114	.707	.459	1.087
	Twatch	.542	.191	8.028	1	.005	1.719	1.182	2.500
	CAT	.449	.119	14.167	1	.000	1.567	1.240	1.981
	Constant	-2.782	.722	14.850	1	.000	.062		
a. Variable(s) entered on step 1: Accessfees, NAT, GEN, AGE, EDU, INCOME, RES, WORK, MEM, Twatch, CAT.									

ii.   Results of logit regression between willingness to pay for voluntary contribution
and 11 variables including nationality for Masirah Island

|		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
Variables in the Equation									
								Lower	Upper
Step 1[a]	VCONT	-.088	.005	292.824	1	.000	.915	.906	.925
	NAT	.534	.191	7.805	1	.005	1.705	1.173	2.480
	GEN	.617	.168	13.431	1	.000	1.853	1.332	2.576
	AGE	.016	.009	3.163	1	.075	1.016	.998	1.034
	EDU	-.611	.112	29.551	1	.000	.543	.436	.677
	INCOME	.001	.000	44.656	1	.000	1.001	1.001	1.001
	RES	-.508	.244	4.330	1	.037	.601	.373	.971
	WORK	-.202	.095	4.501	1	.034	.817	.678	.985
	MEM	-.559	.192	8.499	1	.004	.572	.393	.833
	Twatch	.162	.158	1.046	1	.306	1.175	.862	1.601
	CAT	.029	.099	.084	1	.772	1.029	.848	1.250
	Constant	.741	.664	1.247	1	.264	2.098		
a. Variable(s) entered on step 1: VCONT, NAT, GEN, AGE, EDU, INCOME, RES, WORK, MEM, Twatch, CAT.									

iii.   Results of logit regression between willingness to pay for access fees and 11 variables including nationality for Ras Al Hadd

Variables in the Equation								95% C.I.for EXP(B)	
		B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Step 1ª	Accessfees	-.324	.018	317.873	1	.000	.724	.698	.750
	NAT	.984	.223	19.536	1	.000	2.676	1.730	4.141
	GEN	.480	.152	9.909	1	.002	1.615	1.198	2.177
	AGE	-.022	.007	10.561	1	.001	.979	.966	.991
	EDU	.234	.120	3.830	1	.050	1.264	1.000	1.599
	INCOME	.001	.000	48.298	1	.000	1.001	1.001	1.001
	RES	1.037	.201	26.511	1	.000	2.821	1.901	4.186
	WORK	.382	.092	17.370	1	.000	1.465	1.224	1.753
	MEM	.014	.176	.006	1	.937	1.014	.718	1.431
	Twatch	.250	.157	2.551	1	.110	1.284	.945	1.745
	CAT	.088	.110	.639	1	.424	1.092	.880	1.355
	Constant	-3.163	.574	30.399	1	.000	.042		
a. Variable(s) entered on step 1: Accessfees, NAT, GEN, AGE, EDU, INCOME, RES, WORK, MEM, Twatch, CAT.									

iv. Results of logit regression between willingness to pay for voluntary contribution and 11 variables including nationality for Ras Al Hadd

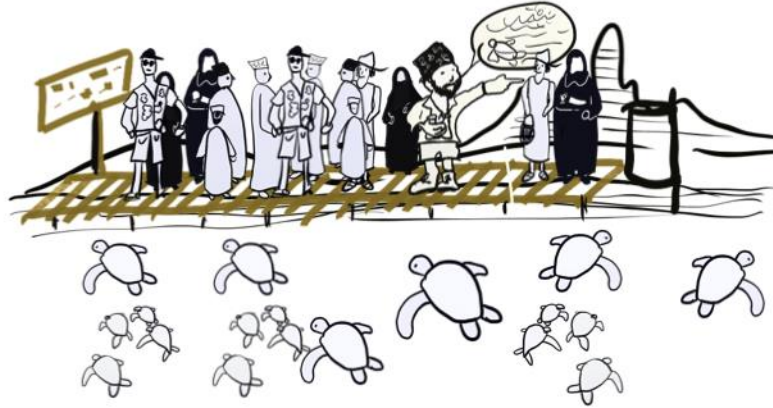| Variables in the Equation								95% C.I.for EXP(B)	
		B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Step 1[a]	VCONT	-.095	.005	407.552	1	.000	.909	.901	.917
	NAT	-.655	.211	9.652	1	.002	.519	.344	.785
	GEN	.182	.136	1.793	1	.181	1.200	.919	1.566
	AGE	-.029	.006	22.080	1	.000	.972	.960	.983
	EDU	-.249	.106	5.506	1	.019	.779	.633	.960
	INCOME	.000	.000	18.662	1	.000	1.000	1.000	1.001
	RES	.251	.194	1.666	1	.197	1.285	.878	1.881
	WORK	.267	.080	11.216	1	.001	1.306	1.117	1.527
	MEM	-.164	.153	1.152	1	.283	.849	.629	1.145
	Twatch	.160	.147	1.181	1	.277	1.174	.879	1.567
	CAT	.000	.094	.000	1	.996	1.000	.832	1.202
	Constant	2.671	.499	28.602	1	.000	14.457		
a. Variable(s) entered on step 1: VCONT, NAT, GEN, AGE, EDU, INCOME, RES, WORK, MEM, Twatch, CAT.									

Appendix 3: Cards used as illustration for the sites attributes for the Conjoint Analysis (CA) part during the field work of the conduction of questionnaire 1
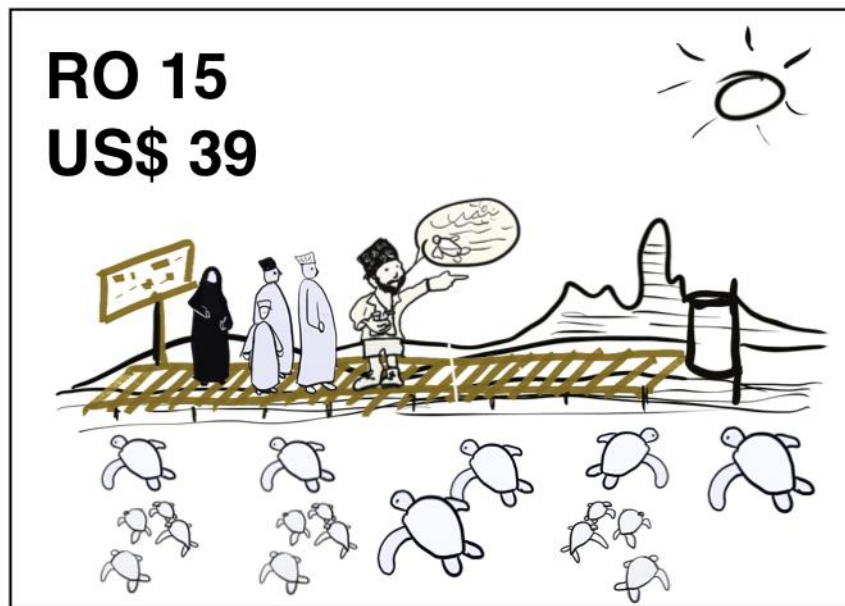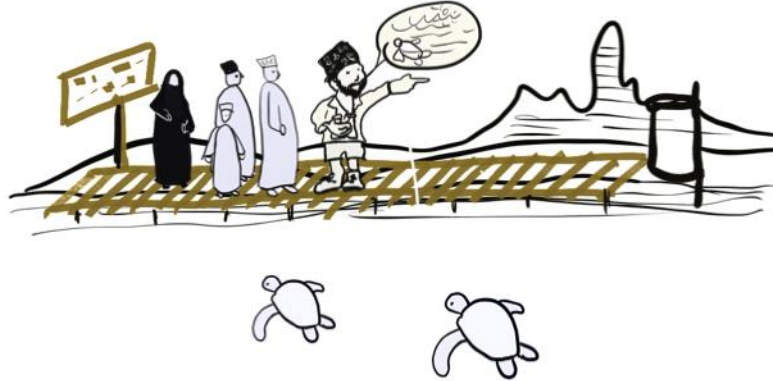

> **High number (5-10) of nesting turtles**
> **Low site congestion (<10 people)**
> **Guided tours**
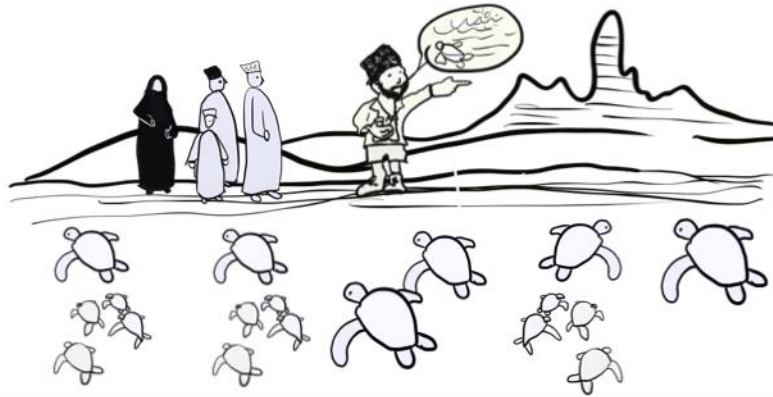> **Managed site with information boards, boardwalk, garbage collection and rangers**

> **High number (5-10) of nesting turtles**
> **High site congestion (25 people)**
> **Guided tours**
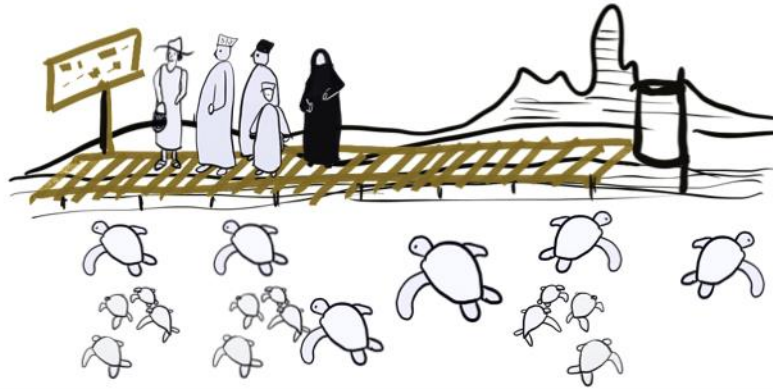> **Managed site with information boards, boardwalk, garbage collection and rangers**

RO 13
US$ 34

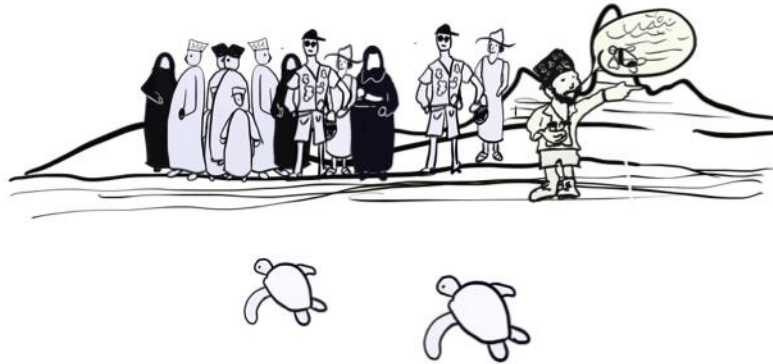> **Low number (up to 3) of nesting turtles**
> **Low site congestion (<10 people)**
> **Guided tours**
> **Managed site with information boards, boardwalk, garbage collection and rangers**

> **High number (5-10) of nesting turtles**
> **Low site congestion (<10 people)**
> **Guided tours**
> **Un managed site with no information boards, no boardwalk, no garbage collection and no rangers**
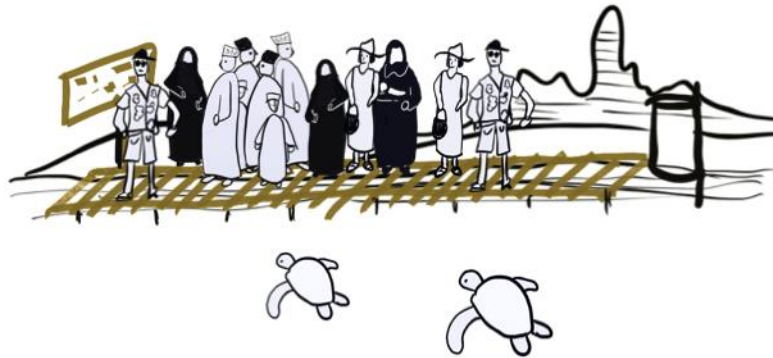
RO
US$ 31

- ➢ **High number (5-10) of nesting turtles**
- ➢ **Low site congestion (<10 people)**
- ➢ **Un guided tours**
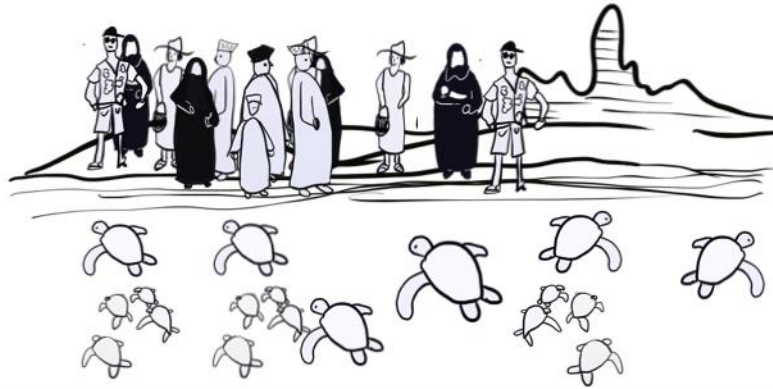- ➢ **Managed site with information boards, boardwalk, garbage collection and rangers**

> **Less number (up to 3) of nesting turtles**
> **High site congestion (25 people)**
> **Guided tours**
> **Un managed site with no information boards, no boardwalk, no garbage collection and no rangers**

RO 8
US$ 21

- Low number (up to 3) of nesting turtles
- High site congestion (25 people)
- Un guided tours
- Managed site with no information boards, boardwalk, garbage collection and rangers

RO 8
US$ 21

> **High number (5-10) of nesting turtles**
> **High site congestion (25 people)**
> **Un guided tours**
> **Un managed site with no information boards, no boardwalk, no garbage collection**

RO 8
US$ 21

> **Low number (up to 3) of nesting turtles**
> **Low site congestion (<10 people)**
> **Un guided tours**
> **Un managed site with no information boards, no boardwalk, no garbage collection and no rangers**
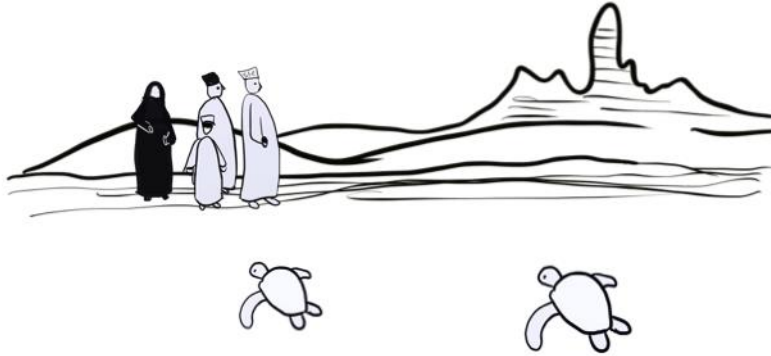
- ➤ **Low number (up to 3) of nesting turtles**
- ➤ **High site congestion (25 people)**
- ➤ **Un guided tours**
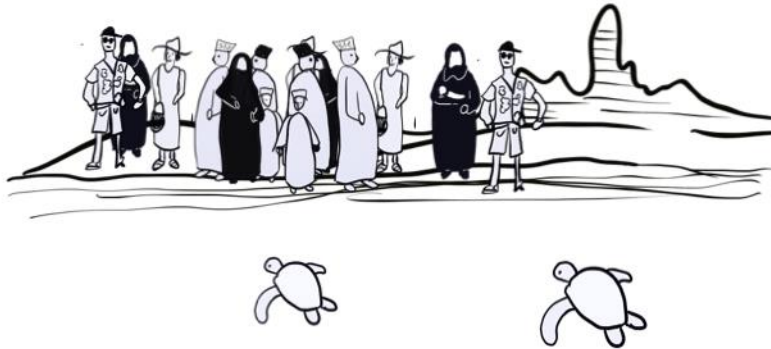- ➤ **Un managed site with no information boards, boardwalk, garbage collection and rangers**

Appendix 4: Results of the Logit regression between site preference of attributes and the independent variables for Masirah Island and Ras Al Hadd including the constant using Eviews

i.   Results of the Logit regression between site preference of attributes and 5 variables

with including of constant for Masirah Island

Dependent Variable: Y				
Method: ML - Binary Logit (Quadratic hill climbing)				
Included observations: 1500				
Convergence achieved after 1 iteration				
WARNING: Singular covariance - coefficients are not unique				
Covariance matrix computed using second derivatives				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
PRICE	-0.249887	NA	NA	NA
NNTH	1.654042	NA	NA	NA
SCM	-0.776768	NA	NA	NA
GTY	0.540040	NA	NA	NA
MSM	0.799094	NA	NA	NA
C	0.000000	NA	NA	NA
McFadden R-squared	0.061072	Mean dependent var		0.199333
S.D. dependent var	0.399632	S.E. of regression		0.388101
Akaike info criterion	0.945946	Sum squared resid		225.0300
Schwarz criterion	0.967199	Log likelihood		-703.4594
Hannan-Quinn criter.	0.953863	Deviance		1406.919
Restr. deviance	1498.431	Restr. log likelihood		-749.2153
LR statistic	91.51164	Avg. log likelihood		-0.468973
Prob(LR statistic)	0.000000			
Obs with Dep=0	1201	Total obs		1500
Obs with Dep=1	299			

ii.   Results of the Logit regression between site preference of attributes and 13 variables with including the constant for Masirah Island

Dependent Variable: Y			
Method: ML - Binary Logit (Quadratic hill climbing)			
Included observations: 1500			
Convergence achieved after 1 iteration			
WARNING: Singular covariance - coefficients are not unique			
Covariance matrix computed using second derivatives			
Variable	Coefficient	Std. Error	z-Statistic	Prob.
---	---	---	---	---
PRICE	-0.247625	NA	NA	NA
NNTH	1.649533	NA	NA	NA
SCM	-0.772249	NA	NA	NA
GTY	0.533252	NA	NA	NA
MSM	0.794575	NA	NA	NA
GEN	-0.015297	NA	NA	NA
AGE	0.000462	NA	NA	NA
EDU	-0.000128	NA	NA	NA
INCOME	-3.48E-06	NA	NA	NA
RES	0.000524	NA	NA	NA
WORK	-0.000211	NA	NA	NA
MEM	-0.008662	NA	NA	NA
CAT	0.002385	NA	NA	NA
C	-1.10E-09	NA	NA	NA
McFadden R-squared	0.061084	Mean dependent var		0.199333
S.D. dependent var	0.399632	S.E. of regression		0.389112
Akaike info criterion	0.956601	Sum squared resid		224.9930
Schwarz criterion	1.006191	Log likelihood		-703.4504
Hannan-Quinn criter.	0.975075	Deviance		1406.901
Restr. deviance	1498.431	Restr. log likelihood		-749.2153
LR statistic	91.52966	Avg. log likelihood		-0.468967
Prob(LR statistic)	0.000000			
Obs with Dep=0	1201	Total obs		1500
Obs with Dep=1	299			

iii.   Results of the Logit regression between site preference of attributes and 5 variables with including of constant for Ras Al Hadd

Dependent Variable: Y				
Method: ML - Binary Logit (Quadratic hill climbing)				
Included observations: 1570				
Convergence achieved after 1 iteration				
WARNING: Singular covariance - coefficients are not unique				
Covariance matrix computed using second derivatives				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
NNTH	1.697546	NA	NA	NA
SCM	-1.547848	NA	NA	NA
GTY	1.723630	NA	NA	NA
MSM	0.379329	NA	NA	NA
PRICE	-0.274461	NA	NA	NA
C	0.000000	NA	NA	NA
McFadden R-squared	0.132530	Mean dependent var		0.189172
S.D. dependent var	0.391770	S.E. of regression		0.364402
Akaike info criterion	0.849124	Sum squared resid		207.6820
Schwarz criterion	0.869604	Log likelihood		-660.5626
Hannan-Quinn criter.	0.856736	Deviance		1321.125
Restr. deviance	1522.963	Restr. log likelihood		-761.4815
LR statistic	201.8378	Avg. log likelihood		-0.420741
Prob(LR statistic)	0.000000			
Obs with Dep=0	1273	Total obs		1570
Obs with Dep=1	297			

iv.   Results of the Logit regression between site preference of attributes and 13 variables with including the constant for Ras Al Hadd

Dependent Variable: Y				
Method: ML - Binary Logit (Quadratic hill climbing)				
Convergence achieved after 1 iteration				
WARNING: Singular covariance - coefficients are not unique				
Covariance matrix computed using second derivatives				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
NNTH	1.657605	NA	NA	NA
SCM	-1.507852	NA	NA	NA
GTY	1.663343	NA	NA	NA
MSM	0.338648	NA	NA	NA
PRICE	-0.254210	NA	NA	NA
GEN	0.059474	NA	NA	NA
AGE	-0.003313	NA	NA	NA
EDU	0.006672	NA	NA	NA
INCOME	2.13E-05	NA	NA	NA
RES	0.006611	NA	NA	NA
WORK	0.009727	NA	NA	NA
MEM	-0.042950	NA	NA	NA
CAT	-0.053432	NA	NA	NA
C	-3.75E-08	NA	NA	NA
McFadden R-squared	0.132958	Mean dependent var		0.189172
S.D. dependent var	0.391770	S.E. of regression		0.364922
Akaike info criterion	0.858900	Sum squared resid		207.2095
Schwarz criterion	0.906686	Log likelihood		-660.2366
Hannan-Quinn criter.	0.876661	Deviance		1320.473
Restr. deviance	1522.963	Restr. log likelihood		-761.4815
LR statistic	202.4898	Avg. log likelihood		-0.420533
Prob(LR statistic)	0.000000			
Obs with Dep=0	1273	Total obs		1570
Obs with Dep=1	297			

Appendix 5: Questionnaire 2 used for data collection of stakeholders perception

Sultan Qaboos University

College of Agriculture and Marine Sciences

Department of Natural Resource Economics

Research Title: Economic Valuation of Natural Reserves in the Sultanate of Oman (Case of Marine Turtles)

Stakeholder's perception

Category:

Questionnaire Code: |____|____|____|

Place (location): _____

Date : |_____|_____|_____|

Sea turtles are threatened worldwide. In response to this international status, Oman's government developed sea turtles conservation on Masirah Island and Ras Al Hadd to ensure their sustainable existence. Four species are nesting on Omani beaches; the loggerhead, green, hawksbill and olive ridley turtle. A fifth species, the leatherback turtle migrates through Omani waters where it feeds but does not nest.

The objective of this questionnaire is to examine the community perception of / views on the protection of sea turtles at Ras Al Hadd and Masirah Island.

Part 1: Background information

The following questions will help us during the analysis process. The answers are confidential and you will not be identified in any way. <u>Please tick your answer:</u>

1.	Nationality	
☐ Omani		☐ Other Please indicate ………………

2.	Gender
☐ Male	☐ Female

3. Age (in years)

☐ 19- 24	☐ 25-34	☐ 35- 50	☐ 51- 64	☐ >64

4. Years of education

1 2 3 4 5 6 7 8 9 10 11 1 2 13 14 15 16 17 18 19 20 21 22 23

5. Monthly income (Omani Rial (OMR) and in US Dollars ($))

☐ OMR 60- 325 US $ 156- 844	☐ OMR 326-550 US $ 847- 1,429	☐ OMR 551-2050 US $ 1,432- 5,327	☐ More than OMR 2051 US $ 5,330

Employment category (occupation)

Public sector	Private sector	Self employed	Other
☐ Ministry	☐ Investment	☐ Consultant	☐ Student
☐ Council	☐ Tourism and recreation	☐ Lawyer	☐ Retired
☐ Hospital	☐ Banking	☐ Investor	☐ Un employed
☐ Education institutions	☐ Industry	☐ Sales	☐ Other……. ..
☐ Other …………………	☐ Retail	☐ Doctor	
	☐ Consultation	☐ Other ……………	
	☐ Education		
	☐ Health		
	☐ Other...............		

Are you a member of an Environmental Conservation Agency / Society / Group?

☐ Yes	☐ No

Part 2: What do you think?

The following questions will help us with policy recommendations by providing your general knowledge/rule on the sea turtles conservation .The answers will be confidential and you will not be identified in any way. Please tick your answer

1. Are you aware of the sea turtles conservation at Ras Al Hadd and Masirah Island?		
Yes	No	
2. Have you seen the turtles at Ras Al Hadd or Masirah Island?		
Yes	No	
3. Have you participated in any sea turtles conservation activities?		
Yes	No	
4. Are you aware of any threats to sea turtles at Ras Al Hadd and Masirah Island?		
Yes	No	
5. If your answer to Q4 was yes, what do think is the greatest threat to sea turtles in Oman?		
Fishing	Light pollution	Lack of public awareness
Pollution	Oil spills	Illegal trade
Tourism	Feral animals	Other, …………
6. The rules and regulations for the protection of sea turtles are:		
Sufficient	Insufficient	I'm not aware of these rules and regulations
7. The enforcement of the rules and regulations for the protection of sea turtles is :		
Sufficient	Insufficient	I'm not aware of the implementation process

8. Do you like to visit a nature reserve?			
Yes		No	
9. Do you think nature reserves / protected areas should be managed by;			
Community- based management	Government	Private sector	Partnership / co-management
10. Are you willing to financially contribute to the sea turtles conservation?			
Yes		No	

Part 3: Your perception

The following questions will help us to understand your perception of the impacts of the sea turtles conservation. The answers are confidential and you will not be identified in any way. <u>Please tick your answer</u>

<u>Your perception;</u>	Strongly Agree	Agree	I don't know	Disagree	Strongly disagree	% of importance (1-100)
1. Conservation of sea turtles is important for economic reasons (e.g. tourism, employment, and investments).						
2. Conservation of sea turtles is important for non-economic, social, reasons e.g. (cultural beliefs, morals, values, understanding and conservation and social association development).						
3. The government should pay more attention to sea turtles conservation and the mitigation of human sea turtles conflict especially with the resources users at the targeted sites.						
4. The local community from the surrounding boundaries of the nature reserves should have more involvement in the sustainable marine turtle conservation.						
5. Sea turtle numbers are already declining globally. It does not matter if their numbers are reduced more to provide more beaches for human recreational activities and fishing.						
6. The value of the protected areas and their beauty would be the same with or without sea turtles.						

3.1 By answering Q3, can you give us the relative weights of importance from 1 to 100 to all your perceptions (please use the column of % importance (1-100) in the table above).

Part 4: Your feedback:

The following questions will help us with policy recommendations by providing your feedback of the sea turtles conservation. The answers are confidential and you will not be identified in any way. Please tick your answer

The conservation of sea turtles is likely to;	Strongly agree	Agree	I don't know	Disagree	Strongly disagree
1. Creates opportunities for the local communities to get formal and informal education and training.					
2. Increases public safety and security through the associated infrastructure development, e.g. roads, buildings and facilities.					
3. Leads to uncontrolled sea turtle tourism, which can have a negative impact on adult and hatchling sea turtles and their nesting beaches.					
4. Provides / promotes greater understanding between the governmental and civil associations.					
5. Creates excessive demand on economic (e.g. water, electricity) and physical (infrastructure, roads, accommodation) resources at Ras Al Hadd and Masirah Island					
6. Leads to alien (negative) habits / culture implication. Has a bad influence on cultural habits, beliefs and values.					
7. Leads to negative impact on tourism due to the limitation measures enforced by the conservations (e.g. restriction on access to the nesting beaches)					

Thank you for your participation

Would you like to add anything regarding the sea turtle conservation in Oman or any suggestion for way of improvement?