Maine Protected Areas & Marine Tourism: An overview of Andaman & Nicobar Islands, India

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Abstract

The present tourism scenario concerning recreational diving activities in Andamans has generated an increased demand for the development of diving tourism in the Andaman seas. The present report draws upon experiences regarding the promotion of sub-aquatic activities found in Andamans, analyses the steps required for cementing diving tourism in the Andaman and Nicobar Marine Protected Areas, and describes what an adequate management plan should ideally encompass, in order to ensure the conservation of the marine environment and subsequently the long term viability of this highly profitable form of ecotourism.

Keywords: Diving Tourism, Marine Protected Areas, Management, Biodiversity.

INTRODUCTION

Over the last decades, the number of Marine Protected Areas (MPAs) is globally increasing since a considerable number of studies have pointed out the necessity for the establishment of MPAs and Networks of Marine Reserves worldwide, as 'tools' for the conservation and safeguarding of the marine environment and biodiversity (Agardy, 1997; IUCN-WCPA, 2008; WWF, 2008). Alongside with the potential environmental benefits, MPAs are usually expected to profit local communities and contribute to the increase of economic revenues, through the replenishment of fisheries, and the development of marine tourism (Badalamenti et al., 2000; López Ornat, 2006). Moreover, MPAs provide favourable conditions for educational activities (e.g. environmental education, summer schools, marine laboratories), while they constitute reference sites for scientific research (Kelleher, 1999; PISCO, 2007). For all these reasons, the establishment of an MPA could potentially raise the environmental and socioeconomic profile of a coastal or insular region and promote sustainable development (López Ornat, 2006; Dalias et al., 2007).

Current experience has shown that tourism is among the first sectors that benefit from the establishment of an MPA (López Ornat, 2006). The positive ecological consequences resulting from the protection of biodiversity attract a large number of visitors not only within the protected zones but in the adjacent regions as well (Badalamenti et al., 2000; López Ornat, 2006). Environmental friendly tourism in MPAs is commonly promoted through marine recreational activities, such as snorkelling and SCUBA diving. Economic surveys (e.g. Brown et al., 2001) have indicated that MPAs support the development of sub-aquatic tourism that subsequently favours

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the installation of new facilities and the creation of new employment opportunities (Dalias et al., 2007). The development of environmentally responsible tourism along with a number of market related revenues (e.g. entrance and diving fees, diving equipment rents, hotels sub-charges, guided tours, short courses) are often used in order to fund the costs for the management, surveillance and monitoring of an MPA (Alban et al., 2006; López Ornat, 2006).

As the tourism industry heavily depends upon the coastal zone (Bellan and Bellan-Santini, 2001; UNEP/MAP/Blue Plan, 2005; UNEP, 2006), marine related tourism constitutes an important source of income for many coastal and insular areas globally (e.g. Red Sea, Caribbean, many Mediterranean MPAs and small island states such as the Maldives). Although diving tourism was initially considered as an advantage of the tropics (Hawkins and Roberts, 1992; Van Treeck and Schuhmacher, 1998), it is now rapidly increasing in the Andamans (Deepanshu, 2015), which are supposed to be a leading tourist destination of the world and consequently one of the most seriously affected regions by tourism.

INTENSIVE DIVING TOURISM: IDENTIFYING AND FACING THE PROBLEM

Marine biodiversity admittedly constitutes the main natural resource upon which the development of diving tourism is based. According to this point of view, diving tourism directly depends on the increasing demand for ecological quality (UNEP/MAP/Blue Plan, 2005; López Ornat, 2006), and thus, there is a critical need to conserve the marine environment in order to ensure long-term viability of such a development. SCUBA divers are usually environmentally aware, motivated by their admiration for the sea, and willing to pay user fees or taxes in order to protect environmental quality of their diving destinations (Davis and Tisdell, 1996; Arin and Kramer, 2002; Depondt and Green, 2006).

Since MPAs are usually established in areas characterized as biodiversity 'hot-spots', such as the tropical coral reefs (Hawkins and Roberts, 1992) and their Mediterranean equivalent (i.e. the complex hard substrate communities) (Ballesteros, 2006), many MPAs worldwide, including those of the Mediterranean Sea (e.g. Port-Cros National Park in France and Islas Medas Marine Reserve in Spain), constitute popular diving destinations (Dalias et al., 2007).

Although recreational marine activities, such as snorkelling and SCUBA diving are considered to be environmental friendly forms of ecotourism, several studies have pointed out that once intensive and uncontrolled they can have a negative cumulative impact on the marine ecosystem. This is the case when divers disturb or damage vulnerable species and habitats, either accidentally or deliberately, directly or indirectly, with their hands, knees, fins, hanging equipment, boat anchoring, etc (Prior et al. 1995; Harriott et al., 1997; Tratalos and Austin, 2001). Furthermore, the level of human impact in some highly visited MPAs has surpassed the ecological carrying capacity (López Ornat, 2006), while marine communities undergo through a strong seasonal stress as the number of divers visiting a particular site usually increases during summertime.

Since the marine ecosystems are largely being affected by these recreational activities, the adoption and implementation of adequate conservation measures is considered to be vital both for the protection of the marine and coastal environment and for the subsequent long term success and promotion of marine related tourism. With regards to diving tourism several measures have been proposed worldwide, in order to eliminate the potential negative impacts of the aforementioned activities. These measures usually include:

- Diving restrictions (e.g. limitations posed to the number of SCUBA divers or dives per day; closing of vulnerable marine areas; rotation of dive sites) (Garrabou et al., 1998; Lloret et al., 2006)
- Special training and briefings in order to increase environmental awareness and ameliorate divers' behaviour (Medio et al., 1997)
- Better management of divers' groups by decreasing their size (Tratalos and Austin, 2001) and/or through underwater interventions, when needed, by the dive guides in order to avoid contact with the substrate (Barker and Roberts, 2004)
- Better allocation of divers among the different dive sites (Davis and Tisdell, 1996), or even increasing the number of sites, with the aim to avoid overcrowding of particular diving 'hot-spots' (Milazzo et al., 2002)
- Concentration of divers in low vulnerability habitats during the initial part of the dive and procedure to more vulnerable habitats only when they have adjusted properly their buoyancy (Di Franco et al., 2009)
- Confining training courses and low level dives to less vulnerable sites (Hawkins and Roberts, 1992; Zakai and Chadwick-Furman, 2002) or in areas of artificially constructed reefs and underwater theme parks that also present interest for diving (Van Treeck and Schuhmacher, 1998)

- Spatial control of divers and snorkelers through the establishment of specified underwater paths (Hawkins and Roberts, 1992)
- Adoption of specific regulations for underwater photography since photographers usually come into direct contact with the substrate in order to take a picture (Rouphael and Inglis, 2001)
- Installation of permanent moorings in popular sites and adoption of regulations for environmental friendly anchoring (Francour et al, 1999)
- Creation of raised boardwalks or submarine paths which allow easy "entry/exit" points for divers, snorkelers or swimmers (Liddle, 1991; Rouphael and Inglis, 2001).

Additionally, before any such measure is adopted, a good knowledge of the target area through detailed mapping is considered necessary in order to identify and quantify the level of vulnerability of the different marine habitats to anthropogenic impacts, record the environmental factors that could potentially boost or hinder marine recreational activities, mark the main sources of pollution and define the ecological state of the natural environment. All this information is essential and should be considered in any future visitors' management plan. Over and above the direct effects of diving, there are several other environmental and social effects related to the development of rapid, unplanned tourism, such as pollution, uncontrolled construction of coastal facilities, loss of traditional jobs and authenticity, conflicts between different groups of people, stakeholders, etc. (Badalamenti et al., 2000; Milazzo et al., 2002). All these factors, either environmental or social, should be taken into account, in order to estimate the carrying capacity of any given area, avoid further "impoverishment" of the environment, and to establish effective tourism management that will enhance sustainable development.

ANDAMAN & NICOBAR ISLANDS & ITS MARINE PROTECTED AREAS

Geographically, the Andaman Islands are located in Bay of Bengal at 92o to 94o East Longitude 6o to 14o North Latitude covering a total area of 8,249 sq.km out of which Andaman Islands are spread across 6408 sq.kms and the Nicobar is in 1841 sq.km.. Andaman & Nicobar Islands are a chain of 572 islands stretching 700 kilometers in length and 52 kilometers at the maximum width. The largest islands in the archipelago are North Andaman, Middle Andaman, South Andaman, the deceptively named Little Andaman, and Great Nicobar. International tourism is not permitted in the Nicobar Islands and domestic tourism is only allowed if a special permit is obtained. Middle Andaman is the largest island in the archipelago covering 1536 square kilometers [20-21]. Out of 572 islands, only 37 are inhabited and the altitude varies from sea level to 732 meters, highest being Saddle Peak (North Andaman Island, 732 Meters) in Andaman Islands and Mount Thullier (Great Nicobar Island, 642 Meters) in Nicobar Islands. These islands have an extensively thick Forest Cover of around 92 % and the climate is tropical and humid. Humidity ranges between 70% and 90% with a gentle breeze blowing at all times. The weather is generally pleasant with a minimum temperature of 23 C and maximum 30 C.Heavy rainfall is received in these islands with an annual average of 3000 mm and the relative humidity remains at about 70% to 90%.

The inhabitants of the Andamans are a mix of nationalities. Some natives of the Andamans have a likeness to the Australian Aborigines and others are of a Mongoloid origin. There are six ethnic tribes still living in the Andaman and Nicobar Islands: Jarawas, Great Andamanese, Onges, Sentinelese, Nicobarese and Shompens. Hindi, the mother tongue of 15% of locals, is the most commonly spoken language in the Andamans with the other 85% divided between around 24 different languages including Tamil, Malayalam and Urdu. However, English is the official language (Karhikeyan, G.,). The population of the Andaman and Nicobar Islands is 379944 (Census 2011) with a high literacy rate of 86.27%.

Tourism industry on the Andaman Islands is quite young as they have only been liberated in the past sixty six years. The island chain was ruled by the British Empire and was used as a penal colony from the mid 1800s. In 1942 it became a Naval Base for the Japanese Military, and finally gained independence in 1945 (Vashishtha, 2008). The biggest resources for these beautiful islands are their natural habitat. The sandy beaches and thick, dense and sub tropical forests as well as the flora and fauna that inhabit them, are significant attractions for tourists. However, the islands also have a dark side in the history arising out of the British and Japanese rule and this historical element and this historical element attract good number of international as well as domestic tourists (Soin, A.S., 2015).

Tourism industry has grown manifolds in last couple of decades and there are good numbers of standard tourist facilities and has a vast range of amenities which are capable to cater to any tourist segment but unfortunately, barring few, most of the islands lack in

infrastructure such as roads, proper waste disposal etc. which have not advanced proportionately. Domestic tourism is the largest section of the Andaman Islands tourism industry at 243703 visitors in 2014. Foreign arrivals for the same year were just over 6% of domestic visitors and accounted for 14742 visitors. Although the growth was small, there has still been positive growth in tourist arrivals from 2013 which saw 240607 domestic travellers and 17811 international tourists. The industry has proved resilient to natural disaster and has more than doubled since 1980 (Chaudhary, P., 2011).

Union Territory of Andaman & Nicobar Islands has constituted 105 Protected Areas out of which 09 are designated as National Parks and 96 are declared as Wildlife Sanctuaries and all of them have coast or some kind of marine environment. These protected areas cover a total area of 162,020 ha (National Parks-115394 ha and wildlife sanctuaries – 46,740 ha). Out of these 15 Protected Areas have marine ecosystems – mangroves, sandy beaches and coral reefs and other Protected Areas in Andaman and Nicobar have small areas of sandy coasts, mangroves, creeks, and coral reefs along with terrestrial moist forests. Although, majority of 105 Protected Areas in Andaman and Nicobar have marine ecosystem or influenced by the environment, only 15 have been listed under Category I and II Marine Protected Areas and rest of Protected Areas are classified in Category III, which constitute boundaries with tidal line and partially contribute to marine biodiversity conservation (Singh, 2003).

Attempts have been made several times, to estimate the carrying capacity of the Islands and contain the population to a sustainable level. One, which takes into account land, climate, water resources, and levels of agricultural technology, and calculates population supportable on the basis of potential of the land to meet protein- calorie demand, places the figure at 1.6 lakh at a density of 3 persons per ha of agricultural land with intermediate levels of agricultural technology. The maximum, with highly advanced levels, could go to 5 persons, per ha, and 2.50 lakh population. However, another study takes the potential of the sea in to account, and places the carrying capacity at 8.5 lakh- one person per sq. km of the 6 lakh sq. km of the Exclusive Economic Zone (EEZ), and a few thousand on the rich coastal, marshy areas by exploiting the potential for fish cropping. The same criticism holds here as well, that the figure is really the maximum that can live here at a point in time, but not the figure that the Islands can sustain over an extended period, environmentally or economically (Dhingra, 2005). The current population of 4 lakhs has crossed the threshold of the former estimation.

DISCUSSION

It is essential to adopt a formula for managing the development of diving tourism at the Greek coastal zone in the framework of an integrated precautionary approach. Recent experience has proved that there are two options to choose from: a) the long-term sustainable development and b) the short-term prospect (UNEP/MAP/Blue Plan, 2005; López Ornat, 2006), which unfortunately is the most commonly followed in India. Diving tourism should be used as a driving force with the aim to promote environmental conservation along with ecologically responsible coastal development (Dalias et al., 2007). Protection of the natural ecosystems must be a priority, in order to maintain the high aesthetic and ecological value of the marine sites. Previous experience from other Mediterranean MPAs (e.g. measures for eliminating potential human induced impacts) should be used as a tool for planning a new management model, adjusted to the local facts and conditions.

The implementation of a well designed management plan focusing on the development of regulated recreational diving activities within any type of MPA could potentially:

a) Bring about important economic sources to support the costs of surveillance and monitoring,

b) Benefit local communities by reinforcing sustainable development, and finally

c) Increase public awareness with regard to the conservation of the marine environment.

However, the primary step for designing any such plan is the conduction of baseline studies to assess local environmental conditions, while its implementation should be based on regular monitoring.

Moreover, effective planning, management and decision making should take into account the carrying capacity of all marine sites that would directly or indirectly be affected by tourism (López Ornat, 2006), while the needs for infrastructure of the various tourist activities should be treated separately. More specifically, the establishment of regulated diving tourism within an MPA usually demands analytical depiction of dive sites, creation of underwater paths and routes for diving and snorkeling, investigation of the optimal distribution of divers between the different dive sites, establishment of mooring systems for boats and finally the installation of dive centers, 'Hyperbaric Medical Centers', and the associated tourism infrastructure (e.g. marinas). Similar steps are needed in order to develop diving tourism at the existing artificial reefs or those to be established in the near future, in order to safeguard funds for their

monitoring. The nomination of artificial reefs as diving sites could potentially redirect SCUBA divers from vulnerable natural marine sites (Van Treeck and Schuhmacher, 1998). On the other hand, the creation of new marine parks in Andaman Seas should follow the current management approaches and practices along with the environmental trends and needs which have been described by the scientific community, NGOs and the management authorities. Therefore, the approach of 'Diving Marine Parks' that has been suggested by certain authors (e.g. Markatos and Koutsis, 2008) seems yet to be quite dubious and unclear.

It is strongly believed and proposed that the future development of eco-friendly diving tourism in Andamans should be combined with the establishment of Networks of Coastal and Marine Protected Areas (networks of permanent or periodically alternating no-take zones). Future target areas should include existing protected areas, as well as new areas that fulfill a number of environmental and socio-economic criteria. These new areas, could be used as buffer zones at a rotational basis, so that the local environment would not be fully 'exploited' at any given site, while at the same time they would protect and finance the permanent MPAs or the core no-take zones of the new parks which host vulnerable ecosystems and where visitation is limited or prohibited (López Ornat, 2006).

The creation of 'Networks of Marine Protected Areas' can provide more effective conservation of different habitats and important nursery grounds for the early life stages of fish and other marine biota, without interrupting human activities at the intermediate areas (PISCO, 2007). Moreover, networks of small MPAs are proved to be more easily managed (López Ornat, 2006), while the large size of the existing MPAs seems to cause many problems with regard to the surveillance and the acceptance of local communities (e.g. conflicts between fisheries and tourism). However several issues, such as the number, size and distance between the protected zones comprising a network have to be carefully investigated through scientific research (Roberts et al., 2003). Therefore, planning and design of these networks has to be based on both preexisting information and environmental data taken in situ, in order to assess the current state conditions and to ensure a good representativeness and distribution of protected natural heritage (e.g. biodiversity, habitat cover, and fisheries stocks) and environmental processes. This requires the conduction of oceanographic environmental studies at the potential target areas. The need for environmental studies prior to any establishment of MPAs is in accordance to what the global experience has shown (Browman and Stergiou, 2004; PISCO, 2007). Furthermore, before the establishment of an MPA, within an integrated approach, socio-economic factors from the neighboring coastal areas (e.g. conflicting interests among the different groups of users) also have to be investigated (Badalamenti et al., 2000), while the involvement of the local communities must be a priority, from the first stages of this process, in order to improve the chances of success and the long-term viability of any development plan (Kelleher, 1999).

Both existing and new MPAs should additionally focus on the establishment of educational activities and appropriate facilities (e.g. special training courses for SCUBA divers, visitor centers and information points) and the production of awareness raising material (e.g. educational tools, brochures, guide books and scientific publications) through which, conservation of the marine environment will be promoted. Moreover, it is essential to maintain local customs and traditions that illustrate the relationship between humans and the marine environment (e.g. historical background, monuments, religious sites, human uses of the marine resources, fishing lifestyles). The decision making process within the MPAs has to be based on a periodic monitoring scheme of ecological and socio-economic alterations which is expected to eliminate potential habitat loss and identify the needs of the local communities. Regional universities, research institutes and NGOs could significantly contribute in the monitoring and consultation process.

Overall, the development of diving tourism alone does not safeguard the success of environmental or socio-economic purposes. A well designed management plan in the framework of a precautionary approach, alongside with an organized management body, responsible for the effective surveillance, sustainable use and scientific monitoring of the marine and socio-economic environment, are absolutely critical to be established.

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