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The Role of Small-Scale Manta Ray Tourism in Eastern Indonesia's Marine Protected Areas

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Manta ray watching tourism worldwide has been reported to bring a significant economic impact that contributes to the effective management of sustainable wildlife tourism. This study was conducted to analyse the role of small-scale tourism businesses in Marine Protected Areas (MPAs) of Nusa Penida, Komodo, and Raja Ampat, both in Indonesia, that offers manta ray tours and determines their significant contribution to the park management. We conducted surveys with 101 respondents from manta ray tourism services and phone interviews with three park managers. The results of this study indicate that more than 90% of respondents engage in conservation activities. The small-scale businesses include boat rentals, gear rentals, dive shops, tour operators, homestays and souvenir shops that promote manta ray conservation through their products and services; educating tourists and staff, collecting plastics when diving and snorkelling, regular beach clean-ups, waste management, recycling programs, manta ray monitoring and photo ID activities. Furthermore, the Marine Protected Area (MPA) management confirmed by establishing a partnership with the small-scale manta ray's tourism businesses to ensure the authentic manta ray experience for tourists and achieving sustainable businesses for the locals. In summary, there are three significant roles of small-scale manta ray tourism business including species protection, sustainable tourism compliance, and effective MPA management that still needs to be strengthened to provide maximum benefits to conservation and tourism.

Key words: *Ecotourism, fisheries, wildlife tourism, elasmobranch, conservation, local community, Indonesia.*

Introduction

Wildlife Tourism

Wildlife tourism has grown into enormously popular tourism activities, ranging from visits to captive wildlife facilities (e.g., zoos, aquaria, marine parks) to small scale guided wildlife tours, to multi-million dollar businesses (e.g., safaris whale watching). More recently, wildlife tourism has been employed as an ecologically benign form of a conservation initiative. Some conservationists believe this to be an effective strategy in marketing conservation as an economically advantageous option (Inman et al., 2016). Others, however, argue that the supposedly new and improved wildlife tourism is deviant of the message of conservation; it essentially views our ecosystem as nothing more than another source of income and therefore worth saving (Hani et al., 2018a). Wildlife tourism encompasses a wide range of experiences, organisms and environments, some of the most popular ones being of marine origin (Inman et al., 2016; CRC Australia, 2009). Expenditures from whale watching alone, for example, generated U$2 billion dollars in 2008 from a total of U$13 million whale watching participants (Venables et al., 2016; O'Connor et al., 2009). In the Maldives, annual expenditure by divers on shark watching dives generate about 2.3 million dollars (Anderson & Waheed, 2001). Manta ray tourism in Mozambique contributes between 16.1 million and 25.7 million dollars to the region's total income each year (Hani et al., 2018a). Looking at these figures, the magnitude of marine wildlife tourism in regards to its corresponding region's economy year after year becomes apparent, especially for areas with limited other opportunities, often struggling to make ends meet (Tisdell, 2012). As tourists are increasingly demanding for a more interactive form of wildlife tourism (Lück, 2015), manta-watching provides the perfect opportunity for such activities (Birtles et al., 2001).

Manta Ray Watching Tourism

Manta rays (*Mobula alfredi* and *Mobula birostris)* are large gentle creatures with unique characteristics such as the size, colour variations, two head lobes (horns), a frontal lobe for filtering plankton, spotted patterns on the lower shoulders and marks on the upper shoulders as a marker allowing to distinguish species (Couturier, 2013; Dewar et al., 2008; Burgess, 2017; Deakos et al., 2011; Hani et al., 2018b, Hani et al., 2019). In the Maldives, Ningaloo Reef (Australia), Raja Ampat, Nusa Penida, and Komodo National Park (Indonesia) are the world's main locations where the majority of tourists reportedly visit specifically to view manta rays as opposed to other marine wildlife (Tisdell, 2012; Hani et al., 2018b; O'Malley et al., 2013; Anderson et al., 2010; Hani et al., 2019). According to Hani et al. (2018b), there are three main reasons for tourists to visit these destinations, including to see manta rays in their habitat; to view an endangered species, and to interact with the fish. Mysterious creatures as they are, it is no surprise that the global manta watching industry attracts millions of tourists each year,

generating an estimate of 73 million dollars annually worldwide with an even more significant indirect economic impact of U$ 140 million (Venables et al., 2016). The Maldives, home to one of the oldest manta ray watching industry, rely almost exclusively on their marine wildlife tourism for income, with manta rays as their highly revered icon. Tourists spend an astonishing U$8.1 million just to see and interact with manta rays in Maldivian waters. The manta ray watching industry is an especially beneficial industry to Indonesia, second only to Japan in terms of direct economic impact with an estimate of U$15.1 million (O'Malley et al., 2013; Lazuardi et al., 2015). Ironically, Indonesia is also home to the largest manta ray fishery trade in the world (Lewis et al., 2015). Although there is a large, starkly obvious disparity between the revenue generated through tourism and revenue generated through fisheries, with the latter only being able to generate U$442,000, the hunt for manta rays still occurs at an alarming rate (O'Malley et al., 2013). Lewis et al. (2015) reported that to ameliorate their declining population as a result of illegal hunting and trading, there has to be a more sustainable alternative for those who depend on manta rays for their livelihood. A better understanding of the actual economic impact and extent of manta ray tourism will assist governments and conservationists in developing a proper strategy to encourage manta ray tourism as one of those alternatives able to create a more sustainable relationship between mankind and manta rays. In this study, the area of focus is Eastern Indonesia, home to a few manta rays' feeding, nursery and aggregation sites critical to their conservation (Hoomanfard et al., 2018).

Methodology

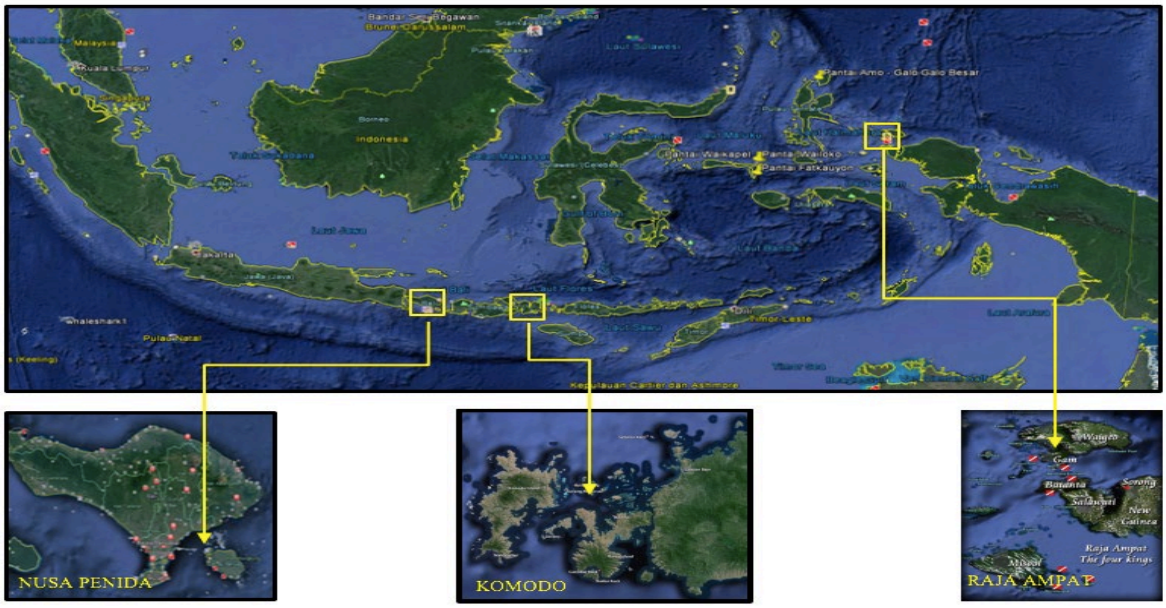
Statement of Problems and Objectives

Tourism, in general, stimulates business opportunities for local communities residing in a tourism destination (Salazar, 2007). Small businesses are community-based retail operations thriving upon traditional and cultural values products and services, for example, traditional wooden crafts from pandanus tree, traditional boats "jukung", and homestay with traditional materials. Small-scale tourism in this study means a business owned by locals with limited capital, workforce, and materials that provide manta ray related products and services. The economic benefits from this industry allow the locals to develop their awareness about the importance of protecting a particular tourism asset, in this case, the endangered manta rays, to provide an authentic experience for the tourists and to ensure the sustainability of the business. It is crucial to provide opportunities for the local businesses to engage in tourism management within the MPAs that allow their concerns and input to be implemented in the MPAs policy strategy. The objective of this study is to determine the role of small-scale tourism businesses in MPAs of Nusa Penida, Komodo, and Raja Ampat, both in Indonesia, that offer manta ray tours and examine their significant contribution to the park management

Study Areas

Indonesia is a developing country consisting of 16,671 islands within 34 provinces. The study areas cover manta ray hotspots in Nusa Penida – Bali, Komodo – Flores, and Dampier Strait – Raja Ampat that are designated as Marine Protected Areas.

Figure 1. Study areas (Hani et al., 2018a)



Nusa Penida Marine Protected Area

Nusa Penida is a sub-district of Klungkung, Bali. Famous for its iconic landmarks, sandy beaches, and exceptionally high levels of marine biodiversity (Susiloningtyas et al., 2018), Nusa Penida's underwater seascape invites thousands of tourists each year, especially since its designation as a priority site for tourist development (Pebriantari et al., 2017). In recognising Nusa Penida's potential for ecotourism as well as encouraging a blue economic growth, a part of it was established as a marine protected area. The Nusa Penida MPA is divided into different zones, with one particular zone allocated for marine tourism (Daulat et al., 2018). This led to a paradigm shift of socio-economic proportions for the people of Nusa Penida. Prior to its recognition, the people of Nusa Penida used to be farmers, fishermen, and craftsman. However, as the influx of tourists continues to increase, the demand for accommodation and amenities rises along with it. Rather than abandoning their previous occupations, the people of Nusa Penida instead integrate the new into the old. By mornings and nights, they tend to their farms, and by day they tend to their jobs in the tourism industry. The community's shift to more tourism jobs is also, in part, fueled by the local government's strict policy of mandating tourist

operators and businesses to hire 50% of their workforce from the local communities (Pebriantari et al., 2017).

Komodo National Park

Komodo, an island situated within the heart of the coral triangle, hosts a thriving marine ecosystem composed of coral reefs, mangroves and seagrass beds; it is home to over a thousand species of fish and 260 species of coral (Mangubhai et al., 2011; Tisdell, 2012). Similar to the people of Nusa Penida, Komodo Islanders were once fishermen, depending on the sea for their livelihood. Now, however, a majority of them work in the ecotourism industry as naturalist guides, homestay owners, souvenir craftsmen, and boat owners (Rahman & Alfioma, 2016). Despite the rapid development of Komodo's tourism industry, Komodo islanders are finding it harder and harder to find jobs due to the lack of prioritisation of locals as the source of the workforce (Ziku, 2015). The issues of the closure of Komodo for habitat restoration in January 2020 is still debatable, especially to the locals that depend their economy on tourism. New policies are being prepared to improve the monitoring and patrol to control the tourist's numbers in the park and species conservation for sustainable management.

Dampier Marine Protected Area

Damper MPA is located in Raja Ampat. Greater Raja Ampat encompasses around 70,000 km2 of land and sea. The islanders were once a predominantly fishermen community. In contrast to other fishermen across Indonesia, fishermen in Raja Ampat have always been cautious of their impact on local fish stock and livelihood, even implementing a law, known as Sasi Law, to close off a part of their sea from fishing activity to allow the fish and coral stock to recover. As a result, most of Raja Ampat's underwater life remains pristine, making it a magnet for domestic and international tourists (King, 2017). Despite the influx of tourists, Tafalas (2010) reports that Raja Ampat remains a predominantly fishing community, with over 70% of the population engaged in fishing. Some locals, however, derive their income from owning and running homestays (King, 2017).

Respondents

The data collection was conducted from August 2018 to August 2019, involving 104 respondents (the residents) from the three study locations introduced in the previous sections. The research covered small scale tourism businesses including homestays, boat rentals, gear rentals, dive shops, tour operators, and souvenir shops, in Nusa Penida, Komodo National Park, and Dampier Strait focussing on manta ray related tours and products owned by the locals residing in the MPAs. To collect the data, we conducted quantitative surveys involved 101 respondents from local business owners in addition to depth interview with three critical

informants of the MPAs managers in Nusa Pedina, Komodo National Park, and Raja Ampat. The questionnaires were distributed to more than 150 samples, but only 101 were valid. Phone and direct interviews were also conducted with the MPA managers to collect data about the annual tourist numbers in the MPAs during 2018. The questionnaires consisted of 15 questions and were divided into three sections: Section 1. Profile of the respondents, Section 2. Business operations and contribution, Section 3. Perceptions.

Data Analysis

Descriptive analyses were conducted to analyse data from the survey and interviews employing SPSS13. The data were analysed descriptively in terms of a measurement of central tendency, including the mean, median, and mode presented on tables, charts, and graphs. Furthermore, Likert scale analysis was utilised to determine the essential aspects of promoting manta ray conservation through tourism business.

Results

Small Scale Tourism Business

The results show that the presence of the manta ray tourism industry affects each study area differently based on local assets and opportunities. The locals who reside in the MPAs established small-scale tourism businesses with the support of financial capital from banks and family members. Table 1 presented the summary of small-scale manta ray tourism business in each study areas completed with the owners' profile and type of services/products.

Table 1: Summary of small-scale manta ray tourism business in study areas

	Nusa Penida MPA	Komodo NP	Dampier MPA
Female		1	32
Male	12	21	35
Age group	25-45	25-55	25-60
Type of business	Boat rental, gear rental, dive shop	Boat rental, gear rental, tour operator, souvenir	Homestay, tour operator, souvenir, dive shop

Referring to table 2, the survey results in Dampier strait - Raja Ampat, presented 26 homestays, two dive shops, nine tour operators, and 30 souvenir shops although some have transitioned into new jobs in the tourism industry, most people within the areas are still fishermen (Djangkaru & Cahaya, 2006). In Komodo National Park, according to the interview with the national park managers, there are hundreds of people from Komodo NP employed in the tourism industry. The number of tourism businesses is relatively high with a total of 72 places

of accommodation, 46 restaurants, 27 dive centres, 13 souvenir shops and four spas or salons (Remmer & Achmad, 2015). From table 2, we documented 11 boat rentals, one gear rental, four tour operators, and six souvenir shops for specific small-scale manta ray tours and products in Komodo. On the other hand, the survey results in Nusa Penida identify a majority of the people have shifted from traditional fishing jobs to tourism-oriented jobs. Dive centres are mainly located on the nearby island, Nusa Lembongan. Based on our data collection, there are at least 15 dive centres in Nusa Lembongan that offer diving with manta rays, but only one dive shop is owned by a local. There is a local group of traditional boat operators (*jukung*) consisting of 10 fishermen that provide boat rentals for snorkelling tours with manta rays, and one working group offers gear rental services (Table 2).

Table 2: Summary of small-scale manta ray tourism business by the locals

	Nusa Penida	Komodo	Dampier
Homestay			26
Boat rental	10	11	
Gear rental	1	1	
Dive shop	1		2
Tour operator		4	9
Souvenir shop		6	30
TOTAL	12	22	67

Annual Visitor Numbers

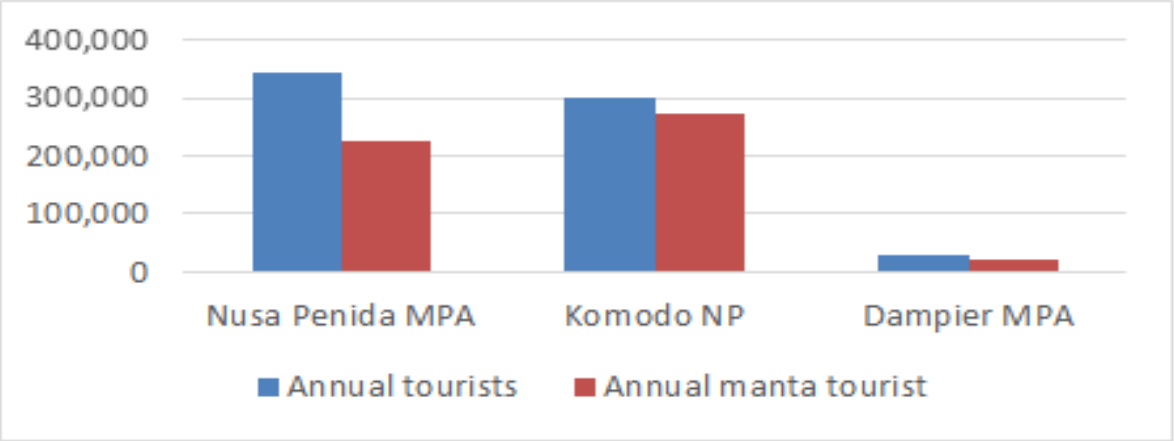
According to the annual report of Komodo National Park, there were a total of 301,903 tourists over the period of 2017-2018 with 80% of them being international tourists. The number of tourists peaked in August for both years. Based on the data provided, there were 14.4% more domestic tourists visiting Komodo in 2018 than in 2017 (Table 3). The number of foreign travellers increased as well, by as much as 58.5%. The total income generated, as a result, increased by U$ 281,386. Similar trends were observed in Raja Ampat, which saw a general increase in visitors, both domestic and foreign, by 27.33% over the course of the 2017-2018 period with an annual expenditure of U$ 1,266,236. Table 3 shows that in contrast to Komodo, however, the number of foreign tourists far outweighs the number of domestic tourists: Foreigners accounted for 79.5% of the total visitors compared to just 20.5% of domestic tourists. The number of tourists peaked in December for both years. In addition, the number of tourists visiting Nusa Penida in 2018 was 343.979 with approximately 4,000 tourists per day, an increase of 25% from the previous year with an annual income of U$ 196,947.

Table 3: Annual tourist's numbers visiting MPAs in 2017-2018

	Nusa Penida MPA	Komodo NP	Raja Ampat MPA
Annual tourist visits	343,979	301,903	28,896
Tourist increase	25%	58.5%	27.3%
Percentage of manta ray tourists	65%	90%	75%
Annual income ($US)	U$ 196,947	U$ 281,386	U$ 1,266,236

The surveys and interviews confirmed there were more than 50% of the annual tourists in each study area who joined manta ray tours in 2018. Figure 2 presents the annual tourist numbers visiting MPAs, while series 2 shows the annual tourist numbers that enter manta ray tours.

Figure 2. Summary of annual tourist numbers visiting MPAs vs manta rays 2017-2018



Conservation Initiatives

The tourism-related threats for manta rays (through tourist numbers and irresponsible behaviour) has raised the awareness of small-scale tourism businesses in the study areas to protect manta rays and their habitat. Graph 1 illustrates the number of respondents involved in conservation activities showing that more than 90% of them are engaged with different conservation initiatives (Table 4).

Graph 1. Respondents involvements in manta ray conservation initiatives

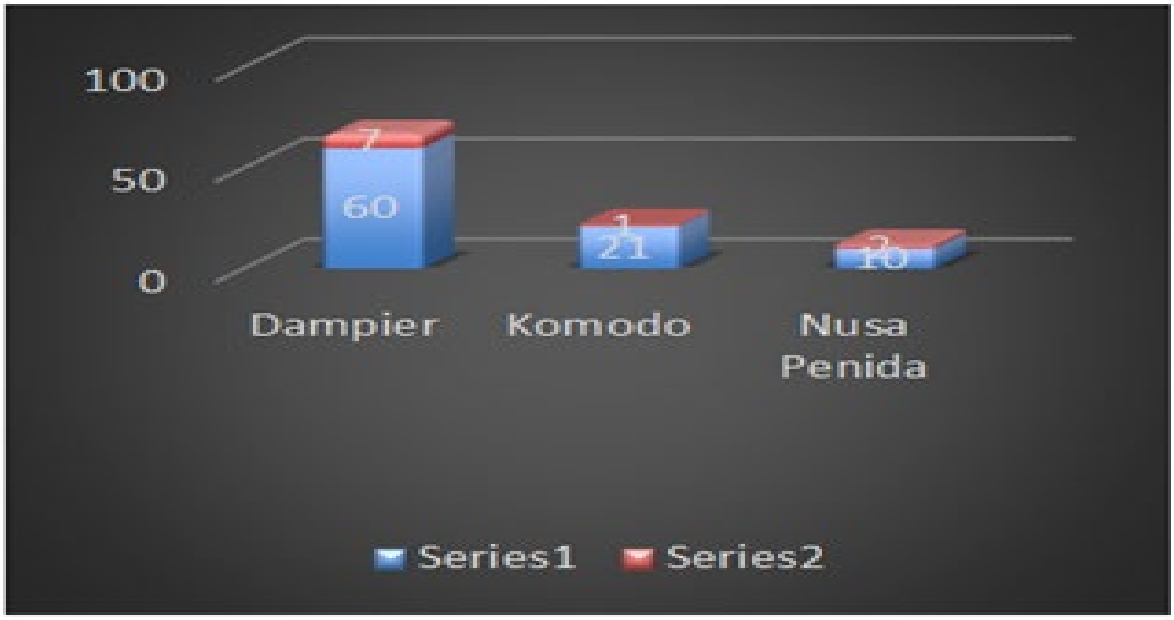


Table 4 below identifies conservation initiatives at the three study areas by respondents implementing responsible manta ray interaction and making a genuine contribution through educating their tourists about the importance of manta rays as an endangered and flagship species, engaging their tourists in collecting plastics while diving and snorkelling, initiating regular beach clean-up activities, waste management, recycling, monitoring and patrol, species monitoring and photo ID. Different initiatives implemented in various locations were in Nusa Penida focusing on education and plastic collection while in Komodo and Raja Ampat there were more varied activities.

Table 4: Manta ray conservation initiatives

Conservation initiatives	Dampier	Komodo	Nusa Penida
Responsible manta ray interaction	94%	93%	90%
Manta ray education/interpretation (tourists and staff)	98%	99%	96%
Plastic collection during diving/snorkeling	93%	91%	92%
Regular beach clean up		95%	
Waste management	91%	92%	
Recycling	96%	93%	
Collective patrol		97%	
Citizen science (manta ray monitoring and photo ID)	95%	94%	

Partnership

Survey results confirmed that the establishment of partnerships between the small-scale manta ray tourism businesses and the MPAs had developed effective links such as working with the association of dive operators Komodo (DOCK) in Komodo National Park, manta working group.

To increase the overall benefit of tourism, co-management with different groups offers opportunities in financial, logistic, and human resources that are utilised to achieve the MPA's objectives. The interviews with three park managers have confirmed the percentage of stakeholder involvement by 80% to support MPA's management.

Table 5 present the positive perceptions of all the respondents from small-scale tourism business in the three study areas. The result indicated the highest mean score of 4.892 with a standard deviation of 0.884. This suggests that positive attitude towards manta ray conservation from respondents the importance of protecting the assets for tourism through their operation in MPAs.

Table 5: Summary of tourist perception

Perception	Mean	Standard deviation
a. To sustain the manta ray population	4.892	0.884
b. To promote livelihood from manta ray tourism	4.817	0.721
c. To promote a healthy ecosystem for the manta ray	4.709	0.764
d. To keep manta ray tourism in balance with conservation goals	4.683	0.653
e. To raise awareness about threats to manta rays and its habitat	4.562	0.712
f. To improve MPAs policy in manta ray tourism operation and management	4.501	0.646

Discussion

Tourism enables the utilisation of protected areas and achieves its effective management with the engagement from society, including the tourism industry, with the establishment of co-management in finance, education, and policy, so the assets are protected, and the tourist experiences it sustainably. Co-management determines a joint effort from all related stakeholders in the MPAs to condense all aspects of the sustainability of tourism in one conservation initiative especially to catalyse sustainability within the tourism sector. Without sustainability, there cannot be tourism development that generates benefits for better livelihoods and preserves the species in question. According to (FAO, 2007; Lee, 2018; Wang

et al., 2018; United Nation Environment Program, 2005, United Nation Environment Program, 2005), co-management is a practical approach for developing strategies and policies for more sustainable tourism, where the government needs to formulate and implement this as a tool of the MPA strategy. In this study, the small-scale tourism businesses incorporate sustainability principles into their day-to-day operations and integrate environmental programs into customer's purchasing choices. The small-scale business manta ray tourism confirmed their positive contribution that enables the conservation of the species in the MPAs can be sustained through many activities and initiatives. This type of community-based conservation management plays an essential role in preserving manta rays from tourism threats.

Conclusion

Based on empirical findings and literature reviews from this study, the results show that small-scale businesses have a significant role in contributing their engagement in conservation initiatives. All respondents have confirmed the co-management initiatives supporting the MPA's effectiveness, resulting in better tourist compliance. The survey results show 80% of small-scale tourism business engagement contributes to MPA management. Development of small-scale tourism enables the community to have opportunities to participate in ensuring the sustainability of the asset and the business (Salazar, 2007). This study confirmed the significant role of small-scale manta ray tourism businesses in different aspects, including species protection, sustainable tourism compliance, and effective MPA management. The co-management between protected areas and tourism businesses needs to be strengthened to provide maximum benefits to conservation and tourism.

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