

LOCAL PERSPECTIVES ON COMMUNITY-DRIVEN MARINE DEBRIS MANAGEMENT FOR SUSTAINABLE TOURISM IN THE ANDAMAN ISLANDS, THAILAND

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Abstract: Community-driven marine debris management is key to sustainable island tourism. This qualitative research aimed to explain perspectives on waste management for sustainable tourism, via two case studies of Andaman Islands. Data were collected by reviewing secondary data, in-depth interviews, and focus group discussions with nineteen key informants: 6 marine debris collectors, 6 community leaders, 5 entrepreneurs, and 2 government officers. Content and narrative analyses were applied. Marine debris management comprised 2 main perspectives with 4 minor perspectives, valuable for policy and long-term planning. Notably, understanding internal factors like beliefs and motivations towards sustainability is crucial for effective waste management strategies.

Keywords: Marine Debris, Sustainable Tourism, Perspectives, Management, Andaman

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INTRODUCTION

In Thailand, there are a lot of outstanding natural resources and important tourist attractions. Especially in the South, there are various marine tourist attractions and islands that have become targets for tourism from around the world, contributing to incomes and development in those areas. However, it was found that development driven by growth, with rapid growth of population and tourism, impacts the sustainability of natural resources (Calderwood and Soshkin, 2019; Khunnikom et al., 2022). Island areas in Thailand contain a variety of plants and other creatures. They have fresh, salty, and brackish water ecologies, the beginning of marine food chains, and ecological habitats such as seagrass resources, mangroves, coral reefs, or planktons as biological resources (De Scisciolo et al., 2016).

On the other hand, the islands are most vulnerable to climate change and sea level rise (Thomas et al., 2020). Some people on the islands try to learn and live with nature as well as have a good relationship with nature, practicing community management in order to live in harmony with the environment and natural resources (Marlina et al., 2020), while other people and tourists desire to change and seize marine resources and limited areas. Humans are considered a stimulating factor for positive and negative natural changes, population growth (Alisha et al., 2020), desires to use resources without sustainability, and increases in marine waste quantity (Rangel-Buitrago et al., 2018). 80% of marine waste discarded by humans is plastic, which is the main environmental problem negatively affecting marine creatures, human health, and the economy (Derraik, 2002; Fallati et al., 2019; Newman et al., 2015). Importantly, increases in waste are caused by

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population growth and continual product demands. Waste has been found on beaches, brought in by water currents, and sourced from local or community areas (Gaibor et al., 2020). In the years 2021 and 2022, 444 and 393 tons of waste was removed from coastal ecology, respectively. In 2022, it was clear that over 81% of the waste on beaches was plastic (Pollution Control Department, Ministry of Natural Resources and Environment, 2022; Pollution control Department, Ministry of Natural Resources and Environment, 2023). This information is relevant to a study by Krishnakumar et al. (2020) showing that most of the plastic waste in the North and the Center of Andaman Islands and Nicobar Islands was white and unshaped polyethylene and polypropylene pieces, carried by water currents, and coming from tourists, boat activities, and inappropriate waste management. Another study was conducted on Libong Island, Trang, which sustains a high biodiversity, essential seagrass resources, and habitats of endangered dugongs. This island has faced a waste management problem caused by people on the island along with tourism. It was found that, according to an inspection of micro-plastic contamination in marine animals, alluvial soil, and seagrass which is dugongs' food, micro-plastic was smaller than 1 millimeter and was consumed by tiny creatures on soil surface, and by dugongs dwelling along beach sediments. It could contaminate the food chain, the local ecosystem, and humans (Pradit, Nitiratsuwana, et al., 2020). A study conducted from May to August 2019 revealed that most of the found waste was ceramic and glass pieces, followed by plastic, most of which was plastic bags used in people's jobs along the beaches and in recreational activities. It is quite surprising that there are still no studies addressing the many islands of Thailand, as regards management of waste that comes from communities (Pradit, Towtana, et al., 2020). Moreover, extended producer responsibility, which can reflect affective feelings showing conative, is a factor that has not been widely researched or deeply described for waste management (Salem et al., 2020), but this factor is important to account for in order to fill gaps and help recycling and waste management in Thailand.

This study aimed to explain perspectives on waste management in island areas of Andaman Coast, which conduct tourism and pursue sustainability of it. Due to various high potential tourism resources, these island areas have a trend of continuous tourism growth. (Samran et al., 2019) This could pose limitations to the balance required by sustainability and affect ecology (Higgins-Desbiolles et al., 2019; Nigam and Sainy, 2024; WTO, 2005), especially as regards marine debris. Thus, marine debris management that is appropriate for social conditions of the people and the tourism on the islands needs to be designed for sustainable tourism with ecosystem services.

LITERATURE REVIEW

Marine debris is defined as hard materials which are made of paper, metals, plastic, woven fabrics, glass, or rubber, and released from industrial or production processes by humans both intentionally and unintentionally via riverine systems, waste discharge, and dumping activities into marine and coastal environments (Mugilarasan et al., 2021; Salazar et al., 2022; STAP, 2011). Thailand is among the many countries facing a plastic waste crisis, so the National Action Plan on Marine Plastic Debris, especially for marine waste management between 2018 and 2030, has been decreed. In fact, it was found that the waste quantity in municipalities is 11,070 kilotons per year, accounting for 17.4%; over 214.7 kilotons/year of waste has not been dealt with; and most of the waste or 70.1% has been from countryside areas, and has not been correctly managed before it is dumped into rivers and sea (World Bank, 2022).

Sustainable tourism is an approach encompassing all types of tourism, that aims to balance environmental, economic, and socio-cultural aspects for long-term viability (WTO, 2005). The growing body of research in this field, with an annual growth rate of 19.9% over the past 25 years (Prerana et al., 2024), reflects the increasing recognition of the challenges and opportunities associated with sustainable tourism development. A key challenge highlighted in the literature is the discrepancy between tourists' pro-environmental attitudes and their actual behavior (Viglia and Acuti, 2022; Peeters et al., 2024).

This "intention-behavior gap" is particularly relevant in community-driven initiatives like marine debris management, where community awareness and willingness to participate may not always translate into sustained action. Understanding the complex interplay of individual values (Dong et al., 2020; Han, 2021), social norms, and contextual factors (Bassi and Martín, 2024) is crucial for bridging this gap and fostering sustainable practices. A comprehensive approach that integrates insights from various disciplines is needed to develop sustainable tourism. This approach should prioritize investigating the effectiveness of community-driven initiatives, collecting empirical evidence on actual behavioral changes, and exploring the influences of cultural, social, and economic contexts on sustainable tourism practices. By addressing these research priorities, stakeholders can develop more effective strategies to promote sustainable tourism and mitigate negative impacts of tourism.

MATERIALS AND METHODS

This qualitative research with multiple case studies (Cook, 1979) was conducted to understand waste management in one of Andaman Islands areas for sustainable community-based tourism, between April and December 2022. This study was approved by the Social and Human Research Ethics Committee at Public Policy Institute, Prince of Songkla University (EC 002/66 issued on 25th April 2022).

Study Area

Libong Island was selected to be a study area by purposive sampling. Its latitude and longitude are 07°14'-07°17' N and 99° 22'-09° 27' E, respectively. It is located on the western coastline of Kantang District, Trang Province, and approximately 2-3 km away from the mainland. Klang Island is located with latitude and longitude at 8° 3' 12.31" N and 98° 55' 57.12" E, respectively (Figure 1). These islands were purposively chosen due to their community tourism management and the following reasons:

1. In the communities, the ways of people's life and culture are unique and sensitive to changes.

2. The areas are at risk from natural and manmade disasters; therefore, the members of the communities totally agreed to manage their area.
3. There were both official and unofficial leaders who were interested in waste management for sustainable tourism.
4. In the communities, tourism management together with systematic and obvious marine debris management was desired for sustainable tourism.

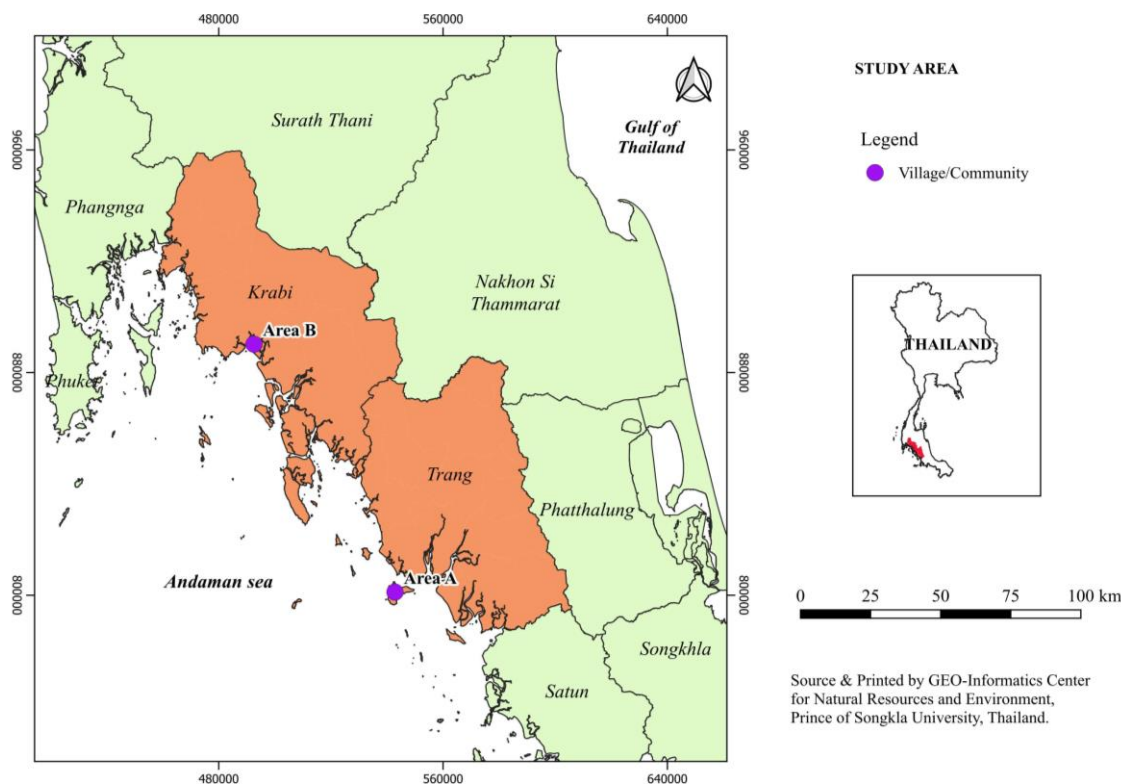


Figure 1. Study Areas (Source: This figure is produced purposely for only this research article)

Key Informants

The key informants in the study were stakeholders affected by community-based tourism. They were selected by purposive sampling with the following inclusion criteria: (1) entrepreneurs operating on the island, or (2) committee members related to community-based tourism or having roles in planning and problem-solving, or (3) people working in garbage collection and recycling exchange jobs, or (4) people living on the island for over six months, or (5) policymakers or people related to tourism operation, or (6) people who can communicate in Thai, or (7) people who volunteer for this study. As a result, there were 19 key informants: 6 marine debris collectors, 6 community leaders, 5 entrepreneurs, and 2 government officers as detailed in Table 1.

Table 1. Respondents' demographic background and line of work (n = 19) (Source: The authors' elaboration)

Respondent	Area	Dominant religion in community	Age	Gender	Line of Work	Data Collection	Date of interview
A01	A	Muslim	37	M	Marine debris collector	In-depth interview	04/10/2023
A02	A	Muslim	59	F	Marine debris collector	In-depth interview	04/10/2023
A03	B	Muslim	47	F	Marine debris collector	In-depth interview	20/08/2523
A04	B	Muslim	52	F	Marine debris collector	In-depth interview	20/08/2523
A05	B	Muslim	52	M	Marine debris collector	In-depth interview	20/08/2523
A06	B	Muslim	37	M	Marine debris collector	In-depth interview	20/08/2523
A07	A	Muslim	55	F	Entrepreneur	focus group	03/10/2023
A08	A	Muslim	38	F	Community leader	focus group	03/10/2023
A09	A	Muslim	44	F	Community leader	focus group	03/10/2023
A10	A	Muslim	50	F	Community leader	focus group	03/10/2023
A11	A	Muslim	50	F	Community leader	focus group	03/10/2023
A12	B	Muslim	45	F	Entrepreneur	focus group	20/08/2523
A13	B	Muslim	35	F	Entrepreneur	focus group	20/08/2523
A14	B	Muslim	36	F	Entrepreneur	focus group	20/08/2523
A15	B	Muslim	40	F	Entrepreneur	focus group	20/08/2523
A16	B	Muslim	44	F	Community leader	focus group	20/08/2523
A17	B	Muslim	44	F	Community leader	focus group	20/08/2523
A18	A	Muslim	51	F	Government officer	In-depth interview	20/10/2023
A19	B	Muslim	49	F	Government officer	In-depth interview	04/10/2023

Research Tools

The research tools included researchers and questions for in-depth interviews and focus groups (Morrison, 2007). The main question was ‘what is your opinion about waste management for sustainable tourism on the island?’, together with the opinion about community’s concerns regarding waste management. The data were recorded in audio clips, and photos of the in-depth interviews and the focus group meetings were permitted to be taken by the key informants.

Data Collection

The steps in data collection were as follows (Figure 2):

1. Secondary data from marine debris collectors’ recycling exchange receipts between April and December 2023 were reviewed.

2. The 3-hour in-depth interviews were conducted with 6 marine debris collectors and 2 government officers. The footage of each interview was recorded.

3. There were two focus groups: the first group with 6 key informants and the second group with 5 key informants. All of these key informants were entrepreneurs and community leaders, and the duration of focus group meeting was 2 hours. The footage of each focus group discussion was recorded.

Focus group discussions were conducted. Entrepreneurs and community leaders, 1 time per area, 2 times in total, including:

3.1 Group discussion in Area A. There were 6 participants, including 4 entrepreneurs and 2 community leaders. Group discussion time: 2 hours.

3.2 Group discussion in Area B. There were 5 participants, including 1 entrepreneur and 4 community leaders. Group discussion time: 2 hours.

4. Participant observation was also conducted in the areas with waste management on Libong Island and Klang Island.

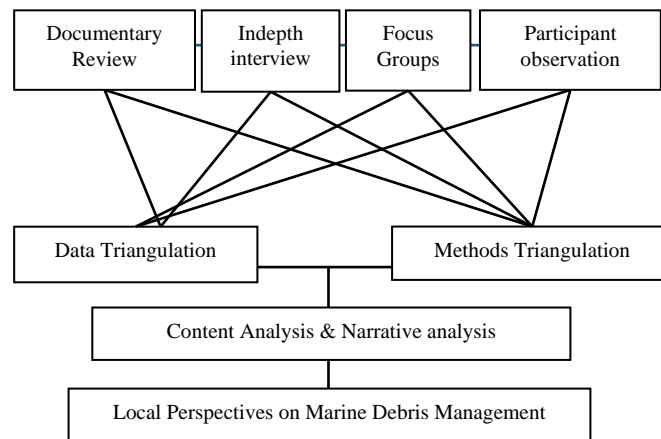


Figure 2. Scheme of research methodology (Source: The authors' elaboration)

Triangulation and data analysis

The collected data were inspected for correction by data triangulation to compare the data given by several key informants who had roles in waste management for sustainable tourism, and methods triangulation compared the secondary data retrieved, the in-depth interviews, the focus group discussions, and the participant observations. After that, content analysis and narrative analysis were applied.

RESULTS

The results of this research in the Andaman Islands, Thailand, are described as follows.

Area Context

It was found that in the social structure of Area A there are 990 households with 3,336 people (1,666 males and 1,670 females) living on the island. In Area B, there are 1,667 households with 7,489 people (3,660 males and 3,555 females) living on the island, which are about twice that in Area A. However, the proportions of males and females are similar in the two areas. Almost all of the people on the islands are Muslims, so most of their traditions are related to their religion such as Rong Ngang, which is a local dancing style. The relationships among people here are based on being relatives. Their main occupation is local fishing, and some of the people operate community-based tourism. Marine debris management is an activity for the tourism season from November to April every year. During this time, people in the islands work in tourism industry, including waste collection. One collector said:

“we started tourism activities and OTOP products, but many people did not know about waste. They just knew that they could earn money from this activity, but they did not know how to separate waste” (A03).

Similarly to some projects by government and private offices, they came to hold waste activities occasionally and discontinuously. One local villager said. *“government and private organizations came to have activities for their reputation by grouping Subdistrict Administrative Organizations and people into teams to collect some waste and debris. Then collected objects were weighed. Each activity was finished in one day”* (A11). According to a review of the secondary data

during April to December 2023, the quantity of marine debris in Area A was 192,710.80 kilograms or about 21,400 kilograms per month. In Area B, the total marine debris quantity was 29,804.45 kilograms or about 3,300 kilograms per month. However, it was found that there are increases in the quantity of marine debris from November to April. In addition, in Area A, people work in tourism industry by using long-tailed boats in some months such as April.

Local Perspectives on Marine Debris Management

According to the results, people in the islands thought that waste was unwanted objects which needed to be discarded without separation. One person said.

“villagers did not know what waste was and how waste could be separated. They only knew they had to discard unwanted waste. However, discarding things became a problem, and some of them were not waste” (A11).

The beginning of waste was from the communities. People living on both islands separate waste into 2 types: wet and dry waste. Wet waste is easily decomposed things such as leaves, wood sticks, and leftovers from food, and dry waste is difficult-to-decompose things such as plastic bags, plastic bottles, and diapers, which are not managed and clearly separated. Therefore, it could be concluded that the perspectives on marine debris management could be described into 2 types: internal and external marine debris management perspectives (Figure 3).

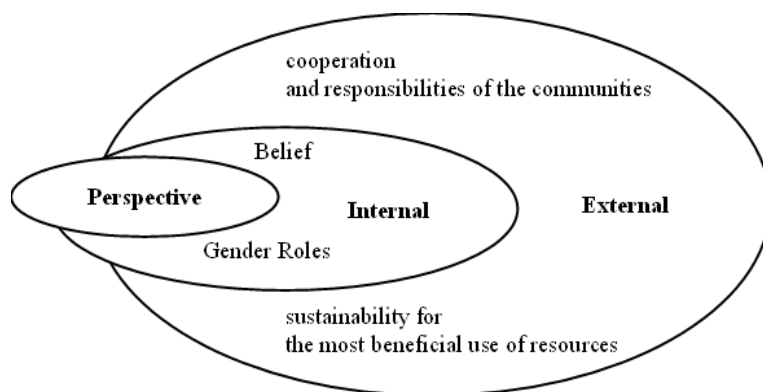


Figure 3. Local Perspectives on Marine Debris Management (Source: This figure is produced purposely for only this research article)

1. The internal perspectives came from previous experiences, knowledge, attitudes or beliefs, which could affect behavioral changes in the waste management. These perspectives took a lot of time and were not immediately changeable per the following details.

Perspectives on beliefs: It was found that nearly all of the people living on the two islands are Muslims who have faith and beliefs related to environmental management according to their religious regulations taught by imams or religious leaders. Men are mostly the leaders on beliefs and transfer their beliefs to family and community members from youth onwards. One man said. *“In my religion, it is emphasized that cleanness is part of faith and embedded since a long time ago”* (A16). Another said *“people were taught since they were kids, and they acknowledged what they learnt. However, when they grew up, they were not taught, and they did not know any more”* (A13).

Nevertheless, it was found that there is a gap by age group in the religious beliefs and in marine debris management. When children grew up to be adolescents, the activities related to their beliefs were not passed on, including other traditional activities, resulting in changes in customs from one generation to another generation.

Perspectives on gender roles: The findings showed that on both islands, men are focused to be religious leaders, but women are mostly the people who are the leaders in waste management. One person said *“mosques are the places where gathering takes place on Friday. Most of the people going there are men. In fact, men’s responsibilities are fewer than women’s because men mostly work as farmers and fishers. Therefore, they are not aware of waste, similarly to men going to mosques, while women work on this waste management. In addition, due to the religion and the cultures, men are considered important and leading people, but women are not”* (A12).

2. The external perspectives were related to the internal perspectives, but they were more obvious for actions which were in the same directions and repeated. This might be altered depending on changing environment as per the following details.

Perspectives on cooperation and responsibilities of the communities

The results revealed that in Area B, the operation of the community’s tourism management was induced by cooperation of people on the island and tourists, mutually agreeing to have ‘Mariam’, a six-month dugong found in Ao Nang Subdistrict, Mueang District, Krabi Province, raised at Libong island which is rich in seagrass. This dugong was also a valuable symbol influencing Anthropogenic Marine Debris afterwards. One villager said *“it has been 8 or 10 years now that everything working on this matter has shown the effects and feedback. More dugongs have moved to live near the community, the conservation has been better, and the people in the community have had more awareness. There have been many meetings, the first of which caused by the Mariam matter, and associations founded for various responsibilities”* (A18).

In addition, marine anthropogenic debris has been dealt with. At first, this management was naturally carried out by leaders who love and value their hometowns, resulting in gathering people, who had the same ideas, into a group called ‘Du Yong Volunteer’. After that the management of the anthropogenic marine debris was more straightforward.

Perspectives on sustainability for the most beneficial use of resources

The results indicated that on both islands the community-based tourism has been operated by designing products and services which are dependent on resources and social capital in the communities, such as food made from local natural resources. In Area A, Sangyod rice farming has been established to support consumption in the area, and for sale as a community product, while in Area B almost all of the people mainly have fishing related jobs. However, it was found that fishing in both areas has been changed, and fishing tools, which could become anthropogenic marine debris, such as squid and crab nets or cages, have been made from foam and plastic bags with bamboo as the main component. Community-based tourism gives people extra jobs, apart from their social capital in the communities. However, due to the limitation of geography, adjustment to tourism activities on the islands, and transportation, sidecars called ‘Saleng’ are the main vehicles for travel and transport on the islands, connecting with ships to and from the mainland. There have been vehicles from a recycling and waste exchange center at the port in the mainland. Saleng is designed to have a special body enabling access to difficult areas where trucks run by local government organizations cannot operate. One villager was interviewed:

“I use an excavator to dig a hole to burn unwanted waste because the truck by Subdistrict Administrative Organizations cannot enter this area. Some waste that cannot burn is waiting for Saleng to be sold” (A11).

In fact, debris collectors can access households by contacting their relatives and by word-of-mouth communication, so debris collection with these sidecars is enabled by the people’s cooperation. One interviewee said:

“relatives help one another. One of my relatives came to ask me if I have some broken TV or telephones to sell, and he is responsible for this matter and ask other relatives” (A04).

DISCUSSION

The management of marine debris in the communities has been tied with social capital, but it was influenced by growth of the economy and the society. Moreover, the expansion of the communities has affected increases in anthropogenic marine debris (Alisha et al., 2020). Due to the economy and the society, which have to rely on the abundant nature, people on the islands earn their living by local fishing, and their economic status has been better. However, their traditional ways of fishing to live in harmony with the nature have been altered. For example, their fishing tools have been modified, resulting in increases in anthropogenic marine debris. In terms of their social life, their lives are still related to their religion, so people have been in harmony and thought that cleanness is part of their faith. Regarding gender roles, most of the men are leaders of beliefs, and their society has still tied the gender status of men beyond women. Therefore, the regulations of waste management in the communities have been followed only at the level of households. In contrast, women are the leaders of marine debris management in the communities because of their studies, their family power, spouse status, economic power, or their personal abilities (Thammachart et al., 2023).

Nevertheless, the reasons why women are leaders in managing waste are about their maternity, which gives a role in taking care and in concern for the environment and negative health impacts, and more women usually pay attention to the natural environment than men (Slavin et al., 2012). Therefore, factors of economy, culture, and institutes importantly affect the internal perspectives on marine debris management (Nigam and Sainy, 2024).

The external perspectives included perspectives on cooperation and responsibilities of the communities, which were necessarily to the same direction as in the island areas. A study by Budiman and Jaelani (2023) stated that a waste bank is one way to manage community waste in Lombok, Indonesia, and the community carried out sustainable development for the environment, economy, and society. However, the results of the operation showed that the facilities for waste management, types of activities or programs related to sustainability, and leadership, were considered factors highly affecting participation by the local communities in their waste management. This was relevant to a study of waste management in the refugee camp, Gaza Strip, revealing problems of insufficient infrastructure, insufficient landfills for increasing waste, and impacted refugees. It could be assumed that correct garbage disposal could support good health, although the challenging management by the refugees was operated by giving away, throwing away, and selling their items (Salem et al., 2020). Regarding the perspectives on sustainability for the most beneficial use of resources, tourism can be sustained together with waste management. The economic process and policies related to biological resources covering the beginning, the midway, and the ending steps of production, use, and conservation of bio-products and services or bio-economy should be emphasized in order to decide marketing strategies and the most beneficial use of resources. The research results by Alazzam et al. (2023) showed that development of bio-economy depended on suitable production components and management among efficient sectors for production organizations in the area and social participation. Similarly, the study results by Adimas et al. (2023) revealed that the operation of green marketing or sustainable marketing was still of interest in research by academics and experts across the world.

In addition, it was found that the sustainable waste management has been a goal of each society, but mostly it was not appropriately designed or controlled. However, it could be seen that trends of ideas and awareness of environmental impacts by manmade activities and desire for energy and materials have been increasing. Therefore, perspectives on waste have been changed, such as use of recycled waste for energy and materials, bioplastic production from agricultural crops as environmentally friendly products which can decompose quickly, especially in developed regions such as Europe, the United States, and Japan. However, waste management has been progressing gradually (Castaldi, 2014; Singh and Verma, 2017), and it could give opportunities for innovation and tourism development for sustainability (Al-Azzam et al., 2024; Ahmad et al., 2022; Răpă et al., 2024; Kaihatu et al., 2024). In this study, the perspectives on marine debris management can be used to design perspectives on internal and external waste management to make it effective.

They can also be useful for policy development or long-term waste management plans, which have to understand internal perspectives of beliefs and the conative for sustainability. As a limitation of this study, due to the particular study areas and purposive operation, the results may not generalize to other areas. Therefore, further case studies should be conducted in order to understand particular local characters, and to develop sustainable tourism management.

CONCLUSION

This study was carried out to understand marine debris management in two island areas, in a case study of Andaman Islands, Thailand. Nearly all the people on the islands are Muslims, so most of their traditions are related to their religion. People on the islands know one another because of their relationships. Local fishing is the main employer on the islands, and some local people operate community-based tourism. Their marine debris management depends on the tourism season from November to April. The perspectives on marine debris management for sustainable tourism could be described in two main aspects and four minor aspects. The internal perspectives included beliefs and gender roles; the external perspectives were composed of the cooperation and responsibilities of the communities, and sustainability for the most beneficial use of resources. However, the perspectives on marine debris management in this study are tied to locality, also depending on the social conditions. Therefore, further case studies should be conducted in order to understand particular local characters, and to develop sustainable tourism management with existing re sources.

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