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Analyses of entrance fees on waste problem
in Koh Larn, Thailand

(タイ ラン島のゴミ問題における入島税の多角的分析)

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1 Introduction

1.1 A concept of Sustainable Tourism

Tourism is a one of the world's largest economic sectors and generates prosperity across the world. While the global economy grew by 3.2%, tourism grew significantly more at 3.9% in 2018. Tourism accounted for 8.8trillion USD, or 10.4% of global GDP and it also created 320million jobs, or 10% of total employment in 2018 (WTTC, 2019a). Tourism is a special sector which can contribute to sustainable development and its challenges because development of tourism not only greatly contributes to economic growth or creating employment, but also connection tool between various stakeholders such as visitors, the industry, environment and local communities (UNEP, UNWTO, 2005).

The concept of "Sustainable development" has been spread across the world since World Commission on Environment and Development used it in 1987. Based on this, the concept of "Sustainable tourism" was generated in 2004. The World Tourism Organization (UNWTO) defines sustainable tourism as *"Tourism that takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities"*¹.

As a principle of sustainability, UNWTO solicits the balance between environment, economy and socio-cultural aspects of tourism development. It seeks to guarantee its long-term sustainability through three dimensions as illustrated in **Table 1**.

Table 1 Three dimensions for sustainable tourism

- | |
|---|
| <ol style="list-style-type: none">1) Make optimal use of environmental resources that constitute a key element in tourism development, maintaining essential ecological processes and helping to conserve natural heritage and biodiversity.2) Respect the socio-cultural authenticity of host communities, conserve their built and living cultural heritage and traditional values, and contribute to inter-cultural understanding and tolerance.3) Ensure viable, long-term economic operations, providing socio-economic benefits to all stakeholders that are fairly distributed, including stable employment and income-earning opportunities and social services to host communities, and contributing to poverty alleviation. |
|---|

UNWTO HP²

¹ UNWTO HP (accessed 2019-11-16)

² *Ibid.*

United Nations declared 2017 as the International Year of Sustainable Tourism in order to aim to change of policies, business practices and consumer behavior toward sustainable tourism which can contribute toward attainment of the SDGs³. UNWTO shows five key areas for sustainable development, ① Inclusive and sustainable economic growth, ② Social inclusiveness, employment and poverty reduction, ③ Resource efficiency, environmental protection and climate change, ④ Cultural values, diversity and heritage, ⑤ Mutual understanding, peace and security, and shows relations to almost all goals of SDGs (UNWTO, 2018a).



Figure 1 Tourism and SDGs⁴

1.2 Overtourism and environmental issues

While tourism sector is globally developed, the word “Overtourism” or “Mass tourism” are significantly reported over the world.

The word “Overtourism” has been used since 2016 and some definitions are provided. UNWTO (2018b) defined it as “*the impact of tourism on a destination, or parts thereof, that excessively influences perceived quality of life of citizens and/or quality of visitors experiences in a negative way*”. UNWTO (2018b) also defined Carrying capacity as “*the maximum number of people that may visit a tourist destination at the same time, without causing destruction of the physical, economic, and sociocultural environment and an unacceptable decrease in the quality of visitors’ satisfaction*” and overtourism means that so many visitors pour into the destination such that it exceeds the carrying capacity of the destination.

Several problems have been reported in tourist destinations over the world such as mass,

³ UNWTO “International Year of Sustainable Tourism” official site (accessed 2019-11-16)

⁴ UNWTO HP (accessed 2019-11-16)

traffic jam and lack of toilets, noise, waste problem and environmental destruction. In 2018, the closure of two Asian famous beach resorts, Phi-Phi Island in Thailand and Boracay Island in Philippines shocked the world. The reasons of closure were environmental problems which had been caused by overtourism.

In Phi-Phi island, the number of tourists had increased rapidly because of that it was chosen as the site of a movie “*THE BEACH*”, starred by Leonard Dicaprio. Thereby, environmental issues such as waste problem and destruction of coral reefs by the boats which tourists take on became serious. Government announced that it has decided to close Maya beach of Phi-Phi Island until 2021 for environmental recovery and conservation.

In Boracay Island, serious environmental issues had been actualized including ocean and beach pollution or waste problem as a result of overtourism after being selected as the world’s No.1 tourist destination in the US travel magazine “Travel & Leisure” in 2012. Philippine President Rodrigo Duterte warned about the environmental damage of this island and described Boracay as a “cesspool”. He also prohibited tourists from entering Boracay Island for approximately six months in 2018 (CNN Philippine, 2018).

Similar to these two cases, various environmental issues such as waste problem, disruption of the ecosystem and sea water pollution have also been reported in beach resorts all over the world. Especially on isolated islands and beaches in developing countries, there are many cases where appropriate solutions, such as waste management systems and treatment plants, are not in place due to the local government’s economic and legal restrictions. As a case that has attracted attentions in recent years, I would like to focus on Koh Larn, Thailand.

Koh Larn is one of the popular beach resorts in Thailand and attracts about 10,000 tourists a day. As the number of tourists increases, the amount of waste generation also increases with no appropriate solid waste management system in Koh Larn. The waste generated in this island is accumulated at an unofficial dumping site and its total amount is estimated to be about 50,000 tons. However, so far, the government has not enforced any specific solutions. Because about 2,800 residents are living in Koh Larn and almost all residents make a living from the tourism industry, the solutions for sustainable tourism which guarantees not only environmental aspects but local residents’ economy are required.

1.3 Objective and importance

Objective of this study is analyzing the effectiveness of entrance fees as the sustainable solution which can contribute to reduce overtourism and waste problem in Koh Larn, Thailand. Entrance fees on tourists have roles of restricting excessive entrance of tourists and enabling long-term investment to solid management system like incinerator. Therefore, this study aims to calculate the appropriate price of entrance fees using data form Contingent

Valuation Method (CVM) questionnaire which was administered to tourists and estimated its effects on tax revenue and the amount of waste. Besides, I consider how entrance fees can be introduced by analyzing residents' attitude toward entrance fees using data of questionnaires administered to local residents.

This study contributes to proposing some specific solutions for the waste problem in Koh Larn which currently has no specific policy with fewer existing literature. Furthermore, although there are many studies using CVM to estimate optimal entrance fees, few comprehensive analyses that includes surveys of residents' attitude toward the introduction of entrance fees as this study. As indicated in the concept of Sustainable Tourism, environmental policies need to be designed with respect to the social and economic aspects of the local community that accepts tourists. Therefore, this study, which includes analysis of residents' consciousness in introducing entrance fees is significant, and it contributes in portraying how sustainable tourism in not only Koh Larn but in developing countries can be realized.

1.4 Construction of this paper

In section 1, I overviewed the growth of the global tourism industry and UNWTO's view on the concept of "Sustainable tourism" and its implications for the SDGs. While the tourism industry is growing globally, adverse effects such as environment and social problems are caused by excessive congestion called "Overtourism" in various destinations across the world. Especially in beach resorts in Asia, various environmental issues such as waste problem, disruption of the ecosystem and sea water pollution which are caused by overtourism have been reported. I focused on Koh Larn, one of the famous Thai beach resorts, and mentioned about objectives and importance of my research on introduction of entrance fees in Koh Larn as a solution of waste problem.

In section 2, I overview about tourism industry that drives Thailand economy and society, and about overtourism and environmental problem of national parks in Thailand. Besides, I study on tourism and waste problem in Koh Larn by analyzing results of hearing survey and previous researches, and consider about measures to reduce these problems. Furthermore, I estimate the amount of waste generation per one tourist. I summarize the cases of introduction of entrance fees that aim to reduce overtourism or environmental conservation in the world and in Thai national parks.

In section 3, I analyze on awareness of tourists and residents toward entrance fees in Koh Larn. I conducted field surveys in Koh Larn on Feb. 2019 and Sep. 2019. Based on the results of questionnaire which was administered to tourists, I calculate optimal entrance fees using Contingent Valuation Method (CVM), and estimate the impact on tax revenue and total waste

generation. On the other hand, based on the results of questionnaire which was administered to local residents, I analyze residents' awareness toward the waste problem and residents' pros and cons of introducing of entrance fees. In addition, I clarify what measures are appropriate for obtaining the residents' consent to introduce the entrance fees by comparing the pros and cons of the residents with their personal attributes using multiple regression analysis.

In section 4, as a conclusion, I propose the effectiveness of entrance fees and how entrance fees can be introduced as the sustainable solution which can contribute to reduce overtourism and waste problem in Koh Larn

2 Tourism and environmental issues in Koh Larn, Thailand

2.1 Tourism of Thailand

Thailand is the No.1 tourism-oriented country in South East Asia. According to World Travel & Tourism Council (WTTC)(2019b), tourism generated 3,538.7 billion THB,109.5 billion USD, which totally contributed to 21.6% of total GDP and it is forecast to contribute to 28.2%. Tourism GDP growth rate in 2018 from 2017 was 6.0% and it was the fourth highest growth rate in the world following China, India and Turkey (WTTC, 2019c). Furthermore, total International spending in 2018 was 80.2%, it is the highest rate among the top 15 countries whose tourism GDP is high in the world. Tourism sector created 5.9million jobs, 15.9% of total employment in 2018 and is expected to create 8.2million jobs (2019b). Therefore, tourism is an important industry that drives Thailand economy and society.

On July 2019, the Tourism Authority of Thailand (TAT) announced the agenda which makes tourism sector the kingdom's most economically promising, environmentally sustainable, and culturally vibrant sector to mark its 60th anniversary in 2020. They set ambitious targets for 2020 to boost tourism revenues by 10%. In implementing this agenda, they highlighted the importance of responsible tourism and set directions to move the Thai tourism out of overtourism and toward responsible tourism concentrating on revenue-generating quality tourists (TAT, 2019a).

Thai government is promoting not only tourism development but also sustainable tourism at the nation level, for example, with regards to tourism-related waste, TAT has set the goal to reduce it by 50% by 2020 (TAT news, 2019b).

2.2 Environmental issues of beach resort in Thailand

In recent years, beach resorts in Thailand are facing problems such as waste problem and the destruction of ecosystems like coral reefs and as a result, there is growing skepticism that tourists may be less interested or satisfied to visit these areas.

In 2018, the Department of National Park, Wildlife and Plant Conservation (DNP) announced that they close Maya beach of Phi-Phi island, which is the most popular Thai beach until 2021. Specialists of environment and authorities have warned that overtourism caused irreparable damage to the beach landscape and tourism-related waste and unplanned development destroyed island's ecosystem. Phi-Phi Island is the location for the movie "*The Beach*", and the number of tourists increased after the movie was released in 2000. As many as 4,000 tourists visit the island a day, and environmental problems such as waste problem and coral reef damage which is caused by the innumerable arrival and departure of boats carrying tourists, are becoming increasingly worrisome.

The environmental damages caused by tourism development in Thailand is not limited only to in Phi-Phi Island, but more than 15 islands and beaches designated as national parks have been temporarily closed for environmental conservation as of May 2018 (Thaizer, 2018). Thai government has started collecting entrance fees for nature parks as a nature conservation fund since 2017, and has been taking measures to prevent smoking at 24 beaches in fifteen provinces since 2018 by enforcing of the smoking cessation law (The Telegraph, 2018). However, there are still islands and beaches that have to be closed due to an increase in the number of tourists exceeding expectations and environmental pollution. Therefore, regulation policies such as limiting the number of tourists, are now under consideration.

Especially on popular isolated islands and beaches in Thailand, there are many cases where appropriate waste management systems and treatment plants are not in place. In Krabi Island, a popular beach resort, for example, only 44% of the total amount of waste generation is properly treated, and the rest is left in the waste dump or incinerated inappropriately. In Chiang Rai, its popularity is increasing recently, but only 58% of waste is collected and only 22% is properly treated (Mae, 2018).

2.3 Tourism of Koh Larn

Koh Larn is an isolated island in Pattaya City, Chonburi Province, next to Bangkok and located 7 km away from Pattaya Beach. Because Pattaya is 147km away, only 2 hours by car, from Bangkok, Koh Larn attracts both lots of Thai and foreign tourists every day. The main industry is tourism, and the population is about 2,800 (in 2016)⁵. Although it is a small island, whose area is about 5.6km², it has six beautiful beaches and as many as 10,000 tourists visit there a day. However, a survey by the Silpakorn University teams indicated the maximum capacity of Koh Larn is 6,410 tourists per day, therefore, various environmental problems have become apparent due to an excessive increase in tourists (Bangkok Post, 2018).

⁵ PIC Pattaya City Information Center (accessed 2019-11-16)



Figure 2 Beautiful beach in Koh Larn

Taken by the author on Feb. 2019

2.4 Waste problem in Koh Larn

In recent years, the waste problem has become serious due to the rapid increase in tourists. The average amount of waste generation on the island is about 25 tons per day, and the amount of waste that cannot be treated and is being accumulated on one dumping site is over 50,000 tons (Bangkok Post 2018). If this condition is left untreated with no serious measures taken, it may lead to soil erosion of pollutants, marine pollution, health hazards by odors and chemicals, and fires. According to a report of Pollution Control Department of Thailand (PCD) (2019), Koh Larn has no landfill site authorized by the government and even on the map, the site where 50,000 tons of waste is dumped is described as “park”. This actually means that the local government is allowing illegal dumping.



Figure 3 Dumping site

Taken by the author on Sep. 2019

There are a wide variety of different types of waste that are dumped, such as raw garbage, plastic products, and building materials and according to the Pattaya authorities, most of them are tourism-related waste (Thaivisa 2018). However, statistical data on the amount and contents of waste of Koh Larn is not publicly available and it is difficult to obtain it. Therefore, this study estimated the amount of tourism-related waste and is illustrated in **Table 2**. I used the amount of waste generation per capita per day in Thailand⁶ as the emission factor for waste a day by local residents. As a result of estimation, the total amount of waste generation from local residents is 3.2 tons a day, therefore, the amount of tourism-related waste estimated 21.8 tons a day in Koh Larn. The waste generation per one tourist is estimated at 2.2kg a day.

Table 2 Estimation of the amount of waste from tourism in Koh Larn

Average total waste generation/day		
25t		
#Residents	Emission factor of residents/day (average of Thailand)	Total generation from residents/day (#residents*emission factor)
2,800	1.13kg	3.2t
Tourism-related generation/day (total waste generation-generation from residents)	Average #tourists/day	Emission factor of tourists/day (tourism-related generation /average #tourists)
21.8t	10,000人	2.2kg

Created based on Bangkok Post (2018), UNCRD (2019), PIC Pattaya City Information Center⁷

So far, no concrete solutions have yet been implemented for the waste problem due to the local government's economic and legal restrictions. Only plastic bottles were collected at various locations on the island, including the dumping site and beaches. According to an interview to managers of the dumping site, PET bottles are collected and then sold and transported to recycling sites outside the island.

⁶ UNCRD (2019)

⁷ PIC Pattaya City Information Center (accessed 2019-11-16)



Figure 4 Plastic bottles collection at the beach

Taken by the author on Sep. 2019

Table 3 summarizes potential solutions and pros and cons of each solutions for waste problem in Koh Larn.

Table 3 Potential solutions and Pros and Cons

	Solutions	Pros and Cons
Control of Generation	Closure	It will cause unemployment of local residents.
	Limitation of # tourists	It is rare to go directly to limiting the number of tourists without trying the alternative measures .
	Entrance fees	It can control the number of tourists and to enable securing tax revenue.
	Restriction of plastic products	There will be no significant change in overall emissions .
Manage	Landfill	It exceeds the permissible amount, and there is concern that soil contamination and sewage inflow into the seawater will occur.
	Incinerator	The city was considering purchasing an incinerator, though many residents were against due to the air pollution this would cause.
	Transfer	A law passed in 2017 prohibits waste transfer.

Potential measures related to this waste problem are classified into measures to reduce the amount of waste generated and measures to appropriately manage the generated waste. The former measures include closure, restriction of the number of tourists, entrance fees, and restriction of plastic products.

The Department of National Park, Wildlife and Plant Conservation (DNP) have closed down the Maya Bay in Phi-Phi Island and restricted the entry of tourists as a measure to solve

the environmental problems caused by overtourism. Closure or restriction of tourists like this case is used in some national parks or beaches, however, it may cause unemployment in Koh Larn because most residents make a living from the tourism sector. In fact, when the Boracay Island was closed, Government was criticized for fear of unemployment of more than 30,000 people working in the tourism sector (TIME, 2018). Besides, although temporary closure is effective in temporarily reducing wastes and restoring the nature such as coral reefs, it will not be a fundamental solution since the island will return to its previous state when entry is reopened.

Although direct regulation such as limiting the number of tourists is effective, it must be accompanied by work to explain the necessity of regulation and difficulty of alternative measures and the burden on the management side, such as advance reservation procedures, which makes it cumbersome. Therefore, it is rare to go directly to limiting the number of tourists without trying the alternative measures (Takasaka, 2019). Measures being taken on other islands include the prohibition of bringing in plastic bottles, plastic bags, plastic containers and the prohibition of providing them on the island. However, plastic products such as PET bottles are collected to some extent on Koh Larn, and it will be estimated that there will be no significant change in overall emissions even if plastic products are restricted.

On the other hand, management methods of waste generation include landfills, incinerator, and transfer to other local governments such as Pattaya City. However, landfill exceeds the permissible amount, and there is concern that soil contamination and sewage inflow into the seawater will occur. There has been strong opposition from the residents with regards to the construction of an incinerator with some reasons the generation of smoke and bad smell. Because if this, no agreement has been reached. (Coconuts Bangkok, 2019). Although, waste generated on Koh Larn had been transported to Pattaya City by approximately 35 tons daily until 2016 (Bangkok Past, 2016), a law enforced in 2017⁸ banned the disposal of waste on other municipalities. Therefore, waste generated on the island must be disposed of on the island (Coconuts Bangkok, 2019).

Currently, Pattaya City has been considering introducing entrance fees on Koh Larn to address above issues (The Pattaya News, 2018). Although no specific proposal of the amount of entrance fees is given, it is hoped that the number of tourists will be properly controlled by the entrance fees and that the cost of countermeasures will be obtained.

Summarizing the above considerations, in the short term, it is necessary to control the number of tourists and obtain tax revenues through entrance fees, and to use the tax revenues to construct an incineration facility with less smoke and smell in the future.

⁸Ministry of Interior of Thailand (2017)

To study incineration facilities on resort islands, JICA (2018) has conducted a feasibility study on a waste treatment system using a next-generation pyrolysis furnace in Maldives. JICA has proposed the installation of a waste treatment device called ERCM (Earth Resource Ceramic Machine) in the resort island which does not have incinerators. Due to the increase in waste generation by population growth, tourism development and increase in tourists, waste is being dumped in marine water or burnt openly. ERCM is capable of treating relatively small amounts of waste at a low cost, and is characterized by the absence of smoke and odor and the elimination of extensive equipment maintenance. It is said that it is possible to adapt to resort islands or small inhabited islands in which the amount of waste generation is small. This technology is expected to be applicable to Koh Larn, which generates approximately 25 tons of waste per day, less than cities.

The introduction of entrance fees will not only reduce overtourism and consequently reducing the amount of waste, but will also contribute to the introduction and maintenance costs of such technologies to create a sustainable waste management system on the island. Therefore, this study conducts analyses focusing on introducing of entrance fees in Koh Larn.

The main purpose of this study is to analyze the effect of entrance fees on controlling the number of tourists. Entrance fees have roles of reducing the number of entrants by imposing fees to tourists, and of having tourists share a part of conservation costs by using the revenue from entrance fees for environmental measures (Kuriyama, 2015). Currently, Koh Larn attracts by an average of 10,000 tourists a day, but a research by the Silpakorn University, a local university, research has shown that the sustainable capacity number of tourists on Koh Larn is about 6,400 a day (Bangkok Post, 2018). The introduction of entrance fees will contribute to both the control of such the excessive number of tourists and the acquisition of costs for waste disposal measures.

2.5 Overtourism and entrance fees

In response to overtourism and environmental issues, some tourist destinations have introduced tourism taxes or entrance fees. Imposing a fee on tourists is an effective way to balance the tourism demand and supply, and raising prices can limit the number of tourists. In addition, pricing is one of the most efficient ways to invest in long-term and sustainable tourism. On the other hand, it is also problematic since it may deprive those who cannot pay of the right to tourism, so it is important to carefully set prices in coordination with all stakeholders related to the tourist destination (McKinsey & Company, WTTC, 2017 p.46).

Table 4 shows the cases of entrance fees in Japan and other countries.

Table 4 Cases of entrance fees in Japan and other countries⁹

Place	Division	Force	Target and amount of EF	Practitioner	Problems	Purpose
Mt. Fuji	Climbing fee (Cooperation fee)	×	Climbers from the fifth station JPY 1,000	Shizuoka Prefecture Tourism department, Yamanashi prefecture Tourism department	<ul style="list-style-type: none"> • Congestion • Lack of toilets • Waste problem • Environmental destruction 	<ul style="list-style-type: none"> • Conservation of the mountain's environment • To safety climbers' safety • Providing information on the value of Mt.Fuji
Yakushima Island	Climbing fee (Cooperation fee)	×	Climbers (above junior high school age) For a day: JPY 1000 For more than one day: JPY 2000	Yakushima Mountain Environmental Management Council etc.	<ul style="list-style-type: none"> • Congestion • Lack of toilets • Deterioration of mountain trails • Environmental destruction 	<ul style="list-style-type: none"> • Maintaining the mountain outhouses • Inspection and minor repairs on the mountain trails and trolley railroad • Programs and activities related to mountain safety. • Conservation of the mountain's environment
Taketomijima Island	Entrance fee (Cooperation fee)	×	Visitors JPY 300	Taketomi City	<ul style="list-style-type: none"> • Congestion • Overexploitation 	<ul style="list-style-type: none"> • For preserving traditional Okinawa's culture, nature, rituals and customs, handmade craft, streets
Iheya Village	Environmental cooperation tax	○	All arrivers (except below high school age and those with disabilities) JPY 100	Iheya village	<ul style="list-style-type: none"> • Reduction of tourists ※not by overtourism 	<ul style="list-style-type: none"> • Beautifying the environment • Environmental conservation • The maintenance of tourists facilities
Himalaya Mt. Everest (Nepal)	Climbing fee	○	Foreign climbers: USD 11,000 Nepali climbers: Rs 75,000 ※Depend on the season of travel	The Nepalese government	<ul style="list-style-type: none"> • Congestion • Distress/ accidents caused by congestion • Waste problem • Excrement problem 	<ul style="list-style-type: none"> • To control the number of climbers • Environmental conservation
Venezia (Italy) ※from 2020	Tourist tax	○	Visitors USD 7-USD 11 ※Depend on the season of travel	The Venezia City government	<ul style="list-style-type: none"> • Congestion • Waste problem • Deterioration of residents' living environment • Infrastructure malfunction • Fishery damage 	<ul style="list-style-type: none"> • To better manage the city, keep it clean, and offer visitors better services • Improvement of residents' living condition
Republic of Palau	Environmental Fee	○	Visitors USD 100	The Republic of Palau government	<ul style="list-style-type: none"> • Environmental destruction • Water & air pollution • Change of living environment and culture of residents 	<ul style="list-style-type: none"> • Environmental conservation • Maintenance, and improvement of the Palau International Airport
Galapagos Islands (Ecuador)	National Park Entrance fee	○	•Foreign tourists adult: USD 100 child: USD 50 •Ecuadorian nationals adult: USD 6 child: USD 3	The Ecuadorian government	<ul style="list-style-type: none"> • Congestion • Environmental destruction • Waste problem • Water pollution • Deterioration of residents' living environment 	<ul style="list-style-type: none"> • To finance the conservation of biodiversity in the islands • For the local community by improving basic services, education projects, sports, health, environmental sanitation, environmental services and services directly related to tourists

In Japan, interest in introducing of entrance fees has been increasing in various destinations since a cooperation fee had been introduced at Mt. Fuji in 2014. The number of climbers of Mt. Fuji has increased due to its recognition as a World Heritage Site. In order to ensure

⁹ Created based on Kyoto University *et al.* (2016), Taketomi Tourist Association HP, Yakushima island official site, Galapagos Islands.com, Embassy of the Republic of Palau HP, CNN (2019), Kohsaka (2019), Iheya Village Environmental Cooperation Tax Ordinance (2008)

safety, preserve the environment and control the number of visitors who climb the mountain, a voluntary cooperation fee has been set at 1,000 yen. However, according to an analysis on Mt. Fuji using the travel cost method by Kuriyama (2013), it is suggested that when the amount of cooperation fee is 1,000 yen, the effect of suppressing climbers is only 4%, and it is necessary to set it to 10,000 yen in order to suppress the number of climbers. Further, since the payment of this fee is voluntary, the current collection rate is only about 50%, and the effect of restraining tourists is extremely low.

In Yakushima Island, cooperation fees to climbers have been introduced to address congestion or toilet problems associated with the increase in tourists in 2016. In Taketomi Island, island-entrance fees have been introduced for the first time in Japan in 2019 as a response to the increase in domestic and foreign tourists and overexploitation. Both Yakushima Island and Taketomi Island have introduced entrance fees in the form of voluntary cooperation fees.

Some places in Japan have enforceable cooperation taxes. Iheya Village in Okinawa Prefecture, for example, imposes an environmental cooperation tax to cover the costs required for environmental protection and maintenance of tourist facilities. All person who enter there except those with disabilities and below high school age are charged 100 yen per entry. However, in the case of Iheya Village, the set amount is as small as 100 yen because it is not for the purpose of regulating the number of tourists, but rather for the purpose of obtaining tax revenues for improving the environment for tourism promotion.

On the other hand, in other overseas countries, there are many cases where entry fees are collected in the form of a mandatory tax. Palau and the Galapagos Islands have a relatively high entrance fees of \$ 100 and as a result, high-quality tourism specialized for specific tourist groups has been realized. Also, in Venice, Italy, the increase in tourists has led to concerns about waste problems, dysfunction in the transportation infrastructure, and deterioration of the living environment of local residents, and the entrance fees is scheduled to be introduced by July 2020. Mt. Everest imposed climbers a high mountain entry fee of \$ 25,000 until 2014. However, since the entrance fees was significantly reduced to \$ 11,000 in 2015, the number of climbers and climbing permits issued in 2019 was the highest ever, and that led to various problems such as congestion and accidents (AFP, 2019). It can be said that this is the case where the entrance fee affects the number of tourists.

As of 2019, there are 127 national parks in Thailand, of which 22 are marine national parks, including beaches and isolated islands. **Table 5** shows examples of entrance fees of beach resorts designated as a national park in Thailand.

Table 5 Cases of entrance fees of national park Island in Thailand

Island name	Force	Target and the amount of EF
Koh Samet	○	Foreigner : adult 200THB child 100THB Thai : adult 40THB child 20THB
Koh Chang	○	Foreigner : adult 200THB child 100THB Thai : adult 40THB child 20THB
Koh Hong	○	Foreigner : adult 300THB child 200THB Thai : adult 60THB child 30THB
Koh Phi Phi, Maya bay	○	Koh Phi Phi : 20THB Maya Bay : Foreigner : adult 400THB child 200THB Thai : adult 40THB child 20THB Scuba diving tax : 200THB
Koh Similan	○	Foreigner : adult 500THB child 300THB Thai : adult 100THB child 50THB Scuba diving tax : 200THB

Created based on Thai National Parks official site

The Department of National Park, Wildlife and Plant Conservation (DNP) manages national parks in Thailand and collects entrance fees at almost all national parks for the purpose of environmental protection, and in 2015, it has increased the amount of entrance fees due to a large increase in tourists¹⁰. In each area, the foreigner's fee is set at about five times the price of Thais. Fees for foreigners vary from place to place, from 200 baht on Koh Samet or Koh Chang to 500 baht on Koh Similan. On Koh Phi-Phi, although the amount of entrance fees is 20 Baht, when entering the Maya Bay, where overtourism and environmental destruction occurred, an additional 400 Baht is imposed, and when diving, 200 Baht diving tax is added. Maya Bay has been closed since 2018. Entrance fees of Koh Similan is set at 500 baht, the highest of all beaches, and additional diving tax will be added when diving. Diving taxes are aimed at protecting and conserving marine ecosystems such as coral reefs.

¹⁰ Thai National Parks official site (accessed 2019-11-16)

3 Analyses on awareness of tourists and residents toward entrance fees

3.1 Analysis of optimal entrance fees using CVM: Survey to tourists

3.1.1 About survey

Contingent valuation method (CVM) is often used to estimate appropriate amount of entrance fees. In this chapter, I estimated the appropriate amount of entrance fees of Koh Larn using CVM questionnaire which was administered to tourists and analyzed its effect on the number of tourists and total revenue of entrance fees.

I conducted a face-to-face questionnaire survey to tourists in Koh Larn on Feb. 2019. In Pattaya, February is the dry season, with relatively little rainfall and stable climate, and it is the best season for tourism. This survey was conducted on 54 men and women between the ages of 18 and 70, covering 16 nationalities. I asked randomly a questionnaire for tourists on the beach in Koh Larn and got answers. The language used in the questionnaire was English and it was conducted using a tablet.

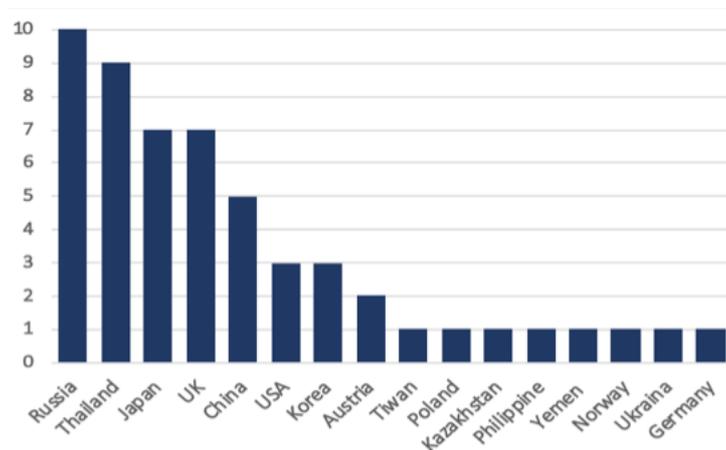


Figure 5 Respondents' nationality

3.1.2 Descriptive statistics of tourists

The followings are the results of inquiries about tourists' perceptions of environmental issues and overtourism on Koh Larn.

Did you face any environmental problems during your stay at Larn Island?

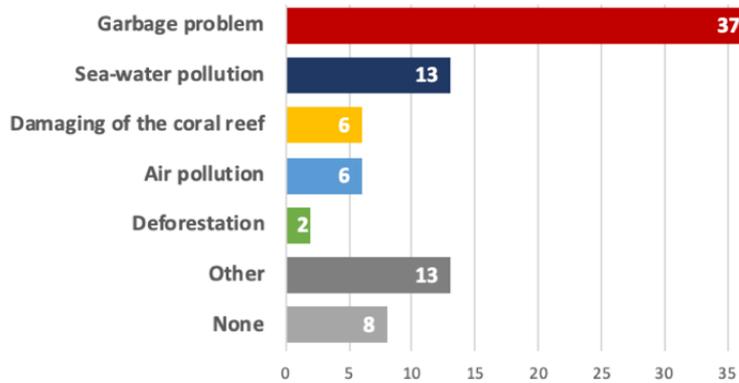


Figure 6 Environmental issues which tourists faced in Koh Larn

Do you think that there are too many tourists on this Island?

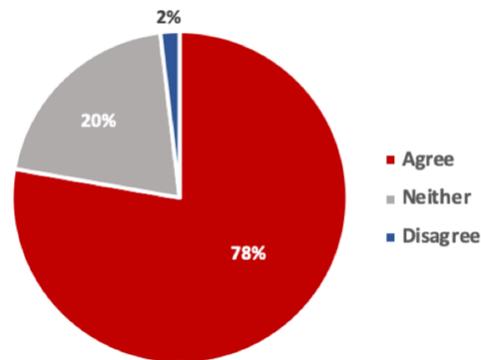


Figure 7 Tourists' realization of overtourism in Koh Larn

Figure 6 and **Figure 7** indicate that 69% of tourists have noticed the waste problem while sightseeing on Koh Larn, and 78% of tourists have felt overtourism. For tourist destinations, customer satisfaction is an important factor. Particularly at beach resorts that use nature as a tourism resource, decline of tourism satisfaction caused by waste problems or overtourism can trigger the decline of tourist destinations' values. Therefore, in order to sustain tourism as a resort, it is necessary to solve the waste problem and restrict tourists.

Figure 8 and **Figure 9** respectively shows the reason why tourists chose Koh Larn as tourist destination and the duration of their stay at Koh Larn.

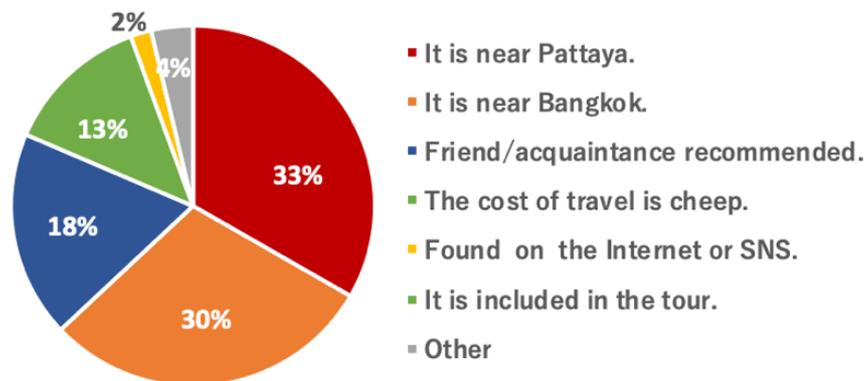


Figure 8 Reasons why tourists chose Koh Larn as their destination

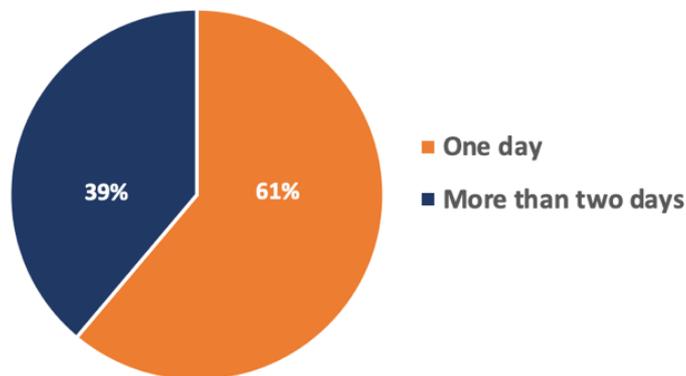


Figure 9 Tourists' visit duration in Koh Larn

As for the reasons advanced for sightseeing on Koh Larn, 63% of the respondents said it was close to big city sightseeing spots such as Bangkok and Pattaya. Including tourists whose reason is the low travel cost, 76% choose Koh Larn as a tourist destination because of distance and travel costs. In addition, since 61% of tourists are day-trippers, it is estimated that there are more tourists visiting Koh Larn with other major cities such as Bangkok and Pattaya rather than visiting Koh Larn as their main destination.

Kyoto University *et al.* (2016), indicates that as the overall trend of sightseeing destinations, the effect of entrance fees on reducing the number of tourists is weak for national parks which are attracting visitors from all over the country and where travel expenses are high, such as isolated islands, because these tourists are willing to pay much more travel cost than entrance fees. On the other hand, it is indicated that even small entry fees have a large effect for national parks which are close to urban areas and attract many day trippers. In Koh Larn, since the main reasons for sightseeing is distance and travel expenses, and the majority are day-trippers, the entrance fees on Koh Larn are expected to have a high effect on controlling

the number of tourists.

3.1.3 CVM analysis

CVM is a survey-based technique of environmental economics for the valuation of non-market resources by asking respondents directly the willingness to pay (WTP) or willingness to-accept compensation (WTA) toward improvement or deterioration of the environment after showing supposed environmental policy (Kuriyama and Managi, 2016 pp.168-171). CVM can evaluate a wide range of environmental services and measure the value of various environmental services, and has been used in many environmental policies overseas.

In Thailand, JICA has surveyed entrance fees of Thai National Park using CVM and has calculated that WTP of entrance fees for beach resort, Koh Samet, was 96 baht for Thais and 453 baht for foreigners¹¹. However, since CVM uses a questionnaire, it has been pointed out that the content of the question may affect the answer and cause various biases. Therefore, it is very important to avoid biases and to improve the reliability of the evaluation result.

In my questionnaire, after giving the respondents information on the waste problem of Koh Larn, I asked them about their WTP assuming that an entrance fees would be imposed to implement preventive measures for this waste problem. This survey employed double-bounded dichotomous choice method. In this method, one respondent is asked the amount twice, and the respondent answer YES (pay) or NO (no pay) respectively. A certain amount of money is presented the first time, and a higher amount is presented to a person who answered YES and a lower amount to a person who answered NO.

The dichotomous choice method is most appropriate and most popular method among CVM because it is the easiest for respondents to answer and the least biased (Kuriyama, 2001 p.63). In general, people are more unfamiliar with setting prices on their own than deciding whether to buy goods at a fixed price. Therefore, when asking WTP, it is fundamental to use a dichotomous choice method in which respondents ask whether they are willing to pay for the presented amount, rather than setting the price by themselves (Ministry of Land, Infrastructure, Transport and Tourism, 2009). Besides, double-bounded method has the advantage that it is statistically more efficient than single-bounded (a method of asking only once) and the number of samples required for estimation is smaller. Therefore, highly reliable evaluation results can be obtained with a small number of samples by using the double-bounded dichotomous choice method (Kuriyama *et al.*, 2001 p.143). However, when asked with YES / NO, there is a possibility that "yes saying bias", which is the tendency to frequently answer YES may occur (Kuriyama, 2001 p.63).

¹¹ JICA "Survey on economic evaluation of natural environment conservation projects" (accessed: 2020-1-16)

Table 6 shows four-patterned proposed prices in this survey. Respondents were randomly assigned to one of the four patterns. T1 represents the price presented for the first time, Ty represents the price presented for the second time when answering YES for the first time, and Tn represents the price presented for the second time when answering NO.

Table 6 Proposed prices of WTP (Thai baht)

Group	T1	Ty	Tn
1 (n=14)	100	300	50
2 (n=14)	300	500	100
3 (n=13)	500	1,000	300
4 (n=13)	1,000	1,500	500

In this study, the minimum amount was set at 50 baht (about 175 yen) and the maximum amount was set at 1,500 baht (about 5,250 yen). This is based on a previous research (Sunida Piriypada *et al.*, 2014) on Koh Chang in Thailand, with the price set at 1.5 USD (approximately 45 baht) to 60 USD (approximately 1,800 baht) in the WTP analysis of tourism resource protection. Furthermore, in my questionnaire, after giving the respondents information on the waste problem in Koh Larn, I asked the WTP assuming that entrance fees would be imposed to implement the measures. Respondents were asked the following question after providing information on the current state of the waste problem in Koh Larn.

“In order to improve the environmental situation of Larn Island, if the ENTRANCE FEE is set to be “XX Baht” (per person/per visit), would you be willing to pay for this amount to enter the island?”

Table 7 shows the number of answers of YES (pay) and NO (no pay) for the price presented.

Table 7 The number of answers toward the price presented

Group	T1	#answer	Ty	#answer	Tn	#answer
1 (n=14)	100	YES 12	300	YES 7	50	YES 1
		NO 2		NO 5		NO 1
2 (n=14)	300	YES 8	500	YES 3	100	YES 2
		NO 6		NO 5		NO 4
3 (n=13)	500	YES 5	1,000	YES 2	300	YES 2
		NO 8		NO 3		NO 6
4 (n=13)	1,000	YES 3	1,500	YES 0	500	YES 6
		NO 10		NO 3		NO 4

3.1.4 Estimation results

The WTP was estimated using the random utility model, and the logistic distribution was used as the distribution function, using Kuriyama's "CVM.xls Version 3.2".

Figure 10 shows the distribution of WTP for respondents' entrance fees. As a result of the estimation, the median WTP is 403 baht and the average WTP is 626 baht.

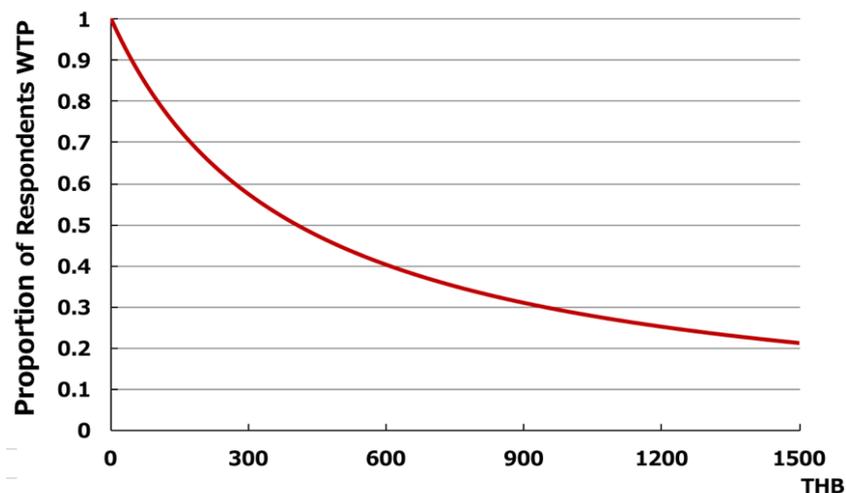


Figure 10 Estimation result of WTP

Table 8 summarizes the relationship between the amount of entrance fees and the entrance rate which were obtained from the median WTP.

Table 8 Relationship between the amount of EF and entrance rate

Entrance fee (THB)	0	50	100	300	500	1,000	1,500
Tourists (%)	100	89	80	57	45	29	22

According to previous studies, as described above, the capacity of the number of tourists per day on Koh Larn is about 6,400. At present, the average number of tourists is 10,000 per day, and assuming that this is 100%, it has become clear that it is appropriate to set the entrance fees at 225 baht in order to reduce it to 6,400. As shown in Table 5, entrance fees for Thais are set at about one-fifth lower as compared to foreigners. For this reason, a setting of about 230 baht for foreigners and about 50 baht for Thais is also appropriate on Koh Larn.

3.1.5 Estimation of the impact on tax revenue and waste generation

This section estimates the impact on tax revenue and the amount of waste generation assuming that the entrance fees on Koh Larn is set at 230 baht for foreigners and 50 baht for Thais and the number of tourists is limited to 6,400 per day.

First, when estimating tax revenues, it is necessary to understand the proportion of foreign tourists and Thais in the total number of tourists on Koh Larn, because entrance fees for foreigners and those for Thais are different. However, there are no official statistics on Koh Larn that show the number of tourists or the percentage of foreign and Thai tourists. Therefore, this study used tourism data of Pattaya City where Koh Larn is located. In 2016, Pattaya attracted 65% foreign tourists and 35% Thais (Bangkok Post, 2017). Using this data, assuming that the total number of tourists on Koh Larn is 6,400 a day, the revenue from entrance fees on Koh Larn will be 1,048,000 baht (about 35,000 USD) per day and 31,440,000 baht per month. On the other hand, a decrease in the number of tourists may be expected to affect negatively the local tourism industry. The average price of an ERCM, a waste treatment facility mentioned in the section 2.5, the domestic selling price of a treatment machine with a daily throughput of 20 tons is 550 million yen, and the monthly average on maintenance cost is 385,000 yen in Japan¹². This means that both initial costs and running costs can be covered by tax revenues from the entrance fees within a year from the introduction of entrance

¹² JICA (2018)

fees.

The effect of reducing waste generation was analyzed using the amount of the tourism-related waste on Koh Larn shown in Table 1. The emission factor for tourists was estimated to be 2.2 kg / day, so assuming that the number of tourists were reduced from the current average of 10,000 tourists a day to the capacity value of 6,400, total waste generation can be estimated to be reduced by 7.9 tons, approximately 30% of current, per day.

3.2 Pros and cons of introducing of entrance fees: Survey to residents

3.2.1 Objectives and outline

The purpose of the survey was to grasp the residents' awareness toward the waste problem and residents' pros and cons of introducing of entrance fees. In addition, this survey clarifies what measures are appropriate for obtaining the residents' consent to introduce the entrance fees by comparing the pros and cons of the residents with their personal attributes.

I conducted a face-to-face questionnaire survey to local residents in Koh Larn on Sep. 2019. This survey was conducted on 201 men and women between the ages of 18 and 81. The language used in the questionnaire was Thai using questionnaire sheets. At the beginning of the questionnaire, all respondents were given the information that the excessive increase in the number of tourists has caused waste problem, and that the government has considered introducing entrance fees in order to control the number of tourists and to cover the costs of measure.

3.2.2 Residents' awareness toward entrance fees and waste problem

As a result of the questionnaire which was administered to 201 local residents, 47 (24%) agreed with the introduction of the entrance fees, 135 (67%) disagreed with it and 19 (9%) chose "Neither". On the other hand, as response to the question "Do you think the waste problem in Koh Larn should be solved as soon as possible, before other public problems in Koh Larn?", 96% of all respondents agreed. That is, it was indicated that the majority of the residents had a strong awareness and sense of crises toward the waste problem in this island, but they were opposed to the introduction of entrance fees.

According to interviews with residents, the most common reason was that the entrance fees collected on the island would not be properly used, and the second most frequent reason was that tourism revenue would decrease due to a decrease in the number of tourists. It is essential that the government of the city and municipal government have clear accountability to residents about the amount of revenue from entrance fees and its usage, and the entrance fees should be collected as a special-purpose tax which can be used only for tourism investment and local communities, such as an investment in waste management infrastructure and

environmental protection. In the short term, a decline in the number of tourists could have a negative impact on the local economy, but solving overtourism and the waste problems as soon as possible will enhance tourism brands of this island and enable sustainable tourism. Therefore, it is necessary for the residents to understand that the positive effects can be brought in the long term in order to promote the introduction of the entrance fees.

Do you agree with introducing entrance fees in Koh Larn?

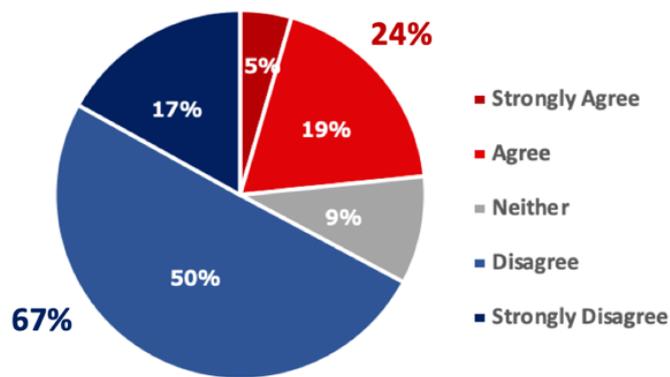


Figure 11 Residents' yeas and nays of introducing EF

Do you think that the waste problem in Koh Larn should be solved as soon as possible, before any other public problems in Koh Larn?

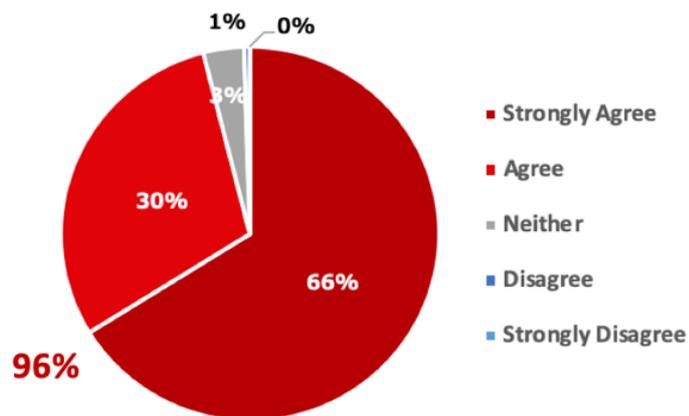


Figure 12 Awareness of waste problem of Koh Larn

3.2.3 Multiple regression analysis

This analysis clarifies what measures are appropriate for obtaining the residents' consent to introduce the entrance fees by comparing the pros and cons of the residents with their

personal attributes. The hypotheses are as follows.

Hypothesis 1: Tourism workers oppose the introduction of entrance fees.

Hypothesis 2: Tourism workers agree with the introduction of entrance fees.

Hypothesis 3: Residents who have children under the age of 15 agree with the introducing of entrance fees.

Hypothesis 4: Residents who have high awareness of the waste problem on this island agree with the introducing of entrance fees.

Hypothesis 5: Residents who have high educational standards agree with the introducing of entrance fees.

Hypothesis 6: Residents who have high level of knowledge about the environment agree with the introducing of entrance fees.

Hypothesis 7: Elderly residents oppose the introduction of entrance fees.

Hypothesis 8: Residents have less trust in the government oppose the introduction the entrance fees.

Tourism workers may oppose because tourism revenue will be adversely affected by the reduction in tourists due to the introduction of entrance fees. Actually, according to interviews with residents, the most common reason of opposition was that the entrance fees collected on the island would not be properly used. On the other hand, Samuel *et al.* (1997) indicate that residents who use the recreation resources that attract tourists may be more concerned about overcrowding and degradation of such resources. Therefore, it is likely that tourism workers agree with the introduction of entrance fees because they consider the impact of the waste problem on their recreation resources, nature, more seriously than non-tourist workers. Those who have children under the age of 15 may tend to agree because they may have high awareness of the future and sustainable development of this island for their children. Residents who have higher awareness of the waste problem on this island will ask a solution and will tend to agree. Residents who have high educational standards or high level of knowledge about the environment may agree because they may understand the effect of entrance fees. Because elderly residents may not be concerned about long-term sustainability of the island, they will tend to oppose. Those who have less trust in the government are concerned that the corruption will tend to oppose. This was considered because the main reason for the opposition was corruption concerns in the interviews with residents who opposed the introduction of entrance fees.

Multiple regression analysis was performed using a logit model, with a dummy variable for approval / disapproval of the introduction of the entrance fees as the response variable and

the individual attributes of the respondents as the explanatory variables.

The explanatory variables include ten variables: basic personal attributes such as gender, age, monthly income, and educational level, as well as a dummy for tourism workers, a dummy for the presence of children under the age of 15 in households, the level of trust in government, awareness of waste problem on the island and environmental knowledge. The respondents answered at five levels of trust in the government, ranging from "I strongly trust" to "I don't trust at all", and five levels of awareness of the waste problem in Koh Larn, from "strongly agree" to "strongly disagree". Regarding environmental knowledge, some basic questions about the environment were given, and answers were given in four choices, including "I have no idea", and the number of correct answers was evaluated.

The model, definitions of variables and the fundamental statistics are illustrated in **Figure 13, Figure 14.**

$$Y^* = \beta_0 + \beta_1age + \beta_2gen + \beta_3inc + \beta_4edu + \beta_5occud + \beta_6childd + \beta_7tgov + \beta_8awaste + \beta_9eknowl + \mu$$

Y^* =	EF dummy (agree=1, disagree=0)
age =	age
gen =	gender dummy (male=1, female=0)
inc =	average monthly income
edu =	education level
$occud$ =	occupation dummy (tourism=1, not tourism=0)
$childd$ =	child dummy (have below 15year-old-child=1, no=0)
$tgov$ =	trust in local government
$awaste$ =	awareness to waste problem
$eknowl$ =	knowledge of environment

Figure 13 Variables and these definitions

Variable	Obs	Mean	Std. Dev.	Min	Max
EFd	182	.2582418	.438875	0	1
gen	201	.4726368	.5004973	0	1
age	201	40.49254	12.88337	18	81
inc	201	2.557214	1.489282	1	6
edu	201	2.825871	1.795697	1	8
occud	201	.7910448	.4075775	0	1
childd	201	.5671642	.4967056	0	1
tgov	201	2.641791	.9803289	1	5
awaste	201	4.616915	.5809582	2	5
eknowl	201	3.084577	1.306832	0	5

Figure 14 Descriptive statistics value

The average age of the respondents was 40.5 years and their average monthly income was 15,286 baht. Tourism workers accounted for 79%. Regarding the level of trust in the government, 13% of the respondents said they "trusted" and 37% said they "don't trust", but 50% said that they could not say neither.

3.2.4 Results of Multiple regression analysis

Table 9 shows the results of multiple regression analysis.

Table 9 Results of multiple regression analysis

VARIABLES	Model1 (all) EFd	Model2 (men) EFd	Model3 (women) EFd
gen	-0.143** (0.357)		
age	-0.00112 (0.0158)	-0.00798*** (0.0292)	0.00590 (0.0231)
inc	-0.00868 (0.133)	0.00954 (0.237)	-0.0208 (0.169)
edu	0.0455** (0.119)	0.254 (0.233)	0.0683** (0.151)
occud	0.107 (0.511)	0.249** (1.254)	-0.0186 (0.615)
childd	0.0598 (0.417)	-0.0255 (0.755)	0.177* (0.526)
tgov	-0.0153 (0.215)	-0.0806* (0.436)	0.0438 (0.273)
awaste	0.179** (0.436)	0.195 (1.222)	0.191** (0.489)
eknowl	-0.00473 (0.163)	0.0300 (0.423)	-0.00983 (0.196)
Observations	182	86	96

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Overall, there was a negative correlation with gender, and positive correlations with education level and awareness of waste problem. In other words, it indicates that women have a higher rate of agreement than men, that higher the education, the more they agree with introducing entrance fees, and the higher their awareness of the island's waste problem, the more they agree it. Residents who have high educational standards agree because they may understand the effect of entrance fees (Hypothesis 5), and who have higher awareness of the waste problem on this island tend to agree because they ask a solution (Hypothesis 4).

Analysis of men showed a negative correlation with age and a positive correlation with occupation dummy. In other words, among males, older residents tend to disagree, and those engaged in tourism tend to agree. Elderly residents tend to oppose because it is likely that they are not concerned about long-term sustainability of the island (Hypothesis 7), and tourism workers agree because they may consider the impact of the waste problem on their recreation resources, nature, more seriously than non-tourist workers (Hypothesis 2).

Analysis of women showed positive correlations between education level, awareness of the

waste problem, and dummy for the presence of children under the age of 15 years. In other words, it is indicated that among females, those with a higher education level, those who have awareness of the waste problem and those who have children under 15 years in their households tend to agree with introducing the entrance fees. Those who have children under the age of 15 tend to agree because it is likely that they have high awareness of the future and sustainable development of this island (Hypothesis 3).

In order to encourage residents to agree with introduction of the entrance fees, it is important to inform residents about the urgency of the waste problem and raise their awareness of it. Approaches to residents should be made to raise the awareness that overtourism and the waste problem will not only affect the living environment of the local residents, but also the tourism brands of Koh Larn and threaten the sustainability of Koh Larn. Especially for the elderly and those who are not engaged in tourism, it is effective to approach to such people because they have a stronger tendency to disagree with the introduction of entrance fees. Due to the fact that residents who have higher education level tend to agree, it is important to raise environmental awareness at elementary or junior high schools on the island by providing education on the environment and waste issues. Besides, due to the fact that residents with small children in the household are more likely to agree, it is effective in hosting workshops and resident meetings with children about the long-term future of the island.

4 Conclusion

4.1 Summary

In section 1, I overviewed the growth of the global tourism industry and UNWTO's view on the concept of “Sustainable tourism” and its implications for the SDGs. While the tourism industry is growing globally, adverse effects such as environment and social problems are caused by excessive congestion called “Overtourism” in various destinations across the world. Especially in beach resorts in Asia, various environmental issues such as waste problem, disruption of the ecosystem and sea water pollution which are caused by overtourism have been reported. I focused on Koh Larn, one of the famous Thai beach resorts, and mentioned about objectives and importance of my research on introduction of entrance fees in Koh Larn as a solution of waste problem.

In section 2, I overviewed about tourism industry that drives Thailand economy and society, and about overtourism and environmental problem of national parks in Thailand. Besides, I studied on tourism and waste problem in Koh Larn by analyzing results of hearing survey and previous researches, and consider about measures to reduce these problems. Furthermore, I estimated the amount of waste generation per one tourist. I summarized the cases of introduction of entrance fees that aim to reduce overtourism or environmental conservation in the world and in Thai national parks.

In section 3, I analyzed on awareness of tourists and residents toward entrance fees in Koh Larn. I conducted field surveys in Koh Larn on Feb. 2019 and Sep. 2019. Based on the results of questionnaire which was administered to tourists, I calculated optimal entrance fees using Contingent Valuation Method (CVM), and estimated the impact on tax revenue and total waste generation. On the other hand, based on the results of questionnaire which was administered to local residents, I analyzed residents' awareness toward the waste problem and residents' pros and cons of introducing of entrance fees. In addition, I clarified what measures are appropriate for obtaining the residents' consent to introduce the entrance fees by comparing the pros and cons of the residents with their personal attributes using multiple regression analysis.

In section 4, as a conclusion, I propose the effectiveness of entrance fees and how entrance fees can be introduced as the sustainable solution which can contribute to reduce overtourism and waste problem in Koh Larn

4.2 Conclusion and Policy implication

This study analyzed the effects of entrance fees on overtourism and the awareness of residents toward the waste problem and the introduction of entrance fees in Koh Larn.

From the questionnaires which was administered to tourists and local residents, it is revealed that 96% of residents are recognizing the waste problem in Koh Larn as an emergency issue, 69% of tourists have noticed the waste problem while sightseeing on Koh Larn, and 78% of tourists have felt overtourism. For tourist destinations that use nature as a tourism resource such as beach resorts, decline of tourism satisfaction caused by such problems such as waste or overtourism can trigger the decline of tourist destinations' values. Therefore, in order to ensure sustainable tourism, it is necessary to solve the waste problem and overtourism as soon as possible. Since in Koh Larn, the government has not enforced any specific solutions, it is necessary, in the short term, to control the number of tourists and obtain tax revenues through entrance fees, and to use the tax revenues to invest in waste-management system such as an incineration facility.

As the result of CVM analyses which was administered to 54 tourists, the median WTP for entrance fees was estimated at 403 baht. According to a previous study, the capacity of the number of tourists per day on Koh Larn is about 6,400. At present, the average number of tourists is 10,000 per day, it was estimated that it is appropriate to set the entrance fees at 225 baht in order to reduce it to 6,400. In national parks in Thailand, entrance fees for Thais are set at about one-fifth lower than those for foreigners. For this reason, a setting of about 230 baht for foreigners and about 50 baht for Thais is also appropriate on Koh Larn.

In 2016, Pattaya attracted 65% foreign tourists and 35% Thais. Using this data, assuming that the total number of tourists on Koh Larn is 6,400 a day, the revenue from entrance fees on Koh Larn will be 1,048,000 baht (about 35,000 USD) per day. This means that both initial costs and running costs of small-scale waste treatment facilities such as ERCM, which JICA considered introducing to the Maldives resort island can be covered by this amount.

With regards to the reason for sightseeing on Koh Larn, 63% of the reason was that it was close to big city sightseeing spots such as Bangkok and Pattaya. Including tourists whose reason is the low travel cost, 76% choose Koh Larn as a tourist destination because of distance and travel costs, and 61% of tourists were day-trippers. A previous study on Japanese national parks indicated that the effect of entrance fees is weak on national parks which are attracting visitors from all over the country and where travel expenses are high such as isolated islands because these tourists pay much more travel cost than entrance fees. On the other hand, it is indicated that even small entry fees have a large effect on reducing the number of tourists for national parks which are close to urban areas and attract many day trippers. In Koh Larn, since the main reasons for sightseeing is distance and travel expenses, and the majority are day-trippers, the entrance fees on Koh Larn are expected to have a high effect on controlling the number of tourists.

Further, the way to collect entrance fees in Koh Larn is discussed as follows.

In Koh Larn, it will be difficult to collect fees after arriving at Koh Larn because there are many arrival beaches for boats there. In addition, although a method of adding to the ship's fare is also conceivable, it is difficult for tourists to see the existence of the entrance fees, and effect of it on restriction can be unexpected. Therefore, it will be effective to collect entrance fees at the port of Pattaya, which is a departure place limited to one place, expressing clearly the purpose and price of the entrance fees.

As described above, the effect of introducing the entrance fees in Koh Larn is expected to be a measure that contributes to the acquisition of tax revenue and the reduction of overtourism and tourism-related waste.

Another questionnaire which was administered to 201 local residents in Koh Larn revealed that 96% of the residents had a strong awareness and sense of crises toward the waste problem in this island, but majority of them were opposed to the introduction of the entrance fees. The most common reason was that the entrance fees collected on the island would not be properly used, and the second most frequent reason was that tourism revenue would decrease due to a decrease in the number of tourists. It is essential that the government has clear accountability to residents about the amount of revenue from entrance fees and its usage, and the entrance fees should be collected as a special-purpose tax which can be used only for tourism investment and local communities, such as an investment in waste management infrastructure and environmental protection. In the short term, a decline in the number of tourists could have a negative impact on the local economy, but to solve overtourism and the waste problems as soon as possible will enhance tourism brands of this island and enable sustainable tourism. Therefore, it is necessary for the residents to understand that the positive effects can be brought in the long term in order to promote the introduction of the entrance fees.

Furthermore, this study utilized a multiple regression analysis of pros and cons of residents on entrance fees and personal attributes. As a result, there was a negative correlation with gender, and positive correlations with education level and awareness of waste problem. Analysis of men showed a negative correlation with age and a positive correlation with occupation dummy, on the other hand, Analysis of women showed positive correlations between education level, awareness of the waste problem, and dummy for the presence of children under the age of 15 years. From these results, proposals to gain the residents approval of introducing entrance fees are as follows.

First of all, it is important to inform residents about the urgency of the waste problem and raise their awareness of it. Approaches to residents should be made to raise the awareness that overtourism and the waste problem will not only affect the living environment of the local residents, but also the tourism brands of Koh Larn and threaten the sustainability of Koh Larn. Especially for the elderly and those who are not engaged in tourism, it is effective to approach

to such people because their tendency to disagree with entrance fees is strong. Due to the fact that residents who have higher education level tend to agree, it is important to raise environmental awareness at elementary or junior high schools on the island by providing education on the environment and waste issues. Besides, due to the fact that residents with small children in the household are more likely to agree, it is effective in hosting workshops and resident meetings with children about the long-term future of the island.

According to interviews with the residents, there is a monthly community meeting in Koh Larn with discussions about the island's issues, and waste problem is often discussed. It is hoped that sustainable tourism of Koh Larn will be realized by taking initiatives to gain the understanding and cooperation of the local residents through such meetings and incorporating multiple measures centering on entrance fees.

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Appendix

Questionnaire to tourists (Feb. 2019, Respondents: 54 tourists ※conducted with a tablet)

Questionnaire about Environmental Policy in Larn Island

Hello, I am a student of The University of Tokyo. I am studying about environmental policy in Thailand. This questionnaire is to be used in my study of sustainable tourism concerning environmental problems in this Island (Larn Island).
I need your opinion on environmental conservation of beach resort in Larn Island.
Your information is completely confidential for academic propose and there are no right or wrong answer.
I really appreciate your corporation.

【Tourists' Socio-Economic Information】

Q.1 *Your Nationality*

Q.2 *Your Gender*

Male Female

Q.3 *Your Age*

Q.4 *Your Education*

Primary school or lower Junior high school High School Bachelor degree
 Master degree Ph.D. Other

Q.5 *Your annual personal income (US \$)*

Under \$10,000 \$10,000- \$20,000 \$20,000-\$30,000 \$30,000-\$40,000
 \$40,000-\$50,000 \$50,000-\$60,000 \$60,000-\$70,000 \$70,000-\$80,000
 \$80,000-\$90,000 \$90,000-\$100,000 Over \$100,000

Q.6 *Is this your first trip to Larn Island?*

YES NO

Q.7 *How much your budgeted (one person) per a day in Larn Island?*

Under 500 Baht 500-999 Baht 1,000-2,000 Baht 2,000-3,000 Baht
 3,000-4,000 Baht 4,000-5,000 Baht 5,000-6,000 Baht Over 6,000 Baht

Q.8 *Why did you choose Larn Island to trip? Chose the number-one reason.*

It is near Bangkok. It is near Pattaya. The cost of travel is cheap. It is included in the tour.
 Friend/acquaintance recommended. Found the Internet or SNS. Other

Q.9 *How long do you stay in Larn Island?*

One day More than two days

Q.10 *How much your budgeted per a day (one person) in Larn Island? (only in this Island. Include marine- sports, hotel and transportation)*

Under 500 Baht 500-999 Baht 1,000-2,000 Baht 2,000-3,000 Baht
 3,000-4,000 Baht 4,000-5,000 Baht 5,000-6,000 Baht Over 6,000 Baht

Q.11 *Do you want to visit Larn Island again within the next 5 years?*

YES NO

Q.12 *Do you think that there are too many tourist on this Island?*

Strongly agree Agree Neither Disagree Strongly disagree

Q.13 Did you face any environmental problems during your stay at Larn Island? You can choose maximum of three answers. If you didn't experience any environmental issues, select "None".

- Waste problem
 Sea-water pollution
 Damaged coral reef
 Deforestation
 Air pollution
 Other
 None

【Tourists' Willingness to Pay】

Larn Island has attracted as many as 10,000 tourists a day, which affects the island's environment, particularly its waste management, to the breaking point. Due to excessive number of tourists, more than 20 tons of waste is generated per day, which exceeded the capacity of its waste disposal.

So now, there are over 50,000 tons of accumulated waste on this island, but no proper way to deal with it. The waste mountain like this is only 700 meters away from this beautiful beach.



If ENTRANCE FEE is opposed to tourists as a part of the solutions to the waste management issue, the environmental situation would be improved like this picture.



Q.14 In order to improve the environmental situation of Larn Island, if the ENTRANCE FEE is set to be "100 Baht" (per person/per visit), would you be willing to pay for this amount to enter the island?

YES

NO

Q.15 How about 300 Baht?

- YES (Pay) NO

(Not pay and not visit this island)

Q.15 How about 50 Baht?

- YES (Pay) NO

(Not pay and not visit this island)

Questionnaire to residents (Sep. 2019, Respondents: 201 residents ※conducted in Thai)

Questionnaire about Environmental Policy in Koh Larn

Hello, I am a student of Tokyo University. I am researching about waste management problem in Koh Larn.
This questionnaire is to be used in my study of sustainable tourism concerning environmental problems in Koh Larn.
It takes about **5 minutes** to answer all questions. The questions are written on both a front face and a back face.
Your information is completely confidential for academic purpose and there are no right or wrong answer.
Thank you so much for your cooperation.

In Koh Larn, the amount of waste has been getting bigger and bigger with the number of tourists has been getting bigger and now, the amount is beyond capacity.

The government is considering introducing entrance fees to tourists in Koh Larn so as to reduce both the amount of waste and the number of tourists.

Q.1 Do you agree with introducing Entrance fees in Koh Larn?

Strongly Agree Agree Neither Disagree Strongly Disagree

Q.2 Gender Male Female

Q.3 Age (Please write) _____

Q.4 Average monthly income

Under 10,000 Baht 10,000-15,000 Baht 15,000-20,000 Baht
 20,000-25,000 Baht 25,000-30,000 Baht More than 30,000 Baht

Q.5 Education

Primary school or lower Secondary school High School Polytechnic
 Bachelor degree Master degree Ph.D. Other

Q.6 Is your job related to tourism or tourists in Koh Larn?

YES NO No Job (retired, housewife, student etc...)

Q.7 How long do you live in Koh Larn?

Under 5 years 5~10 years 10~20 years 20~30 years Over 30 years

Q.8 Do you have child whose age is below 15 years old in your household? YES NO

Q.9 How much do you trust in the local government?

I strongly trust I somewhat trust Neutral I scarcely trust I don't trust at all

Q.10 Imagine you could choose between receiving 350THB immediately, or another amount 1 year from now. Which one is attractive for you? Please chose one for each 4 questions below.

q1. 350THB immediately or 400THB one month later

q2. 350THB immediately or 450THB one month later

q3. 350THB immediately or 500THB one month later

q4. 350THB immediately or 550THB one month later

q5. 350THB immediately or 600THB one month later

Q.11 How far is it from your home to this, the biggest dumping sight in Koh Larn?



Under 3 minutes by motor-cycle 3-5 minutes by motor-cycle 5-10 minutes by motor-cycle

Over 10 minutes by motor-cycle

Q.12 Are you willing to join the voluntary-waste-picking activity on the beach in Koh Larn?

Once a week Once a months Once 6 months Once a year Don't want to join it.

Q.13 Do you think the waste problem in Koh Larn should be solved as soon as possible, before any other public problems in Koh Larn?

Strongly Agree Agree Neither Disagree Strongly Disagree

Q.14 Please choose one answer for each question. Neither search for the answer on the internet nor ask someone.

q1. Which category does bringing your bag without using plastic bag when you go shopping belong to?

Reuse Reduce Recycle I have no idea

q2. Which is the "Renewable energy"?

Coal fired power Wind-power Natural gas-power I have no idea

q3. What is the cause of "global warming"?

A large amount of carbon dioxide was generated by burning oil and coal.
The solar energy became stronger. Volcanic eruption. I have no idea

q.4 Where is the area that emits/generates the most marine plastic waste?

Europe USA ASIA I have no idea

q.5 Which is one of the causes of PM2.5?

Automobile exhaust Human breathing Pollen I have no idea

Thank you so much for your cooperation.